





Enter the world's first educational VR theme park! To explore the full extent of Avanti's World, begin in Main Street, your gateway to Lands full of curriculum-aligned interactive experiences. Choose to allow students to explore the whole park independently, or use the ClassVR Portal to send your class to a specific Land, Zone or Scene that's relevant to your lesson objective. Use our Scene Guides to ensure you're always one step ahead – and be inspired with cross-curricular teaching ideas. Set learning in context like never before in the immersive environment of Avanti's World!

<b>SUPER SCIENCE</b>			
Time and Space	Energy and Forces	Technology	
Animals and Habitats	Humans and Anatomy	Plants	
Materials Properties and States			
<b>TRIP THROUGH TIME</b>			
Modern History	Age of Revolution	Age of Exploration	
Early Civilisation	Early Mankind	Prehistoric	
<b>ENGAGING EARTH</b>			
Rivers and Oceans	Wonderful World	Geology	
Wild Weather	Beautiful Biomes		
<b>MATHSVILLE</b>			
		Coming Soon...	
<b>HUMAN HABITAT</b>			
		Coming Soon...	
<b>AMAZING ART</b>			
		Coming Soon...	

# SUPER SCIENCE

-  **Plants** - Pollination, life cycles, photosynthesis and more
-  **Animals and Habitats** - From forests to beaches; investigate the animal kingdom
-  **Humans and Anatomy** - Shrink down for a trip through the amazing human body
-  **Materials Properties and States** - Look at how materials shape and build our world
-  **Energy and Forces** - Explore energy creation, consumption, and forces
-  **Time and Space** - Explore the solar system, stars and beyond
-  **Technology** - Look inside some of our most amazing technologies



## SUPER SCIENCE

### OVERVIEW

Super Science Land is your gateway to all things scientific. Each gate will transport your students to a different area of study, giving them opportunities to experience science and technology from the inside out. Explore: Technology; Time and Space; Materials, Properties and States; Forces and Energy; Humans and Anatomy; Animals and Habitats; and Plants.





# WIND TUNNEL

## ENERGY AND FORCES

### OVERVIEW



Step inside a wind tunnel and explore how air resistance, lift, thrust and gravity affect aircraft. See how air flows over the wing of a typical private jet, a Sopwith Camel biplane fighter, and an F15 Eagle. Use this scene to spark discussions about how aircraft stay in the air – and how they differ from one another in speed, efficiency and agility.

### KEY FEATURES OF THE SCENE

#### Aircraft

This large space can be used to replicate what happens when an object flies through the air (or moves along the ground) by moving air around it. In this wind tunnel, you will find: a Sopwith Camel, a British WW1 biplane fighter powered by a single rotary engine; an F15 Eagle jet, a twin-engine tactical fighter in service since 1972 and still used today by the US Air Force; and a Cessna Citation CJ4 private jet with two engines.



#### Thrust and Air Resistance

Thrust is the force generated by the plane's engines that drives it forward. The force of the exhaust gases pushing backwards pushes the plane forwards. Look closely at the visible parts of the engines on the Sopwith Camel, F15 Eagle and private jet. What can your students see? Air resistance is the opposing force that an aircraft must overcome in order to move.



#### Lift and Gravity

To get in the air at all, the aircraft must overcome the force of gravity – its own weight. As the plane moves forward, propelled by its engines, air flows over the wings. This air is directed downwards; the curved upper part of the wing reduces air pressure directly above it and generates an upward force we call lift. Once this force is greater than the gravity acting on the plane, it will move in an upward direction. Look at the wings on all three aircraft in this wind tunnel to see the aerofoil in action.



### WHAT CAN I EXPLORE?

Within this scene you can explore a large wind tunnel containing three aircraft. Climb the stairs to view the aircraft from the walkways.

#### You might also want to explore:

- The wing shape of each aircraft.
- The number and size of the engines on each aircraft.
- How air moves around the aircraft, particularly focusing on the wings.

#### Subjects Covered



### GEOGRAPHY

#### Explore

Air flow isn't just something that influences how an aircraft moves, or a parachute falls – it also drives the world's weather systems. Energy from the Sun heats the air in the Earth's atmosphere, causing hot air near the equator to move outwards towards the poles, and in turn driving 'cells' of air circulation. These pressure and temperature changes create weather fronts, although as we know, there is plenty of unpredictable chaos in the system.



#### Research

- In our daily lives, the weather we most associate with air currents is of course the windy kind.
- Find out what causes windy weather and how meteorologists can predict if it will occur.

#### Explain

- What would life be like on Earth with no wind or air movement at all?

### HISTORY

#### Explore

Two of the aircraft in the scene are still in use today, but the Sopwith Camel first flew in 1916 – just 13 years after Wilbur and Orville Wright made their first tentative flights. This incredible pace of technological change reflects the pressures of the First World War. History of flight – Montgolfier Brothers, airships, Wright Brothers, Frank Whittle.



#### Research

- Find out about the history of powered aircraft. How did the Wright brothers build up to their first successful flights at Kitty Hawk?
- Were there other alternative forms of air travel before this?
- Research the Montgolfier Brothers and the first hot air balloons.

#### Explain

- Why did powered flight develop so quickly in the years following its invention?
- What factors affected this technological change?

### SCIENCE

#### Explore

Air resistance is really just a type of friction, between air and another material. It doesn't only act against a plane when it's moving forward; it also slows falling objects, acting against gravity. This is how parachutes work.



#### Research

- When are parachutes used? Find out about how parachutes are made. What materials and shapes are generally used?
- Plan an investigation to explore making parachutes for a toy figure – you might change the parachute's size, shape or material.

#### Explain

- What would happen if you put a parachute in this wind tunnel and turned the fan on?
- What about if the wind tunnel could be turned on its end, so the fan pointed upward?

### LANGUAGE AND LITERACY

#### Explore

Choose one of the aircraft from the scene and write a quick factual explainer for someone who is totally unfamiliar with the subject. Research your chosen aircraft and decide what your text will focus on: technical specifications, historical context, or how the aircraft is used?



#### Research

- Read examples of texts that are designed to convey detailed, factual information about a topic. How are they typically organised?
- What types of sentences are used?
- How do they use diagrams to enhance understanding?

#### Explain

- Before writing your text, make sure you spend plenty of time planning how it will be organised. How will you use diagrams or images?
- What heading and subheadings will you use, and why?



# LIFE CYCLE OF PLANTS

## PLANTS

### OVERVIEW

In this scene, students can explore the stages in the life cycle of a flowering plant. Follow a tiny seed as it germinates and grows first into a shoot, then a plant with leaves; watch it flower and the process of reproduction begin with pollination, and see how the seeds disperse to start their own journey into growth. Cutaway views allow students to see what's happening underground and inside the plant during this process.

### KEY FEATURES OF THE SCENE

#### Germination

Once a seed is settled in the ground, the embryo inside it begins to grow – but only if the conditions are right. Seeds need water and warmth to germinate and send out roots into the soil and a shoot upwards, towards the sky. Those roots take in water and nutrients, and the shoot begins to grow...



#### Growth

In time, this tiny shoot develops into a stem. The stem transports the minerals and water from the roots to the rest of the plant via the xylem, supporting the growth of leaves. Once leaves have grown, photosynthesis can occur, the process that gives plants the power to create their own food!



#### Pollination

Now the process of reproduction begins again as a flower grows on the plant. Pollen produced on the anther of a flower is transferred to the stigma of another flower, either by an insect (like a butterfly or bee) or simply by the wind. Fertilisation occurs, and a seed develops. A pod or fruit grows around the seed to protect it.



#### Seed Dispersal

This seed is then moved to a new place where germination can begin again. How it gets there depends on the plant. The seed might pass through an animal when it eats the fruit, or hook onto an animal's fur. Other seeds are adapted to fly away on the wind (think of a dandelion 'clock'), or might float away on nearby water. Some plants even have exploding pods that do the dispersal themselves!



### WHAT CAN I EXPLORE?

View the five stages of the plant life cycle (seed, germination, growth, pollination and seed dispersal) in order, tracking the development of a flowering plant.

#### You might also want to explore:

- The root system of the plant: walk down the ramp to view what's happening underneath the surface
- The pollinators in the scene
- How the changing seasons might be linked to the plant's life cycle.

#### Subjects Covered



### SCIENCE

#### Explore

Look at the plants in your local area, at school, home or in public spaces. How do you think their seeds are dispersed? You could follow this up by collecting some seeds and seeing if they will germinate.



#### Research

- Find out more about the different types of seed dispersal and create an informative poster or presentation. What examples can you find of plants whose seeds disperse by air, via animals, or by water?

#### Explain

- Present your findings, using your visual aid. Make sure you explain how plants are adapted to suit their environment, and that includes how their seeds are dispersed (and how pollination occurs).

### DESIGN AND TECHNOLOGY

#### Explore

Have you ever eaten a seed before? Are you sure? Get to grips with what our food is really made of. Many of the foods we eat every day are sourced from plants: potatoes are tubers that grow beneath the roots, tomatoes are fruits, and broccoli are closed flowers!



#### Research

- What parts of different plants do we eat? Find out about roots, fruits, seeds, leaves and even flowers that are edible. You could create a sorting activity with photos or real foods, to consolidate your knowledge.

#### Explain

- Plan and make a plant-based meal that uses seeds as its main ingredients. You maybe surprised to find that you have a lot of choice! Nuts, grains, legumes (fresh or dried) and many spices are all an option. Serve your dish to a friend, and make sure you explain to them exactly where the ingredients came from.

### MATHEMATICS

#### Explore

Put your measuring skills and data recording abilities to the test. Set up a small garden in your classroom (a trough or growbag is great for this, and requires very little space). Read the seed packet to find out how far apart they should be planted and measure this accurately (or try out your estimation skills, then measure to see how accurate you were). As the plants grow, measure their stem height at regular intervals and record this data.



#### Research

- What's the best way to record this kind of data?
- How can you make sure your measurements are accurate?

#### Explain

- Present the plant growth data you collected. Calculate the difference in growth over a set period and offer explanations for any large variation. You could even combine your datasets as a group and find the average height, or average growth over a month.

### ART AND DESIGN

#### Explore

As you explore the scene, notice some of the different colours you can see on the parts of the plant as it moves through its reproductive cycle. Think about how these colours may be used to create pigments. From the very dawn of humanity, people have created paints and dyes from plants at different stages in their life cycle. These pigments can be created from berries, leaves, wood ash, onion skin, carrots, beetroot or even pollen!



#### Research

- What plants can be used to create pigments?
- Make a list, then sort your findings by which part of the plant is used (and how this fits into the plant's reproductive cycle). Find a few options that you could try for yourself.

#### Explain

- Explore painting or dyeing with plant pigments you've created yourself, from different plant parts. Explain how you would use each of them in your own artwork, based on the colour, texture and durability of the pigment.



# POLLINATION PLANTS

## OVERVIEW

In this scene, your students can shrink down to the size of a bee and explore how the process of pollination takes place, up close and personal! Fly around the garden to visit the flowering plants and see how pollen is moved from the anther of one plant to the stigma of another.



## MATHEMATICS

### Explore

The garden in this scene supports many different creatures, including many pollinators. Think about how you could collect and present data showing the creatures in a small green space at or near your school.



### Research

- What's the best way to count and record the creatures?
- How have other people done similar surveys?

### Explain

- How will you choose which creatures to count, and how will you know that you've only counted them once?
- What is the best way to present the data you've collected to help you communicate what you found?
- How could you combine your data with that of your friends to create a useful picture of whether or not your local environment is friendly to pollinators?

## KEY FEATURES OF THE SCENE

### Parts of a flower

You'll see that two of the flowers in this scene are shown in cutaway view. Fly right up to them to get a good look at the main parts. Can you identify the stigma, stamen (and its components: anther and filament), style, ovary, petal and sepal? What is the purpose of each part in the process of reproduction?



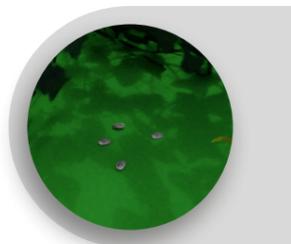
### Pollinators

There are many insects in this garden: mostly bees, but you may spot a few butterflies too, and even a caterpillar (a pollinator in waiting?). Look closely at the bees as they hover and fly. How are the plants adapted to tempt bees and butterflies into their flowers? How do these pollinators aid in the fertilisation process?



### Seeds

You might also notice that a different type of plant is at the end of the garden, opposite the beehives. This plant is at a later stage of its reproductive cycle: the flowers have all gone, and if you look very closely you may see some seeds that have fallen onto the ground. What will happen next?



## SCIENCE

### Explore

Look closely at the 3D cutaway models of the flowers and discuss with a partner what each of the parts within the flower is called, and what they might be for.



### Research

- What is the purpose of each part of the flower?
- Does every flowering plant look like this, or do the parts vary from one species to another?

### Explain

- How is the flower adapted to maximise the chances of fertilisation by pollinators who share its habitat?
- Create a poster, presentation or even animation to show the process of pollination.

## SOCIAL STUDIES / PSHE

### Explore

Take a look at the bees in this scene. They are clearly thriving – enough to produce honey for a beekeeper, and live happily in hives. Bees are so important for the pollination of many types of plants.



### Research

- Why is it important that we ensure that bees can thrive?
- What impact would the loss of bees have on the environment, and on our daily lives?
- How are bees under threat today?

### Explain

- Make a case for the protection of bees. Explain why they are so important, and what you believe we should be doing to protect them. Can you persuade your fellow students to take action?

## WHAT CAN I EXPLORE?

Look around a garden filled with flowers and insects to explore how pollination occurs.

### You might also want to explore:

- The beehives: what do bees do with the nectar they collect from flowers?
- Other animals that share a habitat with these flowering plants (can you see the pigeon or worm?)

### Subjects Covered



## ART

### Explore

The flowers in this scene are very colourful – and as soon as we invent smell-o-vision, you'll be able to tell that they smell great too! Think about the perspective of a bee flying among plants. Which flowers do you think they like the most? Have you seen bees in your own area? Where do they tend to gather?



### Research

- What is it that makes a flower so attractive to bees, butterflies and other insects?
- What colours and patterns can bees see?
- What scents do they prefer?

### Explain

- Design and create your own beautiful flower; you might use paint, collage, or even make a sculpture. Explain how it's adapted to attract bees and other pollinators. You could even add a scent!



# INSIDE AN ANIMAL CELL

## HUMANS AND ANATOMY

### OVERVIEW



This Explorable Scene allows students to fully investigate inside a typical animal cell model. Walk through the cytoplasm and see the different organelles surrounding you. Key features have been helpfully labelled to support student learning, and the experience of becoming surrounded by the cell's different structures allows learners to develop a sense of the scale and three-dimensional structure of cells.

### KEY FEATURES OF THE SCENE

#### Cell membrane

As your students move through the model animal cell, encourage them to look up and around to the outermost edges of the cell. It may feel a bit like being inside a bubble, and the cell membrane does enclose the cell whilst being permeable to some substances but not to others. It therefore controls the movement of substances in and out of the cell.



#### Mitochondria

As your students explore inside the animal cell, the organelles which might be easiest to spot are the oval-shaped mitochondria, with several of them seen 'floating' around in the cell's cytoplasm. These organelles contain the enzymes for respiration and produce energy in the form of adenosine triphosphate (ATP). Encourage your students to move around and view the mitochondria from different angles as some of the models have been cut-away to give an impression of the membranes in the internal structure. Cells with a higher energy demand will have more mitochondria present, so more will be found in a heart muscle cell than in a liver cell, for example.



#### Ribosomes

Ask your students to look carefully for some of the smaller organelles present in the animal cell model. Can they spot several ribosomes, the tiny structures which make proteins? Using RNA, ribosomes can connect amino acids at a rate of around 200 per minute. A mammalian cell may contain as many as 10 million ribosomes, but each ribosome has only a temporary existence.



#### Nucleus

As your students explore see if they can locate the nucleus in a central location in this model. This may have been the first structure within a cell which students learned about, ask them to consider why it is so key in learning about cell biology? The nucleus contains genetic material, including DNA, which controls the cell's activities. This model nucleus has been cut-away to reveal the structures inside.



### BIOLOGY

#### Explore

Once your students have been fully immersed in the animal cell model scene, ask them which key features they thought were most important to notice. Encourage your students to create a cell guided tour script, pointing out key features visitors might be interested in and mentioning the role they play in the functioning of a healthy animal cell.



#### Research

- Choose a specific animal cell, such as muscle, nerve, bone, different blood cells, or your own choice, to research.
- In what ways is your researched cell similar to this typical cell model, and how is it different to this model?

#### Explain

- What key features are noticeable in this typical animal cell model?
- How would you expect specialised cells to differ from this to allow them to perform their specific function?



# INSIDE A VEIN

## HUMANS AND ANATOMY

### OVERVIEW

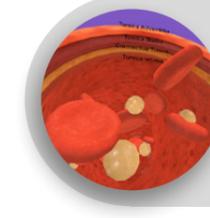


This Explorable Scene allows students to travel through an animated section of a vein, gaining an appreciation of the physical makeup of the vein, the flow of blood, and the body's response to damage to the blood vessel. This useful resource is an engaging way to support student understanding of the circulatory system.

### KEY FEATURES OF THE SCENE

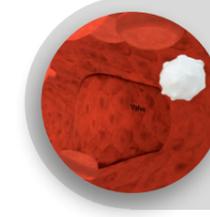
#### Vein

Veins are blood vessels which always carry blood towards the heart. They differ from arteries which have thicker, more muscular walls to carry blood away from the heart under high-pressure, and from tiny capillaries throughout the body with walls just one cell thick to allow substances to pass into every cell and waste products to move to the blood. Like an artery, veins have a tough outer layer, but their muscular tunica media layer is smaller than in an artery. The inner tunica intima layer has an inner surface of endothelial cells which allows blood to smoothly travel through all blood vessels and is continuous throughout the system from heart to capillaries. With a larger passageway for blood (internal lumen) the blood is flowing through the veins at a lower pressure than the arteries.



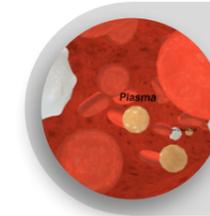
#### Valves

As the blood flows through veins it passes a series of valves. These simple mechanical features ensure that the blood cannot flow backwards, particularly useful as it is often flowing against gravity or along rapidly moving limbs as people are active. As blood flows correctly towards the heart the valves are pushed to the walls of the vein so blood can easily flow through. If the pressure drops and the blood has an opportunity to flow back towards the capillaries, the change will force the thin, tough membrane of the valves to fill and push together, forming a temporary 'wall' across the vein. With the next push forwards the valves again are moved to the sides and the blood can flow freely.



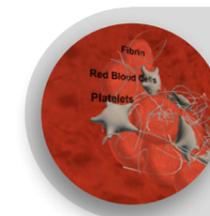
#### Blood

The liquid plasma transports both useful substances and waste products all around the body to where they need to be, including digested food to the cells of the body, waste carbon dioxide away from cells and to the lungs, and hormones to different parts of the body. The plasma also helps regulate body temperature as it flows from the body core to the tips of the limbs. The distinctive red blood cells contain haemoglobin to transport oxygen from the lungs to all the cells of the body. White blood cells come in different types and are an important part of the immune system, helping to fight infections by attacking bacteria or viruses that invade the body.



#### Wound

When the wall of the vein becomes wounded or damaged, the body needs to ensure that minimal blood is lost and also block harmful substances and microbes from entering the bloodstream through the open wound. Small platelets get stuck together with threads called fibrin, and red blood cells also get stuck in the mesh forming a blood clot and then a scab, protecting the area until it can heal.



### BIOLOGY

#### Explore

Allow your students to follow the flow of blood through the vein to fully explore the scene. As they travel through this closed system demonstrating the function of veins, ask them to create a script to accompany a tour, pointing out key features being seen as they travel through the inside of a vein.



#### Research

- How is a vein physically similar to an artery and a capillary, and how are they all different?
- What do the structural differences between these types of blood vessel tell us about their function in the circulatory system?

#### Explain

- What key features of a vein can you see in this model?
- What features of blood can you see as you travel through this scene?



# MARS ONE BASE

## TIME AND SPACE

### OVERVIEW

Transport your students to the cold, rocky surface of planet Mars. Visit the vision for the Mars One Base, a permanent human settlement on Mars. This project has now been abandoned, but a mission of this kind may well set off from Earth in our lifetimes. The aim was to begin the project with an uncrewed mission to establish essentials for working towards a habitable settlement on planet Mars, before later bringing crews of people to the Red Planet. As a cold planet with different conditions to Earth, any similar projects poses a huge challenge.



### DESIGN AND TECHNOLOGY

#### Explore

As your students explore the scene, encourage them to choose a piece of technology to study closely; perhaps a solar panel, a living unit, or even the astronaut's spacesuit. What needs to be considered when designing this technology for human use on Mars? What properties would the materials need to have, how would it be powered, and what if it needed maintenance or repairs during its time on Mars?



#### Research

- What experiences of space exploration might designers have used to help create this new technology?
- Choose an item to research; where has similar equipment been used in previous space exploration missions, and how might it need to be adapted for a mission to Mars?

#### Explain

- What different pieces of technology can you find in this scene? How have they all been built to be suited for planet Mars?

### KEY FEATURES OF THE SCENE

#### Communications

Just like Earth, Mars is a rocky planet. Its solid surface has already been extensively explored by fly-bys since the 1960s, and rovers have been present on the surface and actively exploring the ground for more than twenty years. The team at Mars One planned to send rovers to the surface of Mars in advance of humans travelling to the planet. They would find the most suitable location to create a settlement, and transport essential supplies needed before people arrive, communicating with team back on Earth about mission progress.



#### Living Units

As your students are immersed in the scene, ask them to find the pods, or Living Units, which could provide the shelter for astronauts living at a base on Mars. Can your students describe what they see? What do each of these units need to provide to sustain life on Mars? Some will generate the essentials of energy, water and breathable air needed for the settlement, while others provide the living space required for the astronauts. In the Mars One project plan, these would have been transported to the planet ahead of the human crew and set-up by robotic rovers.



#### Astronauts

The journey to Mars would be among the most bold and challenging ever faced by humans. The trip from Earth to Mars takes around seven months, and could be slightly shorter or longer depending on how close the two planets are to each other on their orbits. Once arrived, astronauts need to wear specially designed space suits to protect them from the extreme cold, and the thin, non-breathable atmosphere found on Mars. This is similar to the protection needed for astronauts exploring the Moon or during spacewalks on the International Space Station.



### GEOGRAPHY

#### Explore

As your students are exploring this scene, encourage them to think about why this particular location on Mars was chosen for the Mars One Base. Think about the locations of settlements on Earth; what factors influence where towns are established? What of these factors might be naturally occurring on Mars, what might not be important on Mars, and what would need to be recreated by humans?



#### Research

- What would rovers look for when choosing where to locate a new settlement on Mars?

#### Explain

- What is needed in a human settlement?
- What similar or different factors are needed to establish a new settlement on another planet?

