



Teacher Resource

# NASA DART Mission

## Focus Questions

Discuss the BTN story as a class and record the main points of the discussion. Students will then respond to the following:

1. In your own words, describe NASA's DART mission.
2. What does DART stand for?
3. What is the goal of the mission?
4. Was the mission successful?
5. What do you understand more clearly since watching the BTN story?

## Activity: Class Discussion

Hold a class discussion about the information raised in the BTN story. Clarify students' understanding of terms such as asteroid, planetary defence, and asteroid redirection. Students will then discuss the story in pairs and share their thoughts with the class.

- What does DART stand for?
- What is the aim of the mission?
- Was the mission successful?
- Why is the DART mission important?
- What words would you use to describe the mission?
- What questions do you have about the story?

## Activity: Questions and answers

Are you curious about space exploration? Students will make a list of questions they have about the story and space exploration that they would like to ask an astronomer. Students will use the internet to find answers to their questions.



Visit the following website to see which questions are answered.  
Ask an Astronomer – <http://curious.astro.cornell.edu/>

### EPISODE 28

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### KEY LEARNING

Students will learn more about asteroids and NASA's space mission DART.

### CURRICULUM

#### Science – Year 5

Scientific understandings, discoveries and inventions are used to solve problems that directly affect peoples' lives.

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

#### Science – Years 5 & 6

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

#### Science – Year 7

Predictable phenomena on Earth, including seasons and eclipses, are caused by the relative positions of the sun, Earth and the moon.

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

## Activity: Glossary

Students will watch the BTN NASA DART Mission story and summarise the story in their own words. Students will watch the story again and listen carefully, circling each of the following words as they hear them and recording any unfamiliar words.

ASTEROID	DART SPACECRAFT	DIMORPHOS
NASA	ORBIT	SPACE AGENCY
DIDYMOS	ASTEROID BELT	PLANETARY DEFENCE TEST MISSION

Ask students to write what they think is the meaning of each word (including unfamiliar words). They will swap definitions with a partner and ask them to add to or change the definition. Check these against the dictionary definition.

Further activities for students:

- Write your own sentences using the key words.
- Illustrate the difference between an asteroid, meteoroid and a comet.
- Draw a diagram which illustrates the scale of the Dimorphos asteroid, the DART spacecraft, Earth and various objects.
- Use the following words to write a summary about the NASA Dart Mission: DART, potential threat, Falcon 9, spacecraft, Dimorphos, orbit, space agency, planetary defence.

## Activity: KWLH

Discuss the information raised in the BTN NASA DART Mission story. What questions were raised in the discussion and what are the gaps in students' knowledge? The following KWLH organiser provides students with a framework to explore their knowledge on this topic.

What do I <b>know</b> ?	What do I <b>want</b> to know?	What have I <b>learnt</b> ?	<b>How</b> will I find out?

Students will develop their own question/s to research or choose one or more of the questions below. To start off their research get students to go to Google and search "DART Mission". What do they discover?

- What is an asteroid?
- What is the DART mission?
- Who was involved in the DART mission? What is Australia's involvement in the DART mission?
- What role did telescopes play in the DART mission?

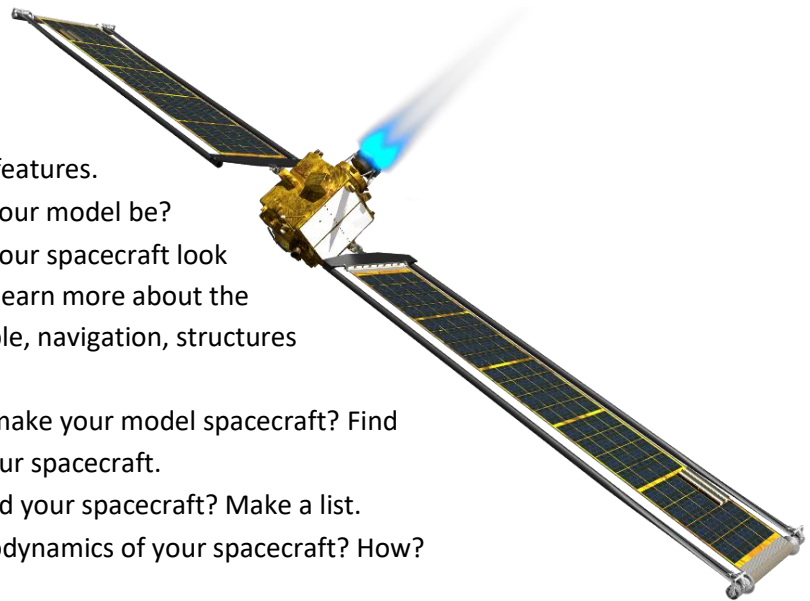
- What's the difference between comets, asteroids and meteors?
- What is the asteroid belt?
- How often do asteroids hit the Earth's atmosphere?
- Is space exploration important? Why or why not?
- How has space exploration affected people's lives?
- How has technology used in space exploration changed over time?

