A FREE RESOURCE PACK FROM EDUCATIONCITY

World Space Week

Science

Topical Teaching Resources

Age 5–11 Suitability

World Space Week Topical Teaching Resources

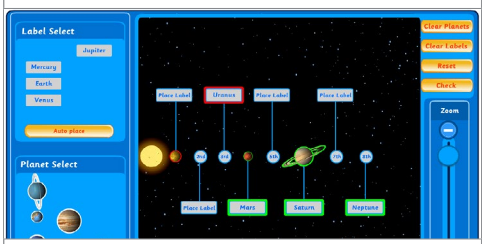
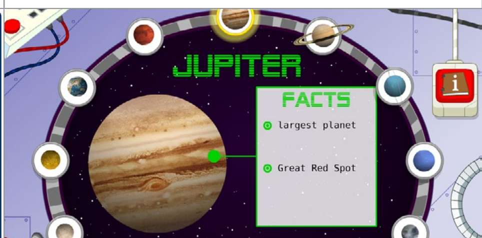
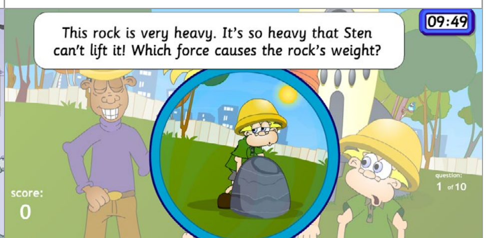
What Does This Pack Include?

This pack has been created by teachers, for teachers. In it, you'll find high quality cross-curricular teaching resources, including Fact Sheets, ThinkIts, Lesson Plans, Activity Sheets and an interactive model, to support your lesson planning and teaching during World Space Week.

To go directly to the content, simply click on the title in the index below:

Other Resources Linking to the Theme

Before deciding what to include in your lesson, check out our online content relating to space too. It's simple to find, just enter the name in EducationCity's Search tool!

Topic Tools: Explore Concepts as a Class	Learn Screens: Introduce or Reinforce a New Concept	Activities: Educational Content
Solar System *Content ID: 1887*	**Solar Stroller** *Content ID: 12644*	**Outer Space** *Content ID: 1116*
		
Position and label the planets in an interactive Solar System and watch the planets orbit the Sun with our Topic Tool.	Identify the position of the planets and Pluto within the Solar System with your students, using our Learn Screen.	Help your students understand the concept of gravity and that it can be measured, using this Activity.

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Did you know that…?

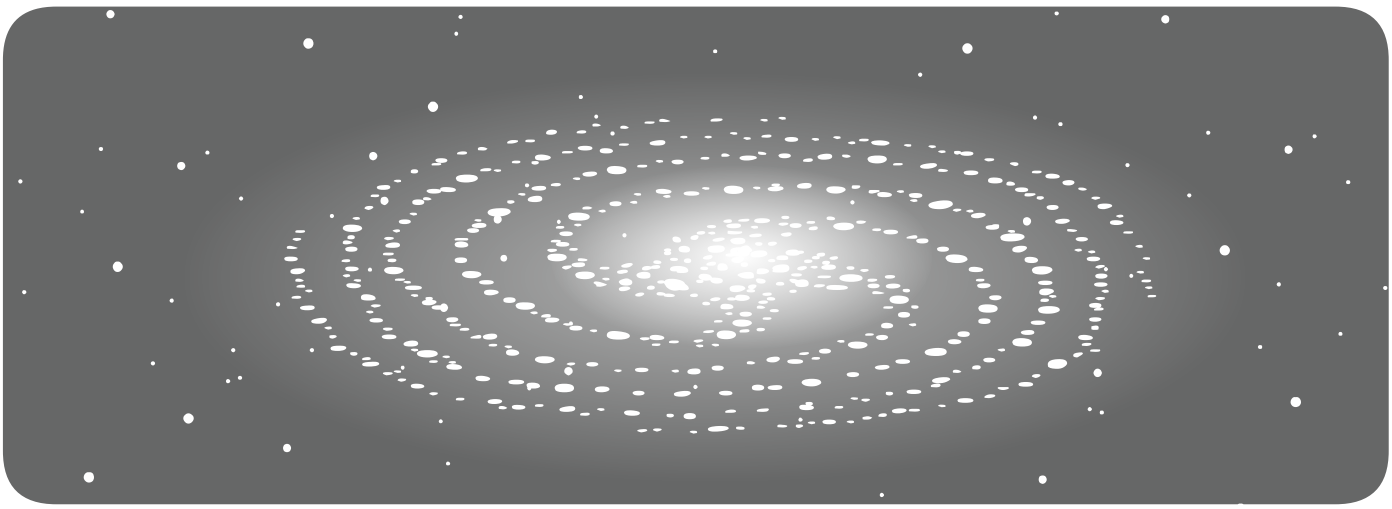
- we live in a galaxy called the Milky Way
- the Milky Way is one of billions of galaxies in the universe
- the Milky Way is made up of over 200 billion stars

Other facts about the Milky Way

- The Sun is just one of the stars in the Milky Way.
- It is called the Milky Way because when astronomers looked up at the sky, they saw a line of light that looked like some milk had been spilt.
- Stars in our Milky Way can be white, yellow or red. White stars are the hottest and red are the coolest.
- It takes light over 100,000 years to travel from one side of the Milky Way to the other.
- There is a black hole in the centre of the Milky Way.
- The oldest star in our Milky Way is about 13.2 billion years old.
- It is shaped like two fried eggs stuck together!

When can you see the Milky Way?

- In the Northern Hemisphere the best time to see it is between July and September.
- If you live in the Southern Hemisphere, watch out for it between October and December.



- For hundreds of years many people have been fascinated by space. Now because of this amazing research people are planning holidays in space!

- In fact it was over 4000 years ago that people first realised that the stars were grouped together. They called them constellations.

- However it wasn't until the 1600s that things started to get really interesting. In 1608 the first telescope was invented which meant that people could get an even closer look at what was happening in space.

- In 1609 Galilei was the first person to ever look at the night sky through a telescope but as a result of all his research, he was arrested in 1633 for saying that the Earth moved around the Sun.

- For over three hundred years scientists carried on researching space but it wasn't until 1961 that the first man was sent up to take a closer look. His name was Yuri Gagarin, he was Russian and he completed one orbit of the Earth in two hours.

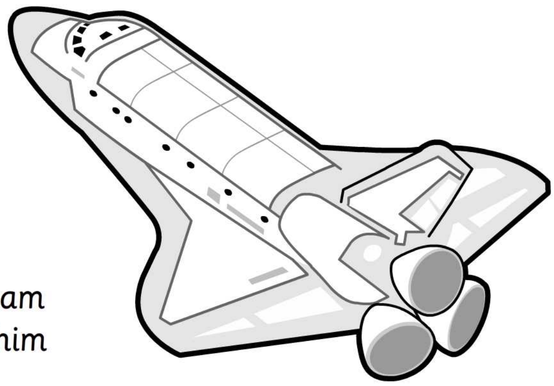
Did you know that Yuri Gagarin wasn't the first living thing to be sent into space?

- Fruit flies were sent up in 1947 and Albert the monkey was launched into space in 1949. He travelled a distance of 83 miles from Earth.

- A dog called Laika was then launched into space on board Sputnik 2 in November 1957. She was sent to orbit the Earth but sadly died because it was too hot for her.

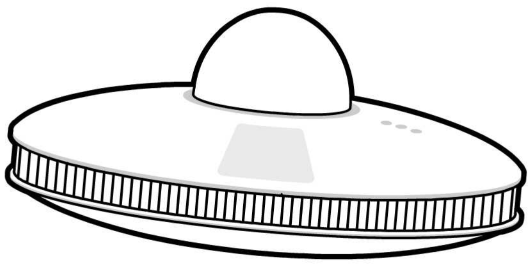
- Eight years after Yuri Gagarin orbited the Earth, Neil Armstrong and Buzz Aldrin landed on the Moon in 1969. They set foot on the Moon and filmed what they saw while their fellow astronaut Michael Collins stayed on board Apollo 11.

The first ever space tourist...



- In a plan to make space travel less expensive the space shuttle was designed and launched in 1981. It could be used up to one hundred times and could fly at over 17,000 miles per hour.

- In 2001, millionaire Dennis Tito finally realised his dream to become the first ever space tourist. His ticket cost him over £13,000,000 and for that he had to train for 800 hours and got to spend one week in orbit, mostly visiting the International Space Station. The most expensive holiday ever!



Over to you...

- What would you do if you got to spend a week in space? Where would you travel to and why?

The International Space Station

Fact Sheet

- The International Space Station (ISS) is one of the largest ever space crafts. It is used to carry out experiments in space and from there observations of life on Earth can also be carried out.

- Up to six astronauts live and work on board the ISS at any one time.

- It travels at a speed of 17,000 miles per hour. It orbits the Earth once every 90 minutes and communicates with Earth using satellites.

- Construction began in 1988 when parts of the space station were flown out into space where they were built. Once completed, it was designed to measure the same length as a football pitch.

- The ISS is powered by solar panels that use the Sun's energy to make electricity.

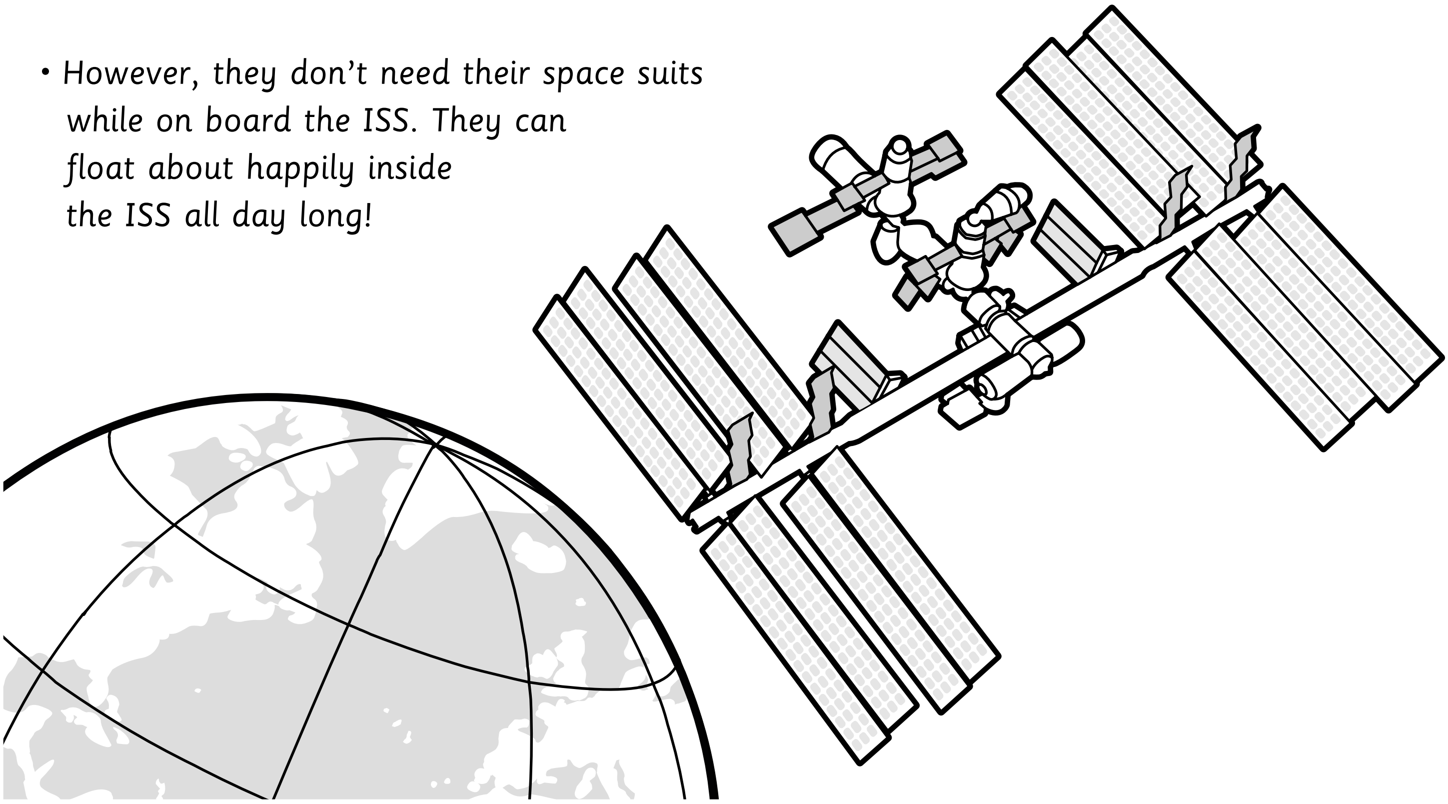
- It has a docking station, a living area where astronauts eat and sleep and some on board laboratories where experiments are carried out.

Did you know…

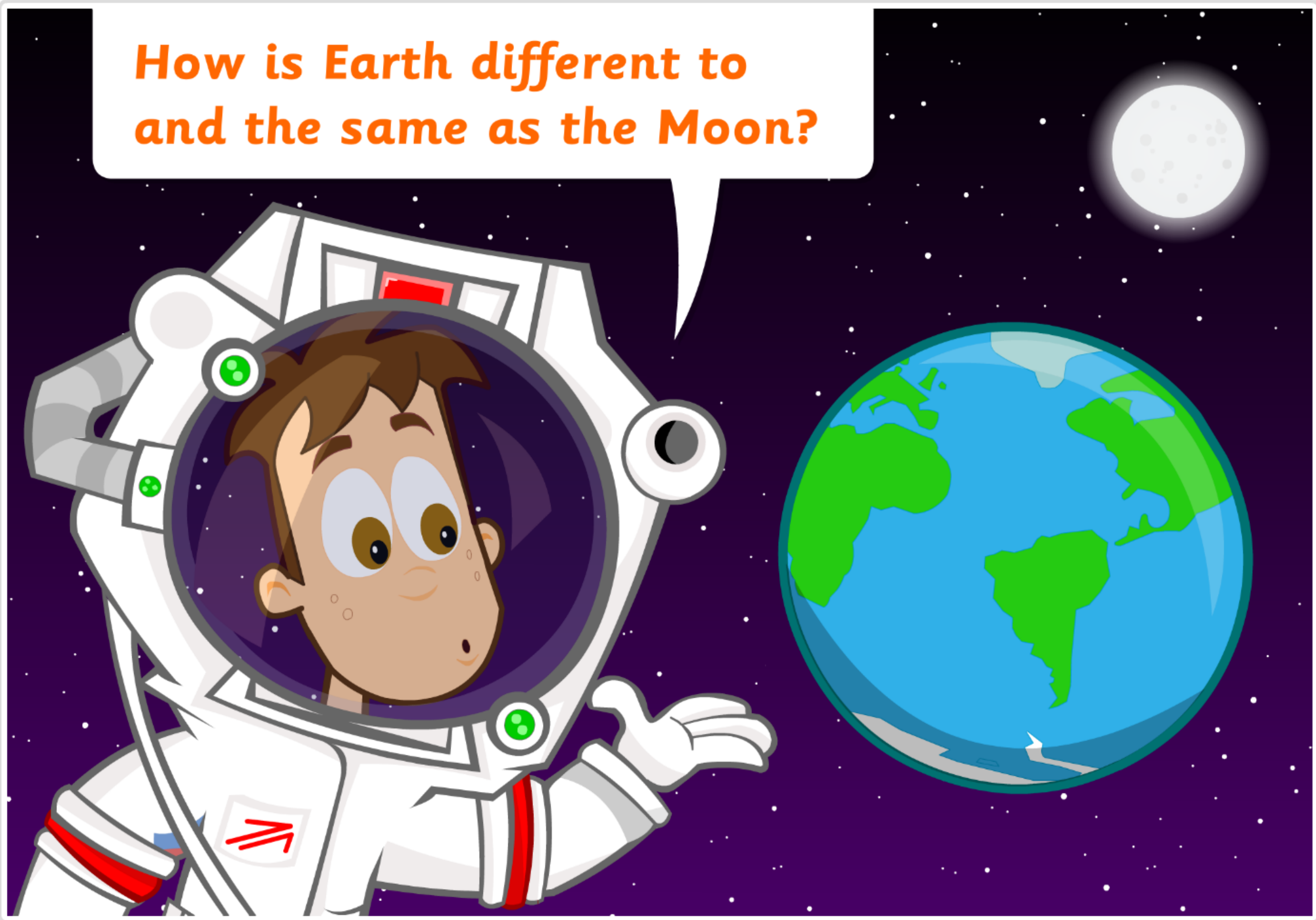
- that when the astronauts go to bed they have to strap themselves in? This is so that they don't end up floating about all night!

- They also have to wear special space suits when they leave the station to go on a spacewalk. Without these suits they wouldn't survive!

- However, they don't need their space suits while on board the ISS. They can float about happily inside the ISS all day long!



ThinkIts EducationCity

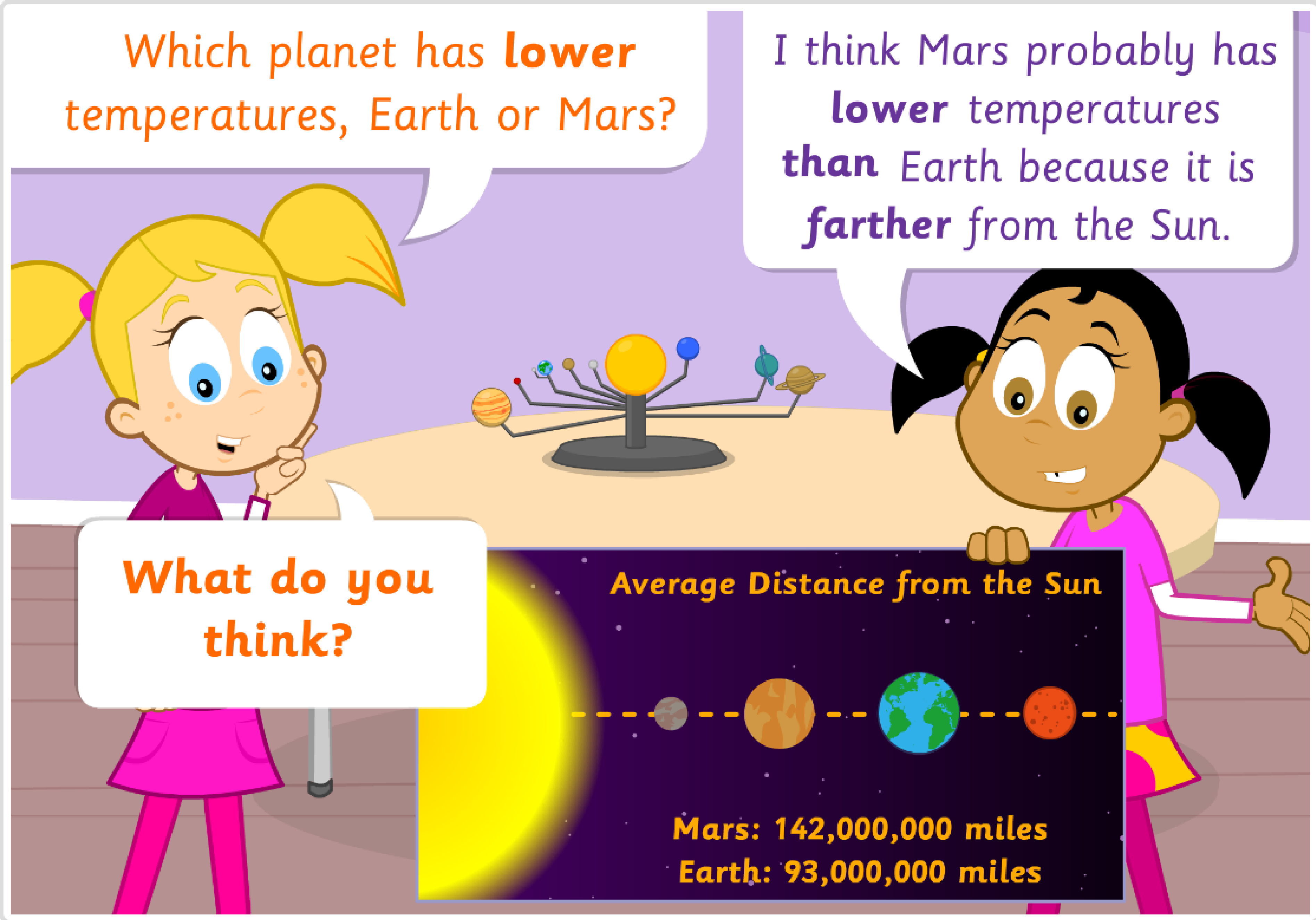


ThinkIts EducationCity

Where shall I start...

