Teacher Resource

Focus Questions

NASA Venus Missions

1. Retell the BTN story using your own words.
2. Venus is the _____brightest object in our sky.
3. How is Venus similar to Earth?
4. What are some of the differences?
5. Venus is the hottest planet in our solar system. True or false?
6. The atmosphere of Venus is made up mainly of…
    a. Carbon Dioxide
    b. Hydrogen
    c. Oxygen
7. What is NASA's VERITAS mission going to do?
8. The aim of the DAVINCI+ mission is…
9. What are some of the challenges of exploring Venus?
10. Think of three unanswered questions you have about Venus. Share them with the class.

Life on Mars

1. What did the BTN Life on Mars story explain?
2. Travelling at about 77,000 km per hour, how long does it take to get to Mars?
3. Why is the soil red on Mars?
4. What is the name of the NASA Mars rover?
5. What is the average temperature on Mars?
    a. -23 °C
    b. -43 °C
    c. -63 °C
6. Why can't humans breathe on Mars?
7. What is the problem with growing food in Martian soil?
8. What are some possible sources of food on Mars?
9. Why is returning home after a Mars mission difficult?
10. Name three facts you learnt watching the BTN story.

Uranus Mission

1. Who wants to send a mission to Uranus?
2. What spacecraft has got the closest to Uranus?
    a. Voyager 1
    b. Voyager 2
    c. International Space Station

KEY LEARNING
Students will view a range of BTN stories and use comprehension skills to respond to a series of focus questions.

CURRICULUM
English – Year 4
Use comprehension strategies to build literal and inferred meaning to expand content knowledge, integrating and linking ideas and analysing and evaluating texts.

English – Year 5
Use comprehension strategies to analyse information, integrating and linking ideas from a variety of print and digital sources.

English – Year 6
Use comprehension strategies to interpret and analyse information and ideas, comparing content from a variety of textual sources including media and digital texts.

English – Year 7
Use comprehension strategies to interpret, analyse and synthesise ideas and information, critiquing ideas and issues from a variety of textual sources.

3. Uranus was discovered before telescopes were invented. True or false?
4. Why does Uranus appear blue?
5. How many moons orbit Uranus?

Pluto Anniversary

1. Briefly summarise the BTN Pluto Anniversary story.
2. How many planets are there in our solar system?
3. What ancient civilisation first observed planets in our solar system?
4. Who first suggested that planets in our solar system revolve around the Sun?
5. What is the name of planet 8?
6. What year was Pluto discovered?
7. Who named Pluto?
8. Why is Pluto called a dwarf planet?
9. Pluto is larger than the Moon. True or false?
10. What questions do you have about Pluto?

Teacher Resource

NASA Venus Missions

Activity: Quick Venus Quiz

Begin the NASA Venus Missions activity with a quick true or false quiz. Circle the correct answer.

1. Venus is the 2nd planet from the sun.	**True False**
2. Venus is bigger than Earth.	**True False**
3. Venus is the hottest planet in the solar system.	**True False**
4. The atmosphere of Venus is made up mainly of hydrogen.	**True False**
5. A day on Venus is longer than a year.	**True False**
6. Venus doesn't have any moons.	**True False**
7. Venus is named after the Roman god of fire.	**True False**

Answers: 1 True, 2 False, Earth is slightly bigger than Venus, 3 True, 4 False, the atmosphere is made up mainly of carbon dioxide, 5 True, 6 True, 7 False, it is named after the Roman goddess of love and beauty.

Activity: Class Discussion

Discuss the BTN NASA Venus Missions story as a class. Ask students to record what they know about Venus. What questions do they have? Use the following questions to help guide discussion:

- Make a list of all the things you know about Venus.
- What does Venus look like?
- How similar are Venus and Earth?
- What are some differences between Venus and Earth?
- Describe the location of Venus in relation to Earth and the Sun.
- Can humans survive on Venus? Why or why not?
- Why do you think NASA wants to explore Venus?
- What might be some of the challenges of exploring it?
- Think of three unanswered questions you have about Venus. Share them with the class.

