James Webb Space Telescope
DEEP SPACE DIARY

ACTIVITY 1.1
TO SPACE AND BEYOND

From Chapter One of the Deep Space Diary discoverydiaries.org/activities/to-space-and-beyond/

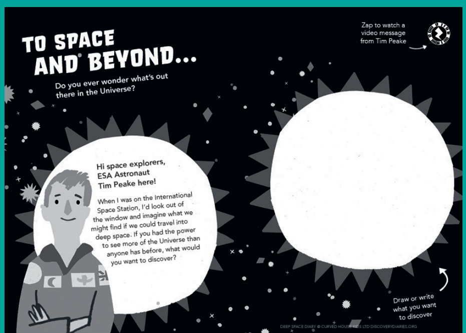
LEARNING LEVEL

KS2, P5-7, Y4-6

CURRICULUM LINKS & DIFFERENTIATION IDEAS

View detailed curriculum links for England, Scotland, Northern Ireland and Wales in the Teacher Toolkit, plus differentiation ideas for your region and year level.

discoverydiaries.org/resources/teacher-toolkit/



Learning Objective

To imagine what I want to discover in Deep Space.

Resources Required

- Smartphone/device or computer to access Zap code (optional)
- Art supplies

Background to this Activity

The development of technology has enabled us to learn more about our Solar System and explore the Universe we live in. For example, in 2005 the Hubble Space Telescope discovered two new moons in our Solar System, orbiting Pluto. Since 1990, Hubble has helped scientists study space. After its last service by astronauts in 2015, NASA decided it would not be repaired again. Now, a new era of space exploration is underway, led by the largest telescope humans have built to date – the James Webb Space Telescope.

Known as Webb, the James Webb Space Telescope has the potential to significantly advance our understanding of the Universe. Webb's huge primary mirror is more than twice the size of Hubble's, allowing it to collect vast amounts of light and detect light from fainter objects in space. This, along with its specialist instruments which are designed to detect infrared wavelengths, allows it to observe stars and planets forming and to see the light emitted by galaxies in the early Universe.

Webb has four key study goals:

- First Light: When did the first stars start to shine?
- Galaxy Building: How do galaxies like the Milky Way form?
- The Birth of Stars and Planets: What is happening within the clouds of gas and dust which form stars, and how do the 'leftovers' of this process evolve to become planets?
- Exoplanets and the Origins of Life: Scientists suspect that galaxies are teeming with planets. They would like to discover if any of those planets are similar to Earth.

Running the Activity

This activity is designed to promote imaginative and lateral thinking.

Begin by drawing on students' existing knowledge to create a mind-map of what they already know about Earth and space. This could be done as a class or in small groups. Before starting the main activity, access Tim Peake's message using a smartphone, device or through the web portal – discoverydiaries.org/activities/to-space-and-beyond/.

Using the concept of space as an endless frontier, ask students to generate ideas and questions about what humans might discover if they had the power to see more of the Universe than ever before, noting these on a whiteboard or whiteboard paper. If in small groups, students can take turns asking each other what they would like to discover most about our Universe. After their discussion, students should have an idea of a question or concept they would most like to explore. They can capture this through art, diagramming, writing or images on their activity sheet – this will become their mission goal.

Questions for the Class

- Where is Earth positioned in our Solar System?
- Which other celestial bodies are in our Solar System?
- Are there any other celestial bodies you know about? What are they?
- What is a star?
- Can stars have planets around them?
- What else might be in outer space that we don't know about yet?

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KS2, P5-7, Y4-6

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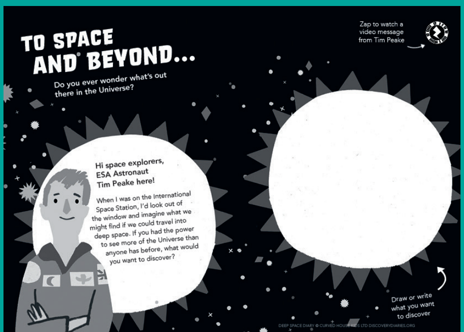

- What can stop us from seeing further into space?
- Other than planets and stars, what else can be found in space?