Man has walked on both the Earth and the Moon but did you know that there is no wind on the Moon? This means that Neil Armstrong's footprints will be on the Moon for millions of years!

What did you think of?


Which planet has lower temperatures, Earth or Mars?
I think Mars probably has lower temperatures than Earth because it is farther from the Sun.
What do you think?
Average Distance from the Sun
Mars: 142,000,000 miles
Earth: 93,000,000 miles

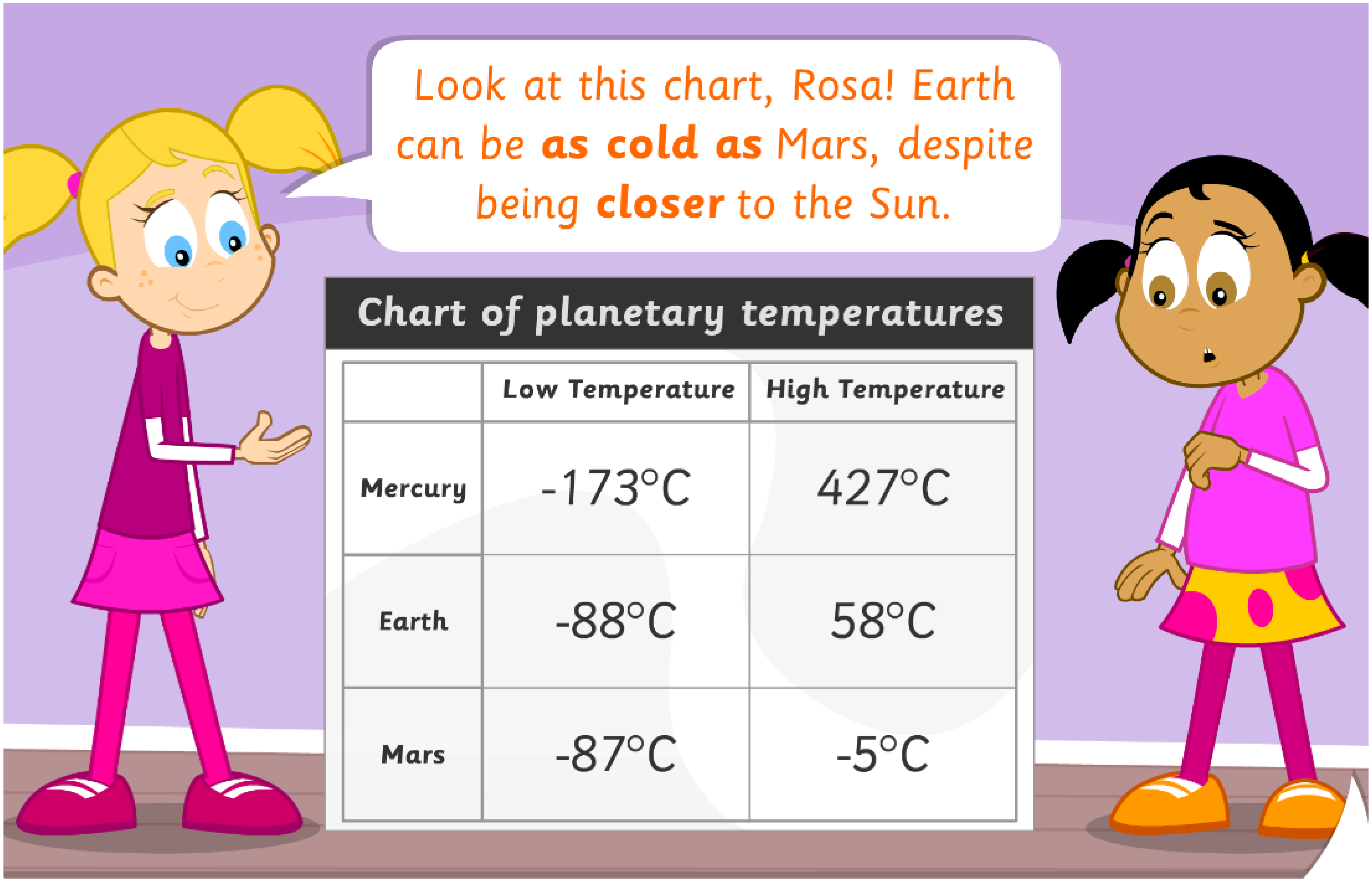


Chart of planetary temperatures

	Low Temperature	High Temperature
Mercury	-173°C	427°C
Earth	-88°C	58°C
Mars	-87°C	-5°C

What other planets are probably **colder than** Earth?


SPACE TOURS
If you were going to be the next space tourist, what would you take with you into space and why?


I would definitely pack my camera. Imagine all of the pictures you could take! It would be amazing!
What did you think of?

Design a Wanted Poster for an Alien

Lesson Plan

Overview

In this 60-minute activity, students have the opportunity to design a wanted poster for an alien. Firstly they consider where their alien has come from, its special powers and why it is wanted. They then complete a poster to publicise the fact that it is wanted. Additional time may be needed to complete the poster.

Materials

Resources and organisation:

- Organise the students into groups of four
- Large pieces of sugar paper and pens
- Access to the EducationCity Mind Map Tool
- Reference Sheet for students to record their ideas before starting on the poster – photocopy enough for one per student

Lesson structure

0 - 10 minutes – Explain to the students that as part of their space-themed activities, an alien has landed on Earth and is responsible for some terrible deeds. Tell the students that the alien must be captured and that their job is to design a poster that will publicise what it has done and why it is important to catch it. Start by helping the students to construct a story surrounding their alien that helps them to build up a picture of why it needs to be caught. Organise the students into groups of four and give them time to share ideas about the alien, where it could have come from, what its special powers could be and why it needs to be captured. Ask them to record their ideas onto sugar paper.

10 - 20 minutes – Draw the class back together and ask each group to share their ideas with the class. At the same time, record their ideas using the EducationCity Mind Map Tool.

20 - 30 minutes – Ask the students to use the Reference Sheet to plan out their poster. Remind them that they can use their own ideas or refer to the class mind map if they wish. Discuss the importance of this planning stage so that the students gain a sense of the need to include as much information as possible while also being succinct.

30 - 40 minutes – Draw the class back together and by way of peer assessment, ask students to swap their plan with a partner and ask them to assess each other's work, commenting on the content covered in each of the sections. Once they have done this, give students time to assess their own designs and add to them should they wish to.

40 - 60 minutes – Give each student an A4 sheet and ask them to start to work on their poster. Circulate to assess understanding and share examples with the rest of the class. Additional time will be needed to complete this task.

Design a Wanted Poster for an Alien

Activity Sheet

EducationCity

Name: ______________________ Class: ______________

What information do we need to include?

1 What does the alien look like?

- ______________________
- ______________________
- ______________________
- ______________________

2 Where has the alien come from?

- ______________________
- ______________________
- ______________________

3 What characteristics and special powers does the alien have?

- ______________________
- ______________________
- ______________________
- ______________________
- ______________________
- ______________________

4 Why do we need to capture this alien?

____

____

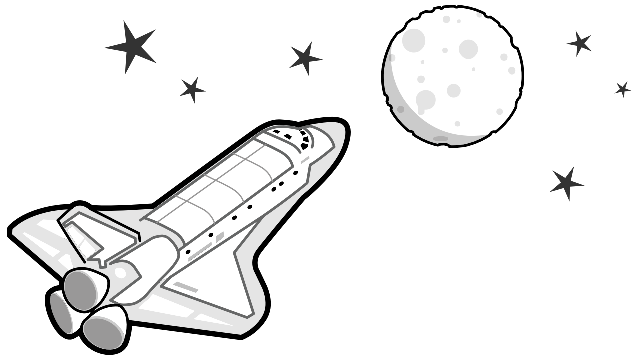
____

____

____

What would you ask Neil Armstrong?

Overview
In this 60-minute activity, students work together to consider questions they would ask Neil Armstrong, if they had the opportunity to interview him, about his journey on Apollo 11 and the moon landing in 1969. They look at some clips of the moon landing and some pictures of the Moon to familiarise themselves with what went on, both in the run up and on that day. Further time will be required to interview Neil Armstrong by way of a hot seating activity.



Materials
Resources and organisation:
- Access to footage of the landing of Apollo 11
- Sugar paper and felt tip pens
- Organise the students into mixed ability pairs

Lesson structure
0 - 5 minutes – Start by explaining to the students that you want them to imagine they work for a local television station and that they have been asked to interview astronaut Neil Armstrong.

5 - 15 minutes – Ask students if they know who Neil Armstrong is and show them some clips to support their understanding. While the students watch the clips, ask them to note down any key facts that provide further information about who he is, why he was so important and who else was on Apollo 11 with him.

15 - 20 minutes – Find a clip that shows the point when Apollo 11 lands on the Moon and ask the students to imagine they are on board. Ask them to discuss with a partner what they would have liked to ask the astronauts at that very moment.

20 - 30 minutes – Draw the class back together. Share their thoughts and ideas and ask students to explain what they think the astronauts might have been thinking.

30 - 50 minutes – Then ask the students to work in pairs to think about the sorts of questions they would ask Neil Armstrong. Give each pair a piece of sugar paper and ask one student to note down the questions. Encourage them to focus not only on the landing itself but also what happened in the lead up to the landing and possibly how Neil Armstrong's life may have changed when he landed back on Earth. Circulate to assess students' understanding and to share some of the questions with the rest of the class in case they need additional support.

50 - 60 minutes – By way of peer assessment, ask students to read out some of their questions. Ask students to discuss how effective the questions are and in what way they could be improved.

In a follow-up session, invite students to take it in turns to enter the hot seat as Neil Armstrong and to answer some of the questions generated.

Design a Space Shuttle

Lesson Plan

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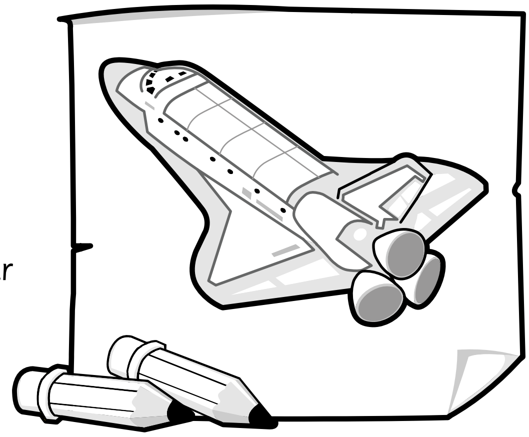
Overview

In this 60-minute activity, students have the opportunity to design a space shuttle to transport astronauts to the International Space Station. This lesson focuses on the design element and additional time will be required to make and evaluate the spaceship.

Materials



- Fact Sheet on the International Space Station
- Pictures and clips of space shuttles (available on the Internet)
- Individual whiteboards and pens
- Access to the EducationCity Mind Map Tool
- Reference Sheet for students to design and evaluate their space shuttle – photocopy enough for one per student

Lesson structure

0 - 10 minutes – Explain to the students that they have been commissioned to design and make a space shuttle for NASA and that as part of this commission they have to design and make a model prototype. Discuss the fact that the space shuttle is needed to take a group of astronauts to the International Space Station. Start by setting the scene and asking the students what they know about the International Space Station. This can be supported by the Fact Sheet on the International Space Station.

10 - 20 minutes – Show the students some pictures and clips of space shuttles (available on the Internet) to give them a starting point for their design should they need it. Discuss the purpose of many of its features, (e.g. the nose cone and number of engines) so that they gain an understanding of their importance.

20 - 35 minutes – Then show the students the design pro forma and ask them to work through the design element so that they consider what it will look like and to draw two different design sketches that they could use to make their design. As they work through this, remind them to think back to the pictures and clips you have shown them to ensure they incorporate the various components.

35 - 45 minutes – Draw the class back together and by way of peer assessment, ask students to swap their space shuttle designs with a partner. Ask them to assess each other's work, commenting on the content covered in each of the sections. Once they have done this, give the students time to assess their own plans and add to them should they wish to.

45 - 55 minutes – Ask the students to choose the design they are going to use and to then consider the resources they will need to complete their prototype. These too can be listed on the pro forma.

55 - 60 minutes – By way of a plenary, ask the students to think about the various design and technology techniques they have learnt, such as joining and cutting, and may need in order to complete their design. Additional time will be needed to make and evaluate their designs. The pro forma will also take students through the evaluation process.

Design and Make a Space Shuttle

Activity Sheet

EducationCity

Name: ____________________ Class: ____________

Designing your space shuttle.

1. What will your space shuttle look like?
   - ______________________
   - ______________________
   - ______________________

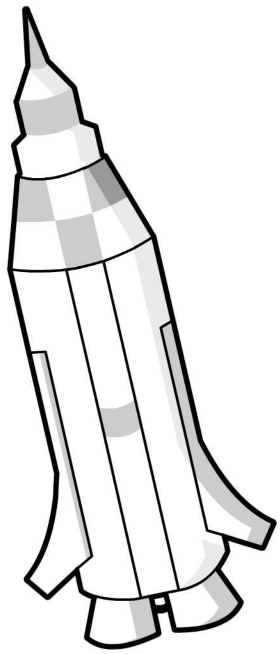
2. What special features will you need to include?
   - ______________________
   - ______________________
   - ______________________

3. Draw two designs to show what your space shuttle might look like.

Design 1	Design 2

Gathering resources.

4. What resources will you need? List them below.
   - ______________________
   - ______________________
   - ______________________
   - ______________________
   - ______________________
   - ______________________
   - ______________________

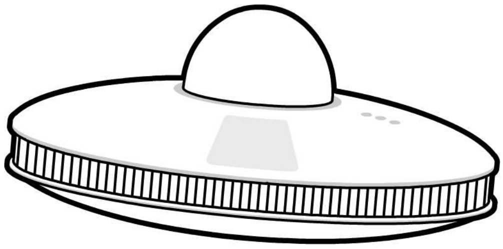


Name: ______________________ Class: ______________

Making your space shuttle.

5 How will you make it? Write yourself some instructions below.

- ______________________
- ______________________
- ______________________
- ______________________
- ______________________



6 Once you have finished making your space shuttle, draw a picture of it here.

Evaluating your design.

7 Which space shuttle did you make and why?

____

____

____

8 Were you pleased with your space shuttle? Why?

____

____

9 How could you have improved your space shuttle and why?

____

____

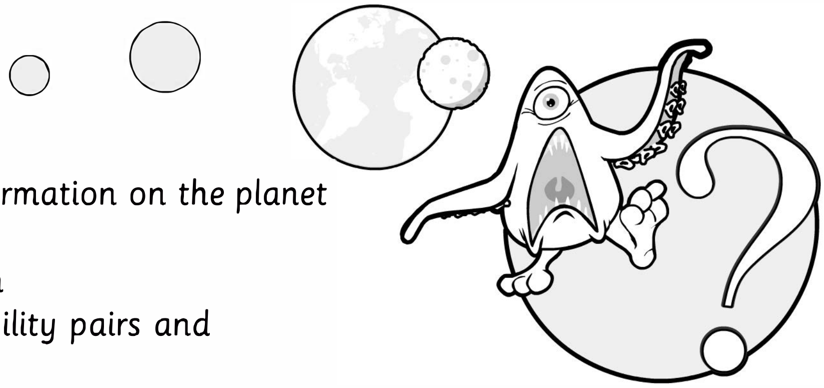
Overview

In this 60-minute activity, students have the opportunity to research the planet Mars in order to try to answer the question 'Why do some scientists think there could have been life on Mars?'

Materials

Resources and organisation:

- Reference books on Mars
- Access to websites that provide information on the planet Mars
- Paper and pencils to record research
- Organise the students into mixed ability pairs and additional groups of four



Lesson structure

0 - 10 minutes – Explain to the students that for many years, some scientists have been questioning whether or not there has ever been life on Mars. Discuss the fact that for this to have been the case, there must be some reasons behind this speculation. Then tell the students that their job is to take on the role of a researcher and to try to find out the reasons behind this speculation.

10 - 15 minutes – Posing the question, 'Why do some scientists think there could have been life on Mars?', organise the students into pairs and ask them to carry out some research that will help them find out the answer to the question. Explain that they can use reference books and the Internet to support their research.

15 - 35 minutes – Give students time to carry out their research. Assign each of the pair a role, for example one could read the research while the other records key facts. While students are working, circulate to assess understanding and ask students to share their findings.

35 - 45 minutes – Draw the class back together and then organise students into groups of four. Ask the students to share their findings in their groups and explain that you would like them to write down up to five key facts that have been found out as a result of their research.

45 - 55 minutes – Again draw the class back together. Ask each group to assign a spokesperson who then shares the key facts to the rest of the class.

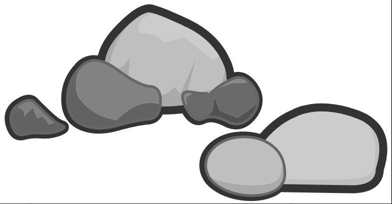
55 - 60 minutes – Once each group of four has completed their fact sharing, remind the students of the question 'Why do some scientists think there could have been life on Mars?' Ask the students to look back at the key findings and see if they can find an answer to the question. Elicit the understanding that the reason some scientists think there may have been life on Mars is because channels found in the ground on the surface of Mars show that there may once have been water running through it and if there is water present there may have been the possibility of life.

Planet Rover
Lesson Plan

Subject: British Science Week	Duration: 1 Day

Broad Aims:

In this one-day lesson, children will assess the terrain of a newly discovered planet, in order to design and command a rover vehicle suitable for the harsh environment. In the first part of the day, Children will look at samples, images and data, sent back by the original rover expedition. They will use these samples to build up their own image of the planet's terrain. In the second part of day the children will design a rover vehicle suitable to travel across the planet's surface and collect samples. Finally, the children will write algorithms to navigate and control the rover.



Curriculum Links

Maths:
Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs.