KEY LEARNING
Students will learn more about Venus and the NASA missions planned.

CURRICULUM
Science – Year 5
The Earth is part of a system of planets orbiting around a star (the sun).

Scientific knowledge is used to solve problems and inform personal and community decisions.

Science – Years 5 & 6
With guidance, pose clarifying questions and make predictions about scientific investigations.

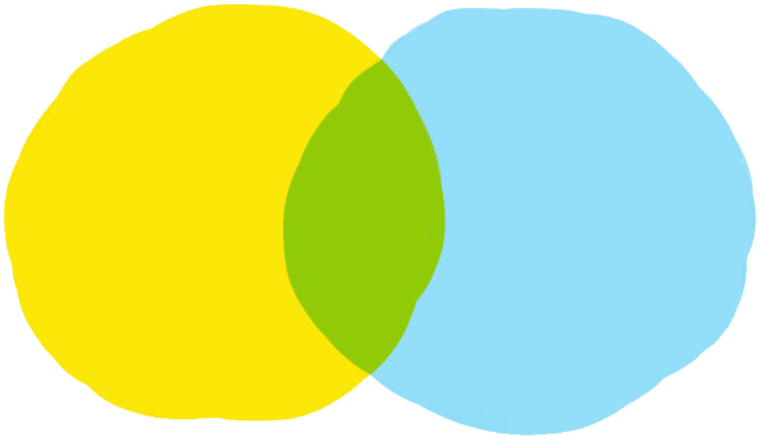
Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena and reflects historical and cultural contributions.

Activity: Profile of Venus

Create a profile of Venus using a range of sources of information. The following questions will help guide students' research:

- Who discovered Venus and when was it discovered?
- How was it named?
- How big is Venus?
- Where is Venus in the solar system?
- Describe Venus' atmosphere.
- What does Venus look like? Describe using words and pictures.
- List 10 interesting facts about Venus.

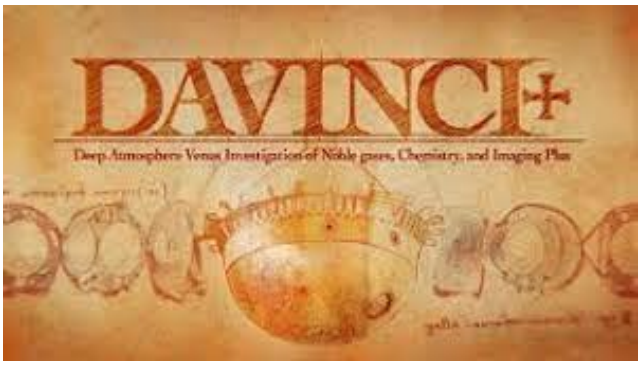
Use a Venn diagram to compare and contrast Venus with other planets in our solar system. Compare and contrast the size of the planets, the distance from the sun and its physical features.



Activity: NASA Venus Mission

Watch NASA's new mission to Venus video to learn more about the DAVINCI+ mission. Students can then respond to the following questions:

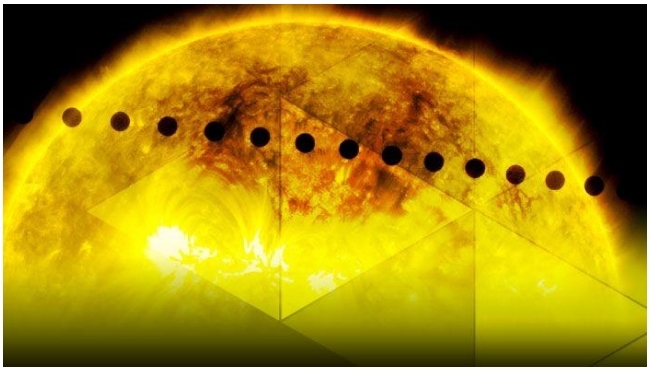
- Why is the probe described as both a time capsule and time machine?
- The probe will act as chemistry lab and _____.
- How long will the mission take?
- What is the purpose of the Veritas Mission?
- Do you think these missions are important? Explain your answer.