Additional Challenges / Extension Activities

Research our Galaxy – the Milky Way – and identify our Solar System's position in it. Other than our Solar System, what else might we find in the Milky Way?

Planning an enquiry: Now that students have their mission goal, can they break down the steps, or explain how they would go about finding out the answer to their question? Question them about evidence they may need to collect in order to support their idea or possible answer.

Non-chronological Report/Explanation text: Using their research into our Galaxy, can students communicate their findings scientifically?

Ideas for Differentiation

Support:

- Support students by working in small groups. Provide students with vocabulary and a suitable glossary for celestial bodies, such as planet, sun, moon, star, exoplanet, asteroid, comet, atmosphere, black hole, galaxy, dark matter. Understanding of these terms could be further supported by providing definitions and images of each word. See the Deep Space Glossary for terms and definitions: discoverydiaries.org/toolkit/deep-space-glossary/

Challenge:

- Linked to the planning an enquiry extension, ask students to write a Mission Request letter to Tim Peake, explaining what they want to discover, why they want to discover it and what they will need to complete their mission.

Useful Links

Information about our Universe: https://www.esa.int/kids/en/learn/Our_Universe/Story_of_the_Universe/The_Universe

Take a virtual (and imaginary!) trip to some exoplanets: https://exoplanets.nasa.gov/alien-worlds/exoplanet-travel-bureau/

This 14-minute clip about the James Webb Space Telescope's mission is an excellent way to familiarise yourself with the difference between Webb and Hubble's capacities and what we can potentially learn with Webb. It may be too technical for students, however the first four minutes contain wonderful images taken by Hubble and could be a useful in introducing students to Webb: https://webbtelescope.org/contents/media/videos/2013/03/1060-Video?page=5&filterUUID=21409408-9414-41eb-a027-a6b3abfe7af5

NOTE: This clip states an incorrect launch date of 2018.

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James Webb Space Telescope
DEEP SPACE DIARY

ACTIVITY 1.2
THE SKY AT NIGHT

From Chapter One of the Deep Space Diary discoverydiaries.org/activities/the-sky-at-night/

LEARNING LEVEL

KS2, P5-7, Y4-6

CURRICULUM LINKS & DIFFERENTIATION IDEAS

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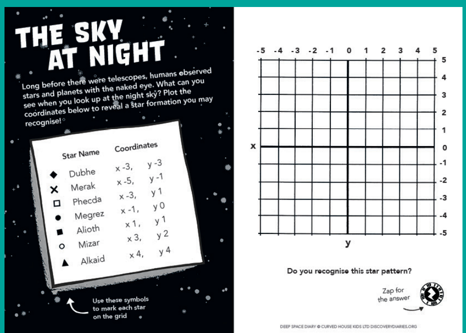
discoverydiaries.org/resources/teacher-toolkit/



Learning Objective

To plot a star pattern visible from Earth on a graph.

Resources Required

- Smartphone/device or computer to access Zap code (optional)
- World globe (optional)

Background to this Activity

Since ancient times, humans have used the celestial bodies (stars and planets) to monitor the passing of time, to navigate and for cultural and religious ceremonies. As early as the mid-seventeenth century BCE, humans were recording the movements of planets. This means they had recognised the difference between stars, which retain their configuration in the sky over time, and planets which change position in relation to these stars.

The 'Plough' is an asterism (a small pattern of stars) which is always visible in the Northern Hemisphere, regardless of the season. It consists of seven bright stars, four which form the 'body' or moldboard of the plough and three which create the 'handle'.

When we look at the Plough from Earth, its position in relation to where we are viewing it from will change according to the season and the time of night. Because the Earth spins on an axis, the Plough completes a rotation around the North Star every 24 hours.