Solve problems involving similar shapes where the scale factor is known or can be found.

Design and technology:
Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups.

Geography:
Describe and understand key aspects of physical geography, including: climate zones, biomes and vegetation belts, rivers, mountains, volcanoes and earthquakes, and the water cycle.

Computing:
Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts.

Lesson	Learning Objective	Success Criteria	Starter	Main	Plenary	Resources
1	To be able to write a description of the surface of an undiscovered planet.	I can describe differences between the surface of the Earth and Moon. I can interpret data from graphs and tables. I can write a scientific description.	Display the 'Search and discover' Thinkit and discuss with the children how the surface of the Moon and Earth differ.	Discuss different categories for comparing the two planets such as terrain, atmosphere and weather, gravitational pull, vegetation and hours of daylight and temperature. Split the class into groups of 3 or 4 to introduce the day's task: It is 2084 and an unmanned probe, Opportunity 64, recently landed on the planet 653b, in the Onomatopoeia galaxy. Unfortunately the rover that was sent to explore the planet has malfunctioned, due to the unusual terrain. The mission today, is to use the samples sent back by Opportunity 64 to assess the terrain and to design and build a rover, better suited for the harsh environment on the planet.	Each group should choose three things that the rover vehicle will find most challenging when it encounters the planet. Discuss as a class their choice of challenges.	• Resource Sheet 1 • Samples of rocks and sand, coloured for effect.

		Challenge: I can explore different kinds of rocks and soils.		Distribute a selection of samples and the images and data from Resource Sheet 1. Explain that these samples, photographs and data were taken of the planet's surface by the first expedition probe. In this session children must use the information available to write a detailed description of the planet's surface and atmosphere. This description will guide them to think about the hazards that the rover vehicle will have to overcome. The description should include details on: • ***the terrain*** • ***the atmosphere*** • ***the weather*** • ***the gravity*** • ***any vegetation*** • ***hours of daylight*** • ***average temperature***  Encourage the children to think and write scientifically, including using measurements from the data sheet (Resource Sheet 1). **Challenge**: Link to prior learning on rocks in science.		
2	To be able to design a rover vehicle.	I can design a rover vehicle to meet a given specification. **Challenge:** I can draw a scale drawing of my design.	Display images of previous mars and moon rovers and discuss their features: • **Viking 1** and **Viking 2** (landed on Mars in 1976)	In this session children will design a rover vehicle to assess the terrain of planet 635b. They should continue to work in their groups, to design the rover, meeting the specification in Resource Sheet 1. Their design should take into account their assessment of the planet's terrain and atmosphere, created in session 1. The design should include an annotated drawing and additional description of the rover's functions, meeting each part of the specification. **Challenge:** Use graph or square paper to draw a scale drawing of the rover design, annotating	Referring back to the previous session, children should explain how their rover is designed to meet the challenges of the planet and present this to the rest of the class.	• Resource Sheet 1 • square or graph paper • rulers, protractors, compasses and set squares

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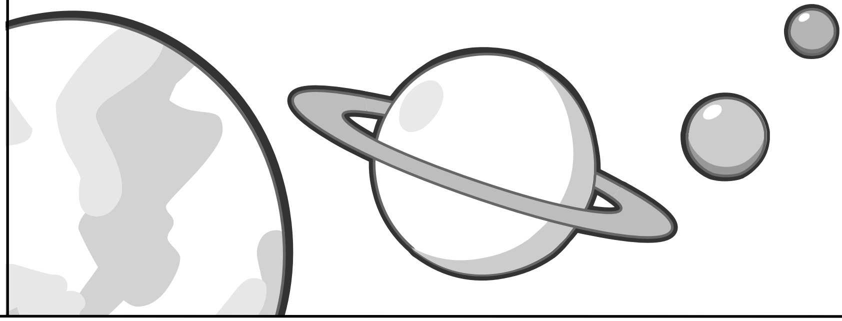
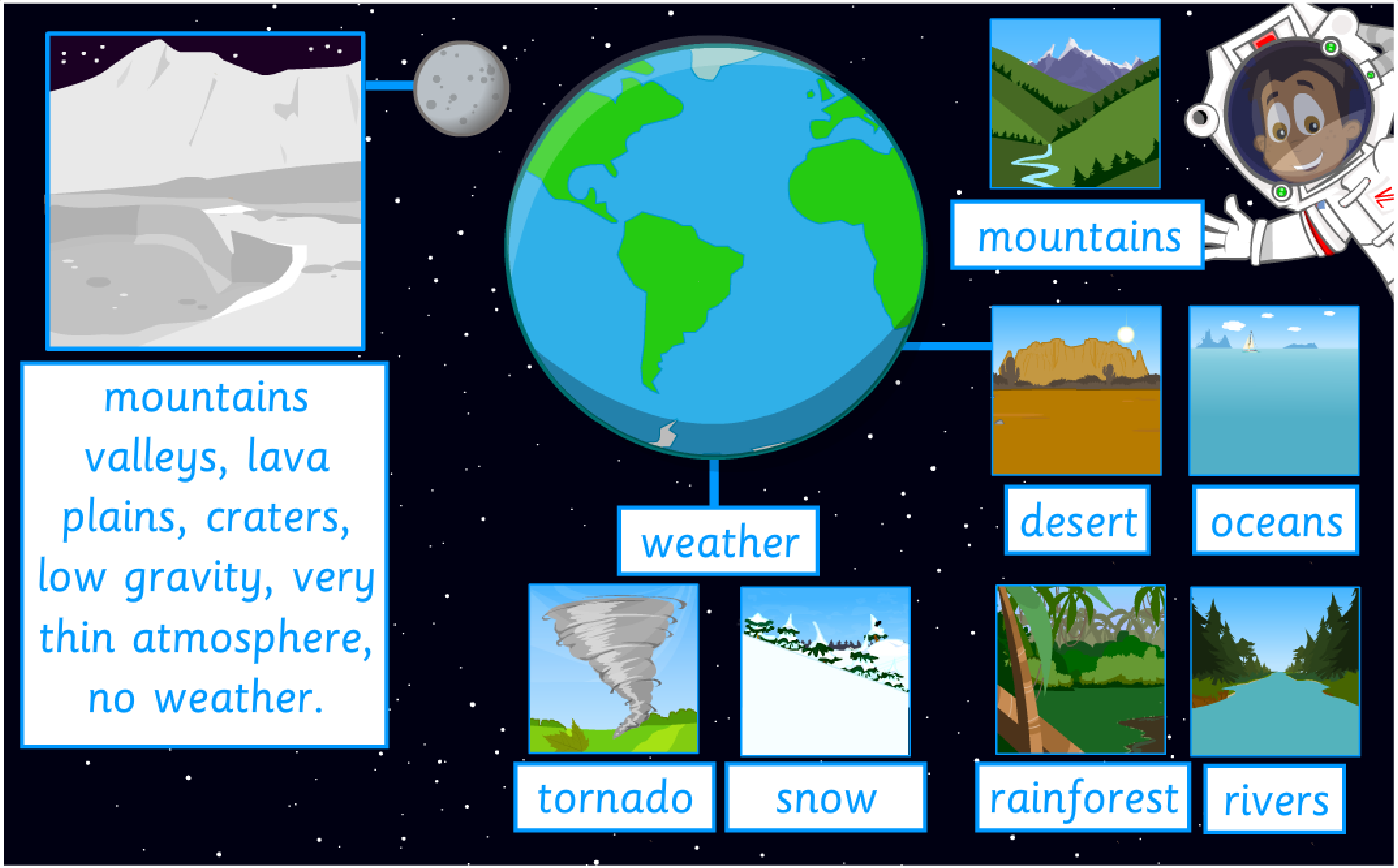
		• **Spirit** and **Opportunity** (landed on Mars in 2004)		particular features. Link to prior maths learning on ratio and scale.		
3	To be able to write an algorithm to control a rover vehicle.	I can write an algorithm to direct the rover vehicle to perform a specific task. **Challenge:** I can display an algorithm as a flow diagram.	One of the specification criteria is that the rover should be completely autonomous. Discuss as a class how control of the rover could be achieved – Through computer control and programming.	Discuss with the children the first stage of the programming process - Writing an algorithm (set of instructions) to perform the given task. Explain to the children that in this session they will be writing algorithms to perform the programming specification tasks in the data and specification sheet (Resource Sheet 1). Model the algorithm to perform the task: To collect a sample of sand from the desert and return it to the landing site. **1. activate heat shields** **2. turn right 90 degrees** **3. travel 6 km at a speed of 20 km/h** **4. stop** **5. activate sample arm and scoop** **6. lower scoop into sand** **7. raise scoop** **8. retrieve sample** **9. turn 180 degrees** **10. travel 6 km at a speed of 20 km/h** **11. stop** **12. deposit sample into main spacecraft**	Children to test out and debug each other's algorithms.	• Resource Sheet 1 • Access to computers and the EducationCity Flow Diagram Tool.

				13. deactivate heat shields *In their groups, children should write detailed instructions for the rover to perform the tasks.* **Challenge:** *Introduce the children to the EducationCity Flow Diagram Tool and the activity and decision box functions. Children should write their algorithms using the Tool.* 		

Next Steps

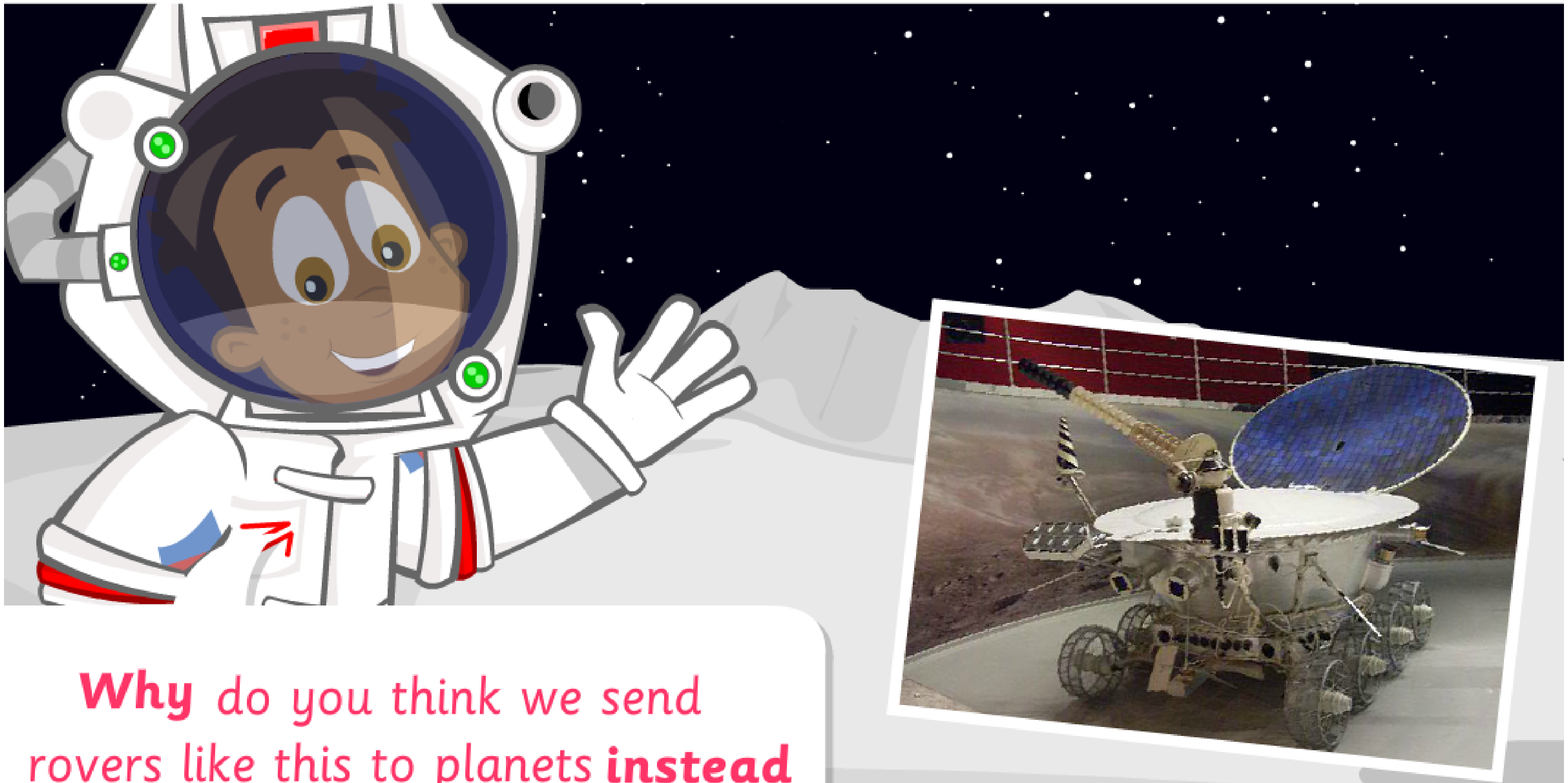
Design and Technology

Construct prototypes of the rover designs and test them out on a mock landscape.



How are the surfaces of the **Earth** and **moon** different?

The Lunokhod 1 rover landed on the Moon in November 1970. It was the first roving remote-controlled robot to land on any planet.

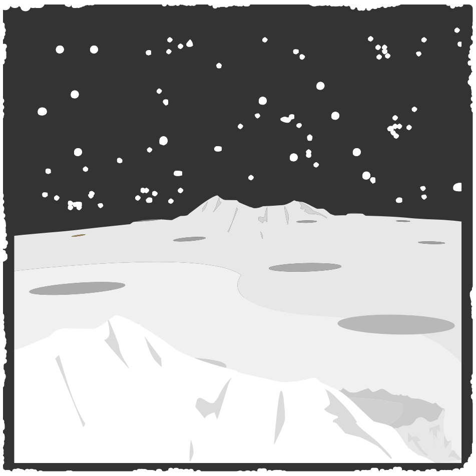


Why do you think we send rovers like this to planets **instead of humans?**

PLANET 365B DATA SHEET AND ROVER SPECIFICATION

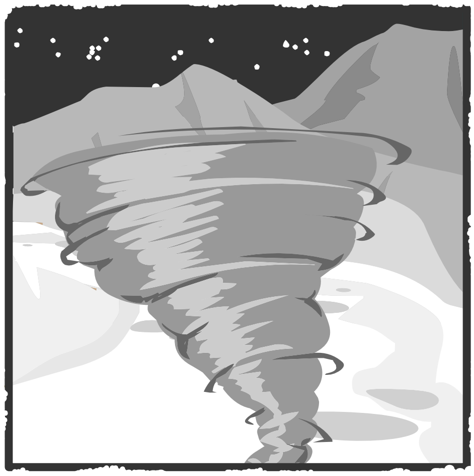
Images taken from Opportunity 64 of the planet's terrain.

Terrain:



Vegetation:

Weather:

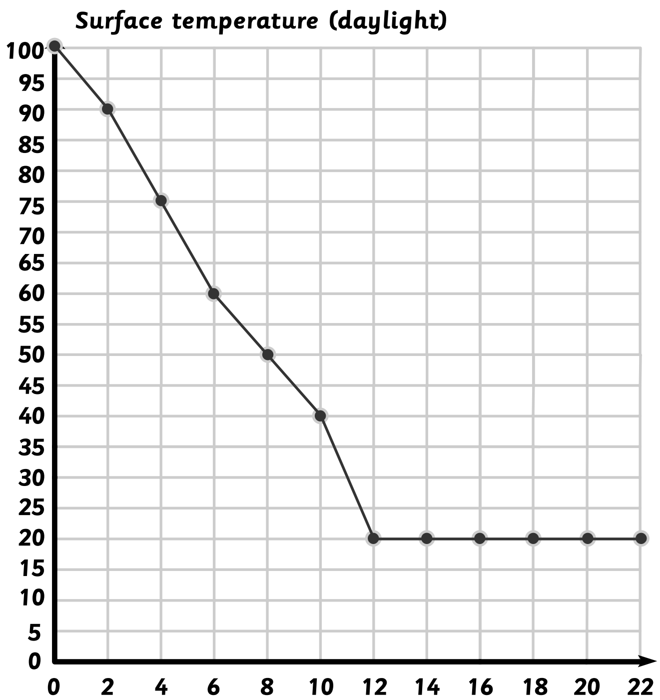


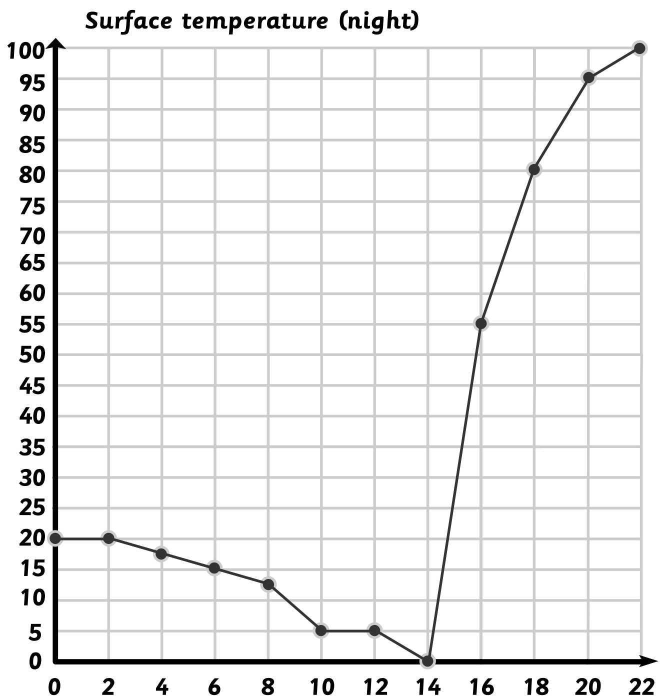
Data from the planet's surface (Time measured in Earth hours)

Time for the planet to make a full rotation: 44 hours

Average daylight hours: 22

Graph to show average temperatures





EducationCity®

TOP SECRET

Rover specification:

1. Must be able to work autonomously (radio signals will not work here).

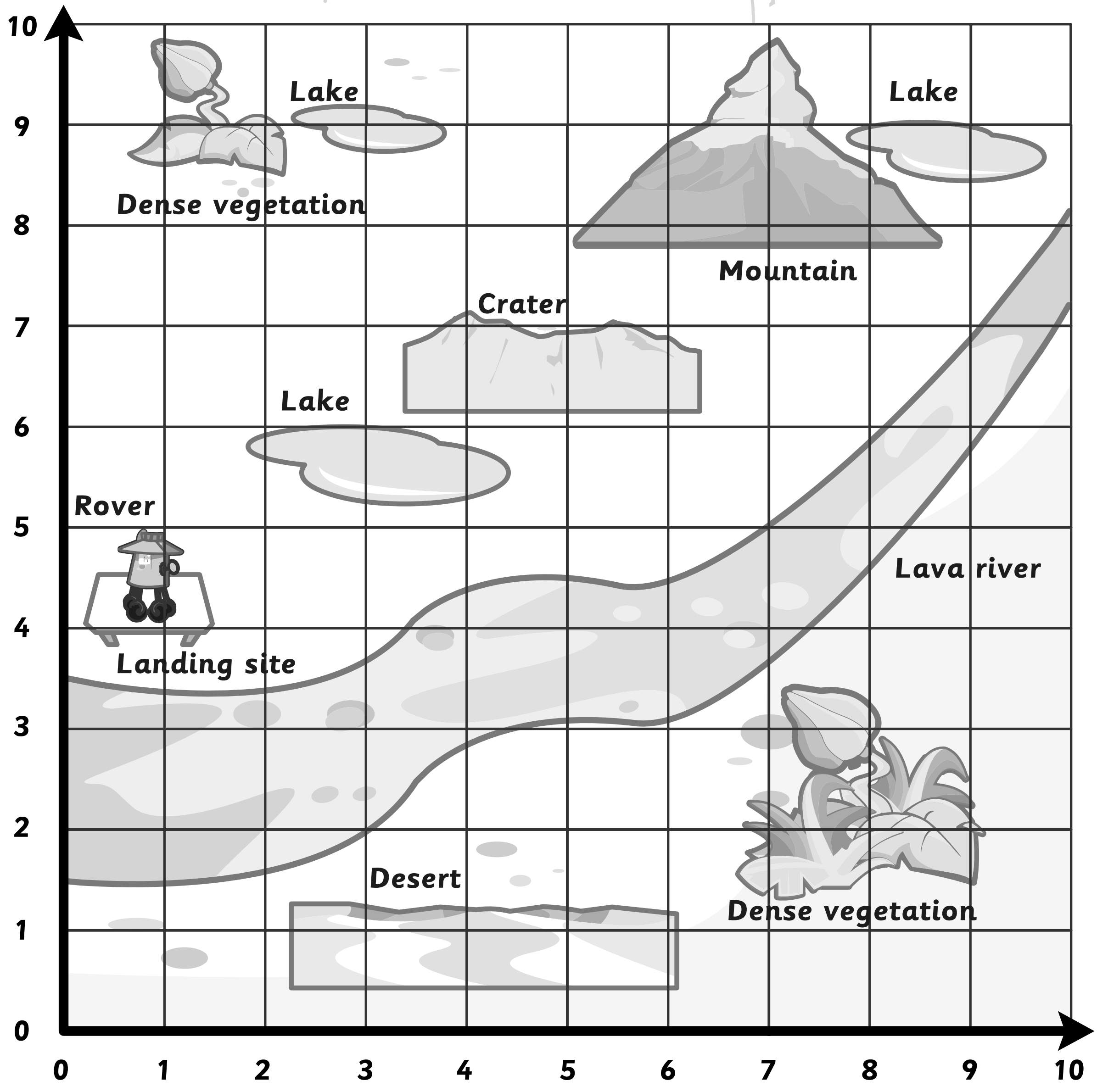
2. Must be able to function without fuel for long periods (conventional fuels may react in the planet's extreme temperatures).