The Evolution of Venus animations shows the change in Venus' landscape over time. Ask students to write a paragraph explaining how Venus' landscape has evolved. They can then research why these changes have occurred. The Mysterious Planet video helps to explain why Venus has changed over time.

Activity: BTN Transit of Venus

Students watch the BTN Transit of Venus story then answer the questions below.



1. Captain James Cook travelled to which place to witness the transit of Venus?
2. In which century did he make the journey?
3. What were scientists and astronomers hoping to learn from the mission?
4. What was Captain Cook's secret mission?
5. Describe Wayne's feelings about Cook's trip to New Zealand.
6. Why did students in New Zealand ask for plant seeds to be sent back from England?
7. Where did Cook go to from New Zealand?
8. Why was the transit of Venus significant to the European settlement of Australia?

Useful Websites

- NASA's going to send new spacecraft to Venus. Here's why – ABC News
- NASA plans two new missions to Venus, its first in decades – ABC News
- Venus: NASA to launch two new missions between 2029 and 2030 – Newsround
- Venue Overview – NASA Solar System Exploration
- Transit of Venus – BTN

Teacher Resource

Life on Mars

Activity: Quick Mars Quiz

Begin the Life on Mars activity with a quick true or false quiz. Circle the correct answer.

1.	Mars is the 4th planet from the sun	**True False**
1.	Mars is bigger than Earth	**True False**
2.	The average temp on Mars is about -63 degrees C	**True False**
3.	The name of the Mars rover is Procrastination	**True False**
4.	The rover was named by a NASA astronaut	**True False**
5.	Scientists have found evidence of water on Mars	**True False**
6.	Carbon dioxide makes up 95% of the atmosphere on Mars	**True False**

Answers: 1 True, 2 False, 3 True, 4 False, the name of the rover is Perseverance, 5 False It was named by a 13-year-old, 6 True, 7 True.

Activity: Class Discussion

Discuss the BTN Life on Mars story as a class. Ask students to record what they know about Mars. What questions do they have? Use the following questions to help guide discussion:

- Make a list of all the things you know about Mars.
- What does Mars look like?
- How similar are Mars and Earth?
- Describe the location of Mars in relation to Earth and the Sun.
- Why do you think scientists want to explore Mars?
- What might be some of the challenges of exploring it?
- Think of three unanswered questions you have about Mars. Share them with the class.

KEY LEARNING
Students will develop a deeper understanding of Mars and the rover, Perseverance, sent to explore the planet. They will investigate what life would be like on Mars.

CURRICULUM
Science – Year 5
The Earth is part of a system of planets orbiting around a star (the sun).

Scientific knowledge is used to solve problems and inform personal and community decisions.

Science – Years 5 & 6
With guidance, pose clarifying questions and make predictions about scientific investigations.

Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena and reflects historical and cultural contributions.

Activity: Glossary

Students will brainstorm a list of key words that relate to the BTN Life on Mars story. Here are some words to get them started.

ROVER	MISSION	MARTIAN
SOLAR SYSTEM	ATMOSPHERE	RADIATION

Activity: Mars Research

After watching and discussing the BTN Life on Mars story, what questions do students have and what are the gaps in their knowledge? The following KWLH organiser provides students with a framework to explore their knowledge on this topic and consider what they would like to know and learn.

What do I **know**?	What do I **want** to know?	What have I **learnt**?	**How** will I find out?