### LANGUAGE AND LITERACY

#### Explore

Allow your students time to pause and become fully immersed in the scene. Encourage them to look around and explore in the way an astronaut might do when they first arrive. Ask your students to try and imagine the feeling of really being here, at Mars One Base, a human settlement on another planet.



#### Research

- What is different about the daily routines of life on Mars?
- How does it feel to be on another planet away from Earth?

#### Explain

- Create word bank of useful words to describe the sights on Mars and use these in a piece of writing. What is the experience of living at the Mars One Base?

### WHAT CAN I EXPLORE?

Within this scene, you can visit the surface of planet Mars and the imagined future Mars One Base. This future human settlement provides a small crew of astronauts all they need to sustain human life on Mars.

#### You might also want to explore:

- The environment on planet Mars.
- Methods of generating power on Mars, such as solar panels.
- How Mars One Base would use satellites to communicate with teams on Earth.

#### Subjects Covered



### BIOLOGY

#### Explore

It has taken billions of years for the diversity of life we currently experience on Earth to become established. Earliest evidence of microscopic life on Earth is found from over 3.5 billion years ago, while some believe microbes could be almost as old as the planet itself, around 4.5 billion years. Humans have evolved in the conditions provided on Planet Earth, some which change seasonally, on different locations on Earth, or over large timescales. Moving to a new planet will be a big change! What do humans need from their environment to be able to survive on Mars?



#### Research

- How would Mars One (or another similar mission) plan to sustain human life on Mars?

#### Explain

- What essentials for life do humans need from their environment?
- Would you expect other forms of life to be needed on the Mars One Base alongside humans? If so, what life and why?



# THE MOON

## TIME AND SPACE

### OVERVIEW

This scene is set on the Moon, at the site of the 1969 Apollo 11 mission lunar landing. From the surface of the Moon, you can catch sight of the Earth, with a clear view of cloud systems and several continents. Students can explore the lander module and examine how humans have left their mark on our closest neighbour. Only twelve people have set foot on the Moon and now you can experience the magnificent view back to planet Earth from our nearest celestial body in space. Explore the rocky lunar surface and notice the lander which brought you to this spectacular landscape.



### KEY FEATURES OF THE SCENE

#### Footprint

As there is no wind on the Moon, the footprints left by the astronauts will remain for a significant period of time, providing they are not damaged by other human or solar activity. Explore the footprint left in the surface of the Moon and the historical, symbolic importance this imprint has. Discuss with your students how long they think it will remain, and reasons for these predictions. Ask the students to explain what other signs of the lunar landings they could find within this scene and follow this up with researching how far apart the student's footprints might be on the Moon.



#### Lunar Lander

The lunar module was used for descent to the lunar surface and served as a base while the astronauts were on the Moon. Explore the structure of the module and the astronaut climbing the ladder. Encourage your students to explain how they think Neil Armstrong was filmed leaving the Lunar Module and what features have been added to make the module suitable for space travel. Guide them to think about the materials used to build the module and what properties these materials needed to have. Follow it up with some possible research, such as finding out how far did the module travel and how long did the journey take.



#### Earth

Its presence and proximity play a huge role in making life possible here on Earth. The Moon's gravitational pull stabilises Earth's wobble on its axis, leading to a stable climate. The Moon is an average of 238,855 miles away from the Earth. Explore the skyline, the Earth in the distance and the continents viewable. Explain to your students that the effect of gravity is about 1/6 as strong on the Moon as it is on Earth. Guide them to hypothesize what effect this would have on them and in what ways would walking on the Moon be different to walking on Earth? Follow this up with research about what humans would need to live on the Moon.



### WHAT CAN I EXPLORE?

Within this scene, you can explore the structure of the lunar module and the astronaut climbing the ladder. Using this, encourage students to think about the materials used to build the module and what properties these materials need to have. As students move around the scene, guide them to look at the skyline, the Earth in the distance and the continents which are viewable. Discuss how far the Earth is away from the Moon and consider how walking on the Moon would be different to walking on Earth.

You might also want to explore:

- The barren landscape and reasons for this
- Any visible craters and how these came to be
- The flag and what it symbolises.

#### Subjects Covered



### MATHEMATICS

#### Explore

Explore the surface of the Moon and encourage the students to take note of any similarities or differences between that of their local environment. Consider if there are any places on Earth which resemble this landscape and why this environment might differ so much to that found on Earth.



#### Research

- How does gravity work in space?
- Why is gravity different on other planets?
- How does the scale of gravity on Earth compare to that on the Moon?

#### Explain

How high could I jump on the Moon? Investigate the concept of gravity and explore how this phenomenon occurs on Earth. Check students' current understanding of gravity and establish that every massive object in the Universe (the Moon being one example) exerts some gravitational pull on the objects on its surface. Explain that the Moon's gravitational pull is around one-sixth of that on Earth; ask the students to predict what they would expect to happen if they were to jump on the Moon. Take the students outside and get them to measure one another's jump height on Earth; from here, they can then use their mathematical knowledge to work out their predicted jump height on the Moon.

### SCIENCE

#### Explore

Explore the surface of the Moon and encourage the students to take note of any similarities or differences between that of their local environment. Consider if there are any places on Earth which resemble this landscape or whether this is totally unique and different to that found on Earth.



#### Research

- How are humans well adapted to living on Earth?
- What support would humans need in space?
- Why is protection in space so important for human beings?

#### Explain

How are humans able to live on Earth? Focus on the biological components which enable human life to thrive (temperature, oxygen, gravity, air pressure, circulatory system, protection given from buildings). Explore the differences in the Moon's atmosphere, weather patterns and how our human bodies have adapted to the Earth's environmental and chemical composition. After this research, create a detailed guide outlining the reasons for wearing a space suit.

### LITERACY AND LANGUAGE

#### Explore

What is it like in space? Allow students time to explore the scene, ideally in silence or with ambient music. Guide them to focus on component parts of the scene, such as the darkness around the Moon, the barren landscape or the sheer distance to anything or anywhere else.



#### Research

- How is the atmosphere in space so different to that on Earth?
- What are the main differences between the Earth's surface and that of other planets?

#### Explain

Brainstorm ideas about how they felt, what they saw and any other knowledge around what space is like and how they might survive in such an environment. Encourage the students to focus on specific details, such as their clothing, where they might sleep and the food they would have access to.

### DESIGN TECHNOLOGY

#### Explore

Create a vehicle to explore the Moon. Explore the Moon's lunar lander and note down its key design and aesthetic features, which enable it to be fit for purpose to land on this celestial body. Investigate and reflect on the surface and texture of the Moon and how this will impact on the ability to manoeuvre around the planet.



#### Research

- How could the students adapt and change the Lunar Lander vehicle to adapt to other planets?
- Why are certain properties so important for successful vehicle exploration of the Moon?

#### Explain

Consider what type of properties and features a vehicle would need to travel safely and effectively around the Moon's surface. Gather a range of resources to enable the design and creation of their own Moon exploration vehicle—either physically or digitally.



# THE SOLAR SYSTEM

## TIME AND SPACE

### OVERVIEW

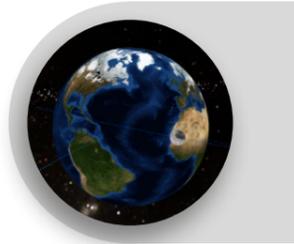


Become surrounded by the beauty of the Solar System in this inspiring Explorable Scene. Spot the central Sun, the rocky inner planets and the Asteroid belt, then on to the distant gas giants, and notice the far-away Kuiper belt of objects including dwarf planet Pluto. Look out for occasional comets travelling from the very edge of our Solar System, and gaze out to distant stars beyond; which could have their own set of planets orbiting?

### KEY FEATURES OF THE SCENE

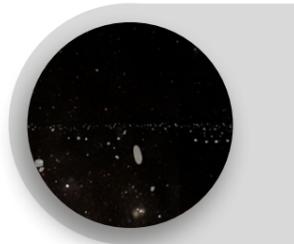
#### Earth and Moon

Encourage your students to locate the position of the Earth within the Solar System. As no humans have ever travelled beyond the orbit of the Moon, we are all seeing a view of our home planet which no person has ever seen first hand. Draw students' attention to the imagery of the surface of Earth, the tilt of its axis, and the texture of the surface of the Moon. Challenge them to consider if anything would appear different if they were really having this view from space. They might notice that the celestial bodies have added lines to mark the orbits of the Earth and Moon, that these two objects are not to scale for their relative size and distance apart, and that the Earth and Moon are not in motion.



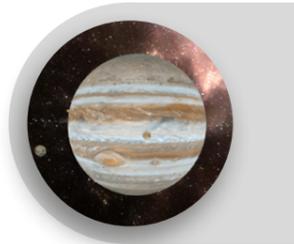
#### Asteroid Belt

The Asteroid Belt is a collection of irregularly shaped objects between the orbits of Mars and Jupiter. As the total mass of all asteroids in the belt is less than the mass of the Earth's Moon, there are large distances between each object. This means that space probes, such as Voyager, have been able to pass through the region without a collision. Asteroids are fascinating to scientists as they have changed very little since the formation of the Solar System some 4.6 billion years ago. Explore the Asteroid Belt looking out for the different shapes and sizes of objects. Can you spot a larger object in the region which could be Ceres, a dwarf planet? How do you think astronomers classify whether an object is an asteroid or a dwarf planet?



#### Jupiter and its Moons

Planet Jupiter has 79 different Moons ranging from the four largest, which were first observed in 1610 to others discovered as recently as 2018. We have accurate images of Jupiter and its Moons from the Pioneer and Voyager missions of the 1970s to detailed observations from Juno which has been in orbit around Jupiter since 2016. What features do you notice across Jupiter's surface? What clues does this give you about the conditions on the planet? What different Moons can you spot in this scene? Why do you think the number of Moons we know about around Jupiter has changed so much over the years?



### WHAT CAN I EXPLORE?

Within this scene, you can explore the appearance of the planets of the Solar System, the paths of their orbits, the largest Moons of the planets, the location of the Asteroid belt, and the surrounding context of our neighbourhood in the Milky Way galaxy.

You might also want to explore:

- The Solar System's place in the Milky Way: Why are there fewer stars in some of the space beyond? Why is there a bright band of light across the view of space in one direction?
- The sense of scale of the Solar System
- Comets
- The Kuiper belt

#### Subjects Covered



### MATHEMATICS

#### Explore

Travel around the Solar System Explorable Scene. Notice that even though the objects have been brought closer together to fit into this scene it still takes a long time to navigate the huge area. But what if this model had been made to scale, just how big would it be?



#### Research

- If you were to make a scale model of the Solar System with the Sun at 1m diameter, how small would each planet be?
- If the Sun were 1m diameter and in a central location of your school, can you research how to calculate how far away each planet would be?
- Measure where each planet would be within your school for the closest planets to the Sun, and sketch onto a map of the local area for the rest of the Solar System.
- Can you see why it is so difficult to make a Solar System model to scale?

#### Explain

Make a list of the planets in order of their distance from the Sun. Mark the largest planet and the smallest planet, and if you can add in the order of the planets from largest to smallest (Venus and Earth as very similar to each other in size, as are Neptune and Uranus).

### PHYSICS

#### Explore

Try to find a Comet in the Solar System Explorable Scene. What does it look like? Where is it compared to the orbits of planets?



#### Research

- Halley's Comet is a famous example of a comet and it is bright enough to be seen without a professional telescope
- Can you research when it was last seen and when it will next be visible from Earth?
- What information did the Philae Lander provide scientists with as part of ESA's Rosetta mission?

#### Explain

Sketch the Solar System and a typical orbit of a few of the planets (use what you have seen in the Explorable Scene to help you). Now add in the orbit path for a typical comet. Why is this shape so different? When do we see the 'tail' on a comet and why?

### MUSIC

#### Explore

Look around the scene and take in the bright Sun, the diverse planets, the twinkles of the surrounding stars in our galaxy, and the band of light from the galactic centre of our Milky Way. How does this all make you feel? Create a soundscape to accompany a tour of the Solar System, considering how you might match the sights of the Solar System with emotional aspects of the music you create.



#### Research

- What pieces of music have been inspired by the Solar System?
- What do you think they are trying to tell us about the Solar System?

#### Explain

What sort of emotion would you like to convey (awe and wonder, calm and reflective, or a sense of drama) and how will you manage to achieve this?

### DESIGN TECHNOLOGY

#### Explore

Explore the planets of the Solar System and notice the detailed images we have of how each planet appears in space. People haven't always known what the planets look like, so how has humanity gained this information?



#### Research

- Can you find images of the planets taken from the Hubble Space Telescope?
- Can you find images which were taken by space probes such as Voyager, Cassini or Juno?
- How does each of these instruments take images and observations from space?

#### Explain

What different ways are there of finding out about planets and what they look like? What key advances in technology have allowed these discoveries to happen?



# MERCURY

## TIME AND SPACE

### OVERVIEW

This Explorable Scene transports viewers to the surface of rocky planet Mercury. The smallest planet of the Solar System, and the closest to the Sun, the view from this world feels very different to Earth. One day on Mercury lasts 176 Earth days, allowing surface temperatures to soar to an extreme 430 degrees Celsius (800 degrees Fahrenheit), and then drop to minus 180 degrees Celsius (290 degrees Fahrenheit) during the long nights. Add to that the high levels of radiation from the Sun, and you will see that Class VR is the safe way to experience standing on the surface of Mercury!



### KEY FEATURES OF THE SCENE

#### Sun

As your students arrive on planet Mercury, the first thing they might notice is the view of the Sun. Why does the Sun look so large from planet Mercury? With this close-up view students get a clear view of features such as sunspots and solar flares in the Sun's dynamic atmosphere. In reality, specialised equipment is always needed to view the Sun, but with ClassVR students can investigate the Sun's features safely and in detail.



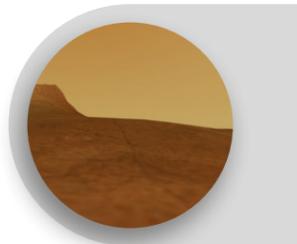
#### Sky

Viewers can gaze up and notice a very different daytime sky to that which is experienced on Earth! With no atmosphere to scatter the sunlight the Sun appears as a bright, close star in the sky, and viewers can see other stars in the daytime sky.



#### Surface

The barren rocky surface of Mercury is covered with impact craters from billions of years of bombardment from asteroids, comets and smaller travelling space objects. On Earth, smaller meteoroids 'burn up' as they travel through Earth's atmosphere and experience friction from moving through the gas and heat up to high temperatures. With no flowing water or stormy atmosphere on Mercury, weathering and erosion does not take place in the way it does on Earth and so the craters remain visible for huge periods of time.



### WHAT CAN I EXPLORE?

Within this scene, you can explore the view from the surface of planet Mercury. The closest planet to the Sun, visitors to Mercury get a detailed look at the Sun through the safety of ClassVR. With no atmosphere, the daytime sky gives clear views out to surrounding stars, and below us the rocky surface is covered in impact craters from billions of years of collisions. With both extreme hot and extreme cold temperatures, humans are very unlikely to visit Mercury for real but with a virtual field trip students can support their learning of the Solar System and compare this planet to the environment on Earth.

You might also want to explore:

- The topography of the landscape.
- The rocky surface of Mercury.
- The stars visible in the sky.

#### Subjects Covered



### HISTORY

#### Explore

As your students are fully immersed in this scene, ask them to reflect on the knowledge needed to be able to create this virtual environment. What might people in ancient times have known about planet Mercury? What different names did this planet have in different cultures, and what might those names tell us about their understanding of the planet?



#### Research

- Choose an ancient civilization, such as ancient Greeks, Romans, or ancient China, and research their name for Mercury.
- How does the name they chose for the planet suggest what that culture understood about that planet?

#### Explain

- How were planets recognisable to people in the night sky in ancient times?
- Why were the changing objects in the night sky of interest to ancient civilizations?

### SCIENCE

#### Explore

As your students explore this scene, allow them to reflect on how human understanding of the planets has changed over time. What technologies and discoveries have allowed this image of Mercury to be created?



#### Research

- Find out about human exploration of Mercury, such as the spacecraft Mariner 10 or MESSENGER. What information did this mission bring to humanity?

#### Explain

- How have humans discovered what other planets look like?
- How has new technology changed our understanding of the Solar System in recent decades?

### GEOGRAPHY

#### Explore

While your students are immersed in this scene, ask them to describe the experience of daytime on Mercury. On Earth, what different things affect difference in temperature between day and night-time at a given location?



#### Research

- What is the difference between daytime and night-time temperatures on Mercury?
- Why is this difference so extreme on this planet?

#### Explain

- What affects day and night-time temperatures on Earth?
- Would any of these factors be relevant to Mercury's temperatures or not?

### SCIENCE

#### Explore

While your students explore Mercury, ask them to take note of the impact craters on its surface. Can they estimate how many they can see? What different sizes of crater are there?



#### Research

- Mercury might appear similar to the Moon with regards to the scale of impact craters on its surface. Research the similarity in conditions between these two objects to find what factors influence its cratered surface.

#### Explain

- What might have caused these craters to form over time?
- Why might they remain for longer on Mercury than on the surface of other planets?



# URANUS

## TIME AND SPACE

### OVERVIEW



This Explorable Scene transports students to distant planet Uranus. Named after the ancient Greek god of the sky, Uranus was the first planet to be discovered using a telescope, compared to other worlds which are visible with the naked eye and had been known to ancient civilizations. As the seventh planet of the Solar System, Uranus takes about 84 Earth years to complete its long journey around the Sun. Sometimes Uranus and Neptune are both referred to as 'ice giants' because of their incredibly low temperatures, and whilst it's not actually possible to 'land' on Uranus to explore, this scene provides an artist's impression and allows students to imagine what it might be like if a spacecraft were able to visit planet Uranus.

### KEY FEATURES OF THE SCENE

#### Planet composition

Like the other gas giant planets, Uranus does not have a surface like we experience here on Earth, but a layer of swirling fluids and gases under extreme pressures. While in reality it's impossible for a spacecraft to travel to the icy mantle and the rocky central core of Uranus, this scene allows students to explore this distant world in a new way. An 'ice giant' planet along with its neighbour Neptune, the temperatures in the atmosphere of Uranus are more than 100°C colder than the lowest temperatures ever recorded at Antarctica on Earth. The planet has a similar composition to Neptune, with most of its mass being a hot, dense fluid of 'icy' materials, including water, methane and ammonia, surrounding a small central rocky core. Its diameter is roughly four times that of Earth.



#### Planet context

On visiting Uranus and gazing out into space, it would be tricky to pick out the distant Sun amongst the other stars as it is about 2.9 billion kilometres (1.8 billion miles) away. While light emitted by the Sun takes about eight minutes to reach the Earth, it takes some two hours and 40 minutes to arrive at Uranus. As the seventh planet from the Sun it takes Uranus about 84 Earth years to complete an orbit. With improvements in telescope technology scientists have observed the planet's faint set of rings and over 25 small moons have been discovered. Uranus features a very unusual rotation, as it's the only planet of the Solar System to have an extreme tilt of almost 90° so that its pole is almost pointing towards the Sun, and only Uranus and Venus spin the opposite direction to most other planets.



#### Discovery of Uranus

Uranus is the first planet of our Solar System to have been discovered using a telescope, as the planets from Mercury to Saturn are visible to the naked eye. Uranus had been observed and recorded in ancient times but had been mistaken for a star because its slow orbit meant it didn't change position as quickly as other known planets in the sky, and its distance means it is much dimmer than other planets. William Herschel first observed Uranus in 1781, and he actually thought he was discovering a new comet at first! Further observations suggested that this was in fact a distant planet, and as the other planets had names of deities from ancient civilisations, this new discovery was named Uranus after ancient Greek god of the sky.



### WHAT CAN I EXPLORE?

Within this scene, you can explore an artist's impression of planet Uranus, a distant ice giant planet with freezing temperatures and a very different composition to Earth.

#### Subjects Covered



### MATHEMATICS

#### Explore

As your students are exploring this scene, ask them to think about some of the numbers and measurements they can research about Uranus; distance from the Sun, time taken to orbit the Sun, tilt of its axis, and other measurements. Challenge your students to find these pieces of data and create an infographic about Uranus in numbers.



#### Research

- Choose a number of properties of Uranus which you think can be measured through observations from Earth, such as day length, size of planet, number of moons, distance from the Sun, time taken to orbit the Sun, tilt of its axis, and other measurements. Research and record these and then use them to produce an infographic of Uranus in numbers.

#### Explain

- What properties of a planet can we measure through observations from Earth?
- How would you expect Uranus to differ from Earth in some of these measurements?

### HISTORY

#### Explore

The planet Uranus has a key place in history as the first planet of our Solar System to be discovered using a telescope. As your students explore this scene, ask them to imagine they are back in time in the year 1781 when this planet is first sighted by William Herschel; what was life like in these times, and what impact might this discovery have had on people?



#### Research

- What else was William Herschel known for?
- How did he work with his sister Caroline Herschel?
- Can you research what life was like in 1781 and how people responded to this discovery?

#### Explain

- Uranus was first planet to be discovered using a telescope; how did people in ancient times know about other planets such as Venus and Mars?
- What else in space has only been discovered through the use of a telescope?

### LANGUAGE AND LITERACY

#### Explore

As your students explore this scene, ask them to think about how the ideas of exploring different worlds has captured the imaginations of storytellers for years. What stories have they heard that involve travel to other worlds?



#### Research

- Can you find a story which involves different planets?
- What does this different planet provide for the story; is it mysterious, exciting, threatening, or something else?

#### Explain

- What do you think it is about different planets that is fascinating to storytellers?
- What stories have you heard of which involve other worlds, thinking about more traditional tales, songs and music, or popular culture reference?

### SCIENCE

#### Explore

As your students fly through this model of Uranus, encourage them to think about how the planets of our Solar System all have similarities with other planets as well as their own unique characteristics.



#### Research

- What is the structure and composition of ice giant Uranus?
- What different elements and compounds are found on this planet?

#### Explain

- Which other planet is Uranus most similar to?
- Why are the inner planets of the Solar System so different to the outer planets?



# MARS

## TIME AND SPACE



### OVERVIEW

This Explorable Scene transports students to the cold, rocky surface of planet Mars. Around half the size of Earth, and our next neighbour away from the Sun in the Solar System, Mars does have many similarities to Earth but also striking differences. Like other rocky inner planets it has central core, a rocky mantle and a solid crust, but the dusty Martian surface is famously a rusty red colour. There is evidence for volcanic activity and flowing liquid water in the distant past, and while over time this activity has ended, the search for evidence of past or current microscopic life on Mars continues.

### KEY FEATURES OF THE SCENE

#### Sky

As your students are immersed in the scene, ask them to look up to the skies above them. In what way are the views out to space similar to what we experience here on Earth, and in what ways are they different? Students may notice that the view is a little hazy; with dust storms a regular occurrence on Mars this can influence the view. It seems that artificial light pollution is not an issue on Mars, with good views of even faint objects in the night sky. Standing on Earth, we often see stars appear to twinkle as their light travels through Earth's thick atmosphere before reaching our eyes, but with a thinner atmosphere on Mars this twinkling effect would not be seen. Mars has two small moons, Phobos and Deimos, which can't be seen from this location at the moment.