3. Must be able to collect and store samples from the planet's surface.

4. Must be made from light materials (Gravity is much stronger than on Earth).

5. Must be able to travel at least 100 km from the base station in a 4 hour period.

Map of the exploration area 100 km2



square= 1km²

Programming specification tasks:

1. Collect samples of rock from the crater and mountain before returning to the landing site.

2. Collect samples of liquid from the three lakes. On analysis, if the rover retrieves a sample of water, return immediately to the landing site.

3. Travel to the base of the mountain and collect samples at night. Return to the landing site in daylight.

4. Collect liquid samples of lava and rock and then return to the landing site.

5. Collect two samples of vegetation, one from the dry desert area and the other from the lake area. Label the samples accordingly and return to the landing site.

6. Measure the temperature of the desert over a period of 4 hours. Return to the landing site and upload the data to the main computer.

Asteroid
Lesson Plan

EducationCity®

Subject: British Science Week | **Duration: 1 Day**

Broad Aims:

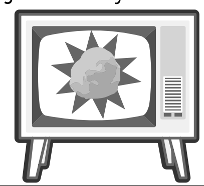
Children have been set a mission: 'To save Earth from the asteroid which is on a collision course with our planet'. Students have a day to complete the mission. In the first part of the day, they must write and make an emergency news bulletin, informing the people of Earth about the asteroid which is heading towards Earth and the catastrophic impact it will have. In the second part of the day, students will work as a team of scientists, trying to find a solution and stop the asteroid from colliding with Earth!

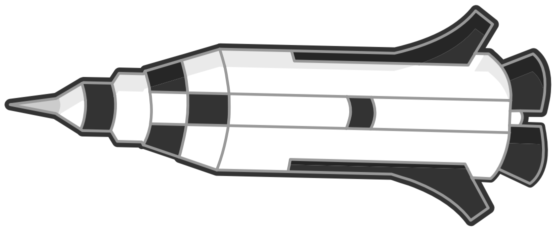
Curriculum Links:

Science: Earth and Space
Describe the movement of the Earth, and other planets, relative to the Sun in the solar system.

Reading: Comprehension
Explain and discuss their understanding of what they have read, including through formal presentations and debates, maintaining a focus on the topic and using notes where necessary.

Writing: Composition
Perform their own compositions, using appropriate intonation, volume, and movement so that meaning is clear.

Lesson	Learning Objective	Success Criteria	Starter	Main	Plenary	Resources
1	To be able to explain and discuss their understanding of what they have read. To be able to describe the movement of the Earth, and other planets, relative to the Sun in the Solar System.	I can read and understand the information to create a presentation. I can explain what a planet is. I can explain what an asteroid is.	Show students the ThinkIt: Major Catastrophe! Explain that a giant asteroid is on a direct course to crash into Earth. Inform the students that they have been selected by the government to work as a team of highly skilled individuals who must inform the people of Earth about the impending catastrophe.	Organise the students into teams of highly skilled individuals. Explain that the first mission is to inform the people of Earth about the asteroid. To successfully complete the mission, students will need to plan and write an emergency news bulletin. Each individual will have a specific role within the mission. Person 1: a broadcast journalist Person 2: a scientist/astronomer explaining what an asteroid is and how an asteroid travels through space. Person 3: a reporter to provide information about the asteroid which is about to hit Earth. Person 4: a physicist to explain what will happen to Earth when the asteroid hits. Show students the 'Official Asteroid Resource Pack'. Explain that in the remaining time, students need to research together to find the information which they will need for the news bulletin. 	Review each area: - What is an asteroid? - Information about the asteroid which is about to hit Earth. - What would happen to the Earth if an asteroid hit? Go through each of the areas in turn, ensuring that students are confident with each of the areas.	• Official Asteroid Resource Pack • Access to information for students to research (books, Internet etc.)

2	To be able to perform their own compositions, using appropriate intonation, volume, and movement so that meaning is clear.	I can perform my composition using intonation, volume, and movement.	Organise students into their groups. Ask students to work together to decide which role each of them will have within the News Bulletin.	Explain that the best News Bulletin will be the one picked by the government to broadcast to the world. When writing the script for each part, emphasise that students need to ensure that they have provided accurate and an adequate amount of information. Encourage students to add more detail, for example, the scientist could work for a famous space organisation, or the reporter could be broadcasting from a space station orbiting the Earth. Once students have finished writing their script, ask them to practise reading it aloud. Encourage students to use this opportunity to edit their text, adding more detail and to work upon their presentation skills.	Students need to perform the bulletins to the rest of the class. (These could be recorded earlier and then played back on the IWB to the rest of the class.) Students need to take a vote (they cannot vote for themselves) to decide which bulletin should be used.	• Official Asteroid Resource Pack • optional: recording equipment • IWB
3	To be able to explain and discuss their understanding of what they have read. To be able to generate, develop, model and communicate their ideas through discussion, diagrams, prototypes and computer – aided design.	I can read and understand the information to create a presentation.	Explain the second task to the students: They are now an elite group of scientists who have been charged with the mission to find a way to prevent the asteroid from hitting Earth. Each group will focus on a different method which could be used to save the Earth. This will then be presented to a panel of Global Leaders, who will vote to decide which method should be used to save the Earth.	As a class, read through the different collision avoidance strategies which can be used to stop the asteroid from hitting Earth. Talk through the different approaches, going through misconceptions and unknown words. **Explain that the presentation must include:** - a diagram of the vessel (this could be hand drawn or done on the computer). - a model of the vessel (use construction materials). - a presentation which explains the collision avoidance plan. This must include an explanation into what the vessel is and how it will be used to stop Thorium from hitting Earth. (All students must have a participatory role in the presentation). In this session, students need to prepare their resources and develop a presentation. (Students could use the Internet to look for images of their chosen method.) 	Ensure the students are on task. Have they created the materials for their presentation? Are students fully confident about how their chosen method is going to work? Encourage students to think about their presentation. What would be the most effective way to present it?	• Official Asteroid Resource Pack • computers • construction materials

4	To be able to perform their own compositions, using appropriate intonation, volume, and movement so that meaning is clear.	I can perform my composition using intonation, volume, and movement.	Explain that in the next part of the task, the students need to make sure their presentation is ready before presenting it to the panel. Remind students that they also need to rehearse their presentation skills, e.g. use intonation, volume and movement.	Stop the students, once they have had an adequate amount of time to prepare their presentations. Organise the classroom into a forum, and explain that each of the groups will present their collision avoidance plan in turn, explaining how it will prevent the asteroid from colliding with Earth. Once each group has presented, ask students to decide which method they feel will be most effective. Conduct a vote to see which method will be used by the Global Leaders to stop the asteroid (students cannot vote for themselves). Reveal the winning group.	Use this opportunity to pursue any questions which students might have about asteroids from today's session. If necessary, reassure students that the actual event of an asteroid hitting Earth is extremely minimal.	• materials required for presentation • access to research material to answer any questions

Next Steps

Science

Explore asteroids, comets, dwarf planets and other objects that can be found within our Solar System.

Design and Technology

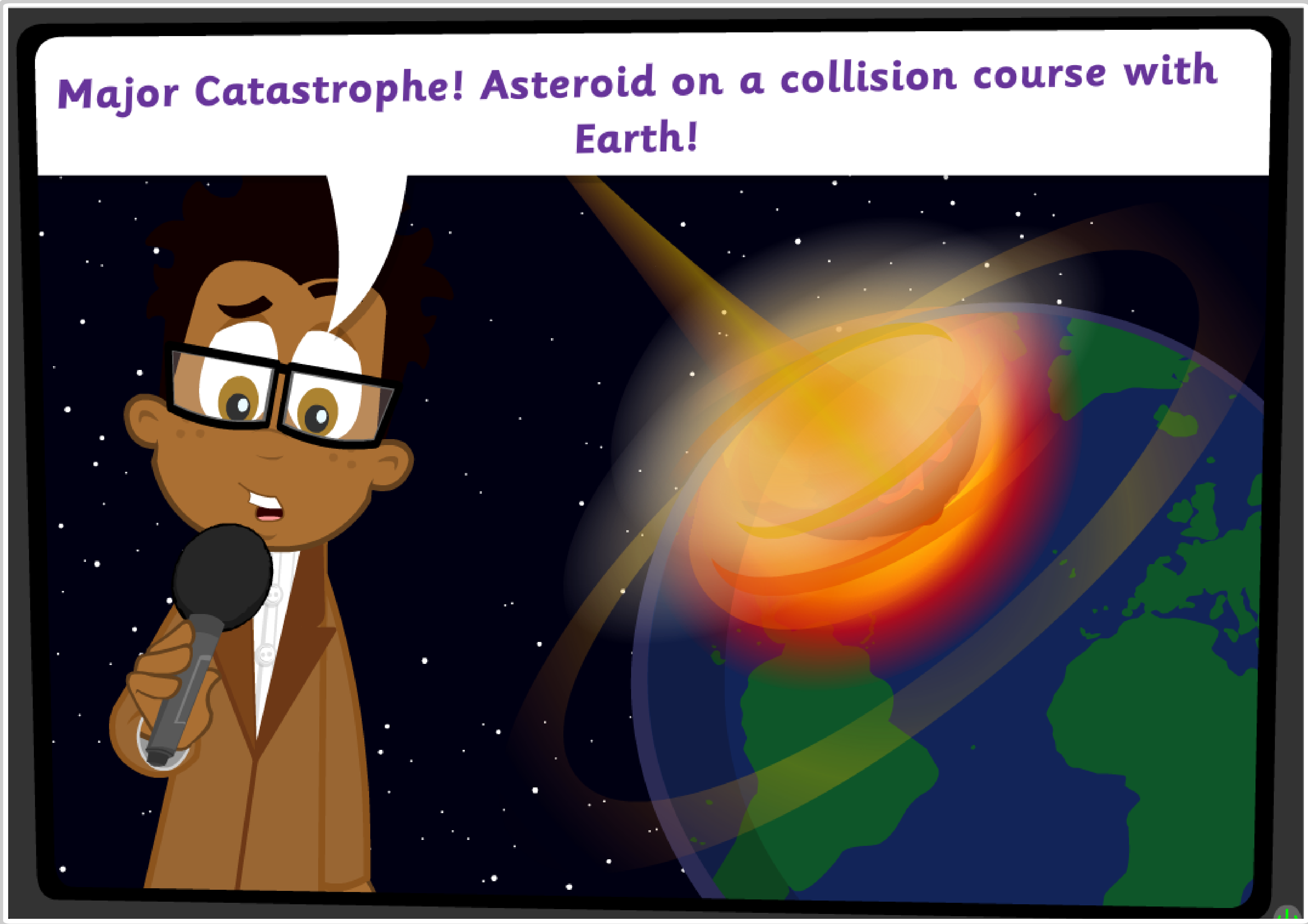
Extend students' initial designs using a wider range of construction materials and evaluate their product using feedback from others.
Students could then apply their technical knowledge to their understanding of computing to programs, to monitor and control their products.

English

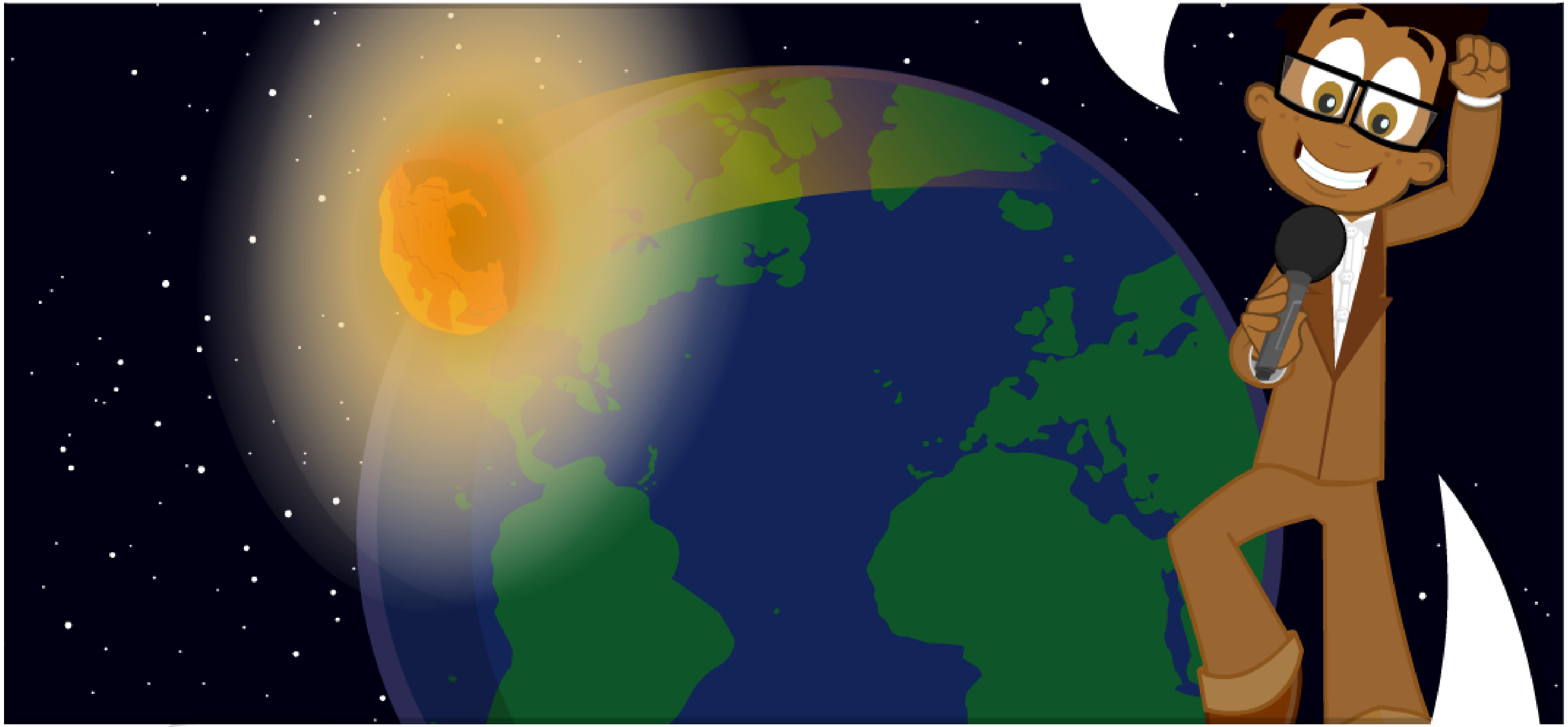
Students could plan and write a report to send to the Global Leaders following the presentation. Students would need to note and develop ideas, drawing on reading and research where necessary. They should also use further organisational and presentational devices to structure text and to guide the reader.

ThinkIts

EducationCity



The Earth has been saved!



The **biggest** asteroid threat is **1950 DA** which could hit the Earth in **2880!**

OFFICIAL GOVERNMENT DOCUMENT

ASTEROID RESOURCE PACK

USE THIS RESOURCE PACK TO COMPLETE THE 2 TASKS

Task 1

To create a programme that will be broadcast all over the world. It needs to inform the world that the asteroid, 'Thorium' is on a crash collision course with Earth. The report must also inform the people what they need to do to prepare for the potential asteroid collision.

Task 2

To create a presentation for the Global Leaders about the different collision avoidance strategies that could be used to save Earth from the asteroid. The Global Leaders will then cast a vote to decide which method they believe would be most effective.

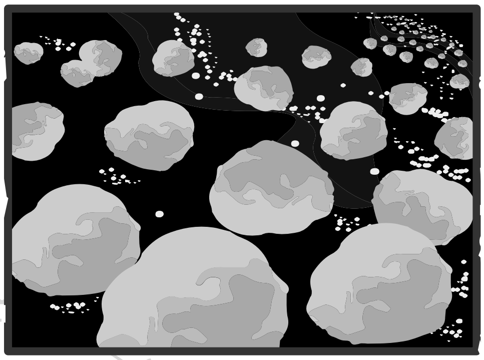
CLASSIFIED

ASTEROIDS

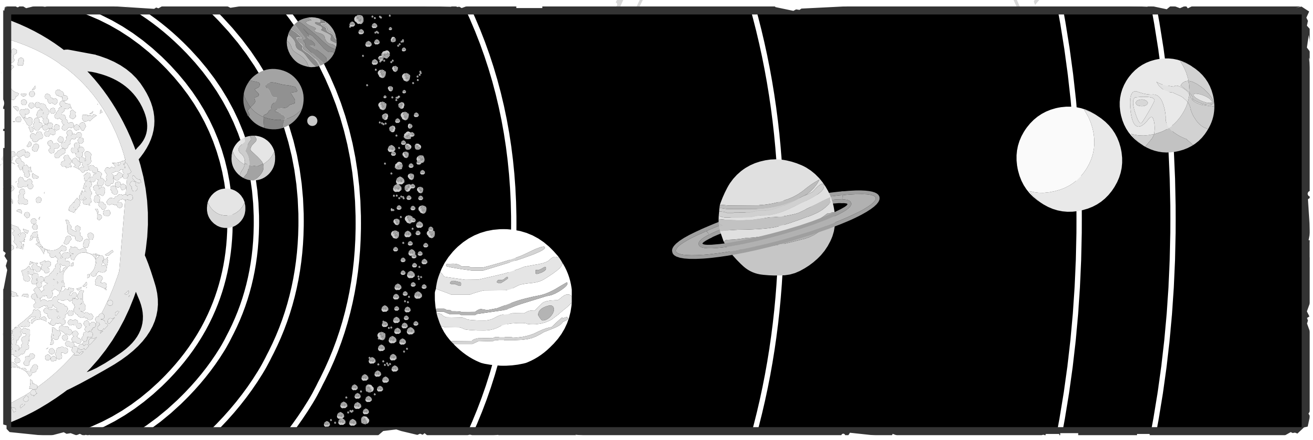
What is an Asteroid?