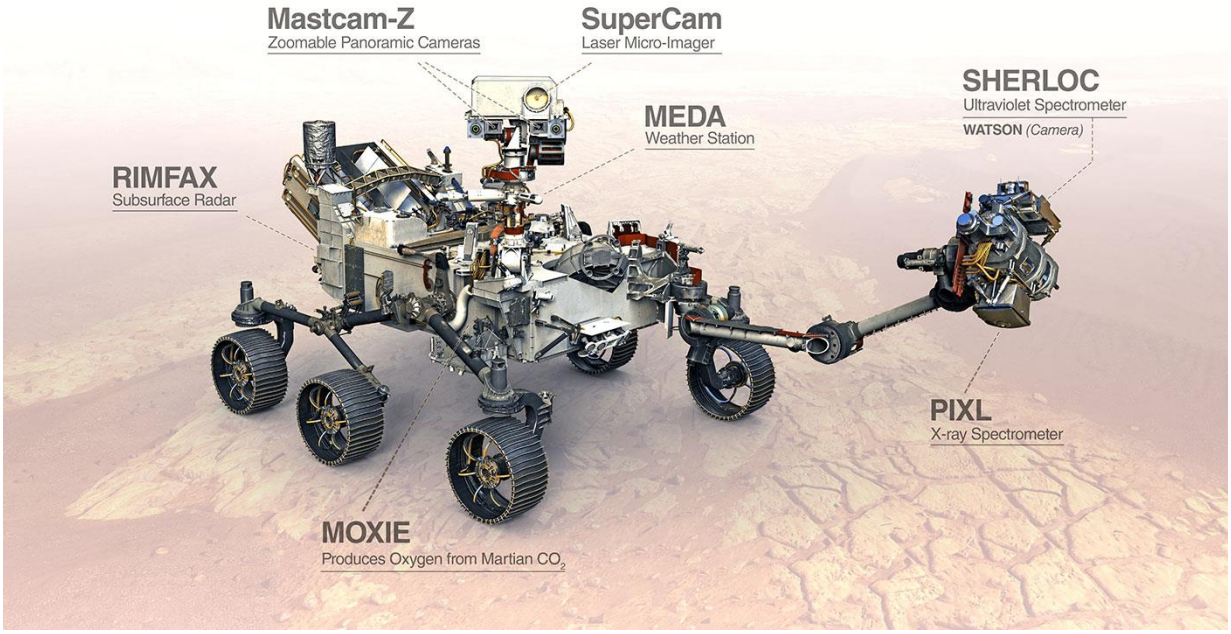
Students will develop their own question/s to research, collecting and recording information from a wide variety of sources. Students may develop their own question to investigate or select one of the questions below.

- What are the challenges of landing a rover on Mars? What is the `7 minutes of terror'? Watch the landing of the Perseverance rover on Mars.
- Should we put humans on Mars? Explore the pros and cons.
- Using a Venn diagram, explore the similarities and differences between Mars and Earth.
- What have previous space missions discovered about Mars?

Activity: Perseverance Rover – Science Instruments

Students will investigate how the Perseverance rover is collecting information about Mars. Begin by exploring the rover in 3D. They can then look at the rover's science instruments in more detail. They are tools for collecting data about Martian geology, atmosphere and environmental conditions. Ask students to look at the different instruments on the Mars Perseverance rover and choose one to explore in more detail. Record information about the instrument:

- Main job of the instrument
- Location on the rover
- Size and weight
- Draw a picture of the instrument



Activity: Mars Helicopter

Students will learn more about the Mars helicopter and its purpose on the mission. They can also explore the 3D model of the helicopter. Here are some questions for them to respond to:

- What is the name of the helicopter?
- The helicopter rode to Mars attached to the _____ of the Perseverance rover.
- Why was Ingenuity included in the mission to Mars?

