

Focus Questions

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?

Exploring the Sun

1. Discuss the *Exploring the Sun* story with another student.
2. What technology was first used to discover the Sun?
3. How many days does it take for the Earth to orbit the Sun?
4. What happens at the core of the Earth?
5. What is the biggest object in our Solar System?
6. The sun is a planet. True or false?
7. Where will NASA send the Parker Probe?
8. Describe and illustrate the spacecraft.
9. How will the spacecraft keep cool during the mission?
10. What did you learn while watching the BTN *Exploring the Sun* story?

Exoplanets

1. In pairs, discuss the *Exoplanets* story and record the main points of the discussion.
2. An exoplanet sits within our Solar System. True or false?
3. In what year was the first exoplanet discovered?
4. Who discovered the exoplanet called 51 Pegasi b?
5. Describe what they noticed about the way the exoplanet was orbiting its star.
6. What is the Kepler?
 - a. An exoplanet
 - b. A star
 - c. A telescope
7. The transit method is when a planet crosses in front of a _____. Complete this sentence.
8. How many exoplanets have been discovered so far?
9. What characteristics does an exoplanet need to be Earth-like?
10. What was surprising about this story?

Teacher Resource

Pluto Anniversary

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1. Briefly summarise the BTN *Pluto Anniversary* story.
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9. Pluto is larger than the Moon. True or false?
10. What questions do you have about Pluto?

Key Learning

Students will learn more 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 – Year 5 & 6

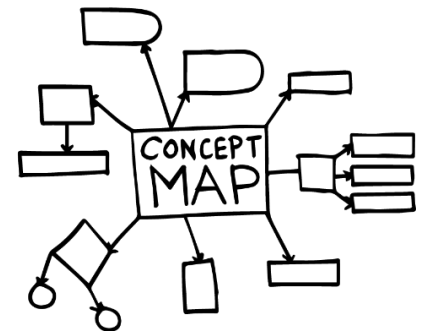
Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena and reflects historical and cultural contributions.

Activity

Class discussion – Pluto

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?



Glossary

Students will develop a glossary of words and terms that relate to Pluto and the solar system. Below are some words to get them started.

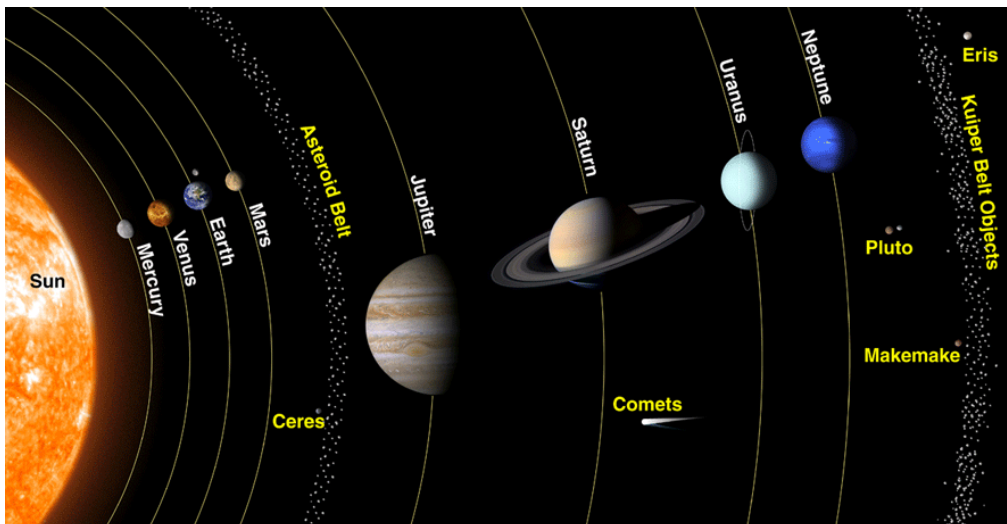
Solar system	Dwarf planet	Kuiper Belt
Charon	Orbit	Planet

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 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! Watch this [ABC Education video](#) to help you visualise the size and scale of our solar system.