An asteroid is a large rock in space, which revolves around the Sun, but is too small to be called a planet. The largest asteroid in our Solar System is Vesta. It was Ceres, but this has been given 'dwarf planet status', so it is now Vesta. Vesta is 530km across and has an irregular spherical shape. Some asteroids are only 10m long, although asteroids of this size are commonly referred to as meteoroids.

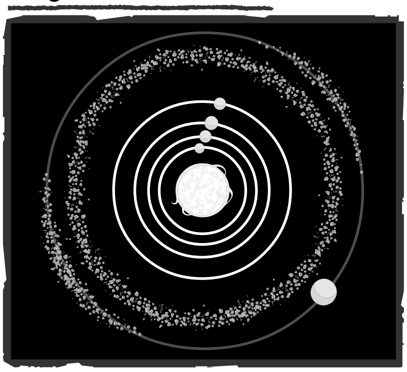
Asteroid Belt



Asteroids were left over from the formation of the solar system 4.6 million years ago. Most asteroids can be found in the 'asteroid belt', which is between Jupiter and Mars. This is because when Jupiter was formed it prevented any other planets forming next to it, causing objects to collide, which formed asteroids.



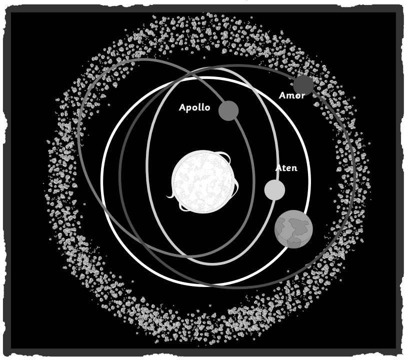
Trojan Asteroid



The Trojan's are a group of asteroids which follow the same orbital path around the Sun as Jupiter. There is a 'lead group' which orbits in front of Jupiter and a 'trailing group' which orbit behind. There are currently about 4,800 Trojan asteroids.

EducationCity

Near Earth Asteroids (NEA's)



Near Earth Asteroids are divided into 3 groups: Atens, Amors and Apollo. The orbits of Atens and Apollo cross over the Earth's orbit path. Amor does not cross the Earth's orbit path, but may become an impact threat in the future if its orbit changes.

Name	Thorium 1550
Diameter	1km
Speed	9 miles a second (15km/s)
Orbital Speed	21.30 km/s
Rotational Speed	2hr 6 mins
Speed upon impact with Earth	61, 000 kilometres per hour
Force of impact	44,800 mega tonnes
Minor Planet Category	Apollo

THORIUM

Thorium was discovered 5 days ago, by Professor Julius Arcadia at the Royal Observatory. Scientists have carried out a detailed analysis and have concluded that the asteroid is a spherical shape and made of Nickel and Iron. The asteroid is rotating so fast that if anyone tried to stand on its surface, they would be sent flying back into space. It is estimated that it will hit planet Earth at 61, 000 kilometres per hour, creating the same force as 44,800 mega tonnes of TNT.

Impact of the collision

Scientists are unsure exactly where, on Earth, Thorium will hit. However, the following list explains what will happen when the asteroid collides with Earth:

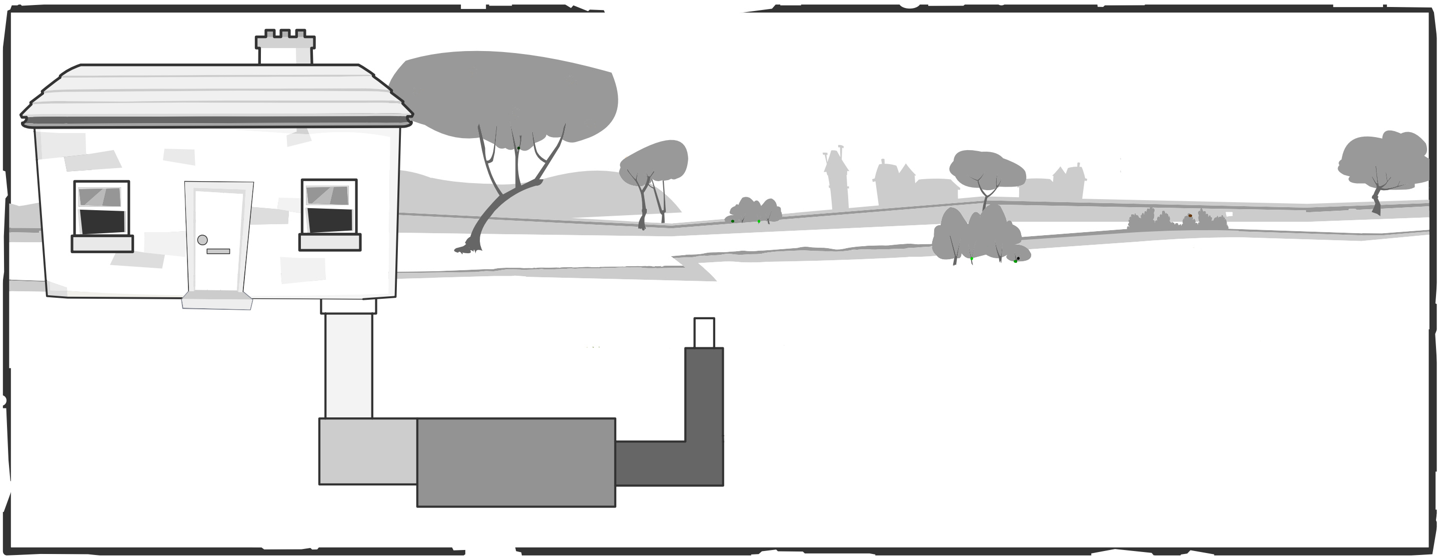
- If it hits the contact would cause a blast that would cause damage up to 300km away and create a crater over 25km long.

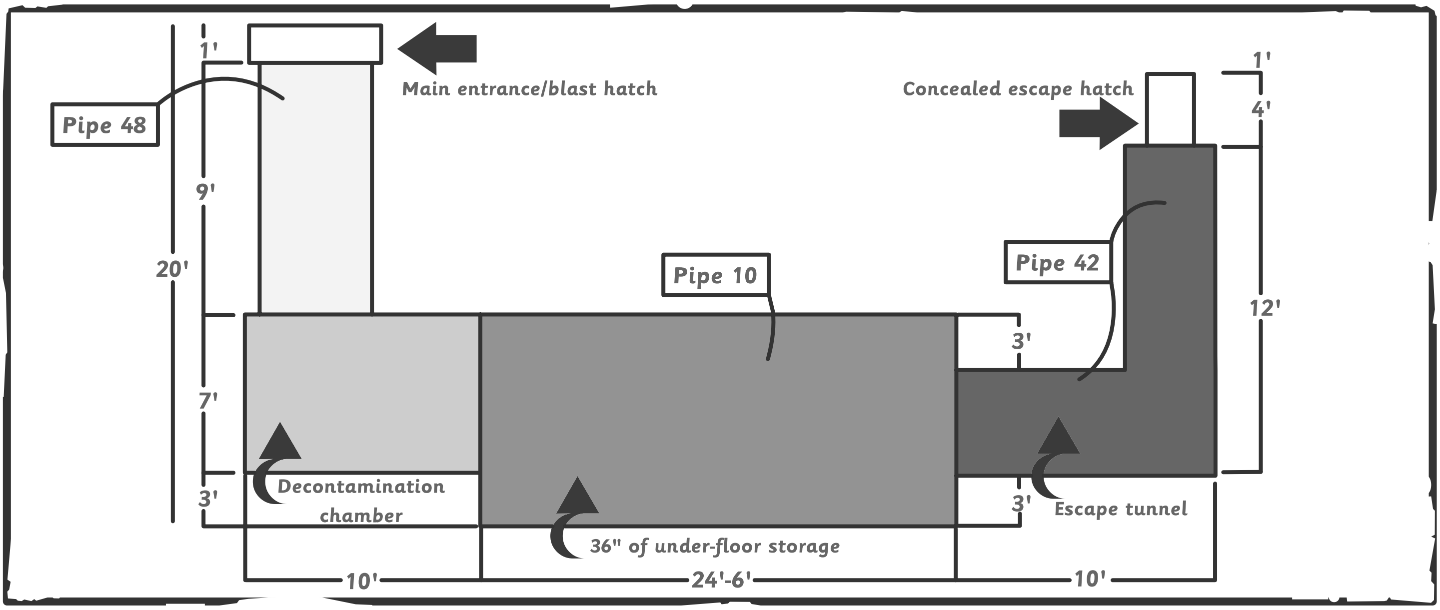
• If it lands in the sea, it would cause a huge tidal wave, or Tsunami, at least 25km high.

• The hole in the atmosphere, which will be created by the asteroid entering, will cause a large amount of loose material. This material will be spread across the globe and will heat up. This heat will cause global fire storms.

• The impact of Thorium hitting Earth would also send a vast amount of dust, ash and other materials into the atmosphere. The amount of dust in the atmosphere would lead to the Sun's radiation (light and heat) being blocked out; this would cause the Earth's temperature to fall. Blocking out the Sun's radiation, would cause a dramatic fall in global temperatures. This is called 'impact winter'. It would cause the plants to die and crops to fail, which would result in world spread famine.

HOW TO SURVIVE AN ASTEROID COLLISION





To survive an asteroid collision, the following must be carried out:

Build an underground shelter:

• Systems which need to be included in the shelter:

- filtered air
- power supply
- light
- heat
- fire safety

• Supplies which need to be kept in the shelter:

- food
- water
- blankets
- reading material
- communication hardwear
- cleaning supplies
- warm weather clothing and footwear
- medical supplies/first aid kit
- bottled air
- torches with spare bulbs and batteries

Outer Space
Activity Sheet

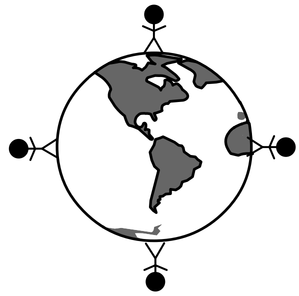
Name: ______________________ Class: ______________

Complete the sentences using the words below.

1 Gravity is a ___________. It is gravity that __________ objects to the Earth's surface an stops them from _____________ away.
The Earth's pull of gravity give objects _____________. We measure the pull of gravity using a _________________. A forcemetre measures in ______________.

forcemeter	weight	floating	Newtons	force	pulls

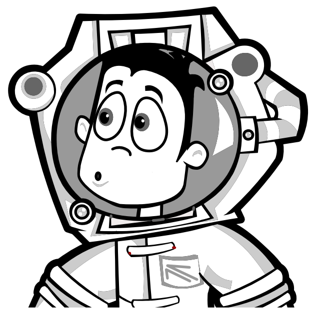
2 Can you explain what is happening in these two diagrams?



____

3 Remember, the power of gravity on the Moon is only about 1/6 of the strength of gravity on Earth. So, everything on the Moon weighs 1/6 of what it would on Earth.
Can you calculate what these creatures would weigh on the moon?

	Weight on Earth	Weight on the Moon
Baby	6kg	
Monkey	18kg	
Manu	36kg	
Elephant	3600kg	



4 If Klara jumped 1 metre on Earth then she should have been able to jump 6 metres on the Moon. If Manu jumped $\frac{1}{2}$ metre on Earth, how high should he be able to jump on the Moon?

____

Measure how high you can jump then calculate how high you would jump on the moon.

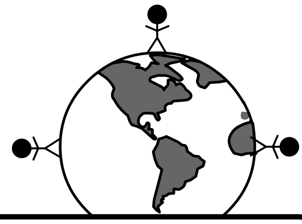
Name: ______________________ Class: ____________

Complete the sentences using the words below.

1 Gravity is a **force**. It is gravity that **pulls** objects to the Earth's surface an stops them from **floating** away. The Earth's pull of gravity give objects **weight**. We measure the pull of gravity using a **forcemeter**. A forcemetre measures in **Newtons**.

forcemeter	weight	floating	Newtons	force	pulls

2 Can you explain what is happening in these two diagrams?



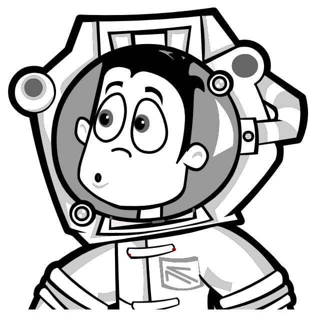
Suggested answers

Klara is using her energy/muscles to lift her off the ground and the force of gravity is pulling her back down to the Earth.

On Earth, the force of gravity pulls us towards the ground – keeping us from falling off into space!

3 Remember, the power of gravity on the Moon is only about 1/6 of the strength of gravity on Earth. So, everything on the Moon weighs 1/6 of what it would on Earth.
Can you calculate what these creatures would weigh on the moon?

	Weight on Earth	Weight on the Moon
Baby	6kg	**1kg**
Monkey	18kg	**3kg**
Manu	36kg	**6kg**
Elephant	3600kg	**600kg**



4 If Klara jumped 1 metre on Earth then she should have been able to jump 6 metres on the Moon. If Manu jumped $\frac{1}{2}$ metre on Earth, how high should he be able to jump on the Moon?

If the gravity on the Moon is 1/6 of that on Earth, then Manu should have been able to jump 3 metres.

Measure how high you can jump then calculate how high you would jump on the moon.

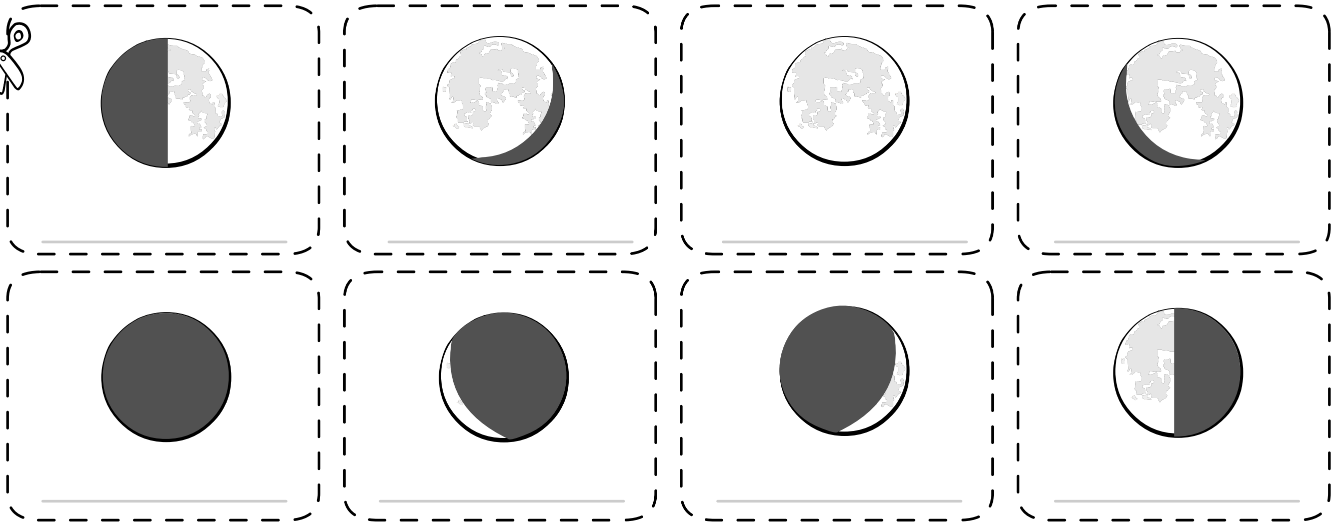
Manu in the Moon

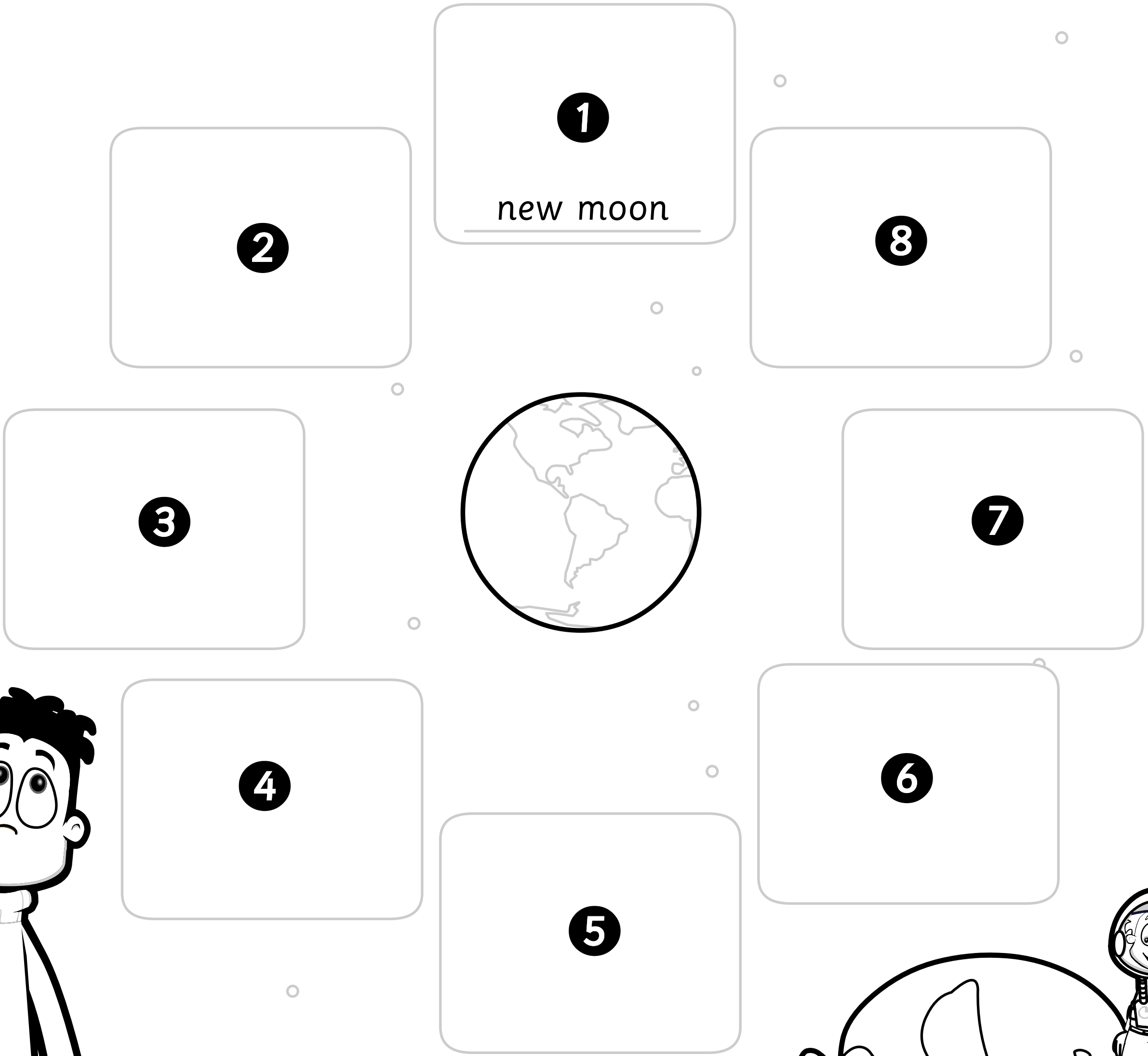
Activity Sheet

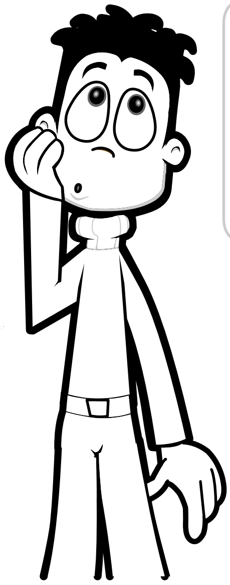
EducationCity

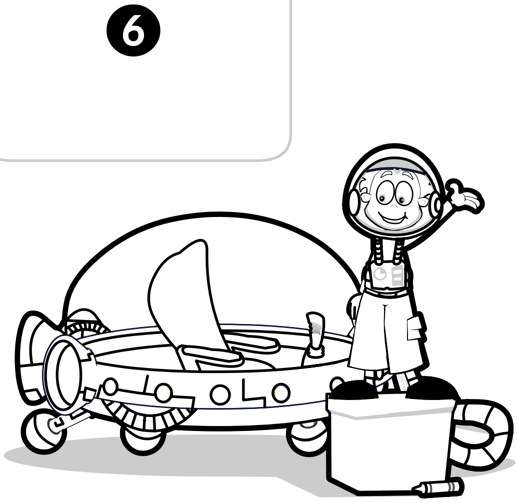
Name: ______________________ Class: ______________