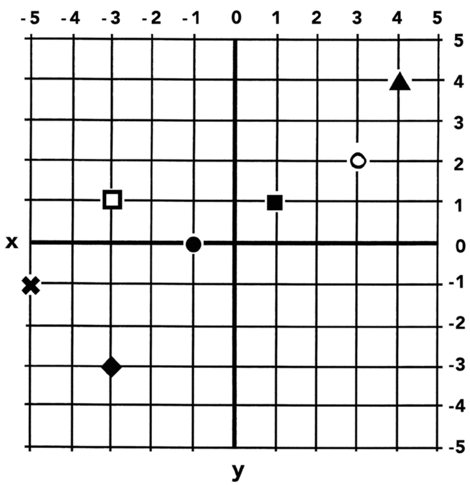
Running the Activity

Introduce the concept that humans have used stars for navigation and to monitor the passing of time for centuries. NB: If students are unaware of vocabulary, such as celestial bodies and constellations, go through this with the class at beginning of activity and refer to the glossary: discoverydiaries.org/toolkit/deep-space-glossary/. Ask students to think about why this might be. Using a globe, demonstrate how the Earth spins on an axis, creating day and night. The angle of Earth's axis can also help students understand why we see different stars in different hemispheres.

To explain why constellations (groups of stars which form recognisable patterns) appear to rotate during the night, ask students to stand below something that is fixed to the ceiling, such as a rectangular fluorescent light fitting. Tell the students to look up and slowly turn on the spot. As they move, the orientation of the light fitting will change from the child's point of view. The activity works even better if students can stand beneath a picture attached to the ceiling, which will appear upside-down to each student as they spin. As a group, discuss why the movement of constellations created by Earth's rotation would have been useful for humans before we had technology to measure time and identify our location on Earth.

Explain to the class that they will be plotting an asterism made of seven stars on the axis and that each star has a name. Students should work through the coordinates, plotting each star by using its symbol. Students can then draw a line from star to star to reveal the Plough's shape. Using the zap code, they can then identify the name of the asterism and confirm that their plotting is correct.

Solution to the Activity



James Webb Space Telescope
DEEP SPACE DIARY

ACTIVITY 1.2
THE SKY AT NIGHT

From Chapter One of the Deep Space Diary discoverydiaries.org/activities/the-sky-at-night/

LEARNING LEVEL

KS2, P5-7, Y4-6

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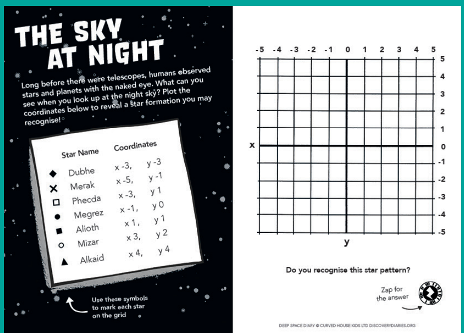

Questions for the Class

- What are some of the differences between stars and planets?
- Why do people in different hemispheres *(halves of the Earth – remember hemi = half, sphere is a shape. Two hemispheres make a sphere – the shape of the Earth)* see different constellations?
- Why do constellations appear to move during the night?
- Besides the movement of constellations, what are some other ways we can monitor the time of day, month or year, without using modern technology?

Additional Challenges / Extension Activities

The Plough is the name of this asterism in the UK, but other cultures have their own names for it. Ask students to research the various names of the Plough – in both contemporary and past cultures – identifying where each name is used both geographically and historically.

The Plough is an asterism – a small collection of stars which is part of a constellation. Ask students to research which constellation the Plough is in (Ursa Major), and ask them to learn about its name and the mythology/story behind it.

Identify other constellations which appear in the Northern Hemisphere and plot them on black cardboard using star stickers, to create a constellation gallery in the classroom.