Further learning

Make a paper Mars helicopter

Code a Mars helicopter video game

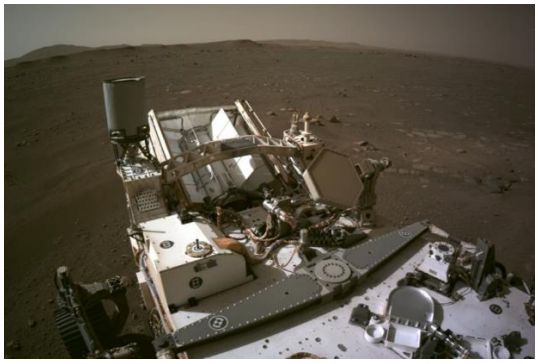
Activity: Sounds of Mars

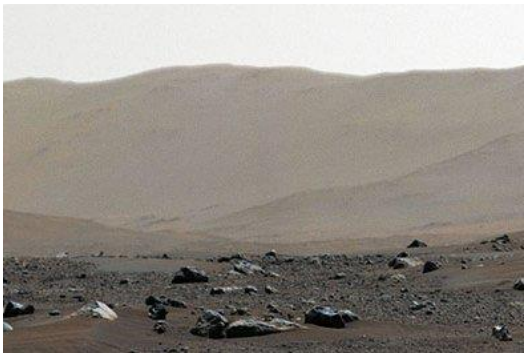
What does Mars actually sound like? The Perseverance rover carries two microphones, that records the sounds of Mars for the first time. The NASA Sound of Mars playlist allows students to listen to the differences between sounds on Earth versus how they would sound on Mars. Students can record a greeting and hear how they would sound on Mars. They can explore how sound works and why sound is different on Mars.

Activity: Images of Mars

Students look at the images taken by the Mars rover Perseverance, on its mission, then respond to the following questions:

- Describe the image. What can you see?
- What does the image tell you about Mars?
- How is it similar to Earth?
- What was surprising about the image?
- What questions do you have about the image?
- Create a caption for the image.





Activity: Life on Mars

Students will plan and design a settlement on Mars that will sustain human life. The following questions can help guide students' research:

- What are the conditions like on Mars?
- What needs to be considered when planning a colony on Mars? For example:
    - Water supply
    - Atmosphere (air supply)
    - Temperature
    - Food production
    - Gravity
    - Waste management
- What materials could be used to build a space settlement?

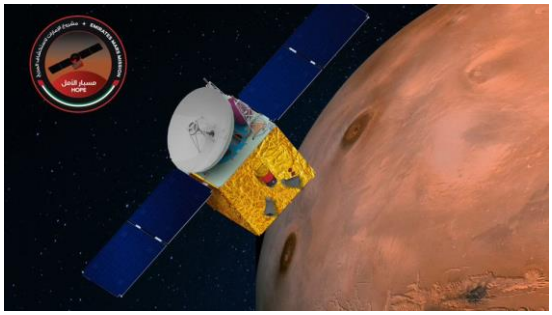
- Create and advertisement or poster to advertise your colony.

Further Learning

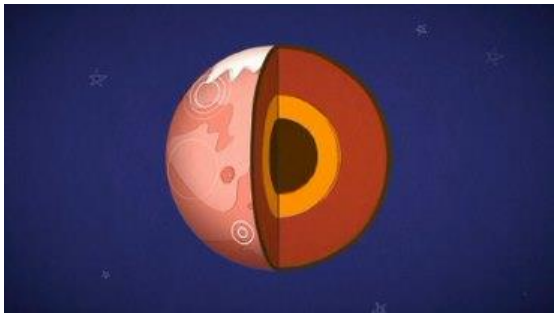
- Write a science fiction story about your journey to Mars and what you found when you arrived.
- Design a system of government for your Mars colony.
- Calculate the cost of a colony on Mars.

BTN Mars Stories

Students can watch one or more of the BTN stories below to learn more about Mars.



Mars Rovers



Mars Insight

Mars Class

Space Future

Useful Websites

- Mars 2020 Mission Perseverance Rover – NASA
- Mars 2020 Mission Overview – NASA
- Mars touchdown by Perseverance rover shown in thrilling video released by NASA – ABC News
- Mars rover Perseverance's giant parachute carried a secret message from NASA – ABC News
- Can life from Earth survive on Mars? – Newsround
- Mars Rovers – BTN
- Mars Class - BTN
- Mars Insight – BTN

Teacher Resource

Uranus Mission

Activity: Quick Uranus Quiz

Begin the Uranus activity with a quick true or false quiz. Circle the correct answer.