#### Surface

Just like Earth, Mars is a rocky planet. Its solid surface has been altered over billions of years by volcanoes, impact creators, and stormy winds. Notable features on the surface include the vast shield volcano Olympus Mons, over 620 kilometres (370 miles) in diameter, which is evidence for past tectonic and volcanic activity shaping the landscape here. There are also valleys and rounded pebbles which look as if they were shaped and smoothed by flowing water at some point in the distant past, as liquid water is no longer found on the surface of Mars. The soils here have a rusty red appearance due to the high levels of iron oxide, and in views of the night sky from Earth, Mars does appear a reddish colour, and is often referred to as the Red Planet. A series of impact craters mark the solid surface; with a very thin atmosphere fewer objects will 'burn up' on entry to the planet, and with less weathering and erosion taking place these craters remain visible for years.



#### Rover

Human exploration of planet Mars began with fly-bys in the 1960s giving clear images of the Red Planet, and a series of robotic explorers have investigated the Martian surface, including rovers such as Curiosity which has been exploring the planet since August 2012. To date Curiosity has discovered many elements known to be essential for life on Earth, including sulphur, nitrogen, oxygen, phosphorus and carbon, present in samples drilled in the surface of Mars. Curiosity has also gathered evidence that past water on Mars could have existed for a long time, perhaps a million years or longer, as there is evidence of rocks which were formed as mud on the bottom of lakes of water. Curiosity has also detected very high levels of radiation on Mars, useful information on how any travelling humans would need to be protected in this harsh world.



### WHAT CAN I EXPLORE?

Within this scene, you can visit the surface of planet Mars as it is being explored by an animated rover. Look upwards for a view of the stars through the dusty atmosphere, or look around at the rocks, reddish sand and impact craters. What processes have shaped this harsh landscape both in the distant past and today?

#### You might also want to explore:

- The topography of the landscape
- The different types of rock visible

#### Subjects Covered



### BIOLOGY

#### Explore

Can your students see any signs of life in the scene? Mars certainly appears a barren and inhospitable place. But scientists are searching for evidence of microscopic life in the past, or even still present today under the dusty surface.



#### Research

- What types of microscopic life can be found in extreme environments on Earth?
- On Earth water is essential for life; what evidence of past and current water on Mars has been discovered?

#### Explain

- Why are scientists interested to look for evidence of past or current life on Mars?
- What might have been different about the environment on Mars in the past which could have made life more likely to survive on this planet?

### DESIGN AND TECHNOLOGY

#### Explore

As your students explore the scene, encourage them to locate the robotic explorer and move closer to investigate it. Ask your students to sketch the rover. Use the research to label key features. What is it looking for on Mars?



#### Research

- Choose a Mars rover such as Curiosity to research. How does it move, how is it powered, what sensors and instruments does it have, and what is its research goal on Mars?

#### Explain

- Why are humans studying the planet Mars?
- How are robotic explorers a helpful tool to discover more about planets?

### CHEMISTRY

#### Explore

As your students are exploring this scene, encourage them to focus on the rocks which they can see. On Mars there are mainly igneous rocks which crystallised from magma when the planet was more geologically active in its past. Basalt is a dark, shiny rock formed by volcanic action. Some sedimentary rocks are found within valleys and large craters on Mars. Much of the surface of Mars is covered in a fine reddish-coloured dust, and it gets its rusty hue from the iron oxide it contains.



#### Research

- What different types of rock are found on Mars?
- What does this tell us about conditions on Mars in the distant past?

#### Explain

- In what ways are rocks formed on Earth?
- How might these processes be similar or different on Mars?

### LANGUAGE AND LITERACY

#### Explore

Allow your students time to pause and become fully immersed in the scene. Encourage them to look around and explore in the way a tourist might when visiting a new location. Although Mars has been explored by humans since fly-bys took detailed images in the 1960s, no person has ever travelled to Mars. Ask your students to write a postcard to home from the surface of Mars trying to describe what they have experienced.



#### Research

- What is different about the experience of being on Mars compared to a remote region of Earth?
- How likely does human travel to Mars feel in the future?

#### Explain

- Create a word bank of useful words to describe the sights on Mars and use these in a postcard note. What is the experience of standing on Mars?



# VENUS

## TIME AND SPACE

### OVERVIEW



This Explorable Scene transports students to the surface of planet Venus. Venus is named after the Roman goddess of love and beauty, suggesting early astronomers probably didn't realise what a turbulent and inhospitable world this really is! From a distance Venus is beautiful; after the Moon it's the brightest natural object in the night sky, and with an orbit closer to the Sun than Earth's it is most visible at dusk or dawn, a recognisable object to many cultures and civilizations since ancient times and sometimes known as the morning star and evening star.

### KEY FEATURES OF THE SCENE

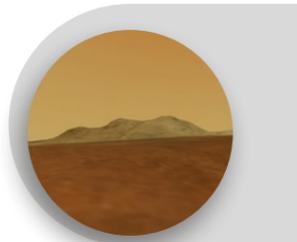
#### Surface

The surface of Venus is not easily visible through its layers of thick clouds, so knowledge of its surface features has grown over recent decades. The physical structure of Venus is similar to Earth in many ways; the planet is almost the same size as Earth, and both planets have a similar rocky surface and an iron core. Then the similarities end and we can see extreme differences between the two neighbouring worlds. It is a completely rocky world, totally dry as the extreme high temperatures will have boiled away any ancient oceans in the distant past.



#### Volcanoes

Looking around the landscape of Venus we see several volcanoes across the surface. Ongoing research suggests some of these might still be active. The shield-shaped volcanoes exist all over the planet, with large flat areas of plains between which seem to be created by rock formed of cooled lava.



#### Atmosphere

The incredibly thick atmosphere on Venus is mostly carbon dioxide with clouds of sulfuric acid, and on the surface visitors would experience huge pressures from the force of the gases like we would find deep underwater here on Earth. The hottest planet of the Solar System, temperatures average a scorching 462 °C (863 °F) across this hostile world. The soaring temperatures are the result of carbon dioxide in the atmosphere creating a runaway greenhouse effect, trapping all the Sun's heat and generating temperatures high enough to melt some metals. Venus has a very slow rotation, with one of its days (rotation on its axis) lasting longer than one of its years (orbit around the Sun), but with a thick atmosphere trapping in heat, temperatures remain high whether day or night.



### WHAT CAN I EXPLORE?

Within this scene, you can explore the barren, rocky surface of Venus with shield volcanoes all around, and look up through the thick atmosphere which blocks out views into space.

#### Subjects Covered



### MATHEMATICS

#### Explore

Set your students a challenge that will help them compare the orbit of Venus to that of Earth. Their first task is to find their age in Earth days by taking their age in Earth years and multiplying by 365.25. For example, 11 Earth years is  $(11 \times 365.25)$  4,018 Earth days. Take the number of Earth days and divide by 225, the number of Earth days in a Venus year. On Venus, this is 17.8 years old! Venus has made 17.8 orbits around the Sun since an 11-year-old was born. Next take your age in Earth days and divide by 243 to find your age in Venus days. For example,

if you are 11 Earth years old, there have been 16.5 days on Venus since you were born. You might use the layout below to support students with the calculations.

Your age in Earth years: [ ] Earth years  
Earth years [ ]  $\times$  365.25 = [ ] Earth days  
Earth days [ ]  $\div$  225 = [ ] Venus years  
Earth days [ ]  $\div$  243 = [ ] Venus days



#### Research

- Why is a year on Venus shorter than a year on Earth?
- What does the length of a day on Venus tell us about its spin?

#### Explain

- Research the movement of Venus, including the length of its orbit around the sun, the direction of its spin, and the tilt of its axis and seasonality that produces.
- How is Venus different to Earth in these respects?

### LANGUAGE AND LITERACY

#### Explore

A real visit to Venus is impossible; electronics would be melted, and your spacecraft may have been crushed by atmospheric pressure, but with ClassVR you can gaze out across this unseen world. How does it feel to be stood here, knowing we can only explore it remotely? Describe the experience of taking in this impossible view, of exploring this world which humans will never physically explore.



#### Research

- Describe the experience of standing on Venus knowing no humans can travel here. What other 'firsts' in space exploration have people experienced and shared with humanity?

#### Explain

- How does it feel to visit somewhere that no human has travelled to?
- Create a piece of text to describe the experience and share it with other people.

### SCIENCE

#### Explore

While your students are immersed in this scene, ask them to take a moment to consider what knowledge was needed to create a model of the surface of Venus. How do scientists know what other planets look like?



#### Research

- Research human exploration of Venus, from early missions in the 1960s and 70s, to the 1990s Magellan mission to map the planet's surface, ESA's Venus Express which was in operation at Venus from 2006 until 2014, and Akatsuki which is currently orbiting Venus.

#### Explain

- What techniques do scientists use to find out about other planets?
- What new technology has helped humans learn more about the planets of the Solar System?

### GEOGRAPHY

#### Explore

As your students explore this scene, encourage them to take notes on the physical features they see and what their relative locations are. Challenge them to sketch a map of this section of the surface of Venus, adding labels and notes from their research.



#### Research

- What physical features are found on the surface of Venus?
- What are the weather conditions likely to be at this location?

#### Explain

- What physical features appear similar to what you might see on Earth?
- In what ways is this landscape very different to Earth?



# INSIDE A COMPUTER TECHNOLOGY

## OVERVIEW

This explorable scene shrinks you down to desktop size and allows your students to explore the inner workings of an IBM Personal Computer, or IBM PC. Originally released in 1981 this model shows just how far technology has come in the space of a few years, with a simple mouse and keyboard, a monochrome monitor and even a floppy disk drive, all on show. Students can even explore the inner workings of the computer by moving through the walls and into the main casing, exploring how components work and where the cables go!

## KEY FEATURES OF THE SCENE

### Peripherals

When you first launch the experience, you will be standing on a desk next to the PC. Before students dive into the machine itself, encourage them to explore the area around the desk. Can they recognise any of the accessories attached? How are they different to modern computers? How are they similar? Consider how the mouse and keyboard are connected, following the cables around and noticing their ports. Why are there no USB connections? Students can then follow the cables through the back wall and see where they connect to the motherboard.



### Motherboard

Inside the casing of the computer you will find its inner workings and a labelled motherboard. As students if they recognise any of the components used or if any are unfamiliar. If possible, compare the parts in the scene with real-world examples of modern computer parts – sticks of RAM, USB ports, DVD drives, graphics cards etc. Ask students to consider the reasons for upgrading computers over the years – considering the purpose of the components you can see.



### Power Supply

By following the power cable from the back of the PC through the case, students can explore how power is distributed throughout all of the components inside safely. You will notice that, once inside the case, the single power cable splits into several, multicoloured cables; why do you think that is? Why does the power supply need its own fan? Why do you think the cables are different colours? Explore the components within the power supply itself – which ones can you identify?



## WHAT CAN I EXPLORE?

Within this scene, you can explore the inner workings of an old IBM PC. These machines are no longer made and can be hard to find, so students can investigate how far technology has advanced since this model was used in the early 1990s. The scene is complete with a power supply and moving fans, as well as internal speakers and a floppy disk drive.

### You might also want to explore:

- The monochrome monitor
- The floppy disk lying on the desk
- The HDD and RAM

### Subjects Covered



## COMPUTING

### Explore

Ask your students to spend some time exploring the inside of the PC, documenting what they find along the way. Direct them specifically to the RAM and the motherboard within the main casing – can they think about what these components might do, related to what is happening on the screen and the inputs from the mouse and keyboard? How do coding programs like Scratch, Java or C++ relate to these components? Encourage discussion among students about the relationship between input, process and output (i.e I press the 'A' key on my keyboard, how does it end up on my screen?)



### Research

- How does a computer process inputs and turn them into images on a screen?
- What is the purpose of a motherboard, RAM and a hard drive (HDD)?

### Explain

- Describe the process of typing and printing a letter in terms of input and output
- If the hard drive was removed from this PC, would it still work? Explain your answer.
- Why would this PC not be able to run modern programs or games?

## PHYSICS

### Explore

While exploring the scene, ask students to pay close attention to the power supply. As it enters the back of the computer it splits into various cables and powers different sections. Students will notice that, inside the power supply itself, there are cathodes, diodes and various connections. There are also a series of LEDs on the outside of the machine that indicate power is being supplied. Discuss with students what the various components do and look at their circuit diagrams. You can also discuss the potential dangers of static electricity to internal components and the importance of grounding yourself before touching them.



### Research

- How is power distributed throughout a computer?
- What components are present here that help do this?
- What are the dangers of using the wrong power supply in modern computers?

### Explain

- Using your knowledge of circuits can you create a basic circuit diagram for this machine?
- When handling computer components, engineers use static discharge bands, why is this needed?

## LITERACY

### Explore

As your students explore the computer, encourage them to look at all of the parts that they can see and to think about what their purpose could be. If possible, compare them to similar parts from a modern laptop or desktop PC. As they explore students can take notes on the key features of an IBM PC including its inputs, components and looks, even making diagrams of the key areas. Encourage them to take the headsets off and make detailed notes on what they have found.



### Research

- What were the key features of an IBM PC?
- What were the main selling points of this computer?
- Which components are most important to know about when buying a computer?

### Explain

- Create a non-chronological report to sell this computer to a school in 1995.
- Use images and research to explain its most important features and how it can be used.
- Use your knowledge of computing terminology to clearly explain the benefits of this PC.



# NETWORKS IN THE HOME

## TECHNOLOGY

### OVERVIEW

In this scene, students can explore how networks are used in our homes in an increasing range of ways. From traditional landline telephones to mobile devices and smart, Wi-Fi-enabled home accessories, encourage your students to find out about the impact of the internet (and the internet of things) on our daily lives.



### COMPUTING

#### Explore

As you move around the scene, think about how many of these devices might be found in a school environment, as well as at home. Are there any devices you have at school that wouldn't be used in the home? How might these connect to the school network and to the internet?



#### Research

- Conduct a network audit at your school (or just in your own classroom). What equipment connects to a network?
- How is it connected (Wi-Fi or cable)? What is the purpose of each device?
- Make sure you ask whoever is in charge of the computer equipment at your school – there may well be devices that are not obvious or usually visible.

#### Explain

- Choose one of the network-enabled devices you have in school, and create a short presentation about how it connects to the school's network (and probably also the internet), and why it's useful.
- What might happen if the school's internet connection went down?

### KEY FEATURES OF THE SCENE

#### Cables

Take a look at the router on the small table in the corner of the main room in the home. What cables can your students see? What is the purpose of these cables? You'll notice that the only other device that's connected to the router by a cabled connection is the desktop PC. How are the other devices connecting to the network? What might the advantage be of connecting the PC with a wire?



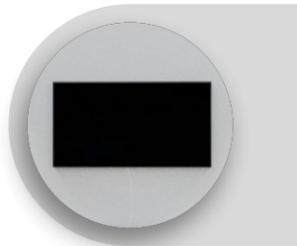
#### No Cables Required

Nothing else in the home is connected via ethernet cable; all the other devices here are using Wi-Fi to access the home's network and the internet. Can your students spot them all? The phone, tablet, games console and TV might be more obvious, but what about the digital weather display and wireless thermostat? Encourage students to discuss how these devices (many of which would not have been Wi-Fi-enabled in the past) use internet access. Might there be some areas in the house where connecting to the Wi-Fi is an issue? Why?



#### Connecting the Home to the World

Leave the house through the front door to see how this home network is linked to the outside world (and therefore the internet) via a telephone line and optic fibre. But what exactly happens when someone in the home uses the smart TV to stream a movie on demand? This can be tricky to explain! Really, the internet is just an enormous (and complex!) network that links computers and other devices to one another.



### GEOGRAPHY

#### Explore

Think about where the house you can explore in this scene might be located. Is it in a city, suburb, small town or rural area – and in which country? Could it be anywhere? Discuss how the ability to use all the devices in this home and to connect to high-speed internet might influence the people who live here. What might they do for work – and can they do it from home? What about their leisure activities?



#### Research

- How has the development of fast internet connections in the past twenty years influenced where people live and work?
- Are there particular regions where the impact has been more obvious?

#### Explain

- What impact do you think fast, reliable wireless networks will have on our future in the next ten or twenty years?
- How will this affect where people choose to live and work?
- What could the potential positive and negative consequences be for our cities, our rural areas, and the environment in general?

### MATHEMATICS

#### Explore

Numbers are very important when it comes to using devices on a network. There are a range of measurements we can use to gauge how useful a network might be, or how fast a response we might get if we need to communicate with other devices or servers. The units used can be somewhat confusing, so it's worth making sure you can tell a megabyte from a megabit!



#### Research

- Find out about the following terms and write a quick definition for each (making sure you include the units they are measured in, if relevant): download speed; upload speed; latency/ping time; packet loss; contention ratio.

#### Explain

- Choose one of the terms you defined above and explain it to a partner. How is it measured, and in what units (make sure you understand and can explain the difference between Kb, Mb and Gb)?
- What impact does it have on the user's experience?

### WHAT CAN I EXPLORE?

Move around the interior of a home and find a range of network-enabled devices there. Step outside to see how this home network is connected to the wider world.

#### You might also want to explore:

- How the Wi-Fi signal strength attenuates as you move away from the router
- What kind of input or display features you can see on each device.

#### Subjects Covered



### HISTORY

#### Explore

List all the network-enabled devices in the home. How many of these existed as products 30 years ago? Some of them (such as the television) certainly existed, but didn't connect to the internet. Others weren't even conceived of yet, like the wireless weather display. Did your parents and grandparents have access to this technology when they were growing up?



#### Research

- Choose one of the devices and think about its purpose in the home. Research what alternative device might have been used for that function or purpose 30 years ago (or perhaps its function wasn't even dreamt of yet).

#### Explain

- Draw, write about, or even create (in CoSpaces, Paint 3D or another similar platform) a house from 30 years ago. Include and label the equivalents of some of the devices we use today. Present your information to a partner or group, explaining how life was different then and the impact these inventions have had.



# CONSTRUCTION SITE

## MATERIALS, PROPERTIES AND STATES

### OVERVIEW

Visit a construction site and see a home in the process of being built. This practical, real-world context will help your students to identify everyday materials. It gives them an opportunity to explore how the properties of these materials affect their use.



### KEY FEATURES OF THE SCENE

#### Walls

The house's walls can be seen in various states of construction, from simple timber frame to those with insulation installed and outer brick walls visible. Various different materials have been used to build the house's walls, each with different properties that make them suited to the task.



#### Foundations

In this scene, you can see a mixer truck pouring liquid concrete into the building's foundations. Use this as starting point to discuss why structures need foundations, and what would happen without them. What makes concrete a good choice?



#### Unused materials

You will see a collection of construction materials that have yet to be used in the building, including panes of glass, wooden beams, metals girders, bags of sand and cement, and house bricks. Encourage students to look at each material closely and consider which part of the house it might be used in. What properties do these materials have that make them suitable for each purpose? The house doesn't yet have a roof. What materials might be used to build it? Why?



### WHAT CAN I EXPLORE?

Within this scene, you can visit a construction site where a new home is being built. The house has a timber frame construction and brick wall exterior, and various building materials can be seen around the site.

#### You might also want to explore:

- The roof frame. What will this look like when it's finished?
- The concrete mixer truck. Why does it have a revolving drum?

#### Subjects Covered



### GEOGRAPHY

#### Explore

Look closely at the shape and features of this house. It's typical of buildings in temperate or cool climates. How do house construction methods differ around the world?



#### Research

- Which types of house are most commonly built in very hot climates?
- Are there types of traditional construction that are not so widely used any more?
- Why were these developed?

#### Explain

- What's the most common type of house construction where you live?
- What are the advantages and disadvantages of this method?

### DESIGN AND TECHNOLOGY

#### Explore

Encourage your students to look at the foundations of this building and discuss why all permanent structures need solid foundations. Can they build models (even using simple construction toys) with foundations that extend into sand or soil, and explore what happens when the 'ground' becomes wet?



#### Research

- Find out about the process of laying foundations and the materials that are used. Is the process always the same, or does it depend on the materials used in the rest of the building?
- Does the height of the building or type of ground have an impact on foundation construction? Why?

#### Explain

- What would happen if this house were built with no foundations? Why?

### SCIENCE

#### Explore

This house has cavity wall insulation to keep it warm in winter and to improve energy efficiency when heating the structure. Encourage students to think about how their own home is constructed. They may not know what is inside the walls, but could discuss other elements like windows, doors and wall materials, and how they may be related to efficient energy use in the home.



#### Research

- What kinds of materials are used to insulate buildings?
- What properties do they have that make them useful for this purpose?

#### Explain

- Design an investigation to find out which of a range of common materials would make the best insulation for an outdoor home for a pet.
- Explain how you could make this experiment a fair test.

### HISTORY

#### Explore

Where did people find shelter before materials such as glass, brick and steel were available? Humans have always needed to keep warm, stay safe and keep out the rain or snow. Without access to a house like this one, how did they achieve this in prehistoric times?



#### Research

- Find out about where prehistoric people may have found shelter. What types of homes did they build?
- What materials did they use?

#### Explain

- How were prehistoric homes similar to and different from modern homes across the world?
- If you lived in one of these prehistoric dwellings, what would life be like across the seasons and in different kinds of weather?



# RAINFOREST HABITAT

## ANIMALS AND HABITATS

### OVERVIEW



This Explorable Scene allows viewers to stand amongst the towering trees of a tropical rainforest. Surrounded by lush green leaves, let your eyes follow the twisting vines up tall tree trunks and gaze up to the canopy high above. Notice the wide range of different plant and animal life as you travel through this Explorable Scene using the action button on the headset.

### KEY FEATURES OF THE SCENE

#### Ground level plants

Ask your students to move around the Explorable Scene and notice the different types of plants found at ground level. What different shapes of leaves can they see, and can they estimate how many different species might be present in this small area of tropical rainforest? Can they spot any insects on the rainforest floor?



#### Tree trunks and vine

Once ground level has been explored, encourage your students to find a suitable spot to look upwards and observe the trunks of the trees. What do they notice about how the trees are growing here? Can they see any vines or other plants using the trees for support? How might these trees compare to trees around your school in terms of their height, number of branches, leaf type, and any other characteristics? Look for animals camouflaged among the foliage.



#### Rainforest canopy

A fascinating feature of a rainforest is the canopy; students can gaze upwards and notice the leaves high above. Do the branches of neighbouring trees touch each other? What might that mean for the habitat of the rainforest canopy and the creatures who live there? How does the thick canopy impact on light levels at the rainforest floor?



### WHAT CAN I EXPLORE?

Within this scene, you can explore a small section of tropical rainforest, from the diverse plant life of the forest floor, up the tall tree trunks with climbing vines to the dense leaves of the canopy layer high above.

**You might also want to explore:**

- The rainforest soil and rocks.
- The area as a habitat.
- Resources that humans use which are found in tropical areas.

#### Subjects Covered



### GEOGRAPHY

#### Explore

What is unique about this environment? Consider the climate, seasonal changes in this area and pinpoint specific parts of the scene which might change depending on the weather pattern or season. Encourage the students to focus on particular aspects of the scene which, when brought together with other parts of the scene, can be used to define this as a rainforest.