Activity

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

Create a 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.



Activity

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

<https://www.abc.net.au/btn/space-science/10614248>

Useful Websites

Visiting Pluto – BTN

<https://www.abc.net.au/btn/classroom/visiting-pluto/10526194>

The Amazing Features of Pluto – ABC Education

<https://education.abc.net.au/home#!/media/2395334/the-amazing-features-of-pluto>

Pluto Dwarf Planet – NASA Science Solar System Exploration

<https://solarsystem.nasa.gov/planets/dwarf-planets/pluto/overview/>

Pluto - NASA

<https://solarsystem.nasa.gov/planets/dwarf-planets/pluto/in-depth/>

Teacher Resource

Exploring the Sun

Focus Questions

1. Discuss the *Exploring the Sun* story with another student.
2. What technology was first used to discover the Sun?
3. How many days does it take for the Earth to orbit the Sun?
4. What happens at the core of the Earth?
5. What is the biggest object in our Solar System?
6. The sun is a planet. True or false?
7. Where will NASA send the Parker Probe?
8. Describe and illustrate the spacecraft.
9. How will the spacecraft keep cool during the mission?
10. What did you learn while watching the BTN *Exploring the Sun* story?

Activity

Class discussion

Hold a class discussion about the information raised in *Exploring the Sun* story. Use the following questions to guide discussion:

- What do you know about the Sun?
- How does life on Earth depend on the Sun's energy?
- How is the Sun different to the planets?
- How do you use the Sun?
- What questions do you have about the Sun?

Activity

Key Words

Students develop a glossary of words and terms that relate to the Sun. Below are some words to get them started. Add words and meanings to your glossary as you come across unfamiliar words throughout your research. Consider using pictures and diagrams to illustrate meanings.

Solar	Ultraviolet radiation	Solar System
Star	Corona	Orbit

Key Learning

Students will learn more about the Sun and its role in the Solar System. Students will investigate the NASA solar probe and its mission to the Sun.

Curriculum

Science – Year 5

The Earth is part of a system of planets orbiting around a star (the sun)

Science – Years 5 & 6

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

Science – Year 6

Scientific knowledge has changed peoples' understanding of the world and is refined as new evidence becomes available

Activity

Sun Research

Define: What do I want to know?

Key questions to research

Students can choose one or more of the following questions or come up with their own:

- What is the Sun's role in our solar system?
- What gives the Sun its colour?
- What is important about the sun's position in relation to the Earth?
- How much energy (in kilowatts) does the sun output each day?
- What percentage of the Sun's power actually reaches Earth?
- What can we learn by studying the Sun?
- Why might it be important to find out more about the Sun?

Locate: Where do I find the information?

What resources will help answer my questions? (Internet, people, resource centre, organisations, print). Discuss with students what a reliable source is.

Select: What information is important for the investigation?

Students may need support to sort through and select relevant information.

Organise: How do I make sense of the information?

Students can organise their research by creating main headings from their questions. Write each heading on a separate piece of paper. Record the information found for each question.

Present: How do we let others know about this information?

Each group needs to discuss then decide on the best way to present the information. Possibilities could include:

- A 'Did You Know' Facts sheet
- Infographic
- Oral presentation
- [Prezi](#) presentation
- Create an infographic using [Canva](#)

Evaluate: What have we learnt?

Each group reflects on what they have learnt about the Sun during their investigation. Students will reflect on their learning and respond to the following.

- What I learned...
- What I found surprising...

Activity

The Power of the Sun

Students watch the ABC Education video [The Immense Power of the Sun](#) and respond to the following:

- What did you see in this video?
- Name three facts you learnt watching the video.
- What did the video make you wonder?
- What did you find surprising?