1. Uranus is the 7th planet from the sun.	**True False**
2. Uranus is smaller than Earth.	**True False**
3. The atmosphere of Uranus is made up mainly of hydrogen and helium.	**True False**
4. Hydrogen gives Uranus its blue green colour.	**True False**
5. Uranus rotates on its side.	**True False**

Answers: 1 True, 2 False, Uranus is about four times the diameter of Earth, 3 True, 4 False, methane gives Uranus its blue green colour. 5 True

Activity: Glossary

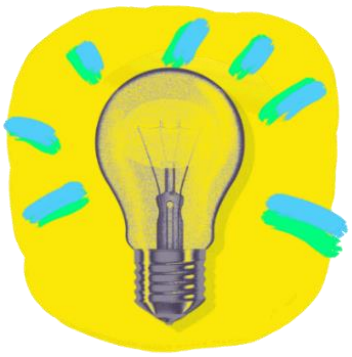
Students will brainstorm a list of key words that relate to the BTN Uranus Mission story. Here are some words to get them started.

PLANET	SOLAR SYSTEM	ICE GIANT
ATMOSPHERE	ROTATE	ORBIT

Activity: Class Discussion

Discuss the BTN Uranus Mission story as a class. Ask students to record what they know about the planet. What questions do they have? Use the following questions to help guide discussion:

- Make a list of all the things you know about Uranus.
- How similar are Uranus and Earth?
- What are some differences between Uranus and Earth?
- Can humans survive on Uranus? Why or why not?
- Why does NASA want to send a probe to Uranus?
- What might be some of the challenges of exploring Uranus?
- Think of three unanswered questions you have about Uranus.



KEY LEARNING
Students will learn more about Uranus and why astronomers want to explore it.

CURRICULUM
Science – Year 5
The Earth is part of a system of planets orbiting around a star (the sun).

Scientific knowledge is used to solve problems and inform personal and community decisions.

Science – Years 5 & 6
With guidance, pose clarifying questions and make predictions about scientific investigations.

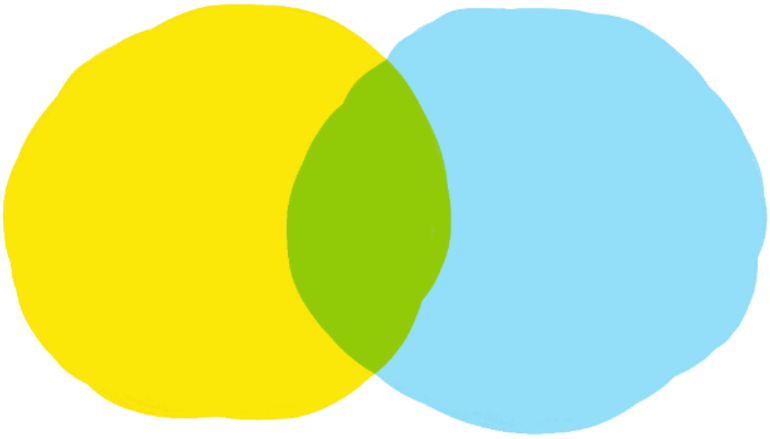
Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena and reflects historical and cultural contributions.

Activity: Profile of Uranus

Create a profile of Uranus using a range of sources of information. The following questions will help guide students' research:

- Who discovered Uranus and when was it discovered?
- How was it named? How long did it take to be named?
- Where is Uranus in the Solar System?
- Uranus is an ice giant planet. What does that mean?
- Describe Uranus' atmosphere.
- How long is a day on Uranus?
- How long is a year on Uranus?
- Why does Uranus rotate on its side?
- Why does Uranus have extreme weather?
- List 10 interesting facts about Uranus.

Use a Venn diagram to compare and contrast Uranus with Earth. Compare and contrast the size of the planets, the distance from the sun and its physical features.