Cut out the phases of the Moon and stick them in the spaces below to show the phases of the lunar cycle. Write the name of each phase in the space provided







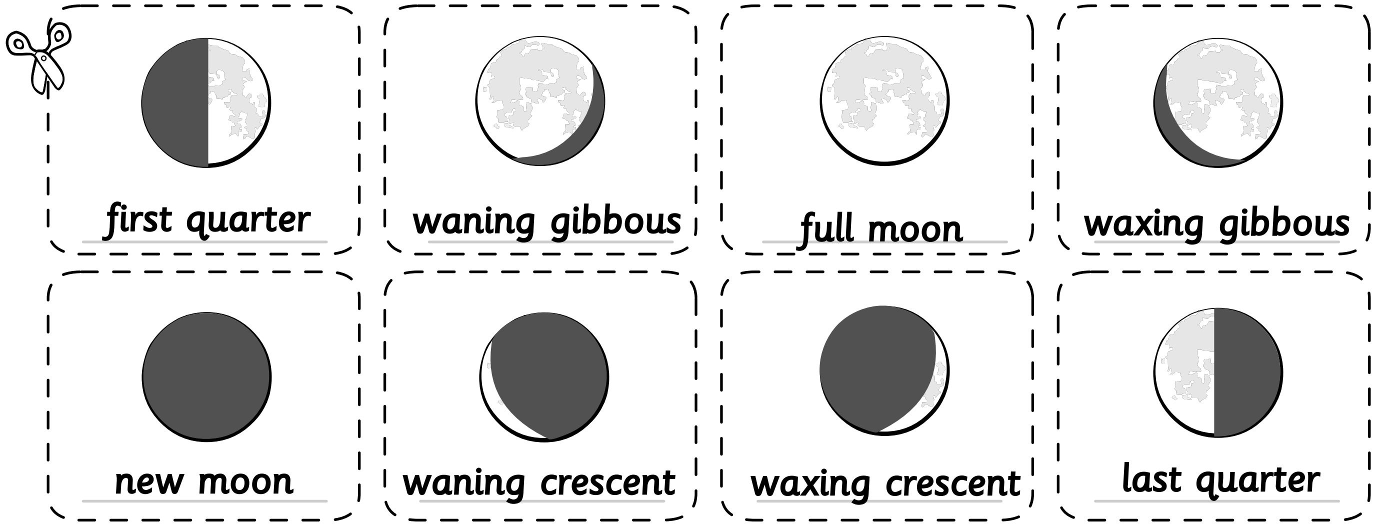


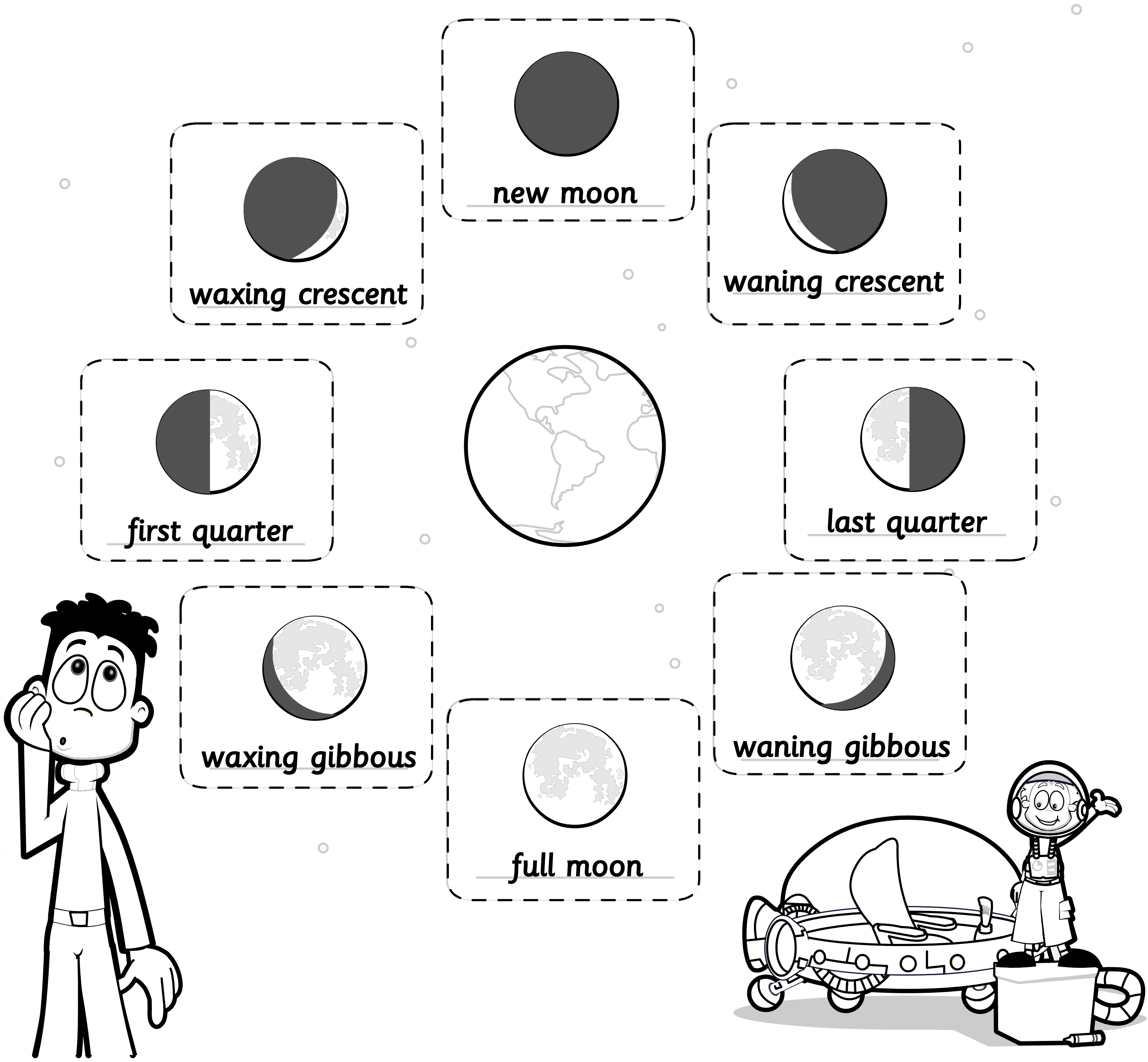
Manu in the Moon

Activity Sheet

Name: ______________________ Class: ______________

Cut out the phases of the Moon and stick them in the spaces below to show the phases of the lunar cycle. Write the name of each phase in the space provided



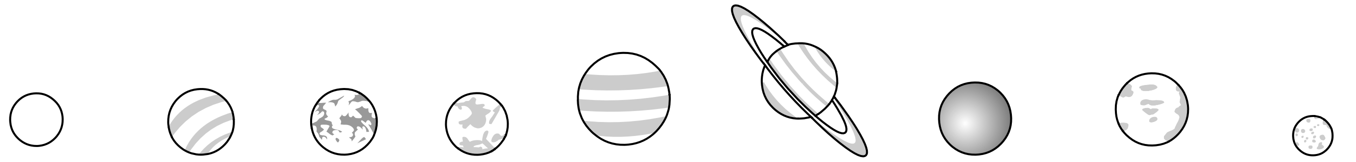


Solar Stroller

Activity Sheet

Name: ____________________ Class: ____________

Fill in the blanks to complete the sentences.



1. **Mercury** is the ____________ planet to the Sun. The half of the planet facing the Sun is very ____________ but the side facing away is very ____________. It is the ____________ smallest planet.

2. **Venus** is very hot because its thick ____________ traps ____________. It spins in the opposite ____________ to the Earth. Its days are longer than its ____________.

3. **Earth** is the only planet known to support ____________, and it has ____________ on its ____________. It has one ____________.

4. **Mars** is known as the ____________ planet, and is named after the Greek god of ____________.

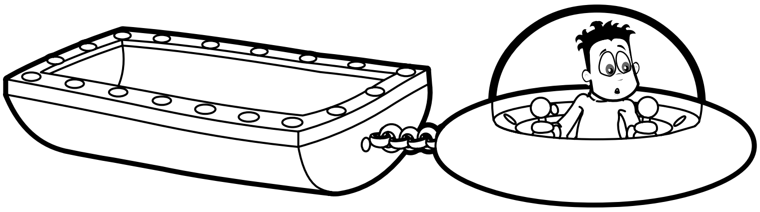
5. **Jupiter** is by far the ____________ planet. It is made only of ____________. It has four ____________ moons and many ____________ ones. Its mass is ____________ times that of Earth.

6. **Saturn** is famous for its ____________. It is the second biggest planet, and is a ____________ giant, made of mainly ____________ and ____________.

7. **Uranus** is the second ____________ of the gas giants, but the third ____________ planet overall. It has 5 large ____________ and at least 22 ____________ ones.

8. **Neptune** is the ____________ biggest planet overall, but is the ____________ of the gas ____________. It has 13 ____________.

9. **Pluto** is now known as a ____________ planet. It has one moon called ____________.

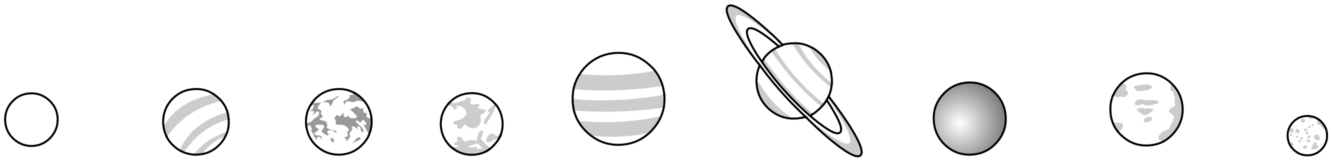


Solar Stroller

Activity Sheet

Name: ______________________ Class: ______________

Fill in the blanks to complete the sentences.



1. **Mercury** is the closest planet to the Sun. The half of the planet facing the Sun is very hot but the side facing away is very cold. It is the second smallest planet.

2. **Venus** is very hot because its thick atmosphere traps heat. It spins in the opposite direction to the Earth. Its days are longer than its nights.

3. **Earth** is the only planet known to support life, and it has water on its surface. It has one moon.

4. **Mars** is known as the red planet, and is named after the Greek god of war.

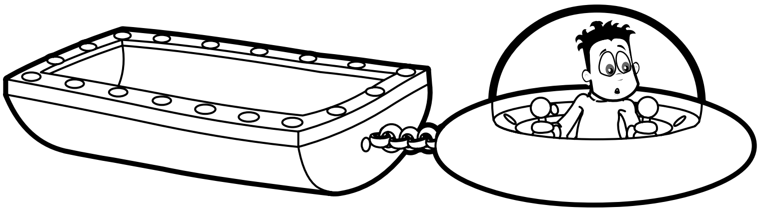
5. **Jupiter** is by far the largest planet. It is made only of gases. It has four large moons and many small ones. Its mass is 318 times that of Earth.

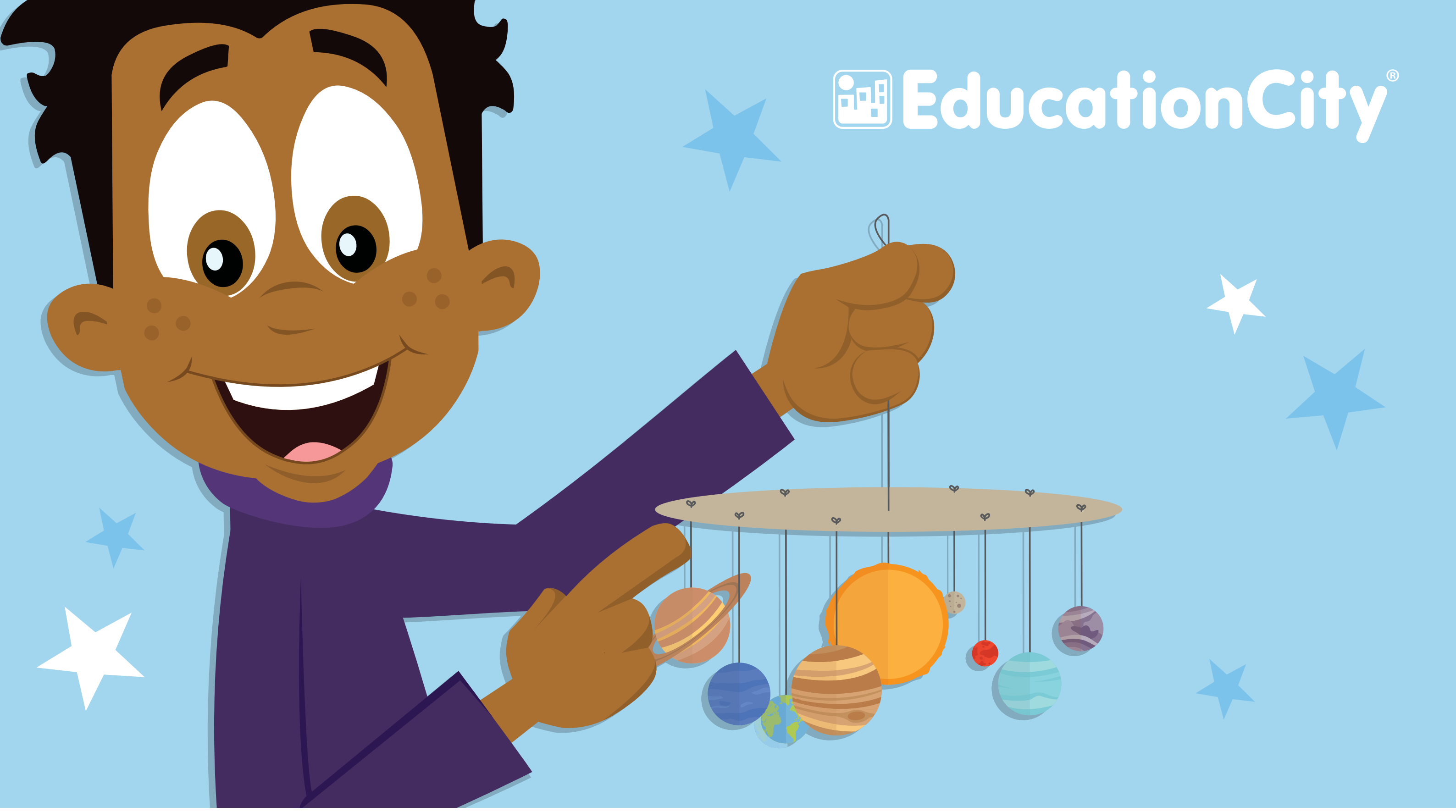
6. **Saturn** is famous for its rings. It is the second biggest planet, and is a gas giant, made of mainly helium and hydrogen.

7. **Uranus** is the second smallest of the gas giants, but the third largest planet overall. It has 5 large moons and at least 22 small ones.

8. **Neptune** is the fourth biggest planet overall, but is the smallest of the gas giants. It has 13 moons.

9. **Pluto** is now known as a dwarf planet. It has one moon called Charon.





MAKE YOUR OWN

Solar System Mobile

Craft Project

Adult Help Required

Make Your Own Solar System Mobile

You will need:

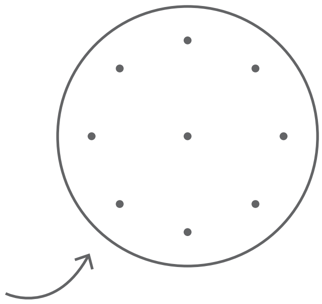
- Cardboard circle (maybe from a pizza, or a sturdy paper plate!)
- Paper
- Colouring pencils, felt-tip pens, paints, glitter
- Scissors
- String
- Tape
- Ruler

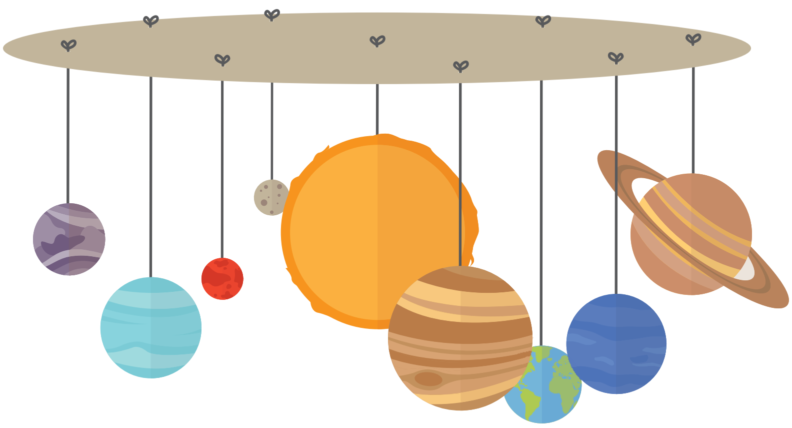
Important:

There are some fiddly bits to cut out, so please make sure you have an adult on hand to help you!