Ideas for Differentiation

Support:

- Support younger students by working through the coordinates as a group. If you have an outdoor playground available, draw the graph in chalk and guide students in physically plotting coordinates by assigning seven students the role of 'star' and the rest of the class as 'astronomers'. Students can then work together to plot the asterism on their worksheets.

Challenge:

- Recreate the graph on an A3 piece of paper, extending both axes five times to 25. Ask students to plot the Plough, labelling each star with its name. Next, ask students to find the position of Polaris – the North Star – which is located by drawing an imaginary line from Merak to Dubhe, then extending it for five times the distance between these two stars. Students can then identify the coordinates of Polaris.

Useful Links

The Big Dipper Clock: https://starrynighteducation.com/images/free_resources/BigDipperActivity.pdf

Article about free stargazing apps: https://www.astronomytrek.com/top-10-free-smartphone-apps-for-stargazing/

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James Webb Space Telescope
DEEP SPACE DIARY

ACTIVITY 1.3
ANCIENT ASTRONOMY
From Chapter One of the Deep Space Diary discoverydiaries.org/activities/ancient-astronomy/

LEARNING LEVEL

KS2, P5-7, Y4-6

CURRICULUM LINKS & DIFFERENTIATION IDEAS

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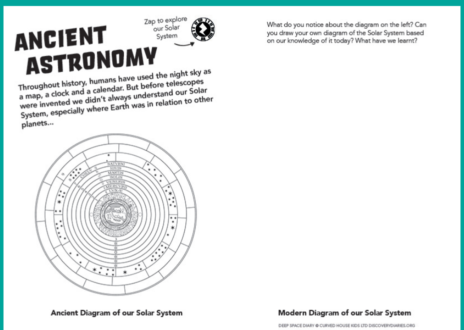
discoverydiaries.org/resources/teacher-toolkit/



Learning Objective

To understand the structure of our solar system.

Resources Required

- Smartphone/device or computer to access Zap code (optional)
- Rulers
- Compasses

Background to this Activity

Our Solar System is made up of seven planets, two dwarf planets (Ceres and Pluto) at least 187 moons, and millions of comets, asteroids and meteors. Although astronomers in ancient times – like Aristarchus of Samos who lived in Greece in the third century BCE – theorised that the planets orbited the Sun, many people believed that the Earth was the centre of the Solar System until the 1500s. This theory was promoted by Aristotle's *On the Heavens*, written in 350BCE. The sketch included in this activity is based on Aristotelean cosmology.

In 1543, Copernicus' book *On the Revolutions of the Heavenly Bodies* was published. It proposed a heliocentric model of our Solar System, which differed from the geocentric model proposed by Ptolemy in the second century CE, in which all celestial bodies orbited the Earth. In 1609, Galileo invented a spy glass or telescope that allowed him to observe the mountains on the Moon, the phases of Venus, Saturn's rings and Jupiter's four brightest moons. The scientific observations made by Galileo supported the theory of a heliocentric Solar System.

Key vocabulary

Helio – Sun
Geo – Earth
Centric – at the centre
Model – a three-dimensional representation of a proposed structure, often at a smaller scale

Running the Activity

This activity supports the development of visual analysis – an important skill for scientists.

Begin by asking students to examine the Aristotelean diagram of the Solar System on the left-hand page of the worksheet. Ask them to volunteer observations about the diagram. What do they notice that differs from their existing knowledge of the Solar System? What's missing? What's in the wrong position? What do they think the words mean?

Ask students when they think this diagram might have been drawn. Invite discussion about how our understanding of the Solar System may have developed over time.

Revisit the structure of our Solar System, then ask students to draw it on the worksheet, encouraging different levels of accuracy concerning the shape of orbital paths and distances of the planets from the Sun, based on student ability. More capable students can be introduced to Astronomical Units, which is covered in Mars Diary Activity 2.1: Going the Distance: discoverydiaries.org/activities/going-the-distance/

Solutions to the Activity

NASA diagram of planetary order with orbital distances represented (via ESA site): https://www.cosmos.esa.int/web/cesar/the-planets

Distance between planets in our solar system: http://www.griffithobservatory.org/exhibits/exhibitsimages/ouraddress-solar_system3.jpg

Questions for the Class

- Why couldn't ancient astronomers see all of the planets in our Solar System?
- Do planets orbit the Sun at the same speed? How can we tell how quickly they are orbiting?