## Activity: Create a Model

In this activity, students will think like engineers and build a model of the DART spacecraft (alternatively, students can build a model of their favourite spacecraft, for example, SpaceX Dragon, Apollo, ISS, Vostok 1, Soyuz, Discovery).

Before creating their models, students will respond to the following:

- Sketch a diagram of the DART spacecraft and label important features.
- What will the size and scale of your model be?
- What do the different parts of your spacecraft look like? Visit this [NASA website](#) to learn more about the parts of a spacecraft. For example, navigation, structures and antennas.
- What materials will you use to make your model spacecraft? Find recycled objects to construct your spacecraft.
- What tools will you need to build your spacecraft? Make a list.
- Will you be able to test the aerodynamics of your spacecraft? How?



Students will then create a model of the spacecraft using the materials they have collected and display them in the classroom. You may want to use a [template](#) which can be used to make scale spacecraft models.

### Research project - Spacecraft

Students will explore the DART spacecraft in more detail and respond to the following research questions to create a profile on the spacecraft.

- Who created the spacecraft?
- When was it created?
- What size is it?
- What is the purpose of the spacecraft? Briefly summarise the mission
- Imagine you are the creator and write a paragraph explaining why you created the spacecraft.
- How has the spacecraft helped people and our understanding of space?
- Include photographs and diagrams in your research.

## Activity: Quiz

1. What do all asteroids orbit?

- A. Earth
- B. Sun
- C. Moon

2. What does DART stand for?

- A. Double Asteroid Redirection Test
- B. Double Asteroid Redirection Target
- C. Dual Asteroid Redeployment Test

3. How many asteroids are in the Didymos asteroid system?

- A. 1
- B. 2
- C. 10

4. What is the aim of the DART mission?

- A. To change an asteroid's motion
- B. To break up an asteroid into pieces
- C. To take a sample from an asteroid

5. The asteroid that the DART mission targeted is NOT a threat to Earth.

- A. True
- B. False

1. What is the diameter of the Dimorphos asteroid?

- A. 17 metres
- B. 170 metres
- C. 1.7 kilometres

2. What telescope was involved in the DART mission?

- A. Hubble Space Telescope
- B. James Webb Space Telescope
- C. All of the above

3. How far away from Earth was the Dimorphos asteroid when it was hit by the DART spacecraft?

- A. 111 kilometres
- B. 1 million kilometres
- C. 11 million kilometres

4. What is a rocky object that orbits the sun?

- A. Asteroid
- B. Comet
- C. Meteor

10. Where is the asteroid belt located?

- A. Between Mercury and Venus
- B. Between Pluto and Neptune
- C. Between Mars and Jupiter

11. What species was wiped out by an asteroid 65 million years ago?

- A. Dinosaur
- B. Woolly mammoth
- C. Tasmanian tiger

Quiz Answers:

1B, 2A, 3B, 4A, 5A, 6B, 7C, 8C, 9A, 10C, 11A

## Activity – Choose a project

Individually or in small groups, students will choose one of the following projects to work on and then present their findings to the class.

### Reporter for the Day

Investigate the NASA DART Mission and write a newspaper article or online news report for kids.

### 3D Model

Create a model of the DART spacecraft using recycled materials. Display your model in the classroom.

### True or False?

Create a true or false quiz about asteroids and test your classmates. Alternatively, create a word find or crossword.

### Make a Crater

Design and make your own crater in your classroom using these step by step [NASA instructions](#) (YouTube).

## 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

- [NASA releases detailed views of DART mission smashing into asteroid from James Webb, Hubble telescopes](#) – ABC News
- [Double Asteroid Redirection Test \(DART\)](#) – NASA
- [DART Fact Sheet](#) – NASA
- [NASA's 'Double Asteroid Redirection Test', or DART, has made impact with an asteroid. Here's what you need to know](#) – ABC News
- [Nasa launches world's first planetary defence mission](#) – Newsround
- [Nasa: US space agency crashes spacecraft into asteroid](#) – Newsround
- [What is the difference between a meteor, a meteorite, an asteroid and a comet?](#) – Newsround
- [Dr Karl discusses mining asteroids](#) – ABC Education
- [Meteors and Meteorites](#) – Australian Museum
- [Asteroids](#) – NASA