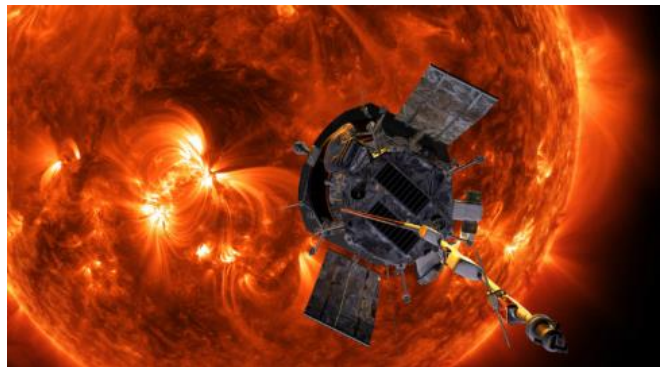
Activity

Parker Solar Probe

Students will investigate the NASA Solar Probe mission in more detail. The [NASA Parker Solar Probe webpage](#) will help students with their research.

Students can use the following questions to guide their research:

- What is the goal of the mission?
- Why is it surprisingly hard to go to the Sun? Watch [this video](#) to find out more.
- How close will the probe get to the Sun?
- What is the name of the Sun's atmosphere?
- Why do we study the Sun?



Source: NASA

Activity

Using the Sun's energy

Students will experiment with a solar powered oven to explore the mathematical and scientific relationship among reflection, transmission and absorption. Students will apply their knowledge to building and testing a solar oven of their own invention. Students can work individually or in small teams.

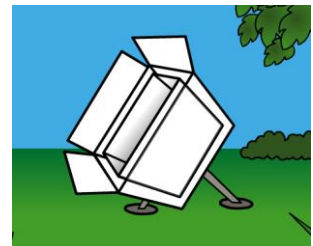
- What shape will your oven be? Find out what shape best captures the Sun's energy.
- Will your oven have insulation? How does insulation increase the temperature?
- What direction will it face?
- What colour will the surface of the oven be (white, black or reflective)? Consider that some colours reflect heat while others absorb it.

Students can look at the following experiments for more information on designing and constructing their solar ovens.

[Design a Solar Oven Interactive](#) (Scoutle username and password required)

[Solar Powered Oven – Instructions and video](#)

Watch this Questacon video to learn how to make a solar powered oven.



Useful Websites

ABC News – NASA’s Parker Solar Probe rockets towards sun for closest look yet

<http://www.abc.net.au/news/2018-08-12/nasa-spacecraft-rockets-toward-sun-for-closest-look-yet/10111626>

CBBC Newsround – Parker Solar Probe: NASA send mission to ‘touch the Sun’

<https://www.bbc.co.uk/newsround/43328818>

NASA – The Sun: The Basics

<https://www.nasa.gov/sun>

NASA Space Place

<https://spaceplace.nasa.gov/menu/sun/>

NASA Solar System Exploration – Sun

<https://solarsystem.nasa.gov/solar-system/sun/overview/>

NASA – Solar System Exploration – Our Sun

<https://solarsystem.nasa.gov/solar-system/sun/in-depth/>

Teacher Resource

Exoplanets

Focus Questions

1. In pairs, discuss the *Exoplanets* story and record the main points of the discussion.
2. An exoplanet sits within our Solar System. True or false?
3. In what year was the first exoplanet discovered?
4. Who discovered the exoplanet called 51 Pegasi b?
5. Describe what they noticed about the way the exoplanet was orbiting its star.
6. What is the Kepler?
 - a. An exoplanet
 - b. A star
 - c. A telescope
7. The transit method is when a planet crosses in front of a _____. Complete this sentence.
8. How many exoplanets have been discovered so far?
9. What characteristics does an exoplanet need to be Earth-like?
10. What was surprising about this story?

Activity

What do you see, think and wonder?

After watching the BTN story, respond to the following questions:

- What did you SEE in this video?
- What do you THINK about what you saw in this video?
- What did you LEARN from this story?
- What was SURPRISING about this story?