James Webb Space Telescope
DEEP SPACE DIARY

ACTIVITY 1.3
ANCIENT ASTRONOMY
From Chapter One of the Deep Space Diary discoverydiaries.org/activities/ancient-astronomy/

LEARNING LEVEL

KS2, P5-7, Y4-6

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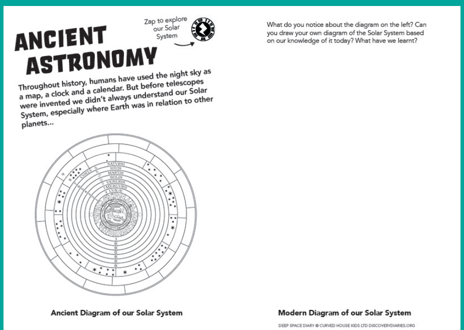

- Why causes day and night?
- What causes our daytime length to change over the course of a year?

Additional Challenges / Extension Activities

Mnemonics are a great way to help students remember the order of the planets e.g. My very educated mother just served us noodles; Ask students to write their own mnemonic to help them remember.

As a class, create a large-scale diagram of the Solar System, including other objects in space like asteroid belts, the ISS, moons, manmade satellites, comets etc.

Looking at the words on the ancient diagram on the worksheet, ask students to research what the different words mean.

Important astronomical discoveries were made across the world in ancient times. Islamic astronomers like Al-Battani, al-Sufi, al-Biruni, and Ibn Yunus recorded the position of the Sun, Moon and stars; the Ancient Mayans built structures like staircases and wells to align with astronomical events and made many detailed records of celestial movements; during the Shang Dynasty, Chinese astronomers produced a calendar of the moon cycle; in the Southern Hemisphere, indigenous Australians had developed astronomical methodologies over 65,000 years ago. Ask students to research an ancient astronomer or culture of their choice.

Ideas for Differentiation

Support:

- Support younger students by using a primer activity like discoverydiaries.org/activities/the-solar-system/ to revise the planets in our Solar System. Work in small groups or pairs to identify the order of the planets. Provide students with cardboard circles of varying size to trace, to position the planets around the Sun.

Challenge:

- Introduce higher ability students to Astronomical Units – the unit of measurement used to measure the distance of planets from the Sun. 1 AU is equal to the distance from our Sun to the Earth. This can be done with a primer activity like: discoverydiaries.org/activities/going-the-distance/
- Challenge students to accurately represent the distance of each planet from the Sun, using a compass to draw each orbital path.

Useful Links

Animated clip of solar system: https://www.youtube.com/watch?v=948Of8BUcTk

Universe in a Box – free resource to help students learn about the Solar System: http://www.unawe.org/resources/universebox/

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James Webb Space Telescope DEEP SPACE DIARY

ACTIVITY 1.4
THE STARRY MESSENGERS

From Chapter One of the Deep Space Diary discoverydiaries.org/activities/the-starry-messengers/

LEARNING LEVEL

KS2, P5-7, Y4-6

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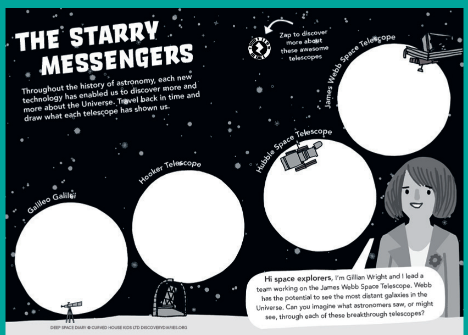

Learning Objective

To learn about the evolution of telescope and astronomy.