#### Research

- Research average temperature and rainfall in tropical rainforest areas at different times of the year.
- How does this data compare to where you live?

#### Explain

Where in the world do we find tropical rainforests? What climates do they experience? How is a rainforest defined and what features are most prevalent?

### SCIENCE

#### Explore

While students explore the Tropical Rainforest encourage them to think about what green plants need to be able to grow. What is the availability of water like in rainforest areas? How do plants respond to the local competition for sunlight?



#### Research

- What factors affect plant growth, and how can this explain the plentiful plant life found in rainforest areas?
- What can you find out about the soil quality in rainforest areas?

#### Explain

What features of tropical rainforests makes them able to sustain such plentiful plant life? How can you see the impact of competition for resources on the way that plants are growing?

### LANGUAGE AND LITERACY

#### Explore

As your students explore the Tropical Rainforest scene, allocate each student to one of two groups; one group are 'travel writers', the other are 'conservation scientists'. All students should write a non-fiction descriptive text about the rainforest, each from the point of view of their group's character.



#### Research

- What different types of people are interested in the rainforest and why?
- Why are rainforests under pressure from human activity?

#### Explain

What might a travel writer or a conservation scientist notice in the rainforest environment? What would they include in a piece of writing about this place? Compare the works of the two groups for similarities and differences in content and style.

### ART AND DESIGN

#### Explore

As they travel around this explorable scene ask your students to notice the many different leaf shapes that they can see. Each student can choose three different shapes to sketch. Can they create a repeating pattern from these images to make a tropical-inspired print? What product would they use this design for?



#### Research

- Find some examples of products featuring leaf designs, looking to stationery, clothing or homeware for examples. What is appealing about these designs?
- How have they been produced?

#### Explain

Have you seen leaf patterns on products in your everyday life? Why do leaves appeal as an image in designs?



# MOUNTAIN HABITAT

## ANIMALS AND HABITATS

### OVERVIEW

Take a trip up a mountain and explore from the tree-covered lower slopes, up past rocky outcrops to the snow-topped peak above. This Explorable Scene allows students to investigate the physical landscape of a typical mountainside, the changes of vegetation with increasing altitude, and to map their knowledge of physical processes onto a clear landscape which is easy to navigate.



### KEY FEATURES OF THE SCENE

#### Mountainside trees

As your students move around this explorable scene ask them if they can spot any trees. Encourage them to choose one to move towards by looking at it while holding the action button on their headset. Once close to a tree, ask your students to describe the shape of it. Are the trees growing close together or spread out? Do they grow everywhere on the mountain or just in one place? What animals can they find hidden among the trees?



#### Loose rocks and rubble

Encourage your students to look down at the ground around them. As they explore, ask them what they notice about the ground; is there sand, soil, grass, or anything else there? Can anyone spot a bigger rock? How might this have got here? What animals might make their homes under and near these rocks?



#### Mountain summit

Finally, encourage your students to look upwards towards the top of the mountain. What is it like up there towards the summit? Can your students describe the shape of the mountain top? If they can see any rocks or soil, talk about what the weather conditions might be like at the highest peak. Are there any animals living here? How are they adapted to the conditions higher up the mountain?



### WHAT CAN I EXPLORE?

Within this scene, you can explore an illustrated mountain environment which clearly shows a range of physical features from steep-sided slopes, rocks and rubble, to trees growing at lower altitudes, all displayed in a way which is simple for students to explore and interpret.

You might also want to explore:

- What different animals can we find on the mountain?
- What people might visit a mountain area and why?
- How do mountains look different at different times of the year?

#### Subjects Covered



### PHYSICAL GEOGRAPHY

#### Explore

Take a look around the scene and think about what the weather might be like at the mountain at this time. Does it look like a warm place or a cold place? How can you tell?



#### Research

- Can you find out what the weather in the mountains is like in the summer and in the winter?
- Look up daytime and night-time temperatures of a mountainous area near to you, and how much rain or snow they experience.

#### Explain

Why do we have different weather during summer compared to winter? Why is there sometimes snow on the tops of a mountain when there is no snow lower down the slopes?

### BIOLOGY

#### Explore

As your students look around the Mountain scene, encourage them to notice where plants are growing and where there are no plants. Ask them what plants need to be able to grow. Support them to consider why there are no plants at the highest points of the mountain, thinking about what the temperature might be like up there.



#### Research

- Find some pictures of moss, lichen or alpine plants, all small plant life which can grow on mountains.
- What do you notice about these plants?
- How are they well suited to growing on a mountain?

#### Explain

Where are trees growing on the mountain? Where are there no plants growing near the top of the mountain?

### GEOGRAPHY

#### Explore

Take a look at the mountain. Describe its size, shape, and the soil, rocks and plants that you can see here. Are there any places like this near to where you live, or is it very different to your home area?



#### Research

- Where are the closest mountains to where you live?
- Can you find them on a map? How close are they to where you live?

#### Explain

What is a mountain like to visit? How is it similar to, and different from, where you live?

### PHYSICAL EDUCATION

#### Explore

Some people travel to the mountains looking for adventure! What different sports or activities can people do in the mountains? Can you create a travel poster encouraging people to visit the mountains to take part in sports or activity? What images will you include?



#### Research

- Can you research different activities that people do in the mountains?
- Try looking into hiking, mountain biking or skiing, as well as your own ideas.

#### Explain

What is special about this location for people doing sports and activities? What makes the mountains a challenging place to do physical activities?



# HOT DESERT HABITAT

## ANIMALS AND HABITATS

### OVERVIEW



Beneath the blazing sun, you'll find scorching hot sand and beautiful blooming cacti in this hot desert Explorable Scene. Notice the distant rocky outcrop and think about the physical processes that shape this harsh landscape; travel around the scene to observe and compare the different plant and animal life found in an extreme desert habitat.

### KEY FEATURES OF THE SCENE

#### Weather conditions

As your students move around this Explorable Scene, encourage them to look up to the sky. What does the weather look like today? What does the lack of clouds tell us about conditions in the desert? All deserts are arid, or dry, experiencing less than 250 mm (10 inches) of precipitation a year. There are different reasons for this lack of rain depending on their location around the globe. Hot deserts are around the Tropic of Cancer or the Tropic of Capricorn and they experience very warm and dry air descending onto them because of the way that air masses circulate around the equator. Other deserts are in the 'rain shadow' of a range of mountains or are in the centre of a continent so moist air doesn't reach them.



#### Sand

Next ask your students to look down towards the floor. What is the ground like in this desert? The soils of a hot desert are dry and sandy, often looking cracked or baked on the surface where any tiny amounts of water have evaporated away. With summer day time temperatures in the desert exceeding 40°C, the sandy ground becomes very hot, which can be a challenge to animals living here.



#### Plant and animal life

As your students explore the Hot Desert scene, ask them to take notice of the plant life surrounding them: what types of plants can they see, how plentiful or scarce are they, and how much diversity or similarity is there in the types of plants they see? Hot deserts are very dry and while this lack of water is a huge challenge to plants and animals there are organisms which have adapted to survive in this hostile ecosystem. Only a few plants can survive here, and those tend to have small leaves to minimise water loss through transpiration, long tap roots which reach for water up to 10 metres underground, and some succulent plants have ways of storing water. Animals in this habitat are similarly adapted to the scarcity of water and extreme temperatures. Can your students find the reptiles in this desert? How are they suited to it?



### WHAT CAN I EXPLORE?

Within this scene, you can explore the barren sandy landscape of a hot desert, the sun in a bright blue cloudless sky, and a few cactus-like green plants growing around the scene.

**You might also want to explore:**

- The size, shape and position of the sand dunes
- Views of any rocky outcrops in the distance
- Animals that can survive these harsh conditions

#### Subjects Covered



### GEOGRAPHY

#### Explore

As your students move around the hot desert, ask them to think where in the world they could be. What features do your students notice which all hot deserts have in common? What might be different when visiting deserts in different parts of the world?



#### Research

- Locate a hot desert on a map, such as the Sahara or the Arabian Desert. What is the average annual rainfall in a hot desert region?
- What geographical factors influence the lack of precipitation in these areas?

#### Explain

Why are deserts found in certain places on Earth? What unique conditions create a hot desert biome?

### BIOLOGY

#### Explore

As your students travel around this explorable scene, ask them to notice the signs of life, plant or animal, that they can spot.



#### Research

- Choose a desert plant, such as a cactus, date palm tree or acacia, and research their adaptations to survive in hot desert biome.
- Choose a desert animal, such as a camel, scorpion or Fennec fox, and research their adaptations to survive in hot desert biome.

#### Explain

Why is the hot desert a challenging habitat for plants and animals? What plants and animals are adapted to desert life?

### LANGUAGE AND LITERACY

#### Explore

Hot deserts are very distinctive places on Earth. As your students move around the scene, encourage them to use all of their senses to experience this location. Ask them to take notes about what they experience to create a senses poem based on the feeling of being in the desert.



#### Research

- Deserts are very hot, dry places. Work with other students to create a word bank of useful words to use when describing a desert.

#### Explain

Create a senses poem about the experience of being in the desert. What is distinctive about the hot desert environment?

### ART

#### Explore

Ask your students to find a view that they enjoy in this scene and then pause to take the time to fully experience what they are seeing. Ask if they would like to make a few sketches of what they see, noting down light, texture and atmosphere they would like to create in their finished artwork.



#### Research

- Find some art pieces inspired by the desert, such as paintings by John W. Hilton and compare them to the work you have created. What have you done which is similar to other artists?
- How has that captured what it is like to be in a desert?

#### Explain

Use the scene to inspire an artwork on the desert. What images and atmosphere are you trying to capture so that viewers experience the desert?



# COASTAL HABITAT

## ANIMALS AND HABITATS



### OVERVIEW

This Explorable Scene allows students to experience a coastal habitat. While there are many different types of coastal habitat, including rocky cliffs and salt marshes, here students have the opportunity to explore cliffs, a sandy beach and the sea. Viewers might notice the tide going out and leaving wet sand in the intertidal zone, and the gently sloping sandy beach heading up to the cliffs which have been weathered and eroded over the years and include a small shelf where plants such as grasses have taken hold on the tiny, exposed ridge. What further living things might be found in this coastal habitat?

### KEY FEATURES OF THE SCENE

#### Tide

As your students travel through this explorable scene guide them to focus on the intertidal zone, the area of the beach between high and low tide. How are they able to find where it is? Any creatures found in the intertidal zone of this habitat need to be able to survive both underwater when the tide is in, and out of the water when the tide is out. What creatures are living here? Ask your students to compare the appearance of the sand in the region closest to the sea to the sand at the base of the cliffs. What do they notice? Why might we be seeing this difference?



#### Cliffs

While your students explore this coastal habitat scene, encourage them to move to a position to gain a clear view of the profile of the cliffs. What do they notice about the shape and steepness of the cliffs here? Might these be described as hard rock (e.g. chalk) or soft rock (e.g. clay) cliffs? Whilst cliff areas appear static and still to a visitor, what might your students expect to see if they were able to watch many years speed by? It looks like there are several small holes across the face of the cliff; could some seabirds such as sand martins be nesting here? What other creatures might make their homes on the cliff?



#### Plants and animals

Whilst your students are exploring this coastal habitat scene, encourage them to look out for signs of plant life. Where have the grasses managed to find a place to survive, and why here? What conditions are the plants able to cope with on this exposed site? How might the environment on the clifftop be different to on a small shelf on the cliff face? What animals can they see, and how are they sustained by the plant life?



### WHAT CAN I EXPLORE?

Within this scene, you can explore the wet sand of the intertidal zone, the dry sand to the top of the beach which is only covered during spring tides or large storms, the size, shape and rock type of the cliff, and evidence of plant life and in turn the animals who might be supported here.

You might also want to explore:

- The steepness and shape of the beach.
- The current weather conditions and the impact on waves in the sea.

#### Subjects Covered



### CHEMISTRY

#### Explore

As your students explore this scene, encourage them to move to a position to gain a clear view of the profile of the cliffs. What do they notice about the shape and steepness of the cliffs here? Can they suggest anything about the type of rock they could be seeing here? Draw your students' attention to the very base of the cliff at the beach; it appears to be cut under at the base, how might this have occurred? Whilst cliff areas might appear static and still to a visitor, what might your students expect to see if they were able to watch many years speed by?



#### Research

- How do different local rock types change the shoreline in different areas?
- Why might we expect to see differences at the top and the base of the cliffs; what different processes are dominating the weathering and erosion at different sites?

#### Explain

- How do different types of rock respond differently to weathering and erosion?
- What is the impact of large waves during winter storms on cliffs such as these?

### BIOLOGY

#### Explore

Life can be tough in coastal habitats with a salty environment, storms blowing in harsh waves, and dramatic weather differences between summer and winter. Many organisms are able to survive in this unique environment; what sorts of adaptations do you think plants and creatures have to be able to live here?



#### Research

- Choose an organism found in a coastal habitat like this, such as different grasses, beach creatures including the lugworm or crabs, or seabirds who nest in cliffs like the sand martin. Where in the habitat would you find them, and how are they adapted to this environment?

#### Explain

- What are the challenges of surviving in a coastal habitat?
- What are the advantages of this habitat to living things?

### MUSIC

#### Explore

While your students are fully immersed in this scene, ask them to imagine they have been tasked with creating the soundtrack for a nature documentary set at this site. What music and sounds will they select to compliment this setting?



#### Research

- Can you find examples of soundtracks to nature documentaries?
- How are sounds and music used to enhance a viewer's experience of a place?

#### Explain

- What impact do you hope the soundtrack will have on audiences?
- What different feelings or moods might producers try to evoke with the music chosen?

### GEOGRAPHY

#### Explore

As your students explore this coastal habitat scene, ask them to consider the physical factors which have combined to create this particular environment. Consider the local rock type, the ocean conditions and prevailing wave direction, and the height difference between sea level and the local land.



#### Research

- What are conditions like at coastal habitats near to where you live?
- What different types of coastal habitats can be found in your local area?

#### Explain

- Where in the world might we see this type of coastal habitat, with a sandy beach and soft rock cliffs?
- What other sorts of habitats can be found in areas where the land and sea meet? Think about different types of cliffs, types of beaches, and where rivers enter the sea.



# ROCK POOL HABITAT

## ANIMALS AND HABITATS



### OVERVIEW

This Explorable Scene allows viewers to travel through the clear waters of a rock pool. Rock pools, or tide pools, are temporary bodies of water found on the shore which are filled during the high tide and remain in place as the sea drifts out to low tide, before being washed over again with the next incoming tide. The little pools make a dynamic habitat for those who can cope with the changing conditions, and are home to creatures such as starfish, crabs, and limpets.

### KEY FEATURES OF THE SCENE

#### Landscape

Rock pools are found in the dips and cracks of stone areas between the high tide and low tide levels on a shoreline. They become covered by the incoming sea at high tide, then as the waters retreat the pools of sea water are left behind. Some very shallow pools heat up quickly in sun, but deeper ones provide shelter and places to hide for creatures washed in with the sea or who have their home in the pool. Twice a day they are filled with the arrival of the high tide. As your students explore the scene, ask them to think about what physical characteristics mean that a rock pool has formed in this location.



#### Plants

Some seaweed might be clinging to the rocks, whilst others could wash in with each tide. Seaweeds come in greens, browns and red colours, and provide food, shade and shelter to creatures living in these small, rapidly changing habitats. As your students move through the rock pool scene, ask them to notice the plant life present and suggest what resources they need to survive in the rock pool, and what they might be providing for other pool inhabitants.



#### Animals

Anemones and limpets might look as if they are barely moving, but time-lapse footage shows these fascinating creatures are active and move around the rocks searching for the best position with access to food and away from competitive rivals. Any creatures living in a rock pool need to be hardy; as well as temperature changes that come with small pools of water exposed to the sun, they will also experience changes in oxygen levels and water salinity (salt levels) which animals need to be adapted to cope with. Common creatures spotted in rock pool include sea snails, limpets, crabs, sea anemones, and small fish such as the shanny.



### WHAT CAN I EXPLORE?

Within this scene you can explore the clear water of a rock pool, from the dip in the rocks at a point on the shore between high and low tide which has created the pool, to plant life in the form of seaweed, and marine animals such as limpets and bright sea anemones.

#### You might also want to explore:

- What can you infer about the water quality here?
- How would conditions here change over a 24-hour cycle?

#### Subjects Covered



### DESIGN AND TECHNOLOGY

#### Explore

As your students explore the rock pool, encourage them to think about how conditions here might change in a 24-hour cycle. Challenge them to imagine they have been asked by an aquarium to design a rock pool feature. How will they artificially recreate the rock pool environment? What measurements might they want to take about the water to ensure it is a good comparison to a real-world rock pool and also ensure it is safe for the living things to stay healthy?



#### Research

- What key measurements would need to be taken regarding the water quality, and what instruments can be used for this?
- What equipment could be used to create an artificial rock pool environment?

#### Explain

- What would be the most important things to replicate in an artificial rock pool for the marine creatures to live there?

### BIOLOGY

#### Explore

Challenge your students to think about what resources are essential to allow marine life to survive in this habitat. What would be advantageous about living in a rock pool, and what are the unique challenges of this habitat?



#### Research

- Research a marine animal commonly found in a rock pool, for example sea snails, limpets, crabs, sea anemones, and small fish such as the shanny.
- How are they well-suited to this unique environment?

#### Explain

- What adaptations do creatures living in a rock pool need to have to survive here?
- How is life in a rock pool different to life in the open sea?

### GEOGRAPHY

#### Explore

As your students travel around the rock pool, encourage them to think about the physical factors which led to the pool forming in this location. Consider the shape and location of the rocks, and the difference between high and low tide levels at this site.



#### Research

- Where are there rock pools in the coastline near to where you live?
- Where else, away from the sea, might you find a temporary body of water forming?

#### Explain

- What physical factors are required for a rock pool to form?
- Why do some beaches not have rock pools?

### MUSIC

#### Explore

While your students are immersed in the rock pool scene, ask them to imagine they are filming a nature documentary exploring life in this pool. Can they create a musical composition to accompany the scene, whether a soundscape or instrumental piece? What will be the atmosphere and emotion they try to evoke in the audience with their work?



#### Research

- Find examples of background music from nature documentaries.
- How do they accompany the footage shown to engage an audience?

#### Explain

- What atmosphere would you like to accompany your rockpool tour; lively, mysterious, relaxing, or something else?
- What instruments, sound effects, or rhythms will you use to create a musical composition?



# WATER CYCLES

## MATERIALS, PROPERTIES AND STATES

### OVERVIEW

This Explorable Scene details the individual stages and overall process involved in the water cycle from a unique viewing platform. You are able to move around and explore the different component events, such as evaporation, precipitation and how water is absorbed by natural resources and used to support biological growth.

### KEY FEATURES OF THE SCENE

#### The Sun

Encourage your students to look all around them to find the Sun. Driving the water cycle, the energy from the sun warms the ocean water. Evaporation takes place on a huge scale, and water vapour rises unseen into the sky from the surface water.

As the water vapour gets higher and higher, it reaches colder areas of the atmosphere. Here the gaseous vapour turns back into tiny water droplets, and this process is called condensation. Clouds of these droplets form and grow as more water vapour joins and condenses.

#### Precipitation

Within the cloud, the tiny water droplets collide with each other and form larger drops of water. The clouds travel on the air currents and, depending on their location, they might rise up over hills or mountains. When the clouds are full of larger, heavy droplets, or are forced higher by mountains, the droplets fall as rain or as hail or snow, if the atmosphere is cold enough to freeze the liquid water into ice. Encourage your students to notice where the clouds are producing precipitation in this scene.

#### Rivers

As the rain falls to the ground, it might sink into the soil (infiltration), or during heavy rain wash down and run off into local rivers and water courses. Streams and rivers flow down towards the sea, growing greater in volume as additional tributaries join and bring more water. Encourage your students to find the different routes water takes towards the ocean in this scene.

#### Plants

Like all life on Earth, plants rely on water for their basic life processes and their survival. Plants take up water through their roots, drawing out moisture from the surrounding soil. Plants also release some water from their leaves, a process called transpiration. When combined with the evaporation of any water on the ground, in some parts of the world, this evapotranspiration moves enough water vapour into the atmosphere to produce more clouds, continuing the cycle.



#### Subject Covered



### WHAT CAN I EXPLORE?

Within this scene, you can explore the key stages of Earth's water cycle in an easy-to-interpret, illustrated world. Find the Sun, notice water vapour evaporating from the ocean, see clouds over mountains with animated precipitation including rain and snow, watch rivers flow towards the sea and find trees and flowers using water to grow.

#### You might also want to explore:

- The ocean: its role in the water cycle and the impact of warm and cold currents on weather systems.
- Water in storage: snow on mountain summits, glaciers, polar ice and groundwater.
- Human management of the water cycle: where might we expect to find reservoirs, dams and treatment plants for wastewater to return to the water cycle?
- Human use of water: agriculture, industry and domestic uses such as drinking and cleaning. The water footprint of different foods and products.

### GEOGRAPHY

#### Explore

As your students explore the scene, encourage them to consider which stages of the water cycle they see near to their home environment. Which aspects of this illustrated water cycle are most familiar to them, and which process do they not see in their local environment?



#### Research

- Research current data about precipitation in your local area. How much rainfall do you experience in different months?
- Why are there seasonal differences?
- Choose another area of your country to act as a comparison and think about why there might be differences, considering the proximity to the sea, prevailing wind direction, the presence of hills or mountains, and any other factors.

#### Explain

- Are there any rivers or lakes near to where you live?
- What is the most common type of precipitation in your local area, and are there any seasonal changes to this?

### SCIENCE

#### Explore

Water naturally exists in its solid, liquid and gaseous state around the Earth. As your students explore the water cycle scene, encourage them to notice the changes of state happening at different locations around this model world.



#### Research

- What is the effect of salt in the oceans on the freezing point of water?
- What factors influence whether precipitation falls as rain, hail or snow?

#### Explain

- At what points in the water cycle do we see changes through warming (melting and evaporation)?
- Where in the water cycle do we see a change of state driven by cooling (condensation and freezing)?



# COUNTRYSIDE AT NIGHT

## ANIMALS AND HABITATS

### OVERVIEW

Visit the countryside after sunset and see how this landscape changes at night-time. As students travel through this Explorable Scene, encourage them to ask about and investigate the view around them and describe what they can see. What animals are hiding in the darkness?



### KEY FEATURES OF THE SCENE

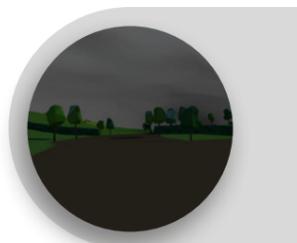
#### Night sky

As your students explore the scene, encourage them to look up to the night sky. What can they see? With less light from artificial sources, such as streetlights and lighting inside homes, it is easier to get a view of the stars in the night sky. Sometimes the glow from cities is called 'light pollution' and locations with the best views of the stars are called Dark Sky places.