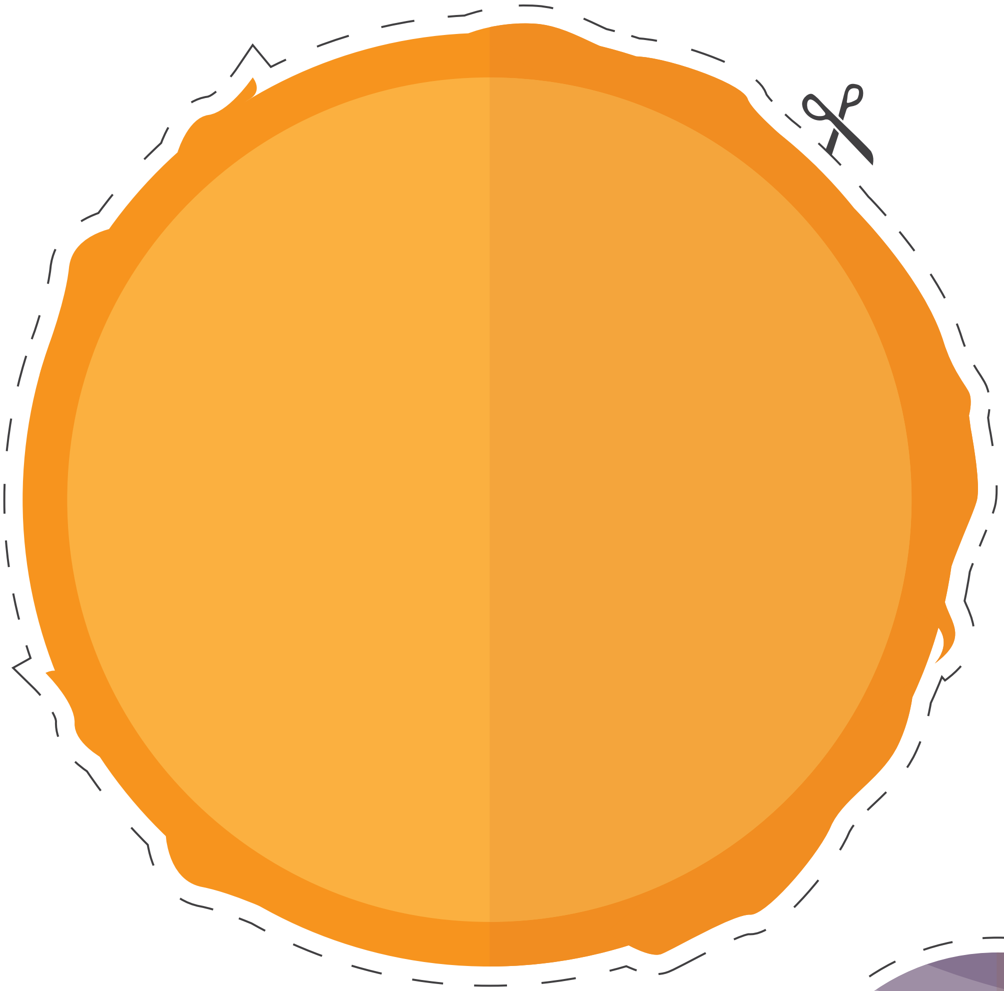
Instructions:

1. Print the planets and cut them out. **Ask an adult to help you.**
2. Colour in the planets using colouring pencils, felt-tip pens or paint. We've given you some colour suggestions for each of the planets! Why not add some glitter to your planets?
3. Cut ten 30cm pieces of string.
4. Tape one piece of string to the back of each decorated planet.
5. Mark ten dots on the cardboard circle. Put one dot in the middle of the circle for the sun and the other eight dots around the outer edge of the cardboard.
6. Ask an adult to use scissors or another sharp tool to poke small holes where each of the dots is marked.
7. You can leave your cardboard circle blank, or you could paint it black and add some sparkly silver glitter to give it a spacey feel.
8. Once your cardboard circle has dried, take each piece of string and thread them through the holes.
9. Use tape to secure the string to the cardboard.
10. Tape another piece of string in the middle of the cardboard circle so that you can hang your solar system!



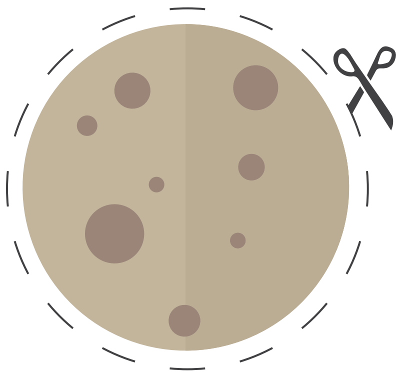


Planet Templates



The Sun

Colour Suggestions:
Yellow / Orange



Mercury

Colour Suggestions:
Light Grey / Dark Grey

Venus

Colour Suggestions:
Light Purple / Dark Purple

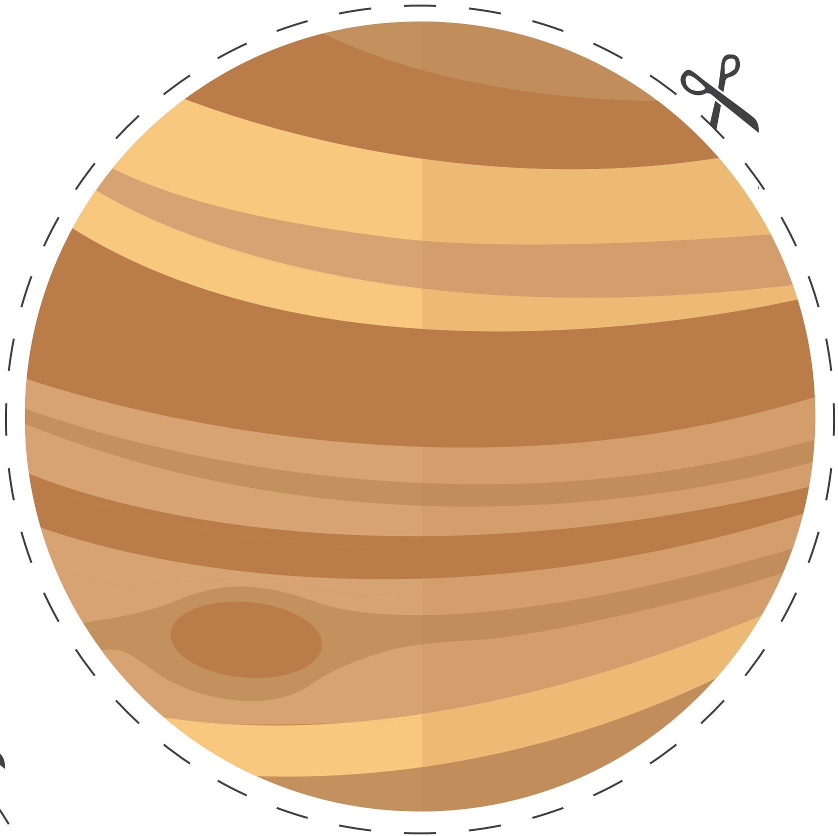
Did you know?

There are eight planets in our Solar System.

Planet Templates

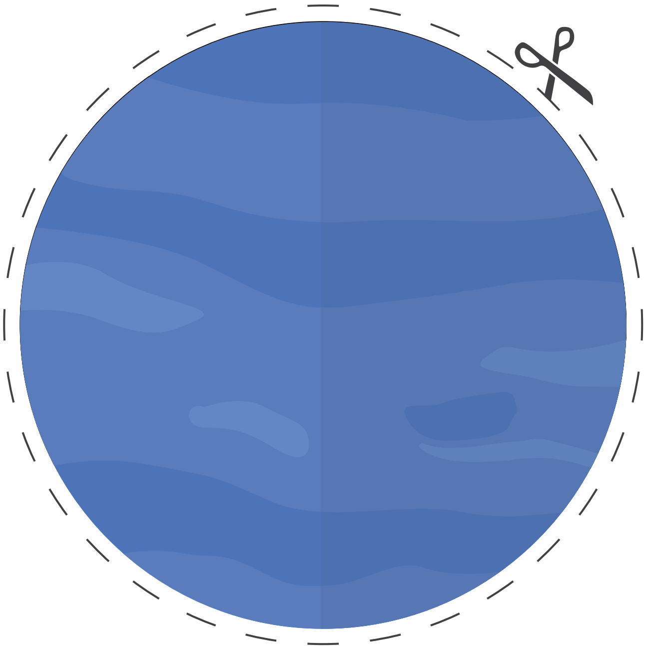
Earth

Colour Suggestions:
Blue / Green



Jupiter

Colour Suggestions:
Light Brown / Dark Brown / Orange / Yellow



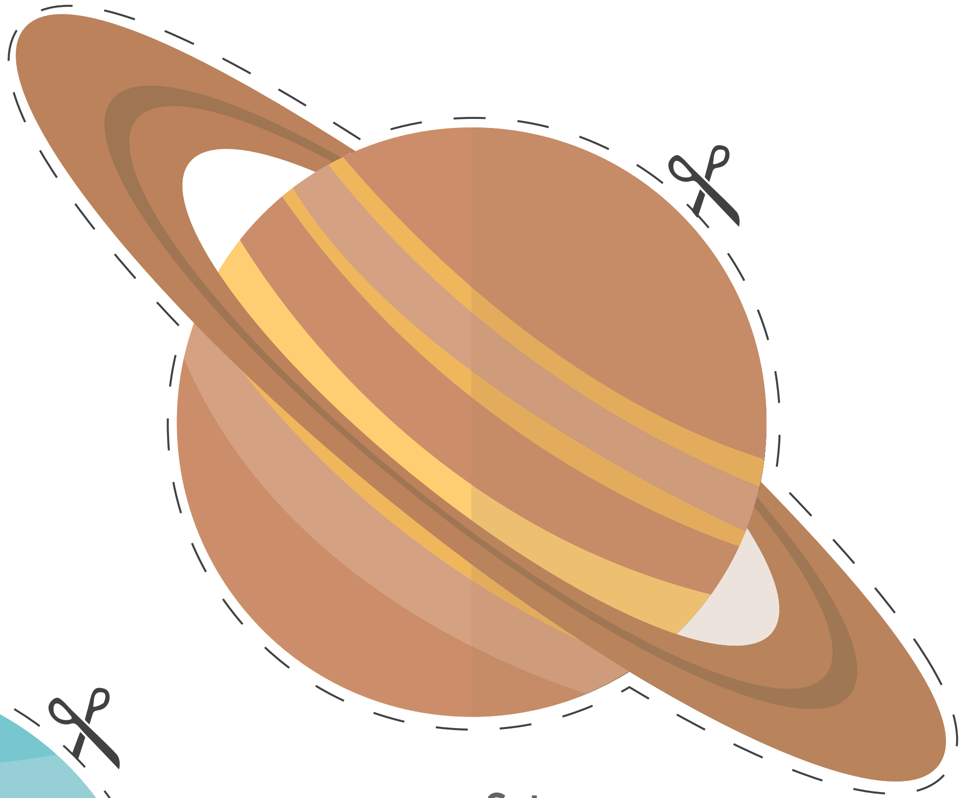
Neptune

Colour Suggestions:
Light Blue / Dark Blue

Did you know?

The Solar System includes the Sun, planets, comets and moons.

Planet Templates

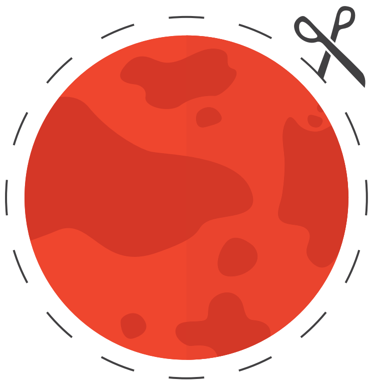


Saturn

Colour Suggestions:
Light Green / Dark Green / Brown / Cream

Uranus

Colour Suggestions:
Light Turquoise / Dark Turquoise / White



Mars

Colour Suggestions:
Dark Red / Light Red

Did you know?

One way you can remember all the planets is by using **‘my very excellent mother just served us nachos’.**

MAKE YOUR OWN

Solar System Mobile

Craft Project

Adult Help Required

Make Your Own Solar System Mobile

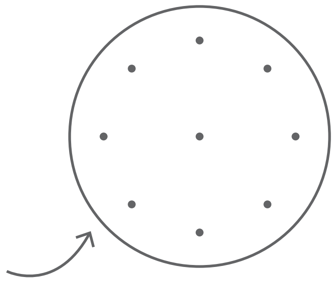
You will need:

- Cardboard circle (maybe from a pizza box, or a sturdy paper plate)
- Paper
- Colouring pencils, felt tip pens, paints or glitter
- Scissors
- String
- Tape
- Ruler

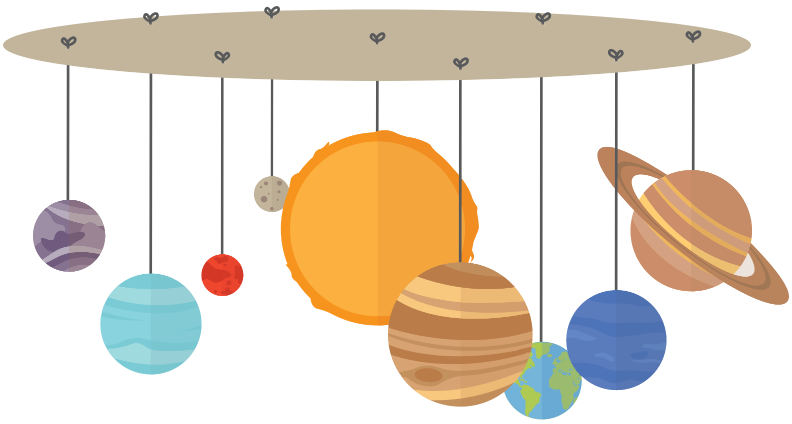
Important:

Some of the elements may be tricky to cut out, so please make sure you have an adult on hand to help you!

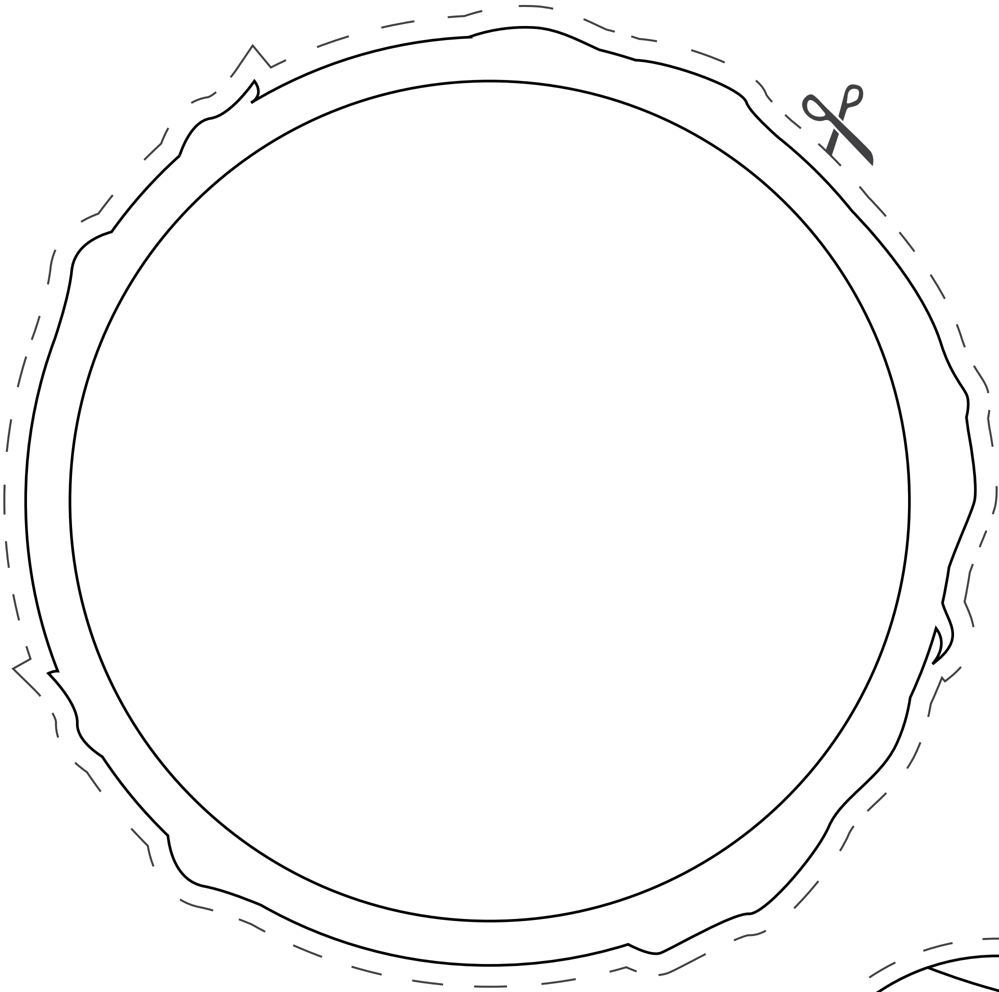
Instructions:



1. Print the planets and cut them out. **Ask an adult to help you.**
2. Colour in the planets using colouring pencils, felt tip pens or paint. We've given you some colour suggestions for each of the planets. Why not add some glitter to your planets?
3. Cut ten 30cm pieces of string.
4. Tape one piece of string to the back of each decorated planet.
5. Mark nine dots on the cardboard circle. Put one dot in the middle of the circle for the sun and the other eight dots around the outer edge of the cardboard.
6. Ask an adult to use scissors or another sharp tool to poke small holes where each of the dots are marked.
7. You can leave your cardboard circle blank, or you could paint it black and add some sparkly silver glitter to give it a 'space' feel.
8. Take each piece of string and thread them through the holes.
9. Use tape to secure the string to the cardboard.
10. Tape another piece of string in the middle of the cardboard circle so that you can hang your Solar System!