Resources Required

- Smartphone/device or computer to access Zap code (optional)
- Whiteboards (mini), scrap paper, lined paper – for drafting letter

Background to this Activity

Humans have been developing technology to help them study the heavens for centuries. In ancient times, structures like Egyptian obelisks and Mayan temples were built in orientation to repeating astronomical phenomena, illustrating a keen interest in and knowledge of celestial occurrences. As early as 220-150BCE, astrolabes were used to take very accurate measurements of the positions of stars and planets. However, it was not until the late 1500s that glassmaking and lens grinding technology was sufficiently developed to lead to the invention of the telescope.

While Galileo Galilei did not invent the telescope, he is credited with being the first person to use one to observe the night sky. Having heard about the 'Dutch perspective glass' invented by Hans Lippershey in 1608, Galileo went about making his own, with a few improvements, which allowed him to magnify objects 20 times. Galileo's telescope enabled him to observe details of the heavens which had never been seen, including the rings of Saturn, Jupiter's four largest moons, and the planet Venus displaying phases just as the Moon does. His observations led him to conclude that the Sun was the centre of the Solar System as Copernicus had theorised, and not the Earth. He also studied shadows cast by mountains on the Moon and, using simple maths, proved they were similar to the mountains here on Earth.

Over time, larger telescopes were constructed which could collect and focus more light, and thereby provide more detailed views of the skies and allow fainter objects to be seen. The Hooker Telescope at the Mount Wilson Observatory in California, USA, was built in 1917 and, with a 2.5 metre primary mirror, was the world's largest telescope until 1949. Observations made in the 1920s by Edwin Hubble with this telescope led to two profound discoveries which revolutionised our understanding of the Universe. In 1923, his detailed observations of the Andromeda Galaxy proved that it lay outside of our own Milky Way, at a staggering distance of 2.5 million light years. In 1929, by combining information from observations of many distant galaxies, Hubble was able to show that the Universe is expanding as predicted by the Big Bang Theory. Both of these discoveries relied on the sensitivity and resolution of the Hooker Telescope.

As the 20th century progressed, humankind's ability to get clearer views of the heavens by making bigger telescopes ran up against a hard limit: the blurring effect of the Earth's atmosphere. Like a hazy view across a hot parking lot on a summer's day, views of space seen through Earth's atmosphere appear blurred as turbulent air bends light in different ways. The 1990 launch of the Hubble Space Telescope – named after Edwin Hubble – allowed us to observe space from above the atmosphere and gave us beautiful images of unprecedented resolution and sensitivity. A huge number of popular images of space have been taken by the Hubble Space Telescope; for people living today, this technology has fundamentally shaped our idea of 'what space looks like'. The telescope's capabilities have been updated by five servicing missions carried out by astronauts, and have produced ground-breaking discoveries about planets, stars, galaxies and the Universe.

The James Webb Space Telescope – or Webb – is a telescope for the next generation, which will shape our understanding of space just as the Hubble Space Telescope has. It will observe infrared light from space, and see things that Hubble can't. For example, it will see

James Webb Space Telescope
DEEP SPACE DIARY

ACTIVITY 1.4
THE STARRY MESSENGERS
From Chapter One of the Deep Space Diary discoverydiaries.org/activities/the-starry-messengers/

LEARNING LEVEL

KS2, P5-7, Y4-6

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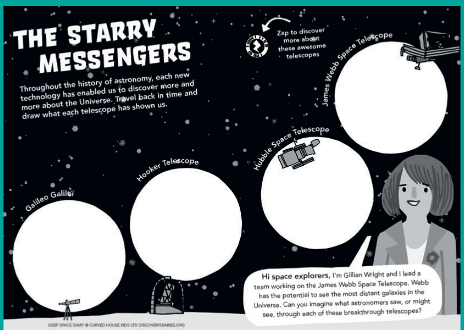

through dusty nebulae (huge clouds of gas and dust) to make detailed pictures of forming stars and planets. It will detect the very first stars and galaxies ever formed in the Universe, over a distance of 13.4 billion light years. It will study the chemical compounds in the atmospheres of exoplanets – planets circling stars other than our Sun – and look for signs these planets might be habitable. While it has been specifically designed to do these amazing things, it will be used to study objects all over the sky. What's perhaps most exciting about Webb is its potential to show us things we can't now imagine, just as Galileo's telescope did over 400 years ago.