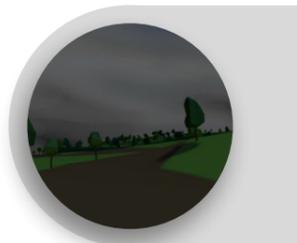
#### Country road

Encourage your students to follow the countryside road. Do you see any streetlights? Why haven't they been installed in this area? You might want to compare to city at night, and think about how many people might be using the road at different locations. Compare this quiet, still scene to the bustling city, where people will still be working, going out for leisure, or even shopping at a 24 hour supermarket. Why is there such a difference between city and countryside?



#### Nocturnal animals

Look carefully to spot the animals coming out as darkness falls. How are they adapted to move around or find food in the night-time? Why do they sleep during the day?



### WHAT CAN I EXPLORE?

Within this scene, you can explore how the open spaces, fields and rolling hills appear once the sun has set over the countryside environment. This simple, block-style countryside allows students to explore the area after dark and discuss what creatures are making their way through the landscape at night.

#### Subjects Covered



### BIOLOGY

#### Explore

As your students explore this scene, ask them to think about what different animals might come out at night here.



#### Research

- Choose a nocturnal animal that lives in the countryside such as a fox, badger or owl.
- How are they well suited to being able to explore the dark world at night?
- What does this animal eat during the night?

#### Explain

- What are the advantages to animals of exploring in the night-time rather than the day?
- What might be more challenging about moving around in the night, and how might different animals overcome this?

### ART

#### Explore

While immersed in the countryside scene, encourage your students to think of where they might see animals at night, such as around the trees or flying in the sky. What different animals might be in this nocturnal habitat? Challenge your students to create a picture of the animal's habitat at night.



#### Research

- Can you find a picture book which features animals coming out at night?
- How has the illustrator created a night-time image?

#### Explain

- Create an image of the animal's habitat as experience in the scene, thinking about the colours you will use to show the viewer that it is night-time. What different animals will be included in the image?

### PHYSICS

#### Explore

As your students explore the scene, ask them to notice what light is allowing them to see. As an extension, comparison could be made with the city night scene, noting the different natural and artificial sources of light in rural and urban areas.



#### Research

- Why is it easy to see the stars in the countryside compared to the city?
- Why is the moon so bright; is it a source of light, or is something else making it appear bright?

#### Explain

- Where are the sources of light in the countryside?
- What sources of light are natural and what has been made by people?

### LANGUAGE AND LITERACY

#### Explore

While your students are immersed in the scene, ask them to imagine that a character has travelled to the countryside to explore. Are they looking for nocturnal animals, or trying to get a clear view of the stars? Write a short adventure story about a trip to the countryside at night.



#### Research

- Can you find a story about a night-time adventure?
- Try reading *The Light in the Night*, *The Night Pirates*, or a book from your school's collection.

#### Explain

- Create a word bank with useful words and phrases to describe the view of the countryside at night. Use as many of these as you can in your short adventure story.



# COUNTRYSIDE HABITAT

## ANIMALS AND HABITATS



### OVERVIEW

Visit the countryside and try to spot elements of the natural physical landscape and areas where humans have made their impact visible. As students travel through this Explorable Scene, encourage them to ask about and investigate the view around them and describe what they can see.

### KEY FEATURES OF THE SCENE

#### Open space

Move around this open space and encourage your students to think about what animals might live here, what habitats there might be and who might live or work here. Consider how the open space can be good to help people stay calm and relaxed – perhaps play an audio track of countryside noises for additional ambience.



#### Cattle crossing

Ask the students why cattle crossings are so important and what purpose they serve for farmers and their livestock. Consider where you might find cattle crossings close by in your local community. Explain to the students why these are really important for the safety of the animals and for human being who may use the fields and countryside for leisure activities, such as exercise or exploring.



#### Greenery

Your students may notice that unlike a forest or wooded area, this countryside landscape only has a sparse population of greenery. Ask the students why fields may only have a few trees and how the trees might help local wildlife. Trees and greenery may help provide protection, habitats and shelter for lots of animals and creatures who live close by.



### WHAT CAN I EXPLORE?

Within this scene, you can explore how the open spaces, fields and rolling hills all work to create a harmonious, peaceful and serene environment. This colourful, block-style countryside scene shows the simplicity and beauty of the countryside with all of its natural greenery. Look for the wild and domesticated animals in the landscape and discuss where they can be found.

#### Subjects Covered



### PHYSICAL GEOGRAPHY

#### Explore

Guide your students to explore how the countryside terrain is uneven, mis-levelled and appears to vary with hills and dips. Consider why people might choose to build their houses or farmhouses in the countryside and how this can be helpful for them. Suggest to your students to explore all parts of the scene so they can see how the rolling hills and hidden dips changes what is visible in the horizon.



#### Research

- Why is the countryside so important to some people?
- How do different parts of the countryside compare to each other – do they have different terrain?

#### Explain

- Why might rural, countryside areas be so uneven and hilly?
- Why might some farmers choose to have their crops or livestock so far away from big cities?
- Think of examples of rural countryside your students know and compare them to this countryside landscape – how are they similar or different?

### LANGUAGE AND LITERACY

#### Explore

Allow your students to explore this vast landscape and think about a specific character who might live in, work in or simply visit this countryside landscape scene. Encourage them to think about what job they might have here, where they might live or why they would want to visit. Guide them to create a character profile about this person and start thinking about a typical day for them in the countryside.



#### Research

- What jobs can people have when they work in the countryside – do they have to be specific to the landscape?
- Why do some people prefer the countryside way of life to living in a large, urban city?

#### Explain

- Why is your character in the countryside?
- How did they get here?
- What do they do when they are in the countryside?
- Guide students to keep revisiting the scene and be fully immersed in this colourful, simple and happy landscape.

### SOCIAL STUDIES / PSHE

#### Explore

Explore this scene and consider what it might be like to live in the countryside: all of the shops and local amenities are some distance away, your job may be close by (or you may have to drive/catch the bus to reach it) and you have very few other people and services around you. Compare this to the 'City Landscape' scene and consider how these two environments compare – both the benefits and difficulties of living and working in both environments.



#### Research

- Which important countryside locations do people around the world think are the nicest to live in?
- Research rural places in the United Kingdom, such as the Peak District, the Cotswolds, Powys, Isle Of Skye, and the Lake District. How do different these locations compare to each other and why is this?

#### Explain

- Discuss with your students that more people than ever before are choosing to live in large, urban cities instead of the countryside. Ask them to imagine they are advising different people (each with different jobs) where to live.
- Where might a farmer, a banker, a teacher, a doctor, a businessperson or a shop keeper want to live and why?
- How does living farther away from people impact some of these jobs?

### HUMAN GEOGRAPHY

#### Explore

Walk around this huge scene and suggest to your students how sparsely populated it appears to be. Guide them to focus on the fact there are very few human-made structures and that most of what is visible is naturally occurring. There is a small amount of evidence that human beings might work or visit here, but most of what is viewable is naturally growing from the Earth.



#### Research

- How have human beings impacted or changed the countryside over time?
- Why might fences and gates be important in countryside living and work?

#### Explain

- What makes your students think human beings might live or work close by?
- Why is the countryside's infrastructure so different to that of a town or city?
- What different smells, sounds and tastes would you be able to experience in the countryside?



# POLAR HABITAT

## ANIMALS AND HABITATS

### OVERVIEW



This Explorable Scene takes students to the extremes of north and south on planet Earth to discover the polar landscape. The area surrounding the North Pole is known as the Arctic, while around the South Pole we find the Antarctic. Both these habitats are incredibly cold, covered in snow and ice, and experience a long dark night lasting several months during the peak of their winter. There are also differences; the northern Arctic is closer to other land masses so sees a greater diversity of wildlife, but iconic creatures are found surviving in both tough environments.

### KEY FEATURES OF THE SCENE

#### Expanses of snow and ice

As your students explore this scene they're bound to notice the huge expanse of snow and ice that is characteristic of polar regions. While on the surface the areas surrounding the North and South Pole appear similar in their snowy covering, underneath they are very different, with the North Pole sitting above frozen sea ice but Antarctica being a continent of land covered in ice and snow, and therefore higher altitudes are found at the South Pole compared to the flatter landscape of the North Pole.



#### Coast and ocean

The cold waters of polar seas are actually a key part of these environments. As the seasons change through summer and winter the extent of the sea ice will expand or begin to thaw and melt, depending on how conditions are changing. An ice floe is a large pack of flat floating ice which has formed on the sea, while an iceberg is a large piece of freshwater ice that has broken off a glacier or an ice shelf and is floating freely in open sea water. The seas around polar region hold a rich diversity of life, from tiny plankton to huge whales.



#### Weather conditions

What is the weather like today? Despite all the snow and ice you can see, polar regions are considered deserts because levels of precipitation (rain or snow) are so low; most of the snow and ice has been there for many years as it has not been warm enough to thaw and melt. For part of the year the extreme poles experience a 'midnight sun' where the sun never sets below the horizon for several months, and the opposite to that is many weeks of winter darkness when the sun does not rise in the sky.



### WHAT CAN I EXPLORE?

Within this scene, you can explore a model of a typical polar landscape, with vast expanses of snow and ice, icebergs floating just off the coast, and a bright clear sky associated with the long daylight hours of high summer.

#### You might also want to explore:

- Formations and structures in the ice.
- Conditions on the ocean.
- Different animals found living in the Arctic and Antarctic regions.
- Why polar environments are important for scientific research.

#### Subjects Covered



### BIOLOGY

#### Explore

As your students explore the polar landscape, encourage them to think of some of the reasons why this is such a challenging place to survive. Although you won't find any large plants or trees in polar habitats, tiny plant life such as different types of moss and lichen can be found in some areas, and there is more food to be found in the cold ocean waters.



#### Research

- Choose the North or South pole. Research a creature that lives here and their place in the local food web; where do they find their food, and do any other creatures prey on this animal?
- Compare with other students' work to build up a picture of the ecosystem in polar regions.

#### Explain

- What food sources might be available in this harsh landscape?
- What do animals need to survive in these conditions?

### GEOGRAPHY

#### Explore

As your students explore this scene ask them to describe the physical landscape. What do they notice about the polar region? Describe the features of the snowy landscape, anything they notice around the coast, and the weather conditions in the scene.



#### Research

- What is the difference between the North and South Poles in terms of land mass and sea ice?
- Why are these polar areas described as a desert?

#### Explain

- What are the key characteristic of a polar landscape?
- How is this region different to other snowy locations on Earth, such as mountain tops?

### PHYSICS

#### Explore

As your students explore the scene, encourage them to notice the bright daytime sky. Due to the way that planet Earth spins on its tilted axis, the extremes of north and south experience very long light summers and long dark winters, with just a brief spring and autumn between. Make a sketch of the Sun and Earth showing Earth's tilt and its position for December and June. Can this sketch help you explain why there are such extremes of day and night in polar regions?



#### Research

- Find a settlement in the far north, such as Honningsvåg in Norway. Compare the hours of day and night at different times of the year.
- Why is this seasonal difference more extreme in locations closer to Earth's poles?

#### Explain

- Estimate the latitude of your home area; where is it between the equator and your nearest pole? Add your location on to your sketch of Earth.
- How does day and night length change with from December to June where you live?

### ART

#### Explore

As your students are immersed in the scene, ask them to explore and take in a favourite view that they find. Encourage them to make a sketch of what they can see of the polar landscape, and then work that up into a larger piece of art; this could be a painting with whites and blues as the palette, or a collage using different pieces of white and blue materials. Can they include a creature such as a polar bear or Arctic fox in the artwork? How effective is this animal's camouflage?



#### Research

- Find a picture book featuring characters from a polar environment, such as penguins, whales, or polar bears. How has the illustrator created an image of a polar landscape?

#### Explain

- Create a word bank with words to describe the look of the polar landscape.
- How are some animals able to blend in to this harsh environment?

# TRIP THROUGH TIME

-  **1 Prehistoric** - Millions of years ago, when dinosaurs roamed the Earth
-  **2 Early Mankind** - 3500BCE – 1CE: ancient societies, amazing monuments
-  **3 Early Civilisation** - 0 – 1200CE: from Antiquity to the Middle Ages
-  **4 Age of Exploration** - 1200 – 1700: plagues, renaissance and discovery
-  **5 Age of Revolution** - 1700 – 1900: industrial, French and American Revolutions
-  **6 Modern History** - 1900 and beyond: world wars to space travel



# TRIP THROUGH TIME



## OVERVIEW

Explore the past like you never have before. From a time before humanity to our recent past, become fully immersed in the way things were. The zones in Trip Through Time Land are divided into chronological eras to support your students' understanding: Prehistoric; Early Mankind; Early Civilisation; Age of Exploration; Age of Revolution; and Modern World.





# WW1 TRENCH

## MODERN WORLD

### OVERVIEW

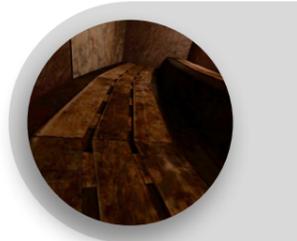
This Explorable Scene takes you right to the frontline of the battlefield in World War One. Explore part of a network of narrow, cramped trenches that were a key feature of battle during the First World War. Experience how the dimly lit, muddy and uncomfortable trenches felt for the soldiers who called this their home and their place of work for many years between 1914 and 1918. Life was tough for the many troops in the battlefield trenches and this experience will give you some insight as to how soldiers worked and lived.



### KEY FEATURES OF THE SCENE

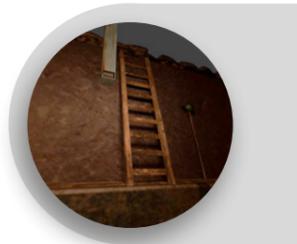
#### Floor of trench

The floor of the trench tells a story all on its own. As you walk through the trench, many of the features of the defensive fortification are on display to present the daily experiences of soldiers during the war. They were very muddy, uncomfortable and the toilets overflowed. These conditions caused some soldiers to develop medical problems such as trench foot. The floors are boarded for durability and to try to provide some element of cleanliness for soldiers who spend many hours walking and working in these trenches.



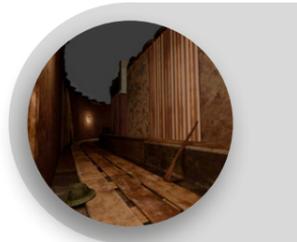
#### Trench ladder and wall

Trenches were long, narrow ditches dug into the ground where soldiers lived. Trenches typically had an embankment at the top and a barbed wire fence. Often, trenches in World War I would be reinforced with sandbags and wooden beams. Trenches needed to be repaired constantly to prevent erosion from the weather and from enemy bombs and gunfire. It took 450 men six hours to build around 250 metres of British trenches.



#### Weaponry

At the start of the war, most soldiers carried only a rifle and a bayonet, and most soldiers within the same small unit were similarly armed. As the war progressed, armies used a wider variety of weapons to better equip their troops for trench fighting and attacks across No Man's Land, including grenades, rifle grenades, mortars, and several types of machine guns. Small units of eight to 30 soldiers, came to rely on a balance of rifles, machine guns, and other weapons. Training for raids and attacks emphasised how firepower, movement, and innovation could be used to go through, or around, enemy strong points.



### WHAT CAN I EXPLORE?

Within this scene, you can explore the environment and context of WW1 trench life and provide students with the opportunity to explore the cramped, narrow and dirty tunnels which became the frontline of the war.

#### You might also want to explore:

- The crates of resources scattered around
- The curved shape and form of the trench
- The indents and sheltered sections.

#### Subjects Covered



### HISTORY

#### Explore

Explore and investigate the artefacts and construction of this scene. Encourage students to consider the structure and design of the trench and why this might be effective for warfare. Guide your students around the scene and get them to focus on specific points of strategic importance, perhaps the ladder, the sheltered area or something they have identified themselves.



#### Research

- What disease did many soldiers get from the constant moisture in the trenches?
- What were 'duckboards' in the trenches?

#### Explain

- Explore the purpose and evolution of trenches throughout the war. Why were trenches built and in what way did they shape the type of warfare which was pursued? Consider how life had to continue and how basic physical needs, such as eating, drinking and sleeping were met. When not fighting, what would soldiers do in the trenches?

### DESIGN AND TECHNOLOGY

#### Explore

Guide the students around the trench and encourage them to take note of the different artefacts in this scene and how they are built, constructed, designed and where they are used within the scene.



#### Research

- What material is this artefact made from?
- How would this artefact be recreated?
- Would we need this tool in modern times and why?

#### Explain

- Ask the students to choose one particular artefact of the scene and explain its purpose and how soldiers may have used it within World War One. Why is this artefact so important for trench life?
- How might this artefact be used today?
- Students should now research their chosen artefact, plan to design and create this artefact.

### LANGUAGE AND LITERACY

#### Explore

Explore this scene and focus on the emotion that soldiers may have felt when working, living and sleeping in this type of environment. Focus on how the trenches are cramped, small, damp and exposed to the elements. Guide students to identify specific aspects of the trenches which would be effective when creating poetry or other written materials.



#### Research

- How is trench life comparable to modern warfare?
- Why were trenches so overwhelming for many soldiers?

#### Explain

- How might life have been challenging for soldiers?
- Why might the trenches have been a place of mixed emotions and feelings?
- What metaphorical language could be used to exemplify the extremities of trench life?

### CITIZENSHIP / SOCIAL STUDIES

#### Explore

Take time to explore this scene and consider why trenches were historically an important factor in traditional warfare. Consider the design, layout and structure of a warzone and how trenches were a core part of that landscape.



#### Research

- How do nation states fight wars in the modern era?
- What would the modern-day equivalent of a trench be?
- Are there any locations on Earth which still have a trench-like boundary in an active warzone?

#### Explain

- How have the 'boundaries', at which a war was traditionally fought, changed over recent years? Would trench warfare be seen in modern day conflicts and why?



# LONDON BLITZ

## MODERN WORLD

### OVERVIEW

This Explorable Scene takes you into a London Underground station during the Second World War. The heavy and frequent bombing attacks on London and other cities was known as the 'Blitz'. Blitz is a shortened form of the German word 'Blitzkrieg' (lightning war). Night after night, from September 1940 until May 1941, German bombers attacked British cities, ports and industrial areas. London was bombed every day and night, bar one, for 11 weeks. One third of London was destroyed. Most air raids happened at night and, during the Blitz, 32,000 civilians were killed and 87,000 were seriously injured. As such, many people sought shelter deep underground, such as Underground stations like this one.



### KEY FEATURES OF THE SCENE

#### Gathering together

Whilst just a few people feature in this model to allow exploration, in reality, many underground stations were full of people and very crowded. As your students explore the scene, encourage them to think about what might have drawn people here during the Blitz. Consider aspects such as safety, community, and how easy the stations were to access.



#### Trying to rest

It would often take all night before the 'all clear' was sounded and people were safe to return to their homes. As your students explore the scene, ask them how they would try to get some rest if they were in this situation. What about being in this location might be comfortable and reassuring, and what might make it difficult to sleep?



#### Posters and flyers

In the 1930s and 40s, media was very different to how it is today and public information was often shared through poster campaigns. As your students explore the scene, ask them to notice the flyers and posters which can be seen around the underground station. What messages are they trying to share with the public? What do your students think about the style and images shown?



### WHAT CAN I EXPLORE?

Within this scene you can explore a London Underground station being used as an overnight air-raid shelter during the time of the Second World War Blitz. Notice the structure of the station, the infrastructure such as clocks and lights, the posters and flyers around the space, and how people have made themselves comfortable while sheltering here.

You might also want to explore:

- What materials has this station been built from?
- What about the design of the station makes it appealing as a shelter?
- How different would this station have been during the daytime?

#### Subjects Covered



### HISTORY

#### Explore

As your students travel around the Explorable Scene, ask them to try to imagine why people were motivated to stay in an Underground station during the Blitz in London. What drew people to shelter here rather than somewhere else?



#### Research

- What can you find out about the experience of sheltering in an Underground station?
- How did officials respond to the influx of people into Underground stations?

#### Explain

- What would it feel like to be here at that time?
- What would be the advantages compared to staying in a small shelter above ground?

### MUSIC

#### Explore

As your students visit this Explorable Scene, ask them what they imagine the atmosphere was like here during the months of the Blitz? How might communities have kept morale high?



#### Research

- What songs were popular in the UK during the time of the Second World War?
- What role do you think popular songs had in everyday life during the years of war?

#### Explain

- How do people keep feeling positive during difficult times?
- Could music and song have played a role in connecting communities and lifting spirits during these difficult months?

### ART AND DESIGN

#### Explore

Ask your students to focus on the posters and flyers they see as they travel through this Explorable Scene. Take note of what the different messages are, from advertising to government campaigns, and describe any accompanying imagery.



#### Research

- What posters and slogans were most widespread in the United Kingdom during the Second World War?
- What messages did the government try to share with the public?

#### Explain

- What sorts of messages are being shared with the public through posters?
- Challenge your students to think of their own wartime message to share with the public, whether it is using fewer resources or supporting the war effort, and ask them to design a slogan and visual poster to display in an Underground station.

### DESIGN AND TECHNOLOGY

#### Explore

As your students move around the Explorable Scene, ask them to notice the physical features of the station: what materials it is built from, the shapes of the roofs and walls, and consider how deep underground it might be and what would be surrounding it.



#### Research

- Can you find out what different air raid shelter designs were like?
- How did different designs protect people during the Blitz?

#### Explain

- What makes Underground stations like this an effective shelter during the Blitz?
- Sketch a 'blueprint' style image of the station and label any features which would be advantageous when using the space as an air raid shelter.



# BERLIN WALL

## MODERN HISTORY

### OVERVIEW

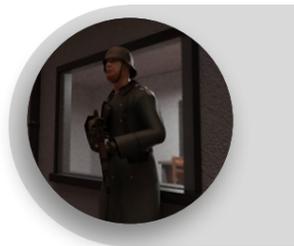
Walk your students along a length of the Berlin Wall to give them a sense of how life in a divided Germany changed from 1961 to 1989, and how the wall remained until its dramatic destruction. The German Democratic Republic (GDR, or East Germany) began construction in August 1961, to prevent defection from the GDR, and the wall quickly became a physical symbol of the Iron Curtain between the Eastern Bloc and Western Europe during the Cold War era.



### KEY FEATURES OF THE SCENE

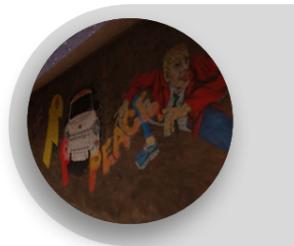
#### Surveillance and Control

In this scene, you can see a number of clues that indicate just what the atmosphere around the border between East and West Germany was like during the Cold War. Direct students to look out for the checkpoint, armed guards and watchtower. From 1961 until its fall in 1989, over 100,000 people attempted to leave the GDR via the Wall, with approximately 5,000 succeeding. An estimated 136 to 200 people were killed during their attempt.



#### Graffiti

In the 1980s, the Berlin Wall was reconstructed – this new wall was 14 feet tall. Graffiti artists from around the world used the Western side of this wall as a canvas to express their views, and the graffiti on the wall soon became a popular tourist attraction. Thierry Noir was among the first to paint on the Berlin Wall, and as destruction began in 1989 he climbed through a hole in the wall to paint on 'the other side'.