Activity

Glossary

Students will develop a glossary of words and terms that relate to exoplanets and our Solar System. Below are some words to get them started. Add words and meanings to your glossary as you come across unfamiliar words throughout your research. Consider using pictures and diagrams to illustrate meanings.

Planet	Exoplanet	Galaxy
Milky Way	Transit method	Universe
Solar System	Habitable zone	orbit

Key Learning

Students will investigate the characteristics of an exoplanet. Students will explore how scientific knowledge is used to discover exoplanets.

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 – Year 7

Scientific knowledge has changed peoples' understanding of the world and is refined as new evidence becomes available.

Research

Define: What do I want to know?

Key questions to research

Students can choose one or more of the following questions or come up with their own:

- What is an exoplanet?
- When was the first exoplanet discovered? Explore the exoplanet in more detail.
- How are exoplanets different from planets in our solar system?
- How do astronomers find exoplanets?
- How many exoplanets are like Earth? What makes them similar?
- What can we learn by studying exoplanets?
- How are exoplanets different and similar to planets in our Solar System?
- What makes a planet liveable? Think of three characteristics that would make a planet Earth-like.

Locate: Where do I find the information?

What resources will help answer my questions? (Internet, people, resource centre, organisations, print). Discuss with students what a reliable source is.

Select: What information is important for the investigation?

Students may need support to sort through and select relevant information.

Organise: How do I make sense of the information?

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Present: How do we let others know about this information?

Each group needs to discuss then decide on the best way to present the information. Possibilities could include:

- A 'Did You Know' Facts sheet
- Infographic
- Oral presentation
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- Create an infographic using [Canva](#)

Evaluate: What have we learnt?

Each group reflects on what they have learnt about exoplanets during their investigation. Students will reflect on their learning and respond to the following.

- What I learned...
- What I found surprising...
- What I would do differently next time...

Activity

Discover a new exoplanet

Students will imagine they have discovered a new exoplanet which has never been seen before. Use the following as a guide for this activity:

- Illustrate the new exoplanet using only a black felt-tip pen on a piece of A4 art paper – include as much detail as you can.
- Give the exoplanet a name.
- Describe what the exoplanet looks like – what are some of its physical characteristics?
- Does it have any interesting or unique features?

Activity

Daytime stargazing

Bring the stars to your students by using an online application to discover and explore stars, planets and constellations in the classroom. Before starting this activity download a free app like [SkyView](#) onto your classroom hand held device/s. This activity may need to be modified depending on the number of devices available to students.

- If possible, dim the lights in the classroom to create the feeling that it is night time. Students will sit on the ground with SkyView open on their hand-held device.
- Students will point their device at the sky to locate and identify planets, stars and constellations. There is the option to turn on night mode. Students can learn more about what they find by selecting a celestial body and tapping on it. Give students time to explore the night sky.
- Hold a class discussion. What did your students discover?
- Students will choose one planet they want to learn more about. Students will develop their own question/s for inquiry, collecting and recording information from a wide variety of sources.
- Students will think of creative ways to display their findings.

Useful Websites

BTN – Planet Nine

<http://www.abc.net.au/btn/classroom/planet-nine/10523444?cachebusterTimestamp=1553577118035>

<https://www.zooniverse.org/projects/marckuchner/backyard-worlds-planet-9/>

NASA – What is an exoplanet?

<https://spaceplace.nasa.gov/all-about-exoplanets/en/>

NASA – Five ways to find a planet

<https://exoplanets.nasa.gov/5-ways-to-find-a-planet/>

NASA – What is a planet?

<https://solarsystem.nasa.gov/planets/in-depth/>

ABC – How the sky works: A beginner's guide to finding stars and planets

<http://www.abc.net.au/news/science/2017-04-04/a-beginners-guide-to-finding-planets-and-constellations/8373718>