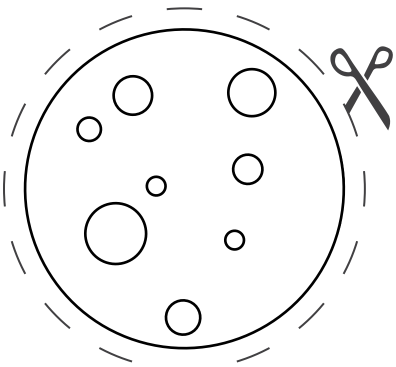


Planet Templates



The Sun

Colour Suggestions:
Yellow/Orange



Mercury

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Colour Suggestions:
Light Purple/Dark Purple

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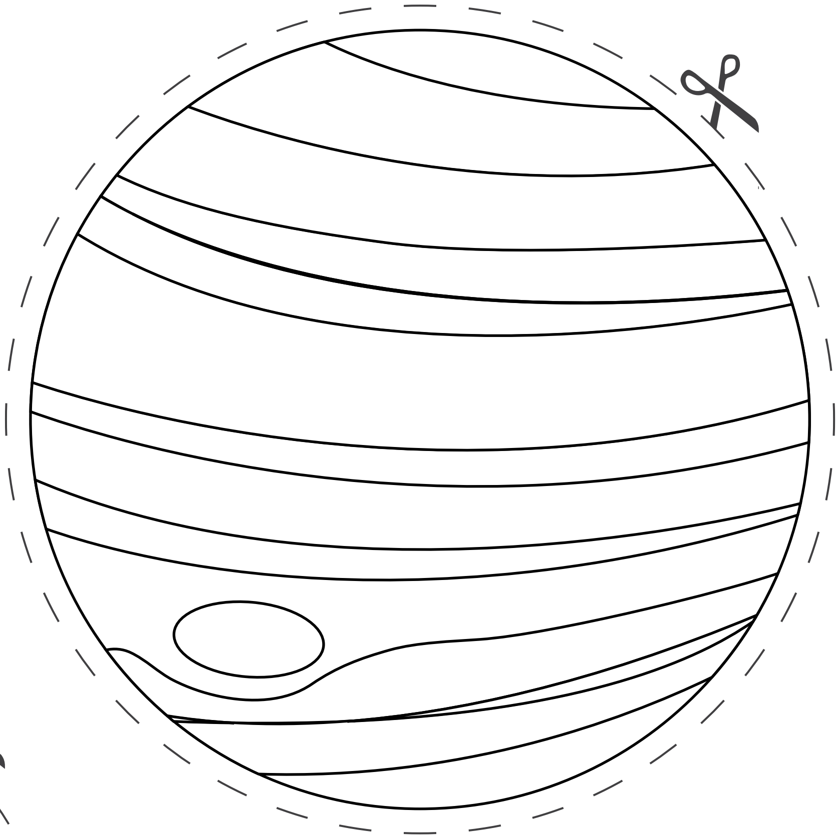
Planet Templates

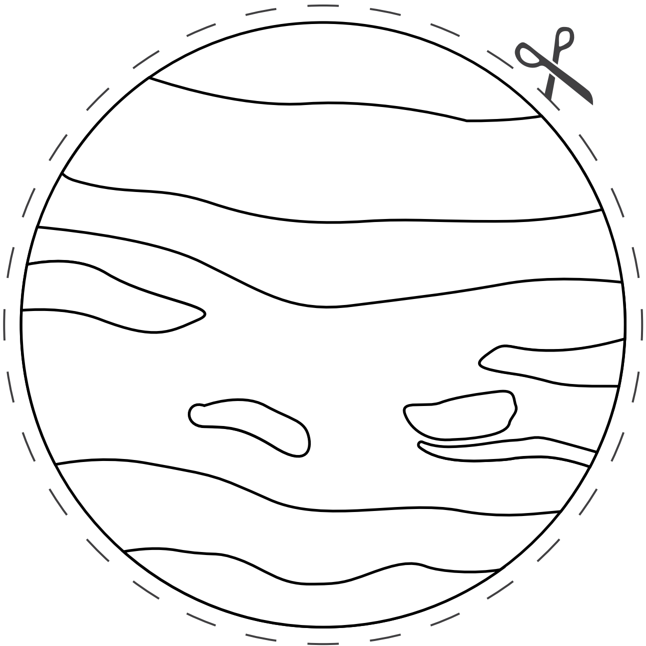
Earth

Colour Suggestions:
Blue/Green



Jupiter

Colour Suggestions:
Light Brown/Dark Brown/Orange/Yellow



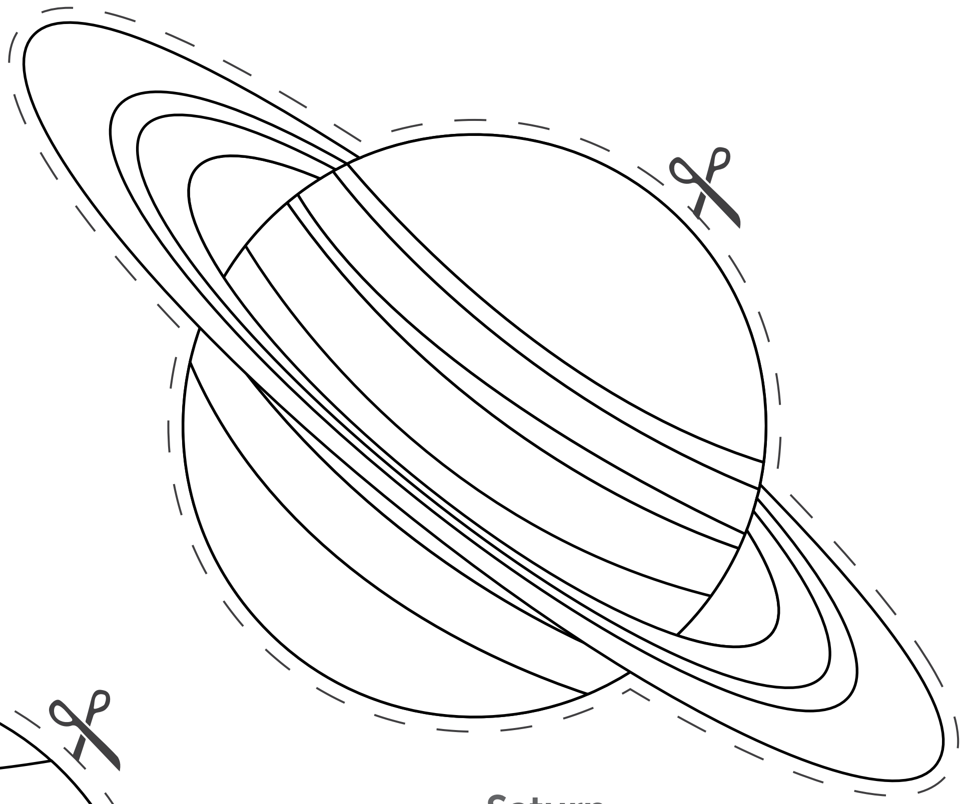
Neptune

Colour Suggestions:
Light Blue/Dark Blue

Did you know?

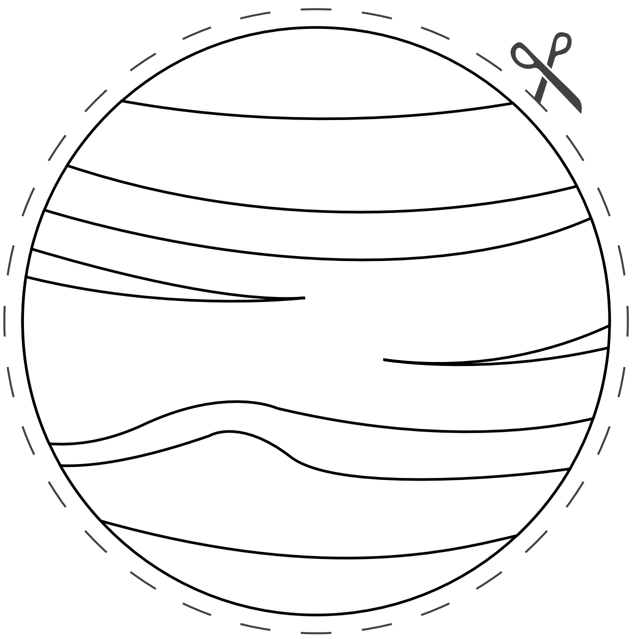
The Solar System includes the Sun, planets, comets and moons.

Planet Templates



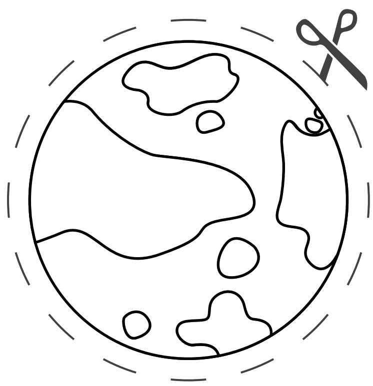
Saturn

Colour Suggestions:
Light Green/Dark Green/Brown/Cream



Uranus

Colour Suggestions:
Light Turquoise/Dark Turquoise/White



Mars

Colour Suggestions:
Dark Red/Light Red

Did you know?

One way you can remember all the planets is by using **'my very excellent mother just served us nachos'.**

ACTIVITY

Lunar Phase Cut-Out

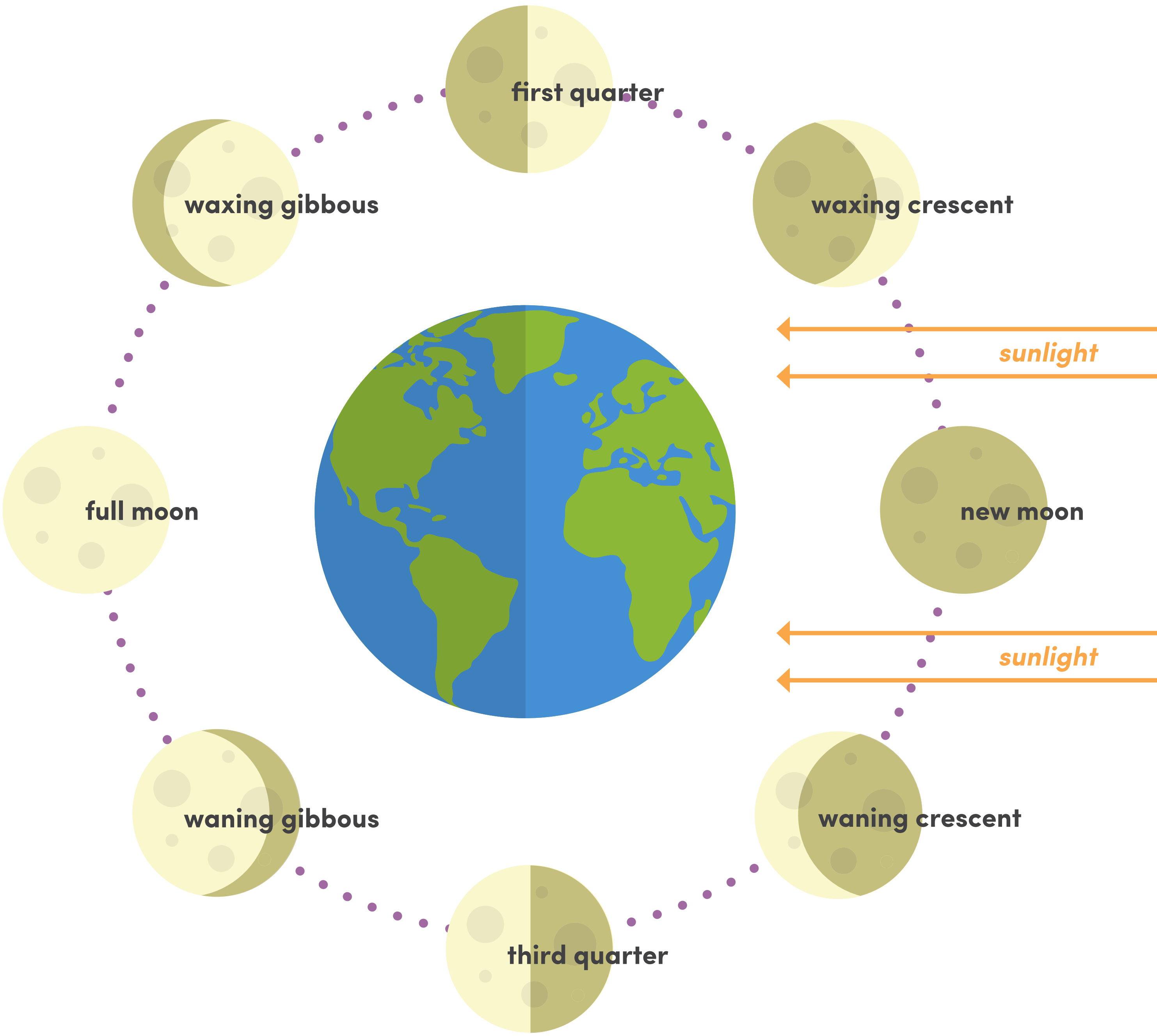
Craft Project

Lunar Phase Cut-Out

The lunar phase is the appearance of the Moon from Earth over a period of about a month.

There are eight major phases: first quarter, waning gibbous, full moon, waxing gibbous, new moon, waning crescent, waxing crescent, and last quarter.

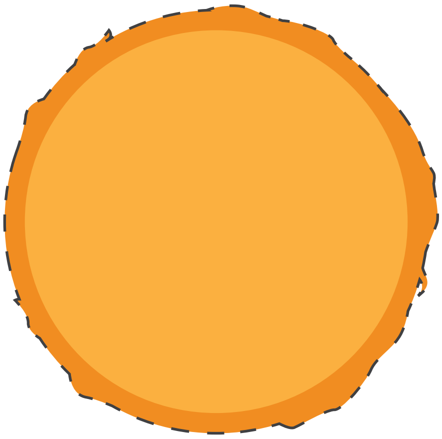
The Moon does not give off any light itself, but reflects light from the Sun. The Moon's position within its orbit around Earth dictates how much of the Moon's shape is visible to us.



Lunar Phase Cut-Out

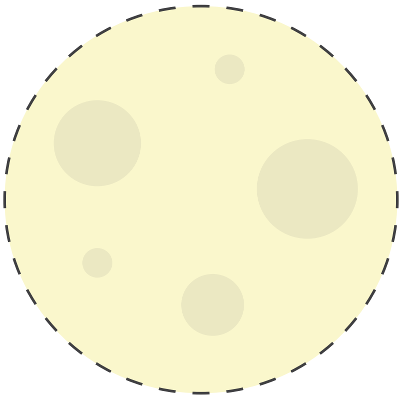
Make moon phase learning fun for all your students with our interactive cut-out.

Following the dotted line, cut out and assemble your own scenarios to quiz students' knowledge of each Moon phase. Depending on how you have chosen to position the Sun, Earth and Moon, students should choose the correct moon phase shape and lay it over the moon.

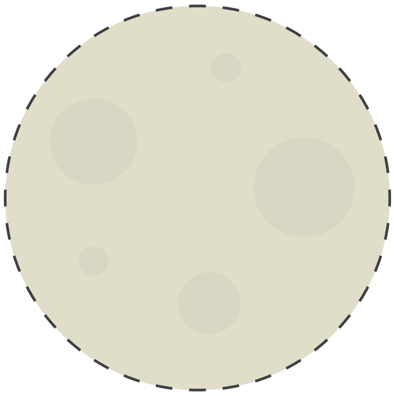


Sun

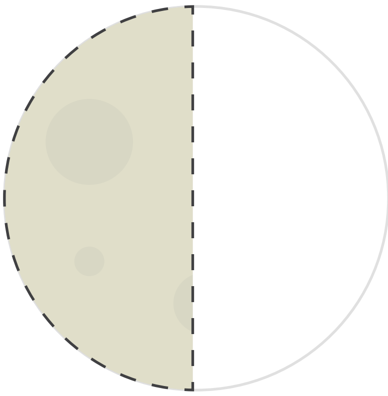
Earth



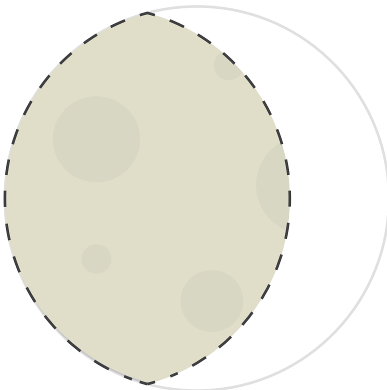
Moon



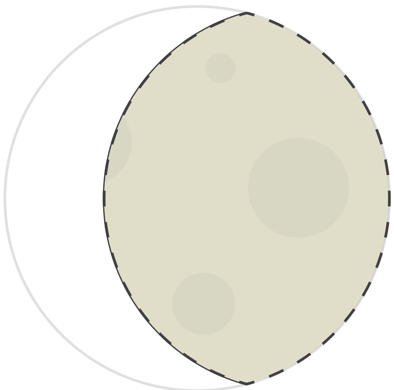
new moon



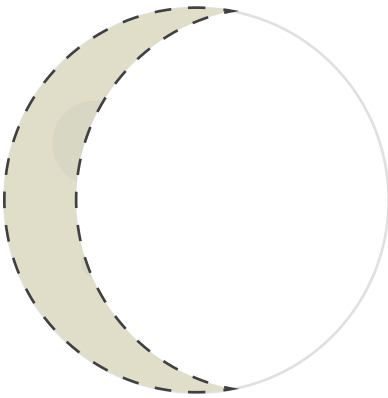
first quarter



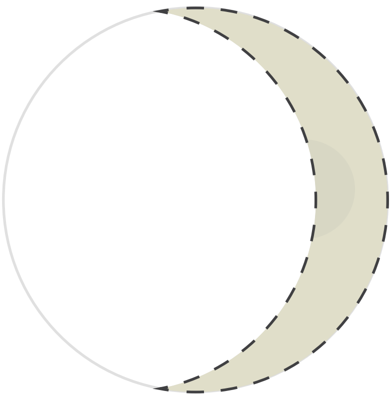
waxing crescent



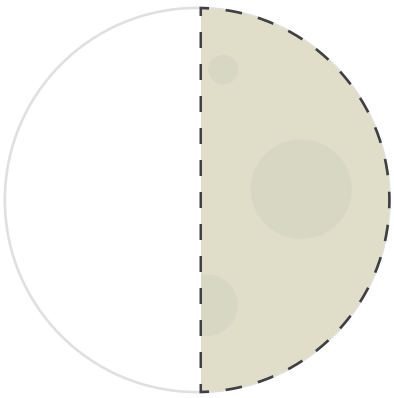
waning crescent



waxing gibbous



waning gibbous



last quarter

About EducationCity

EducationCity produces fun, educational materials to engage students in learning and empower teachers to tailor their teaching. **Take a look at how EducationCity can support you in the classroom:**

Target Lesson Objectives Easily

Find relevant content that links to your curriculum by using our Curriculum Map or Search tool.

Comprehensive and clearly organised by strand, content is so easy to access!

Plan in Advance

When planning your lessons, choose your Activities in advance and put them into a MyCity so they're easy for students to access. Choose a meaningful name for each MyCity and you'll be able to update and retrieve them year after year!

Differentiated Teaching

Monitor progress with SuccessTracker and you'll be able to identify the strengths and areas of development for each of your students and so choose relevant activities to help them progress.

Flexible Learning

EducationCity is accessible via desktops, laptops, tablets and whiteboards, so can support you whatever equipment is available in your classroom.

Lesson Plans

Access our ready-made Lesson Plans, topical content and Teacher Resource Pack to support teaching and learning in the classroom.

There's more to EducationCity than Activities alone!

Blog

Keep abreast of events in the teaching arena, changes to the resource, and see how EducationCity is supporting the education community.

"Teachers have been delighted with the content of this package and most impressed with how easy it is to find appropriate learning and teaching resources and then to use them in a variety of ways."

Mark Sanderson,
Senior ICT Consultant, Herefordshire Learning and Achievement Service

Want to find out more about EducationCity?

Start a free trial for your school today and see it for yourself. Simply call us on +44 (0)1572 725080 or email trials@educationcity.com to arrange.

Website: **www.educationcity.com**
Email: **trials@educationcity.com**

EducationCity®