#### The Fall

After a bungled public announcement by East Germany on 9 November 1989, citizens began crowding at the Berlin Wall and demanding that guards open the gates. After hours of confusion, the border was opened and East Germans flooded through, rejoicing with their West German counterparts and climbing to the top of the wall together. People took demolition into their own hands using whatever tools they had, ahead of the official demolition in June 1990. In this scene, we have depicted some sections of the wall already chipped away.



### WHAT CAN I EXPLORE?

Walk along the Berlin Wall near a checkpoint, taking a stroll through time as the wall becomes covered with graffiti and finally begins to crumble.

You might also want to explore:

- The East German guards
- The watchtower on the East German side
- The checkpoint buildings and barriers

#### Subjects Covered



### DRAMATIC ARTS

#### Explore

In this scene we can see only the guards – no civilians are present. But we can use other resources to help us imagine the atmosphere on the night the Wall started to come down. As a group or class, each student can take on the role of either an East German, a West German, or GDR guard, examining how those people may have felt, and what their actions may have been in the months following the fall of the Berlin Wall.



#### Research

- Find some real-life accounts from each of the groups of people mentioned above. Use these testimonies to pull together ideas about the mixed feelings many people had about this event. Consider the different factors (work or money, family, political views and personal preferences) that would have influenced the decisions of East and West Germans at this time.

#### Explain

- If you are an East German, what are your reasons for deciding to stay or to defect to West Germany?
- If you are a West German, how do you feel about the people entering your side of the city?
- If you are a guard, how do you feel about this sudden change in the balance of power?

### HISTORY

#### Explore

Create a timeline starting at the end of the Second World War, and ending with the completion of the wall's demolition in November 1991.



#### Research

- Find out about the events that led up to the building of the Berlin Wall in the wake of WW2. What was daily life like in East Germany during this time?
- Why would citizens want to emigrate to Western Europe?

#### Explain

- Find out about the events that led up to the building of the Berlin Wall in the wake of WW2. What was daily life like in East Germany during this time?
- Why would citizens want to emigrate to Western Europe?

### LANGUAGE AND LITERACY

#### Explore

How might it have felt to live in East Germany during the Cold War, and to then see the Berlin Wall be pulled apart? Research and write a diary entry from the perspective of a young person who was present on that evening in November 1989 when the borders were finally opened once more.



#### Research

- What were opportunities like for young people in the late eighties in the GDR?
- Did most young citizens agree with the state's views, or were they in favour of reunification?

#### Explain

- Use your research to take on the perspective of your character and get across their thoughts and feelings. Why might those feelings be a mixture of positive and negative?
- How do you think their parents may have felt?

### ART AND DESIGN

#### Explore

Germans (and artists from around the world) used the wall as a canvas in the 1980s, turning this symbol of division into a gallery of expression. Its democratic nature – anyone brave enough to approach the wall had the opportunity to paint on it – was at odds with the experiences of those living on the other side.



#### Research

- Which artists were renowned for their work on the Berlin Wall?
- Was there any controversy surrounding international artists coming to Germany to paint it?

#### Explain

- Use the scene as inspiration for your own piece of graffiti-inspired artwork on the theme of unity. What elements have you used to make your work eye-catching, bearing in mind it would be surrounded by other graffiti (and could even be painted over)?



# D-DAY LANDING

## MODERN HISTORY

### OVERVIEW

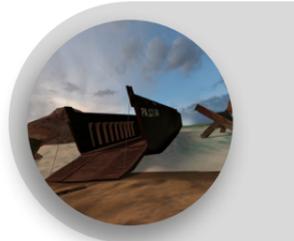
Experience a beach of Normandy in Northern France on Tuesday 6 June 1944; five years into the devastation of World War Two, France is occupied by German forces and today is the start of the Normandy landings, often called D-Day. Some 156,000 troops from American, British, Canadian and other Allied forces landed on the beaches across an 80 kilometre stretch of the Normandy coast, arriving in boats and supported by aircraft flying above.



### KEY FEATURES OF THE SCENE

#### Boats

As well as safely transporting over 155,000 troops to the five beaches of the Normandy landings (Utah, Omaha, Gold, Juno and Sword), the boats also needed to transport trucks, tanks and other equipment to begin the Allied invasion into occupied northern France. Close to 7,000 different vessels were involved in bringing troops and equipment to the beaches. How can you tell that these ships are well-suited to transporting trucks for this operation?



#### Defences

The shoreline of the Normandy coast was protected by Nazi Germany with several layers of defences. Although the Allies successfully managed to spread false information that they were planning an invasion further east and many Nazi troops were sent to that area, the beaches of Normandy were still strongly defended. In this scene, students can see examples of 'Czech hedgehog' defences made from metal which would trap tanks or boats trying to approach the shore. German gun emplacements sit high on the tops of the cliffs above the beaches.



#### Equipment

Soldiers of the Second World War would have been provided with their uniform, strong boots, a weapon and personal equipment including a water bottle and basic rations of food. Although the Allies successfully took all five Normandy beaches by nightfall on the 6th of June, there were sadly many losses experienced during the operation. Due to the chaotic nature of the event, the number of fallen soldiers is not accurately recorded, but estimates suggest thousands lost their life across these five beaches.



### WHAT CAN I EXPLORE?

Within this scene, you can explore one of the five stretches of beach in occupied France used in the Normandy Landings, often referred to as the D-Day landings. Explore the wide sand and steep cliffs, the defences used by Nazi Germany, and the boats used to transport Allied troops to the beach. See the equipment used by soldiers of the Second World War and pause to reflect on the huge human cost of the devastating conflict.

You might also want to explore:

- The challenging terrain
- The coastline.

#### Subjects Covered



### DESIGN AND TECHNOLOGY

#### Explore

As your student are in this scene, ask them to focus on the boats they can see. What shape and design are the vessels? How might they be suited to transporting the heavy loads needed during the Normandy landings? Encourage your students to sketch a design of a boat they think would be ideal for transporting heavy loads. Extend the activity by using aluminium foil to create different boat designs and float the boats in a sink of water to see how much each design can hold by filling with various small items.



#### Research

- Research some of the different boats used for the Normandy landings, such as HMS Belfast or a Higgins Boat (the Landing Craft Vehicle and Personnel or LCVP). Did they have different roles to play in this event?

#### Explain

- How do different boat designs compromise between the ability to travel quickly in the water, to be manoeuvrable, and to take heavy loads? What use do you think the boats in this scene are designed for?

### HISTORY

#### Explore

Codenamed 'Operation Overlord', the Allied landings on the beaches of Normandy marked the start of a long and challenging campaign to liberate north-west Europe from Nazi occupation. As your students move around this scene, encourage them to think about the historical context of this event: what had been happening in the Second World War immediately before these landings and which nations were working together on this operation?



#### Research

- What events led up to Operation Overlord?
- What impact did the D-Day landings have on the overall course of the Second World War?

#### Explain

- Why was this location chosen to invade occupied France? How might the support from air forces have influenced the experience on the beaches?

### LANGUAGE AND LITERACY

#### Explore

Many civilians would have heard about the Normandy Landings through news bulletins broadcast over radio. As your students move around the scene, encourage them to use the experience of being on the beach to create a script for a short radio news segment about the D-Day landings.



#### Research

- How did most civilians keep informed of developments during the Second World War?
- How were the Normandy Landings reported in the news?

#### Explain

- What will people want to know about the D-Day beach landings? What different words and language could be used to share what is happening during the Normandy Landings?

### SOCIAL STUDIES

#### Explore

The Normandy landings were an international effort. Whilst American, British and Canadian troops may have made up the greatest numbers, they were joined by Australian, French, Polish and countless other countries' naval, air or ground support. The operation was led by US General Dwight D Eisenhower, who needed to balance national and international interests.



#### Research

- Which nations were involved in the Normandy Landings?
- What might have been some of the advantages and challenges of coordinating so many forces to work together on this operation?

#### Explain

- Why was international cooperation and collaboration so important during the Second World War? How might the different national troops be identified during the operation?



# INDUSTRIAL REVOLUTION

## AGE OF REVOLUTION

### OVERVIEW



In the period from around 1760 to 1840, an enormous change was happening in Europe and the United States: manufacturing was changing in ways that had never been seen before. Explore a factory from the height of the industrial revolution in England, at the beginning of the 19th century. See the technological developments of the era, both inside the factory gates and outside them.

### KEY FEATURES OF THE SCENE

#### Inside the Factory

As soon as you step through the imposing factory gates, you'll notice just how big this building is. Such a cavernous space would have been unfamiliar for most at the start of the industrial revolution (unless they were in a large church). Listen for the rhythmic sounds of many looms at work and imagine what it would be like to work all day in this environment.



#### Water Power

Outside the factory, you'll see a canal and water wheel. Canals were a critical part of infrastructure during the 18th and 19th centuries, and were of particular importance before the railway network was built across Britain. Boats were used to transport raw materials to factories, and finished goods to consumers. Water wasn't just used for transport; its power could also be harnessed to drive machinery, using water wheels like the one in this scene. The most powerful water wheel in the UK was the 100hp high breastshot wheel at Quarry Bank Mill near Manchester.



#### The Age of Steam

Near the canal is a steam train (listen out for it powering up as the coal is shovelled into the engine). This was another crucial invention of the age. The first steam locomotive was designed by Richard Trevithick in 1802, and they were quickly pressed into service to haul freight to and from steelworks and collieries. As the rail network expanded in the 1830s, this much faster form of transport led to the decline of canals as a primary method for moving goods.



### WHAT CAN I EXPLORE?

In this scene, you can explore the area surrounding a factory dating from the late 18th century, at the height of the industrial revolution. Look inside the factory to find an example of the manufacturing equipment that was used (a spinning jenny).

#### You might also want to explore:

- The canal and steam train: how were both these forms of transport critical to the development of large-scale manufacturing?
- The water wheel, which could be used to power machinery.

#### Subjects Covered



### HISTORY

#### Explore

Take a look around at all the technology you can see in this scene – technology that was cutting edge at the time. Who invented the power loom, steam engine or locomotive? Who designed the railway network's bridges and tunnels?



#### Research

- Find out about a key figure who had an impact on the industrial revolution. Some suggestions include: Isambard Kingdom Brunel, James Hargreaves, James Watt, Richard Trevithick, George Stephenson and Richard Arkwright. What was their contribution, and how did it make a difference?

#### Explain

- Create a fact file about the person you have chosen. Explain to a partner how their inventions or contributions changed working life for many people. How are they still having an impact today?

### HISTORY

#### Explore

Before the industrial revolution, most working people lived in rural settings and worked on farms. The shift in focus to manufacturing on a large scale caused a massive change in their daily lives. Looking at this scene, think about just how different it would be in comparison to the workplaces people were used to (you might want to use our Countryside Landscape scene to emphasise this).



#### Research

- How did the industrial revolution change the lives of ordinary people in Britain and beyond?
- Where did people live in order to work in the new factories?
- What changes occurred in their daily routines?

#### Explain

- Do you think the industrial revolution was a good or a bad thing? Why?

### DESIGN AND TECHNOLOGY

#### Explore

Find the water wheel outside the factory. Water power was very important during the early stages of the industrial revolution and many mills such as this one would be powered by a water wheel. How do you think a wheel like this could generate enough power to drive the machinery for a whole factory?



#### Research

- Find out about how water wheels work. Where does the energy come from?
- How is it harnessed and used to power machinery?
- Do you have access to any water toys that use a similar principle?

#### Explain

- Use what you have found out to design a prototype of a water wheel. What materials will you use and why?

### LANGUAGE AND LITERACY

#### Explore

Take a look around the factory and look closely at the spinning jenny loom. Up until 1833, there were no restrictions surrounding child labour in the United Kingdom. Young children were particularly useful in the factories because of their small size; they could easily slip between machines to re-thread them, or even climb underneath to fix problems. Unfortunately, this job was extremely dangerous and must have been very frightening.



#### Research

- What exactly did children do in factories?
- Why did they need to go work, instead of being at school?

#### Explain

- Write a diary entry from the perspective of a child worker in a textile factory. Make sure the language you use conveys your feelings and fears.



# COLONIAL AMERICA

## AGE OF REVOLUTION

### OVERVIEW

This Explorable Scene provides a first-hand experience of what Colonial America may have been like for European settlers: a vast land settled by Spanish, Dutch, French and English immigrants who established colonies such as St. Augustine, Florida; Jamestown, Virginia; and Roanoke, in present-day North Carolina. This scene shows you the type of living conditions, infrastructure and tools early European settlers had when they first arrived in America. Start your journey inside the colonial town and explore their way of life; venture outside, towards the ships, to see how important coastal access truly was during the 1600s.



### KEY FEATURES OF THE SCENE

#### Housing

Take a look at the different styles of housing, some of which was imported from native Europe, based around what the settlers already knew. Many of these buildings were constructed with raw materials in the local area and provided much-needed shelter, protection and warmth from the local weather. How did the European style of architecture influence the early settlers?



#### Weaponry

Many early settlements were fortified with weaponry and armour. There are many reasons for this, partly as a way of maintaining and assuring an element from European powers who were seeking to control these new lands; other reasons for having these settlements protected may have been based around protection from native wildlife and other natural threats. Why was weaponry so important to early settlers in America?



#### Boats

As the only way Europeans could reach America was by boat, many sailors would depart from the European shores and spend weeks, months and sometimes longer travelling across the Atlantic Ocean. Upon their arrival in America, they would unload raw materials, food, medical supplies and other goods to provide the inhabitants of these new towns with all of the resources they needed to maintain a good standard of living.



### WHAT CAN I EXPLORE?

Within this scene, you can explore the vast open space of the humble beginnings that the European settlers had when they first arrived in America. Take a look around their settlement to see how they brought European culture, ideas and customs to this New World.

You might also want to explore:

- The characters and how they are dressed.
- The emptiness and rural surroundings around the settlement.
- How the settlement is guarded and protected by a high wall.

#### Subjects Covered



### HISTORY

#### Explore

Guide your students around this scene and direct them to the different locations which indicate its time period, its setting and its context. Ask your students to consider how the early European settlers were able to create these townships, why they wanted to expand out of Europe and the purpose of the early travellers' journeys.



#### Research

- When did these new settlements become more hostile to European powers?
- Where were many of the Colonial American settlements based (in modern day America)?

#### Explain

- Why did Europeans travel to America?
- What was the intention and purpose of setting up towns and colonies in the New World?
- How did these small towns become such a powerful nation in a relatively short period of time?

### SOCIAL STUDIES

#### Explore

Encourage your students to independently explore the space, infrastructure and setup of this Colonial American town. Ask them why European settlers may have made such a challenging, long journey to reach these new shores and consider why their towns are protected so comprehensively.



#### Research

- How did these small communities grow to become so influential over political and social issues across the world at the time?
- Were the settlements governed in the same way as European monarchs wanted?

#### Explain

- What did the New World have which Europe did not?
- How were settlements like this born out of what was happening in Europe during the 1400s, 1500s and 1600s?
- Why was Colonial America so important for various European nations at the time?

### GEOGRAPHY

#### Explore

Provide time for your students to move around the scene and explore both its natural, physical geography, as well as the impact its European settlers have had on its human geography. How has the physical landscape enabled settlers to build and construct a town settlement so easily?



#### Research

- Which settlements have stood the test of time?
- How have these early settlements influenced the human geography of modern America – such as population density and the location of significant places?

#### Explain

- How does a settlement's proximity to open water influence its growth and prosperity?
- Why did settlers look for flat coastal areas to create their first towns?

### DESIGN TECHNOLOGY

#### Explore

Take a detailed look at this scene: focus on the buildings, the environment and the inhabitants. How is their infrastructure, fashion, design and way of life different to our 21st century living? Consider the different aspects of the settlement, from the housing to the clothing to the fortification of a town wall.



#### Research

- Find other examples of colonial settlements and the various designs and appearances each settlement had. Use these different ideas to help support the creation of your students' own miniature colonial scene.

#### Explain

- What materials would be appropriate to use to re-create a model-like version of the buildings in this scene?
- What artistic or design techniques might you use to demonstrate the different textures of this colonial settlement?



# SHAKESPEARE'S GLOBE

## AGE OF EXPLORATION

### OVERVIEW



This Explorable Scene allows learners to step inside the Globe Theatre and imagine what it would have been like to visit in the year 1599, when it first opened. Built in central London, by William Shakespeare's company, this famous theatre offers us a peek into the lives of those living in Elizabethan England. What would it have been like to stand in the audience in this building and watch a Shakespeare play performed on this stage?

### KEY FEATURES OF THE SCENE

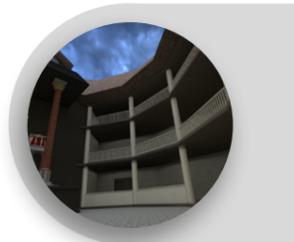
#### The Globe Theatre

When it first opened in 1599, the Globe was made from large timber frames which were then filled with smaller slats of wood and covered with plaster containing cow hair. Constructed in a circular layout, it had a roof over some of the seating but the yard area in front of the stage was exposed to the elements and so it was considered an outdoor theatre, or playhouse. The original Globe theatre burned down in 1613 due to an accident with gunpowder used in a performance, but the theatre was rebuilt the following year before finally closing in 1642. A reconstruction of the theatre, known as Shakespeare's Globe, was built very close to the original site. It opened in 1997 and celebrates Shakespeare's transformative impact on the world.



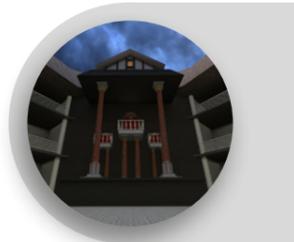
#### Audiences

In the year 1600, larger London theatres such as the Globe could hold an audience of up to 3,000 and it would put on several performances a week, so visiting the theatre became a common pastime for large numbers of the population. Prices varied from roughly the same cost as a loaf of bread to be a 'groundling' and stand up in the crowded yard close to the stage, to paying much more for a seat and even a cushion in the sheltered areas of the galleries. Unlike today, where people often sit quietly to enjoy the play, audiences in Elizabethan times would have expressed their interest in the play with loud boos, cheers and shouts.



#### The Stage

The apron stage projects out towards the middle of the yard, or pit. It would have had a trap door used by performers to enter from, and viewers might notice that the back wall has several doors and a balcony for the play's cast to enter and exit from. It is believed that the first Shakespeare play to be performed at the Globe was Julius Caesar in the theatre's opening year, 1599. Other Shakespeare plays first performed at this theatre include As You Like It, Hamlet, Othello, King Lear and Macbeth.



### WHAT CAN I EXPLORE?

Within this scene, you can explore Shakespeare's Globe theatre, viewing the timber and plaster construction, the tall and circular building shape, the multiple levels of audience seating inside, the open-air nature of the stage area, and the different structures available for performers to use on the stage.

You might also want to explore:

- What type of lighting was used in the Globe theatre?
- How did the open-air aspect of the theatre impact on the space?
- How might the scale and style of this building have looked compared to the rest of London's buildings at this time?

#### Subjects Covered



### HISTORY

#### Explore

As your students move around this scene, ask them to try to imagine how this theatre would have fitted in to life in London from 1599. What might it have felt like to step inside a playhouse like this more than four hundred years ago?



#### Research

- What was the place of theatre in Elizabethan society?
- What other entertainments were commonplace at the time?

#### Explain

- What might it have felt like to visit a large theatre like this in Elizabethan times?
- What features might have been most surprising or impressive to visitors at the time?

### LANGUAGE AND LITERACY

#### Explore

Encourage your students to think about why William Shakespeare's work continues to be well known over four hundred years after his plays were first performed. One of the things audiences enjoy about his work is the frequent use of the iambic pentameter, a way of writing which is enjoyable to listen to and some say sounds like a regular heartbeat. It is a line with five repeating pairs of syllables, for example 'Shall I compare thee to a summer's day?' Write a passage about visiting the Globe theatre, trying to use the iambic pentameter if you can.



#### Research

- As well as the iambic pentameter, what other techniques was William Shakespeare known for using in his written works?

#### Explain

- What words, phrases and styles of writing can you use to captivate your readers?

### DRAMATIC ARTS

#### Explore

Take notice of the stage area, particularly the different doors and balconies available for performers to use. What could a director do to captivate the audience at a time with less technology to use on stage? Think of a way which you would use these physical aspects of the theatre and what you would hope the audience would experience from your use of the stage.



#### Research

- What was the relationship between performers and audiences like in the time of William Shakespeare?
- What techniques and effects were popular in stage plays at this time?

#### Explain

- What simple techniques could productions use which do not require modern technologies but provide interest and excitement for an audience?
- How has this theatre been designed to allow performers to really engage an audience?

### MUSIC

#### Explore

Music and song would have been important facets in most of Shakespeare's plays. Take the example of scenes including the fairies in A Midsummer Night's Dream. How might music be used to create an enchanted atmosphere on the stage?



#### Research

- What style of music was commonly heard during the Tudor and Stuart periods?
- How did William Shakespeare use songs and music in his work?

#### Explain

- What impact does music used in theatre performances have on an audience?
- What instruments might have been available to use on the stage at this period in history?



# FIRE OF LONDON

## AGE OF EXPLORATION

### OVERVIEW



This Explorable Scene transports you to the start of the Great Fire of London. The fire began in a bakery in Pudding Lane and lasted from 2nd to 5th September in 1666. Before the fire began, there had been a drought in London that lasted for 10 months, so the city was very dry. In 1666, lots of people had houses made from wood and straw which burned easily. The fire burnt down a lot of buildings – over 13,000 houses, 87 churches and even St. Paul’s Cathedral!

### KEY FEATURES OF THE SCENE

#### Buildings in 17th Century London

In the seventeenth century, much of London’s housing was getting old; it was built mainly from wood with few bricks, and it was crowded into densely-packed neighbourhoods. Many buildings became wider on the upper floors, so much so that some almost touched each other across the narrow streets! Encourage your students to navigate through this Explorable Scene and notice any features of the buildings which could be a fire risk and how each of these factors might have impacted how the fire spread.



#### Storage of goods

At the time, it was common for people to live above businesses, with goods stored below people and sleeping above. As Pudding Lane was located near the River Thames, there were lots of storage buildings and warehouses nearby. Can your students locate any goods being stored in this scene? What impact do you think storage of materials like oil, rope and pitch (tar) had on the fire when it reached those buildings?



#### Fire-fighting equipment

In seventeenth-century London, small fires were a useful part of everyday life, used in daily cooking and other tasks. As these fires sometimes became out of control, it was common to see buckets of water at the ready to extinguish the flames. Long fire hooks would have been used to pull down the roof and wooden walls of collapsing buildings, so they did not act as more fuel for out-of-control fires. In September 1666, the fire was too large for these usual methods to have impact and was only stopped when a series of buildings were fully destroyed using gunpowder to create a fire break, combined with a lessening of the strong winds which had been spreading the sparks and flames. Encourage your students to explore the scene to look for evidence of equipment to fight fires and ask them to speculate as to how it might have been used at the time.



### WHAT CAN I EXPLORE?

Within this scene you can explore the streets around the start of the 1666 Great Fire of London, a bakery on Pudding Lane. Experience this densely populated area with its narrow streets, buildings made with mainly wood, and mixture of businesses and housing. Notice items left on the street, from goods being stored in wooden crates to fire-fighting equipment such as buckets of water and long fire hooks.