Uranus  Earth

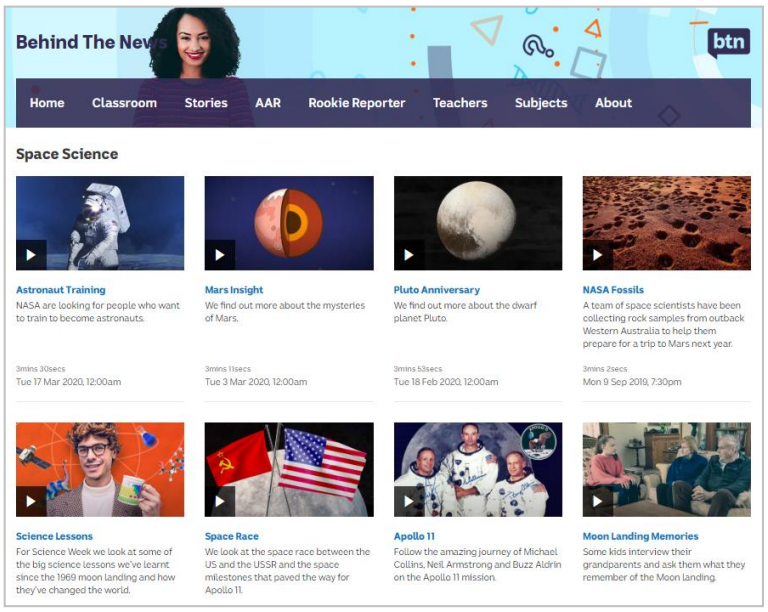
Activity: Create a Kahoot Quiz

Use *Kahoot!* to test students' knowledge about Uranus. Quizzes can be created to recap learning or test personal knowledge. There is also the option to connect with classrooms around the world and play kahoot in real time.

BTN Space Science stories

Visit BTN's collection of stories which focus on space science and space exploration. After watching any one of the BTN videos ask students to respond to the discussion questions (to find the discussion questions and teacher resources go to the related BTN Classroom Episode and download the Episode Package).

Link to collection of BTN Space Science stories



Useful Websites

- Uranus – NASA Science
- Uranus is a very weird planet. Here's why astronomers want to send a probe to it – ABC News
- By the Numbers: Uranus vs Earth – NASA Science
- All about Uranus – NASA Space Place

Teacher Resource

Pluto Anniversary

KEY LEARNING
Students will learn about the dwarf planet Pluto and other planets in the solar system.

CURRICULUM
Science – Year 5
The Earth is part of a system of planets orbiting around a star (the sun).

Science – Years 5 & 6
With guidance, pose clarifying questions and make predictions about scientific investigations.

Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena and reflects historical and cultural contributions.

Activity: Class Discussion

Hold a class discussion about the information raised in the Pluto Anniversary story. Ask students to **name the planets in our solar system**. Students will then create a class mind map about Pluto asking students to record what they know. Use the following questions to guide discussion:

- Who discovered Pluto?
- How was it named?
- Where is Pluto in the solar system?
- How big is Pluto?
- When and why did Pluto become a dwarf planet?
- How many moons does Pluto have?
- How long does it take for Pluto to orbit the Sun?
- What is the Kuiper Belt?

Activity: Glossary

Students will brainstorm a list of key words that relate to the BTN Pluto Anniversary story. Here are some words to get them started.