Running the Activity

Open by asking students to consider how we look at things that are far away on Earth. What instruments do we use to see in different ways? Prompt students to think about binoculars they may have used for sight-seeing or recreational activities like bird-watching. What different things can you learn by seeing things more clearly or by detecting things that are further away?

Have students list all the things they already know exist in space; you might use images of the Sun, Moon, planets, other moons, comets, nebulae and/or galaxies to prompt discussion, or you might ask students to find or draw these images. How many of these objects can/have students seen with their own eyes? How do we know they exist and what they look like? Have any students used telescopes before? What have they seen with them? What do they imagine they could see if they had access to a powerful telescope at an observatory? What about an observatory in space?

To help students understand why a telescope in space could humans give a clearer view, like the Hubble Space Telescope, ask them to think of looking across a hot parking lot and how the image seems wavy. You might use a simple demonstration of refraction – such as looking at a pencil in a glass half-filled with water – to help them understand that light is bent as it moves through different materials.

To understand why a telescope in space could see types of light that are blocked by the atmosphere, ask students to consider materials which are opaque/transparent to optical light and ask if they are also opaque/transparent to other types of light, such as ultraviolet light or radio waves. A good example is sunscreen – we can see through it, but it blocks harmful UV.

Once students have considered as a group how different telescopes allow us to learn more about space, introduce the four telescopes featured on the worksheet. Using the PowerPoint slides or Zap code materials provided, or through independent research, ask them to draw or collage a representation of what they might be able to see using each telescope.

Questions for the Class

- Why is it important to learn about space?
- What are some of the important discoveries that telescopes have made?
- What do you think Webb might discover about our Universe?
- What is the difference between a telescope, a space probe and a satellite?

Additional Challenges / Extension Activities

Create a detailed timeline about the history of the telescope using these references:

https://www.stem.org.uk/rx34cs

Make your own telescope:

https://www.stem.org.uk/rxetrh

A fun craft activity that can help younger students understand the main components of a telescope, as well as how basic telescopes are used.

James Webb Space Telescope
DEEP SPACE DIARY

ACTIVITY 1.4
THE STARRY MESSENGERS

From Chapter One of the Deep Space Diary discoverydiaries.org/activities/the-starry-messengers/

LEARNING LEVEL

KS2, P5-7, Y4-6

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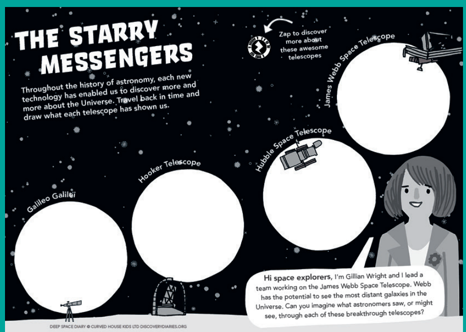

Ideas for Differentiation

Support:

- Work as a class or in small groups, using the visual prompts provided in the PowerPoint slides. Use a washing line to pin up key dates and changes in telescope discovery to support the students visually.

Challenge:

- Ask more capable students to research each telescopes' capabilities independently.

Useful Links

Downloadable booklet about Hubble's key achievements:
https://www.nasa.gov/sites/default/files/atoms/files/highlights_of_hubbles_exploration_of_the_universe_0.pdf

Explore the Hubble Space Telescope's photo galleries:
https://www.flickr.com/photos/nasahubble/albums

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discoverydiaries.org/toolkit/discovery-diaries-zappar-instructions/

If you don't have access to the internet in the classroom, all Zap code content is available to download on the activity's web page (see link to the left) as a PowerPoint presentation or as bundles of images.