#### You might also want to explore:

- The streets around the start of the 1666 Great Fire of London, which all began in a bakery on Pudding Lane.
- Boats on the river: many people fled to the Thames to escape on boats.
- Weather conditions: strong winds spread sparks from the fire making it difficult to control.
- Buildings to the south of the River: these were unaffected by the fire.

#### Subjects Covered



### HISTORY

#### Explore

Ask your students to move around the scene looking for clues about how fires were dealt with at this time. What equipment can they spot which might be useful in the event of a fire?



#### Research

- What was the usual way to fight fires before the Great Fire of London?
- Consider both technology available to people and attitudes towards dealing with fires. What changes were there immediately following the events of September 1666?
- How have our approaches to fires developed over time?

#### Explain

Challenge your students to consider whether these methods would continue to work for larger fires. Several circumstances combined to mean that this fire became out of control very quickly; the fire began at night when most people were sleeping, there had been a lot of dry weather so buildings burned more easily, and strong winds spread the sparks and flames quickly. Why were usual methods insufficient to tackle this fire?

### HUMAN GEOGRAPHY

#### Explore

Ask your students to move around the Explorable Scene and notice how the city of London is laid out: the width or narrowness of the streets, how close buildings are to each other, and how easy it is to navigate the area. Can any of these layout features have had an impact in how the Great Fire of London was able to spread?



#### Research

- With some 80% of buildings destroyed by the fire, London experienced extensive rebuilding in the following years. How has the city layout and the skyline changed since the fire?
- Compare maps from the time of the fire to images from modern London.

#### Explain

How do considerations of town planning impact on fire control and the safety of residents?

### PHYSICAL GEOGRAPHY

#### Explore

Take a look at the sky in the Explorable Scene. As well as the smoke from the fire, it might look a bit stormy. How would windy conditions influence the fire?



#### Research

- How did weather conditions before and during the Great Fire of London impact on the severity of the fire?
- How do weather conditions influence fires today?
- Research the impact of weather on the bushfires in Australia in 2019.

#### Explain

By September 1666, London had just experienced months of dry weather. What impact might this have had on the fire?

### LANGUAGE AND LITERACY

#### Explore

Allow your students to experience the streets of London in 1666 and encourage them to look all around at the types of buildings, the street layout, and the density of the buildings. Samuel Pepys was known for keeping a detailed diary of his life in London at this time; write a diary entry about your experience exploring this area of London, including descriptive language about what you saw.



#### Research

- How has the diary of Samuel Pepys influenced our understanding of seventeenth-century London?
- What other written records do we have from life at this time?

#### Explain

Why might only certain people have written in a diary in seventeenth-century London? How are diary entries useful to understand what life was like for different people?



# ST. BASIL'S CATHEDRAL

## AGE OF EXPLORATION



### OVERVIEW

Officially named the Cathedral of the Intercession of the Most Holy Theotokos on the Moat, the church in Red Square was built between 1555-1561. The cathedral used to be white and its domes were gold. The red brick and multicoloured decorations are a more recent addition, with the current paint scheme created in 1860. The building consists of nine chapels built on a single foundation and the interior is a maze of galleries, winding from chapel to chapel and level to level, via narrow stairways and low arches. The walls are painted in floral and geometric patterns throughout.

### KEY FEATURES OF THE SCENE

#### Red Square

The geographic and historic centre of Moscow, Red Square is the location of some of the most significant buildings of Russia. Notice the tall red outer wall of the Kremlin, featuring the clock tower Spasskaya Bashnya and on to Nikolskaya Tower at the furthest point from St Basil's Cathedral. Midway across the square viewers can see the pyramid shape of Lenin's Mausoleum. Straight ahead is a view to the red brick State Historical Museum at the opposite end of the square. And to your right is the long, ornate facade of the GUM department store, built from 1890.

#### Historic and Cultural Significance

The Cathedral's architect Postnik Yakovlev was said to have been inspired to create a vision of the Heavenly City on Earth. It was built from 1555 to 1561 by orders of Ivan IV Vasilyevich (Ivan the Terrible), who was the first Tsar of Russia. Ivan IV Vasilyevich wanted to commemorate the conquest of the Kazan kingdom. The original building contained eight churches arranged around a ninth, central church of Intercession, and a tenth church was created later in 1588 over the grave of venerated local saint Vasily (Basil). Each of the original sanctuaries commemorated an aspect of the conquest of the Kazan kingdom in 1552.

Created as a Russian Orthodox Church, its use altered over time reflecting the societal changes seen in Moscow and across Russia. For much of the 20th Century this spectacular building housed a museum, and today it still features a museum whilst also holding worship services.

Described as 'one of the most beautiful monuments of Old Russian church architecture' it was declared in 1990 a World Heritage Site by UNESCO alongside the Kremlin and Red Square. To many around the world this uniquely beautiful building is a symbol of Russia.

#### Decorative exterior

Whilst the cathedral has always been a striking and unique design, its current appearance is the result of several changes over the 450 years it has stood. The red brick used was a relatively new building material at the time, and has been used in decorative effects as well as the building's structure. The iconic twisted domes replaced simpler designs at the end of the 16th century. The church acquired its present-day vivid colours in several stages from the 1680s to 1848.



### WHAT CAN I EXPLORE?

Within this scene, you can explore Moscow's iconic St Basil's Cathedral and its setting of Red Square.

#### You might also want to explore:

- The materials used in the building.
- The shapes and forms used in the design.
- Decorative features on the cathedral's exterior.

#### Subjects Covered



### HISTORY

#### Explore

The Cathedral was built on a prominent central site on Red Square next to the Moscow Kremlin, a complex of palaces and cathedrals all enclosed by the Kremlin Wall which contains the Grand Kremlin Palace, previously the Tsar's Moscow residence. As your students explore this scene, encourage them to imagine the context of building a huge cathedral on this important site in 1555.



#### Research

- What other buildings were in central Moscow at the time St Basil's Cathedral was built?
- What historical and symbolic importance does this building have within Russia?

#### Explain

- What might people have felt visiting this site when it was first built over 450 years ago?
- What message does building such a large and ornate cathedral in a central location send to the people of the city?

### GEOGRAPHY

#### Explore

How many of your students were able to recognise where in the world they are from this building? Iconic structures such as St Basil's Cathedral are part of our understanding of different nations and cities around the world.



#### Research

- Find examples of globally recognisable structures from other cities around the world.
- Research what sorts of buildings they are, what period of history they are from, and what they tell you about that location.

#### Explain

- What about St Basil's Cathedral makes it so recognisable?
- Why do people associate this with the city of Moscow?

### RELIGIOUS EDUCATION

#### Explore

As your students explore the exterior of St Basil's Cathedral, ask them what symbols from religion they recognise on this building. How can you tell that this was created as a place of worship?



#### Research

- How has the religious nature of this building changed with societal changes in Russia?
- Do people worship in this Cathedral today?

#### Explain

- Why do you think Ivan IV Vasilyevich wanted to commemorate his victories with a Cathedral?
- What does that suggest about the importance of religion in people's lives in the 1500s?

### DESIGN AND TECHNOLOGY

#### Explore

As your students travel through this explorable scene, ask them to study the 3D shapes that make up this complex structure. How has the architect combined simple shapes in new and interesting ways to create such an interesting overall building? Ask your students to pay particular attention to the design and shape of the domes, and challenge them to recreate the shapes in 3D.



#### Research

- How were the complex shapes within the structure of the design assembled in the 16th century?
- Can you find a modern building which uses domes and curves in an interesting way?

#### Explain

- What different shapes have been combined in this building?
- What materials and techniques could be used to create the distinctive twisted domes?



# CASTLE COURTYARD

## EARLY CIVILISATION



### OVERVIEW

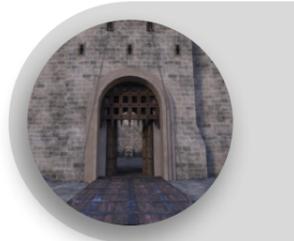
This Explorable Scene takes you to the courtyard of a fictional castle designed in the style of the medieval castle found throughout most of Europe. 'Medieval' describes castles built from the time of the Norman Conquest, which began in 1066, to the start of the Tudor period in 1485.

Today, most of the surviving castles are used as museums to showcase a country's history, however there are still a few notable examples from around the world of royalty that still live and work from their ancestral homes.

### KEY FEATURES OF THE SCENE

#### Entrance

When you first arrive in the castle scene you will be standing outside the towering front gates. Students can cross the drawbridge and enter the courtyard through the portcullis. Ask your students what the purpose of these features was – why would a castle need to raise their drawbridge? Looking up at the outer walls, they will notice banners and windows. Who do they think these banners belong to?



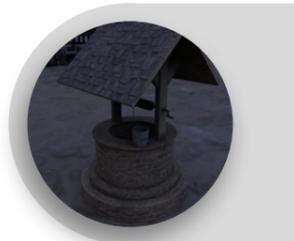
#### Defences

Castles were built to be defensible, with towering battlements, arrow loops in place of windows and numerous traps to keep attacking forces at bay. Ask students how they think this castle has been designed to keep out an attacking army – why are the tops of the walls shaped the way they are? Discuss the shape of the windows - why would castle windows be narrow slits, rather than windows like we have now? What other features could a castle have to make it easier to defend?



#### Castle life

Within the courtyard you will find a large, open space with a few examples of the features that might have featured in a real castle of this era. Ask students to explore and think carefully about what each feature might have been used for. Why would a castle need a well? What clues can you find that tell you more about what life inside a castle would have been like? The central courtyard also gives some clues as to other parts of the castle, such as the tops of the battlements and the grand doors leading to the castle interior.



### WHAT CAN I EXPLORE?

Within this scene, you can explore the inner courtyard of a Medieval castle from daily life within the safety of the walls to the defensive features on the outside that kept enemies at bay. The battlements and tall, circular towers would have had permanent sentries, as would the main entrance. Castles were most commonly used to house lords and royalty, meaning they were always well defended.

You might also want to explore:

- The flags hanging from the castle walls
- The various ladders and staircases leading to the battlements
- The surrounding landscape and the castle's positioning

#### Subjects Covered



### DRAMATIC ARTS

#### Explore

As you let your students explore the scene they will likely notice that there are no people here in this castle. Why do you think that could be? It might be that they are all hiding from an invading army, or that everyone has been put to sleep by a magical spell! Encourage your class to explore their ideas as to why the castle is abandoned and then, working together, create a short play script about 'The Abandoned Castle'. Students can play out what happened or consider playing the last few remaining people. How would life change? What emotions would the characters be feeling?



#### Research

- How are castles depicted in Shakespeare's plays, plays such as Macbeth or Richard III?
- How would people have spoken differently during this time period?
- What possible outfits would your characters have worn, based on your chosen time period?

#### Explain

- How did the castle become abandoned?
- What is life like in the castle without anyone else there?

### HISTORY

#### Explore

As your students explore the castle encourage them to look at the defensive features such as the portcullis, the battlements and the drawbridge. Look at the construction of the walls and buildings and discuss what materials might have been used. There are clues to the construction dotted around the courtyard that can be discovered. Encourage your students to look up at the walls and think about their structure: why do castles have the familiar 'battlements' you can see here?



#### Research

- What was the main purpose of a medieval castle?
- How were castles designed to make them easier to defend?

#### Explain

- Considering the time period, how do you think this castle was built?
- If you had to design your own castle, what features would it have to keep you safe?

### MATHEMATICS

#### Explore

For this session, encourage your students to consider the shapes and measures involved in constructing this castle – from 2D squares, rectangles and circles to 3D cylinders and cuboids. Younger students can explore the scene and document the 3D shapes they can find while older students can use known formulae to calculate the volume, area and perimeter of various buildings and parts of the castle. Before the availability of calculators, how do you think the size and shape of castles was calculated so accurately?



#### Research

- How can you calculate the area of the central courtyard?
- What measurements would you need to find the radius of the circular towers?

#### Explain

- Using your knowledge of shape, estimate the area of the entire castle's floors. Explain your thinking
- When the castle was built, what calculations were done to measure the towers and keep them all the same size?

### ART AND DESIGN

#### Explore

Castles used their flags to proudly display to the world who occupied them. In the time this castle was designed most of the powerful families would have had their own flag design that let people know who they were. Looking at the flags that are decorating the castle now, who do you think might occupy it? Think about the colours as well as the designs that have been used. Using materials of your choice, ask students to create a banner for their family, school or local area. What features would you include that would let the whole world know it belongs to you?



#### Research

- What famous flags originate from your local area?
- How were flags used in medieval times?

#### Explain

- When designing your own flag, what real world flags inspired you?
- How is your flag different to some examples of flags from the past?



# VIKINGS

## EARLY CIVILISATION



### OVERVIEW

In this Explorable Scene students can experience the arrival of three impressive Viking longships on the shores of Britain. The Vikings were people from an area known today as Scandinavia, and in Europe the Viking Age was the period from around the year 800 until around 1100. Vikings were excellent seafarers, exploring and trading by sea, and travelling as far north as Greenland, and south as the Mediterranean, with some evidence they reached the shores of North America to the west. They were also formidable warriors, raiding new lands for valuable items, and settling and building new communities in new countries.



### KEY FEATURES OF THE SCENE

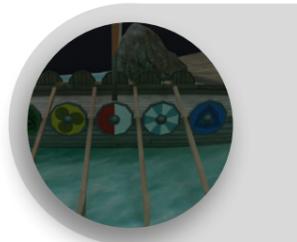
#### Longships

Ships and sailing were at the heart of Viking culture, used as the Vikings travelled for exploration, trade, and raiding other lands. In this scene we see examples of wooden longships; light and quick on the water, they were powered by teams of people rowing and also had a single large rectangular sail to provide additional force, especially helpful on longer journeys. Larger longships could carry one hundred Vikings across the seas to new shores.



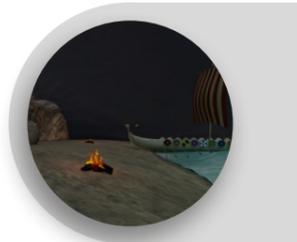
#### Shields

These typical Viking shields were made of wood with metal handle to grip on to. On the front a central metal dome protected the user's hand. Some examples were thought to have been covered in animal skin, or leather, for additional strength. Shields were lightweight and widely available so all Vikings could have one to use during attacks. Once decorated, the shield showed the user's identity or loyalty, and was sometimes painted with runes or symbols to bring good fortunes. At sea they could be stored on racks on the side of the ship as they entered into harbours, protecting the crew of the ship if needed.



#### Land

The Vikings were famous as excellent sea farers. They had different motivations for their travels; trade and exploration, but also raids and invasions of other lands. The first Viking raid of Anglo-Saxon Britain was around the year 787. It was the start of a fierce struggle between the Anglo-Saxons and the Vikings. During raids Vikings would take treasures from the 'easy targets' of churches and monasteries which were not defended. These raids would have been terrifying for local people, with buildings sometimes being burned after items had been taken. The Vikings were formidable warriors, attacking different areas of the coast many times and soon settling in much of England from modern day East Anglia up to Northumbria, the north and west coasts of Scotland, and parts of Ireland. They settled where they could farm more fertile lands in a more hospitable climate than their home nations, and over time established cities such as modern day York.



### WHAT CAN I EXPLORE?

Within this scene, you can explore the arrival of three impressive Viking longships on the shores of Britain. Powered by oars and a sail, and protected by lines of brightly coloured shields, these ships were used by Vikings to travel far from their Scandinavian homelands.

You might also want to explore:

- The decorative dragon's head at the front of one longship.
- The size and shape of the ships.
- The fires on the beach; what does this suggest about their visit?

#### Subjects Covered



### ART AND DESIGN

#### Explore

As your students are immersed in the scene, draw their attention to the shields held in racks on the sides of the ship. As well as the practical use of defending the ship and the crew, these shields have each been decorated in bright colours and patterns, with some having symbols. Why might the Vikings have chosen to do this decoration, and does this give us any clues about their culture?



#### Research

- Can you find an image of a recovered wooden shield from an archaeological site?
- Can you find an image of another example of Viking craftwork, such as a gold brooch or silver jewellery?

#### Explain

- How do you think it felt to see a large ship lined with brightly coloured shields approaching your shores?
- What impact do the colours and patterns have on the Vikings and on the people they are fighting?

### SCIENCE

#### Explore

As your students are immersed in the scene, encourage them to focus on the longships that they can see. An instantly recognisable part of Viking culture, the longships were used on the open sea as well as to sail up larger rivers to trade in towns.



#### Research

- How many Vikings could row together on the biggest longships?
- What different ships did Vikings have for different tasks?

#### Explain

- How does the shape of the ship allow it to move quickly through the water?
- What is the benefit of having both oars and a sail to power the ships?

### HISTORY

#### Explore

As your students explore the scene ask them to speculate as to why the Vikings have chosen this beach to land their boats. Is this a resting point for a longer journey, the chance to raid and take valuable objects, or the beginning of years of settlement in a new area?



#### Research

- Research King Alfred the Great and the relationship between Anglo-Saxons and the Vikings in Britain.
- How did the Vikings change from carrying out terrifying raids to settling and farming the land?

#### Explain

- Why do you think Vikings travelled to other lands away from Scandinavia?
- What did Vikings do when they reached different countries?

### RELIGIOUS EDUCATION

#### Explore

As your students are exploring the scene, ask them to consider what it would have been like to arrive on new shores in the age of the Vikings. Would the people here have differing cultures and beliefs to the Vikings, and why might this be?



#### Research

- Who were the gods and goddesses of Viking culture?
- How did Vikings who settled in Britain respond to Christianity over the years?

#### Explain

- Churches and monasteries were attacked by Vikings; what does that tell us about some of the religious beliefs in Britain at this time?
- What valuable items might have been stored in a church or a monastery that Vikings were interested in?



# NATIVE AMERICA

## EARLY CIVILISATION

### OVERVIEW

This Explorable Scene takes viewers to the Great Plains area of North America to visit three very different homes as used by different Native American communities of the region.

There were once tens of millions of Indigenous peoples inhabiting all North America, living in societies with diverse languages, cultures and ways of life. In this scene viewers visit a small snapshot of this diversity with three examples of homes from different nations brought together from across the Plains region to one site for exploration.



### KEY FEATURES OF THE SCENE

#### Tipi

These instantly recognisable structures were homes to many indigenous peoples who had a hunting-and-gathering society, including those of the Sioux nation. The tipi is a temporary structure which can be set-up and packed-down quickly, as well as being possible to transport, so is ideal for tribes who lead more nomadic lifestyles and move with bison migrations or other influences. The tipi is created with a cone-shaped core structure made of wooden poles and then covered by a canvas made from animal hides. The hole at the top of the tipi allows the smoke of a fire to escape, so they could contain an internal fire for cooking which also warmed the home. While historically most tipis in a village would not be decorated, those which were externally painted might depict personal experiences such as hunting animals, or a dream or vision from someone in the community. This village is also making use of horses which were brought to North America by the Spanish and proved useful for hunters who quickly became skilled at riding them during bison hunts.



#### Grass House

Here is an example of a grass house in the style of those built by the Caddo nation. As a lighter building material, grass provides less insulation and so was typically used by indigenous people living further south in a warmer climate. Villagers would work together as a team to build these tall and strong dome-shaped homes. Frames of long, strong poles were covered in bundles of woven grass to create the thatching exterior. As well as hunting small animals and gathering wild foods, the Caddo people would have cultivated crops such as corn (maize), beans, and squash on their farms.



#### Wattle-and-Daub House

Built by the Cherokee and other tribes who settled in permanent villages, these homes were made of woven sticks, bark, vines, and other plant material (wattle) covered with clay or some other plaster (daub). The interior of the houses included a central fire pit and a large pot for cooking the family meals. Woven mats or deerskins may have been used as floor coverings. Living in permanent homes suited the farmer-hunter lifestyles of some Native Americans. A typical Cherokee town had between 30 and 60 houses and a council house where general meetings took place and a sacred fire burned. While living in permanent settlements, tribes cultivated corn (maize), beans, and squash, and were sometimes able to grow surplus foods to see them through leaner times.



### WHAT CAN I EXPLORE?

Within this scene, you can explore three of many different types of home built and used by indigenous people, focused on those living in Great Plains area of North America. Students can visit a Tipi as used by the Sioux nation, a Grass house as built by the Caddo nation, and a Wattle-and-Daub house as built by the Cherokee and other tribes who settled in permanent villages.

#### You might also want to explore:

- Inside the three different types of home, including decorations, fires and tools.
- The physical landscape of the Great Plains area in the centre of the continent.
- Clues as to the climate of the region and any wildlife that might live here.

#### Subjects Covered



### DESIGN AND TECHNOLOGY

#### Explore

As your students explore this scene ask them to locate a Tipi and to walk inside. As they explore the interior of the home, encourage your students to look all around and above them to try and understand how these transportable structures were made. Then they can move outside again and walk all around the Tipi to view it from all angles. Try to make a small-scale model in 3-D using resources such as dowel rods and small pieces of fabric. Can the model be easily packed away for transit?



#### Research

- How did people of the Sioux nation make use of Tipis?
- What other transportable homes can you find being used around the world?

#### Explain

- Why is this type of structure ideal for people living in hunting-and-gathering societies?
- How has the Tipi been designed to be easy to transport?

### BIOLOGY

#### Explore

As your students explore the site, ask them to speculate which of the structures indicate that communities were settled in more permanent villages. One motivation of many cultures globally to settle is the ability to tend to plants for harvests and to slowly modify the crops over generations. Maize is a great example of a wild plant which has changed dramatically over generations of people cultivating it into the versatile food crop we know of today.



#### Research

- What did the wild ancestor to modern day maize look like?
- How has maize been changed over the years as it was cultivated by indigenous people in America?

#### Explain

- Why are some plants selected for farming?
- What do people need to do through a year to tend to their crops to ensure a good supply of food from them?

### GEOGRAPHY

#### Explore

While your students are immersed in the scene, encourage them to take a moment to look out beyond the human-made structures and to the physical landscape. What do they notice about this setting? What physical features can your students see, what sort of vegetation is available, and what wildlife might be found grazing here?



#### Research

- Locate the Great Plains region of North America on a modern map.
- Why was this location able to support large and diverse groups of indigenous peoples?

#### Explain

- Describe in detail the local landscape.
- Are there any clues as to the climate of this region?

### HISTORY

#### Explore

As your students explore this scene, encourage them to discuss some of the different ways of life that they are viewing, especially noting the different between hunting and gathering societies and communities who settled in permanent villages. What might the daily and annual routines be like in these two different ways of life? What might be beneficial and also challenging about living in these different societies?



#### Research

- What was the traditional way of life like for Native Americans who were in a Hunting-and-Gathering society?
- What was the way of life for those who lived in villages?

#### Explain

- Why was the continent of North America once able to support millions of people living in Hunting-and-Gathering society?
- Why is it difficult to live that way today?



# ANCIENT EGYPT

## EARLY MANKIND

### OVERVIEW

Land yourself right outside the pylon of an immense Ancient Egyptian temple and begin by walking down the grand colonnade surrounded by pillars, statues and flags. Using the action button on the headset or your controller, you can navigate inside the temple to explore the impressive decorated columns and speculate as to what might lie in chambers beyond.