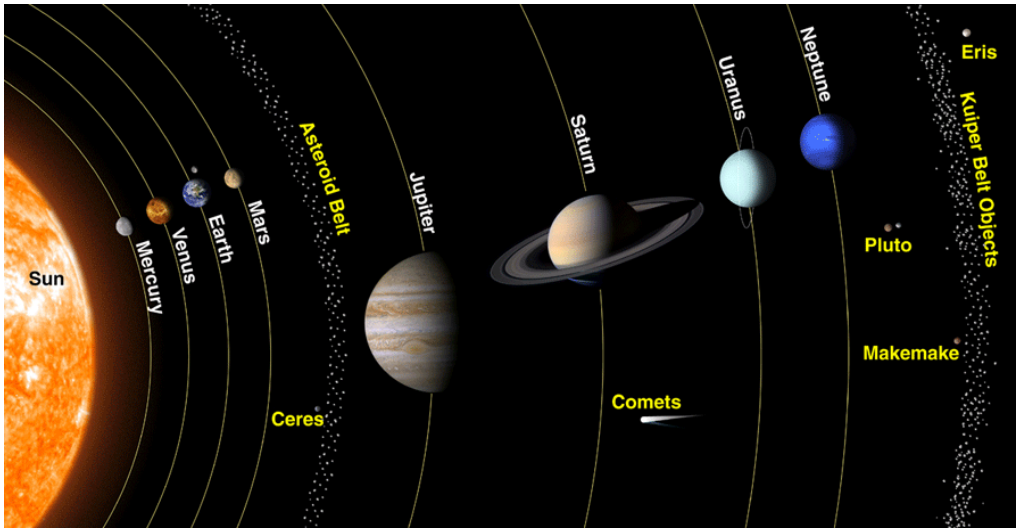
DWARF PLANET	SOLAR SYSTEM	KUIPER BELT
CHARON	PLANET	ORBIT

Activity: Planet Research

Students begin by recording what they know about the solar system. Working in pairs, students will research one of the planets in the solar system. Use the following to help guide students' research.

- Choose a planet in our solar system (or the dwarf planet, Pluto)
- Conduct in depth research into one of the planets. The NASA website has useful information.

- Include a description of what the planet looks like.
- Find out some interesting facts about the planet.
- Geographical features – Is it gaseous or rocky? Does it have an atmosphere? What are conditions on the surface like?
- Distances – how far is this planet from the Sun?
- Movement – identify the path of this planet. How fast does it travel around the Sun?
- Present research using Prezi, Canva or Glogster



Activity: Make a model of our solar system

Make a scale model of the planets in our solar system. In small groups, students will represent the size of the Sun and the planets in our solar system as accurately as possible. Students need to agree on an approximate scale for their model. The model should begin with the Sun and show planets in order. Use this calculator to help determine size and scale.

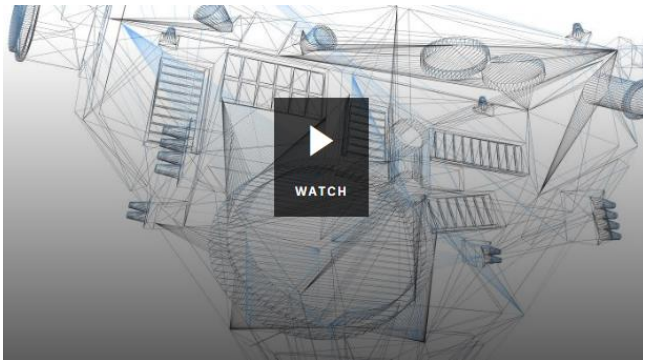
- What scale will you use to model the solar system?
- What materials or found objects will you use to represent the Sun and each of the planets?
- What surprised you about you about this activity?

Following this activity, students will agree on a scale to represent the distance of the planets from the Sun. Calculate and record the distances using a spreadsheet. Consider modelling your findings on your school oval. In this BTN story we demonstrate the scale of our solar system, using a bowling ball, a pin, a peppercorn, a pecan, a hazelnut and a peanut, on a racecourse!

Activity: BTN Visiting Pluto story

Students watch the BTN Visiting Pluto story about the New Horizons mission to explore Pluto, then answer the following questions:

1. What is the name of the spacecraft that took photos of Pluto?
2. Pluto was first discovered in...
3. What do scientists know about Pluto?
4. Why is it called a dwarf planet?
5. When was the spacecraft launched?
6. New Horizons is about the size of a _____.
7. What interesting things are on board the spacecraft?
8. Describe the images of Pluto.
9. New Horizons is the fastest spacecraft NASA has ever built. True or false?



Watch this video to learn more about Pluto's atmosphere.

Watch this video to learn more about the amazing features of Pluto.

Activity: Kahoot Quiz

Use *Kahoot!* to test students' knowledge about Pluto. Quizzes can be created to recap learning or test personal knowledge. There is also the option to connect with classrooms around the world and play kahoot in real time.

Useful websites

- Visiting Pluto – BTN
- The Amazing Features of Pluto – ABC Education
- Pluto Dwarf Planet – NASA Science Solar System Exploration
- Pluto - NASA