GET ZAPPAR
ZAP THE CODE

zappar — Download on the App Store — GET IT ON Google play

Find more great space-themed STEM resources at:
https://www.stem.org.uk/esero

James Webb Space Telescope
DEEP SPACE DIARY

ACTIVITY 1.5
THE DEEP SPACE QUIZ

From Chapter One of the Deep Space Diary discoverydiaries.org/activities/deep-space-quiz/

LEARNING LEVEL

KS2, P5-7, Y4-6

CURRICULUM LINKS & DIFFERENTIATION IDEAS

View detailed curriculum links for England, Scotland, Northern Ireland and Wales in the Teacher Toolkit, plus differentiation ideas for your region and year level.

discoverydiaries.org/resources/teacher-toolkit/

Learning Objective

To consolidate ideas and concepts learnt this chapter.

Resources Required

- Smartphone/device or computer to access Zap code (optional)
- Fact sheets/whiteboard paper from previous activities

Background to this Activity

The Deep Space Quiz is a fun way for students to consolidate their learning from this chapter. Students can create a True/False quiz and use it to test their fellow classmates.

Running the Activity

Consolidate learning by inviting students to contribute what they've learnt. Note this down on a whiteboard, so that all students in the class can access the information. Revise any scientific vocabulary that students have encountered, along with the definitions of these words.

In groups or individually, ask students to prepare five questions, reminding them of the 'True/False' format. You may like to provide some examples of True/False questions by using the examples below, so that students understand the format their questions must follow. Highlight the fact that 'False' questions are ones which do not accurately represent facts. Students may need time to research answers in order to better frame their questions.

Once students have prepared their questions, ask them to test each other in pairs, small groups or as a class.

True/False Sample Questions

- Nebulae, black holes, moons and solar winds are all found in deep space. / T
- Our Solar System is in a galaxy called the Murky Way. / F
- A constellation is a group of planets in the sky. / F
- Constellations appear to move in the sky because the Earth rotates on an axis. / T
- Mars is the planet closest to the Sun in our Solar System. / F
- Galileo was the first astronomer to theorise that Earth was the centre of our Solar System. / F
- Edwin Hubble used the Hooker Telescope to study our Universe. / T
- The Hubble Space Telescope discovered new moons orbiting Pluto. / T
- The James Webb Space Telescope (Webb) can see through space dust because of x-ray vision. / F
- The James Webb Telescope is positioned 1.5 million kilometres from Earth. / T

Questions for the Class

- Why is it important for scientists to ask questions?
- What are some questions you have about space that were not answered in Chapter 1?
- Are there any words in Chapter 1 that you don't understand? What are the different ways you could find out what they mean?
- Did you learn anything in Chapter 1 that amazed you?
- What are some of the ways we can learn more about the Universe without being astronauts?

Additional Challenges / Extension Activities

Host a game show, using questions written by students. To involve the whole class, use mini-whiteboards with T on one side and F on the other. Alternatively, replace the whiteboards with physical action, such as hands on

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heads for true and hands behind backs for false. This method will provide educators with instant feedback.

Ask students to rewrite their questions as full Q&As, rather than in a True/False format e.g. 'What are four things that are found in space?' or 'What is the name of the galaxy which our Solar System is in?'

Ideas for Differentiation

Support:

- Students create top trumps style Q&A cards to support recollection of learning.

Challenge:

- Ask students to research one question of their choice. Set them the challenge of proving why it is true or false and present their findings to the class.
- Provide students with a quota for True and False questions, such as three False questions, to ensure that they think creatively about the questions they formulate.

Useful Links

Why scientists ask questions: https://www.bbc.com/bitesize/articles/zwdtrwx

Find more great space-themed STEM resources at https://www.stem.org.uk/esero