### KEY FEATURES OF THE SCENE

#### Hieroglyphs

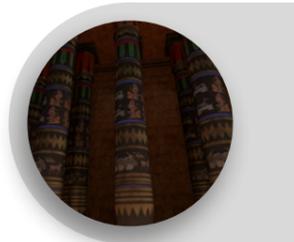
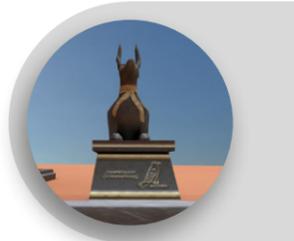
Students can begin their exploration travelling down the grand walkway towards the entrance of the temple. They will become surrounded by the striking rows of statues. These statues are of Anubis, the God of Death who had different roles in Ancient Egyptian culture including being a protector of tombs. Ask your students to pause and explore the bases of the statues in more detail. What markings can they see? Egyptian hieroglyphs were the collection of around 1,000 different symbols and pictures used as writing in Ancient Egypt.

#### Statues

Students can continue their exploration by moving towards the entrance of the building. In Ancient Egypt temples were seen as houses for the gods or kings to whom they were dedicated. Within them the Egyptians performed a variety of rituals and would give offerings to the gods. Allow your students to take their time and explore the tall statues and their positioning. What can they see here? Could this be Ra, the god of the Sun and the sky? He was one of the most important gods in ancient Egyptian religion, and all forms of life were believed to have been created by Ra.

#### Columns

Allow your students to make their way inside the temple and explore its spectacular interior. Can they describe what they see? Hypostyle halls, covered rooms filled with columns, appear in temples throughout Egyptian history. Draw your students' attention to the markings on the columns; what messages might the makers be sharing with visitors to this temple?



### WHAT CAN I EXPLORE?

Within this scene, you can explore a typical temple from the Ancient Egyptian civilisation. The gate at the front of the temple is called the Pylon, and it serves as a boundary between the outside world and the space for the gods within the temple. Impressive statues create a walkway towards the temple entrance and also decorate the pylon. Stepping into the temple you find a tall hall filled with colourful columns covered with painted hieroglyphs, and can speculate about what might be discovered in the chambers beyond.

You might also want to explore:

- The environmental context and desert landscape.
- The flags at the top of the pylon.
- The role of temples in Ancient Egyptian daily life.

#### Subjects Covered



### HISTORY

#### Explore

As your students move around this scene ask them to try to imagine they were first discovering artefacts from Ancient Egyptian culture. What would they think about the civilization which had built these structures? What would they think about the significance of this place?



#### Research

- What can you find out about Ancient Egyptian culture?
- How does it compare with other ancient civilizations from across the world?

#### Explain

- What motivates people to create impressive buildings such as this?
- What does this building tell us about how people lived in ancient civilizations?

### DESIGN AND TECHNOLOGY

#### Explore

This temple, like many others in Ancient Egypt, has been built from heavy stone, symbolising the everlasting nature of the gods, while other buildings at the time would have been built from smaller bricks. How were people in ancient civilizations able to move large pieces of stone without motorised machinery?



#### Research

- What systems did ancient Egyptians have for moving large materials for building temples?

#### Explain

- What systems might have helped ancient people to move heavy objects while building temples?
- How can your knowledge of forces help you invent a simple technique for moving large loads?

### ART AND DESIGN

#### Explore

As your students explore the scene ask them to pay particular attention to the statues present in the area. Ask them to choose one to sketch its form and add notations about details, for example size of the statue, materials it is made from, style of the sculpture, and any markings or hieroglyphs present.



#### Research

- Where are statues used in important public places near where you live?
- Can you find out what some of these statues represent to your community?

#### Explain

- What style are the statues and what are they depicting?
- What might all the statues be telling us about this place?

### MATHEMATICS

#### Explore

As the students explore the scene encourage them to notice the physical shape of the structures, how they have been built with different 3D shapes, and any symmetry in the design. Ask the group to create a series of sketches to show how the building has been made, labelling with key features they recognise.



#### Research

- Where else in ancient Egyptian buildings can you see examples of columns?
- Where can you find symmetry being used as a key design feature?

#### Explain

- Where can you find symmetry being used in the temple's design?
- What atmosphere is created from the use of space in and around this temple?



# STONEHENGE

## EARLY MANKIND

### OVERVIEW

This Explorable Scene allows you to wander amongst the impressive standing stones of this prehistoric monument, created by people living some 5,000 years ago in England. The colossal stones are positioned to align with the sunset of the winter solstice and the sunrise of the summer solstice. Walk in the footsteps of our Neolithic ancestors and explore the symbolism included in this scene. The purpose of Stonehenge is unknown to us. It has no obvious practical purpose. It was not lived in and could not have been defended so there must have been a spiritual reason why Neolithic and Bronze Age people put so much effort into building it. There have been many theories put forth over the years but what does the evidence suggest it may have been used for?

### KEY FEATURES OF THE SCENE

#### The Sarsens

The outermost setting of Stonehenge, if completed, was a circle of 30 upright sarsens, capped by horizontal lintel stones all carefully shaped. The source of most of the sarsens is generally accepted as being on the Marlborough Downs, some 19 miles to the north, although new research on their origin is currently underway. When freshly worked, the surface of the sarsens would have appeared much brighter and whiter than the grey stones you see at Stonehenge today.

#### Lintels

There are only six remaining lintels in situ at Stonehenge, but if the circle was ever complete, the effect would have been an unbroken ring of stone, 30 m inside diameter, suspended 4m above the ground. Additionally, the tops of the upright stones have been levelled to overcome the effect of the slope on which they are set, resulting in no more than a few centimetres difference in height across the diameter of the circle.

#### Stone 56

The tallest of the sarsens at Stonehenge, Stone 56 is the only remaining upright of the tallest trilithon through which the setting sun at winter solstice was once viewed.



### WHAT CAN I EXPLORE?

Within this scene, you can explore the famous prehistoric monument of Stonehenge. View the outer circle of sarsens, the top lintels which would have completed the ring of stone, and tall Stone 56 which marks the viewing point for the setting sun at winter solstice.

#### You might also want to explore:

- Markings on the standing stones.
- Markings and smaller stones on the ground.
- The context of Stonehenge in the local landscape.

#### Subjects Covered



### LITERACY AND LANGUAGE

#### Explore

Move around this historic landmark, focusing on the formation and how human beings from the past have intentionally structured this site. Guide your students to embrace the ambience and atmosphere of this eerily peaceful setting.



#### Research

- How heavy are these stones?
- What does the formation of these stones tell us about their possible original purpose?

#### Explain

Design a story plan about this monument: either set your story in the past, focusing on creating a possible story explaining why these stones were moved miles and the purpose they have originally served, or use this setting as a modern-day backdrop for a spooky, haunting paranormal story.

### GEOGRAPHY

#### Explore

Consider the natural landscape and how the physical geography and terrain may have helped humans move the stones to their current resting place.



#### Research

- What is the local terrain around Stonehenge like?
- Why might this location have been chosen for Stonehenge, given theories about the site's original purpose?

#### Explain

- What impact has human geography had on the physical geography? Why might humans have constructed this monument? How do the stones themselves indicate they were moved considerable distances?

### HISTORY

#### Explore

Built in several stages, Stonehenge began about 5,000 years ago as a simple earthwork enclosure where prehistoric people buried their cremated dead. The stone circle was erected in the centre of the monument in the late Neolithic period, around 2500 BCE. Get students to explore the scene so they understand the scale, size and human design of the site.



#### Research

- Why were the stones erected hundreds of years after its initial use as a burial site?
- Does its physical location tell us anything about where the population was largely concentrated in 2500 BCE England?

#### Explain

- Why was Stonehenge seen as an appropriate site for burials? Given the weight, size and shape of the stones, how might humans have transported the stones thousands of years before the invention of vehicular travel?

### SOCIAL STUDIES

#### Explore

Investigate the different stones, the structure and positioning of each stone in comparison to the others and how the site itself is designed. Consider the both symbolism and importance of this monument, as well as the era in which it was built. Whilst moving through the scene, guide students to think about symbolic and important sites of the 21st century and how humans associate shapes, formations and positionings as important, such as elements of design for a religious place of worship.



#### Research

- What are the main theories behind Stonehenge's construction?
- Why is Stonehenge still so important to some people today?

#### Explain

- How might Stonehenge have been an important symbol for human beings in 2500 BCE? Why might the stones around the site been organised in the way they have? Do they have a specific purpose based on their physical location?



# ROMAN VILLA

## EARLY MANKIND

### OVERVIEW

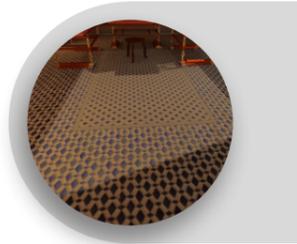
This Explorable Scene transports students to the inside of a typical Roman villa. Built from brick and stone, a Villa was a large home for wealthy families living in the countryside in the days of the Roman Empire. In this scene, students visit the Triclinium, a formal dining room with couches for reclining on while eating, popular with wealthy families hosting dinner parties. It appears that skilled craftspeople would have worked on this villa, creating frescos on the walls and mosaic floors, all very popular decorative features for rich families in Roman times. Students can also look out of the window over the surrounding farmland and think about the crops which might be growing ready for dinner later.



### KEY FEATURES OF THE SCENE

#### Mosaic floor

Families could show their wealth and importance with beautiful mosaic floors made from thousands of tiny tiles arranged in patterns. Created by skilled craftspeople of the day, some of these mosaic floors have survived to modern times and are being preserved so people can continue to admire them into the future.



#### Painted frescos

The technique of painting onto wet plaster is known as fresco, and images created in this way were seen throughout the Roman Empire in public buildings and in the homes of wealthy families. Painted using natural earth colours of reds, yellow and browns, the fresco seen here is similar to many examples of frescos from Roman times. Some might show people in everyday life or scenes from mythology, while others could depict a landscape or garden view. The artist would work by painting onto the wet plaster, and then the paintwork is smoothed and polished for a long-lasting finish.



#### Fashionable furniture

A Klinai was a type of couch which was used to recline on while eating; the wealthy owners of this villa probably had frequent dinner parties with friends and powerful neighbours. Arranged around the table, a typical formal dining room layout would have three couches to be used by the homeowners and their guests. Lying down while other people served your food to you was thought to be a sign of power and was very fashionable amongst the wealthy in Roman society.



### WHAT CAN I EXPLORE?

Within this scene, you can explore inside a typical Roman Villa, a large countryside home for a wealthy family. Admire painted frescos on the wall and a detailed mosaic floor, all created by craftspeople to show that this is a fashionable and expensive home. The formal dining room furniture we see suggests that this family might host extravagant dinner parties here.

#### You might also want to explore:

- The view out to surrounding countryside.
- How the furniture has been made.
- How the dining room of a Roman villa compares to rooms today.

#### Subjects Covered



### MATHEMATICS

#### Explore

Encourage your students to focus on the intricate floor beneath them. Notice the different colours of tiles used and how a repeating, symmetrical pattern has been formed. Imagine the time and skill it must have taken to create a patterned floor such as this.



#### Research

- Find examples of Villa floors preserved today, such as Chedworth Roman Villa or North Leigh Roman Villa. What patterns and designs can you see?
- Have any illustrations been created with the mosaics?

#### Explain

- Using squared paper, create a design which includes symmetry and a repeating pattern with two different colours of tile. Next add in an extra colour so you are working with three different types of tile; what changes can you make to your pattern?

### HISTORY

#### Explore

While your students are immersed in this scene, challenge them to imagine they really are back in time to when this villa was occupied more than 1,600 years ago. What was everyday life like for people at the time of the Roman Empire? How is it similar and different to life today?



#### Research

- What was invented for Roman homes which we still use today?
- How was life in Roman times similar or different to how life is now?

#### Explain

- What does the villa tell us about life for wealthy people in Roman times?
- What features look similar to things we see in homes today?

### ART AND DESIGN

#### Explore

While your students are exploring the scene, bring their attention to the painted frescos on the walls. Why do you think this villa features these large, elaborate paintings? How do you think the homeowners decided what images to have on their walls? How does it compare to decorations inside rooms today?



#### Research

- What different types of images can be found on Roman frescos?
- How is this similar or different to room decorations today?

#### Explain

- What would you have painted on the walls of your villa?
- Create a design, using similar natural colours to those you can see in the scene.

### LANGUAGE AND LITERACY

#### Explore

As your students are exploring this scene, ask them to imagine they are a local family visiting this villa for the first time to attend a dinner party. What do they notice about the room? What might the owners be like? How do they feel about having a party here?



#### Research

- Who had dinner parties in Roman times?
- What different sorts of foods might have been eaten by the guests?

#### Explain

- Write a letter to a friend describing your feelings on attending the villa for a dinner party. Try to include details you notice about the room and any guesses about the family who lives here.



# CRETACEOUS PERIOD

## PREHISTORIC

### OVERVIEW

This Explorable Scene transports students back to the time when dinosaurs dominated life on Earth. The Mesozoic Era can be divided into three periods: the Triassic, Jurassic and Cretaceous. Together these span a huge part of Earth's history, from approximately 250 to 65 million years ago. Of this time, the Cretaceous period occurred from approximately 145 million years ago to 66 million years ago, and the period ends abruptly with a devastating mass-extinction event which sees many species of dinosaur lost forever.



### KEY FEATURES OF THE SCENE

#### Habitat

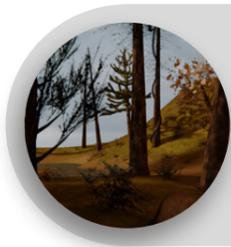
Explore a landscape from the Cretaceous period, a time when the climate was warmer and wetter than today. The continents of Earth were moving with the land masses shifting towards the positions we would recognise today. On the land plants were evolving during this time. In this scene we can see conifers and monkey puzzle trees, and ferns and cycads at ground level, all of which had already been established for millions of years by this time. We also see the emergence of flowers on a Magnolia tree; flowering plants (angiosperms) are first seen during the Cretaceous period, and of course go on to establish a beautiful wide diversity of plant life today.

#### Dinosaurs

Watch out! Here we can see just a few examples of the dinosaurs found in the Cretaceous period, the final time that dinosaurs would dominate life on Earth. Students will probably notice the animated Tyrannosaurus Rex! This formidable carnivore is looking around, is it planning its next meal? While it undoubtedly ate other dinosaurs, it probably scavenged for the bodies of already dead creatures as well as hunting live prey. The iconic Triceratops lived at the end of the Late Cretaceous period, and as a herbivore they were probably prey to other larger dinosaurs. Viewers can also see some examples of Sauropods, this type of dinosaur were large, long-necked herbivores who walked on all four legs.

#### Meteorite

While there had been other mass extinction events before the end of the Cretaceous period, this event is notable for the way it particularly affected the dinosaurs which had dominated the Earth for millions of years, and so dramatically shifted the diversity of life on Earth. The mass extinction is widely believed to have been triggered by the impact from a massive asteroid collision. The huge impact filled the atmosphere with gas, dust, and debris and drastically altered the climate, and in the aftermath the dust blocked the Sun's rays and hindered photosynthesis in plants, which would have then devastated the rest of the food chain. As large creatures, dinosaurs without a reliable food supply soon became extinct. Overall, approximately 80 percent of animal species disappeared, and the only dinosaur survivors from the period were the lineages that led to modern birds and crocodilians. Other creatures who made it through the period might have been omnivores and able to scavenge for whatever food they could find. Small shrew-like mammals had been present during the time of the dinosaurs, but now those huge beasts were wiped out, the mammals had an opportunity to diversify, evolve and spread around the world, beginning the biodiversity we see on Earth today.



### WHAT CAN I EXPLORE?

Within this scene, you can explore an area of landscape from the Cretaceous period, including examples of the plant life and a small selection of dinosaurs found at the time. See a huge meteorite heading towards the ground, about to collide and trigger the mass extinction event which marks the end of the time that dinosaurs dominate life on Earth.

#### You might also want to explore:

- The swamp area and its role in fossil formation.
- Any clues about the climate and how it might be different to modern times.
- Conversations about how land masses shifted during the Cretaceous period.

#### Subjects Covered



### LANGUAGE AND LITERACY

#### Explore

Allow your students some time to move around and fully explore this scene, taking in the landscape, plant life and dinosaurs that they find here. Encourage them to create a piece of writing about the experience; it could be a poem, a short story, or a factual piece.



#### Research

- What different types of writing can you find about the Cretaceous period?
- Look for children's storybooks set in this time, non-fiction pieces, journalism about new discoveries, or novels and films about this time. Compare them to your experience of this scene and to your own writing.

#### Explain

- What striking elements from this scene are important to capture and describe in your writing?
- Create a word bank of descriptive words and phrases to ensure you include in your final piece.

### BIOLOGY

#### Explore

As your students are exploring this scene, encourage them to focus on the plant life they see growing around them. At 66 million years ago, is it surprising how many plants look familiar to students, and what has happened to the diversity of plant life in the huge amount of time since the Cretaceous period?



#### Research

- Choose a plant you can see in this scene, such a Monkey Puzzle tree, a flowering Magnolia tree, or a fern or cycad at ground level. Research when these plants first appeared on Earth and whether we can still see them present today.

#### Explain

- This scene was set over 66 million years ago; which plants look similar to plants we see today?
- Why do we see more diversity in plants across landscapes today than we see in this scene?

### PHYSICS

#### Explore

Encourage your students to look up to the sky; a devastating meteorite is about to collide with the planet, bringing about the mass extinction event which ends most species of dinosaur.



#### Research

- What is the evidence that a meteorite impact caused the mass extinction event at the end of the Cretaceous period?
- Why was planet Earth more vulnerable to impacts millions (even billions) of years ago, and why are they far less likely now?

#### Explain

- What happens when a space object travels through Earth's atmosphere?
- What evidence might they leave behind if they reach the ground?

### CHEMISTRY

#### Explore

As your students are immersed in the scene, draw their attention to the swamp. As the climate during the Cretaceous period was generally warmer and wetter than today, the landscapes would have been different to what we recognise. It might not look much, but swamps like this are crucial to our understanding of the time of the dinosaurs as they provided conditions for the remains of dead creatures to become fossils.



#### Research

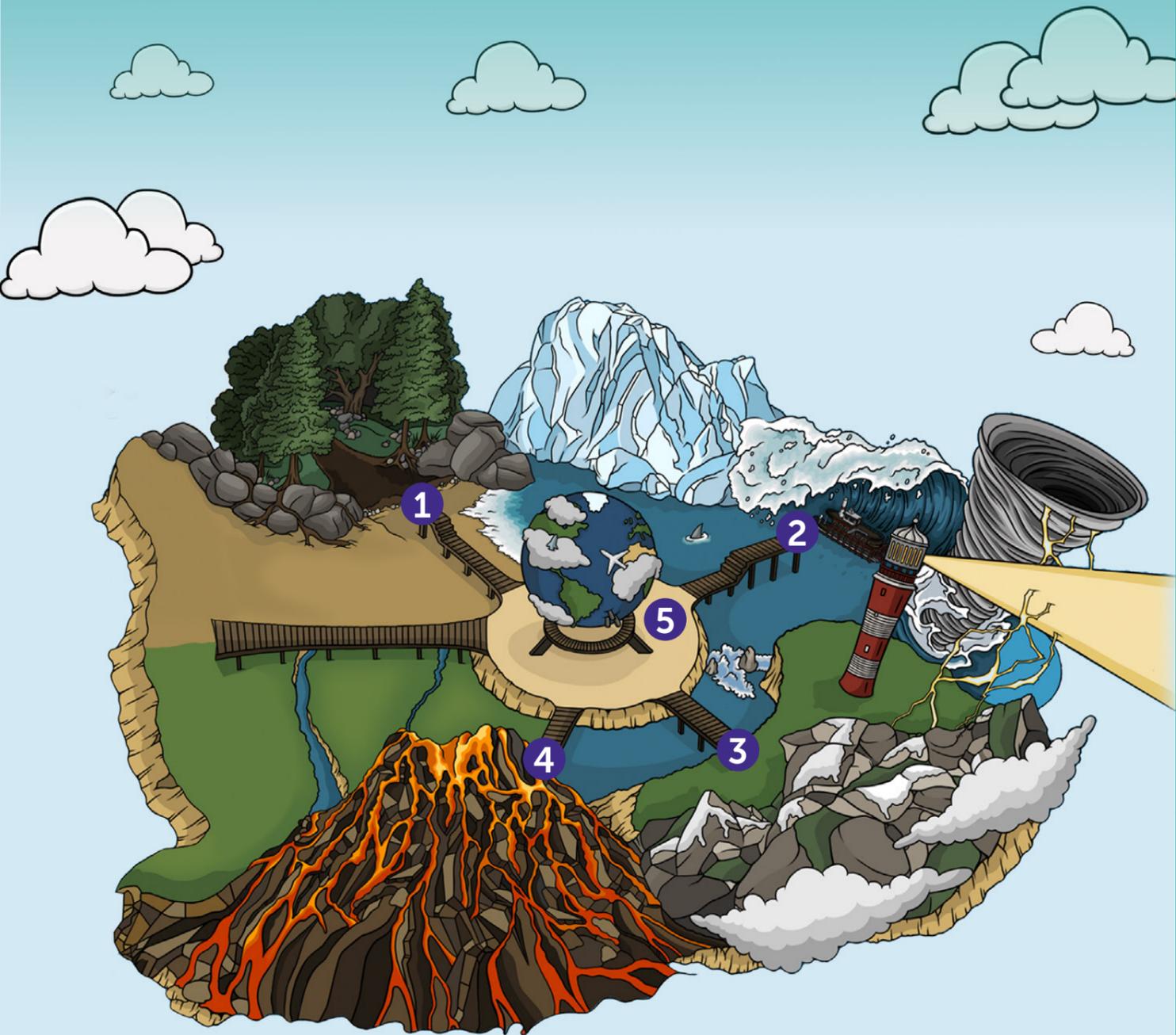
- What conditions are needed for fossils to form?
- What happens to the fossils in rocks over time to make it possible for humans to discover them?

#### Explain

- What can we see around this scene which we have discovered fossils of?
- Think about plants and animals, and particularly which aspects are preserved in fossils and what features are lost.

# ENGAGING EARTH

- 1  **Beautiful Biomes** - Explore the world's environments and climates
- 2  **Wild Weather** - Storms, systems, seasons and climate change
- 3  **Rivers and Oceans** - Nile to Mississippi, Atlantic to Pacific
- 4  **Geology** - What's under our feet? From rocks to tectonic plates
- 5  **Wonderful World** - View the globe as you've never seen it before



# ENGAGING EARTH



## OVERVIEW

Explore our incredible planet from pole to pole. Delve into Earth's Beautiful Biomes, experience some of its most extreme climates and conditions in the Wild Weather Zone, and find out what's happening underground in the Geology Zone. Climb up the stairs to the viewing platform to get a close look at the globe and uncover its secrets in the Wonderful World Zone, or find out about famous Rivers and Oceans and how they shape our environment.



