





## Goals

- Can read and understand the main points in a text about spatial wormholes.
- Can discuss the possibilities of space travel using a wide range of vocabulary.







## Warm up

**What do you think  
are some of the  
challenges  
involved in space  
exploration?**





## Vocabulary

spontaneous

shortcut

solar

tunnel

reality

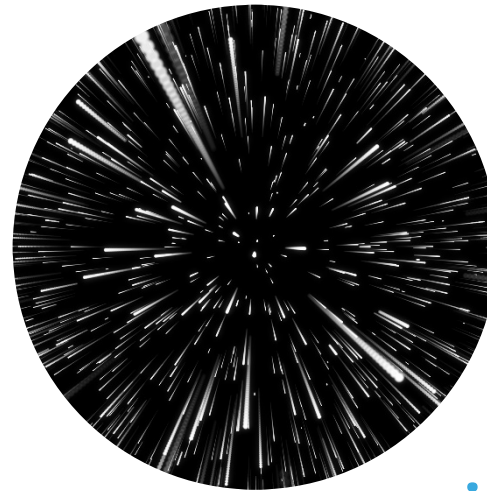
time warp

paradox

manifestations

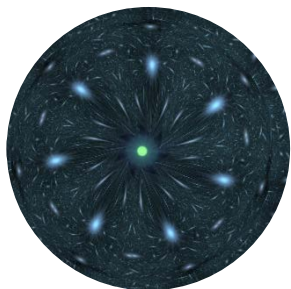
instantaneous

negative mass





## Sentences



He is a very **spontaneous** person.

**Reality** is often dependent on your point of view.



Countless stars lie beyond our **solar system**.

What came first, the chicken or the egg? Here lies a classic **paradox**.





## Sentences



The room burst into **instantaneous** applause.

There are many different **manifestations** of love.



The new **tunnel** under the city will reduce congestion significantly.

I thought you said this was a **shortcut**?





## Travelling through a wormhole

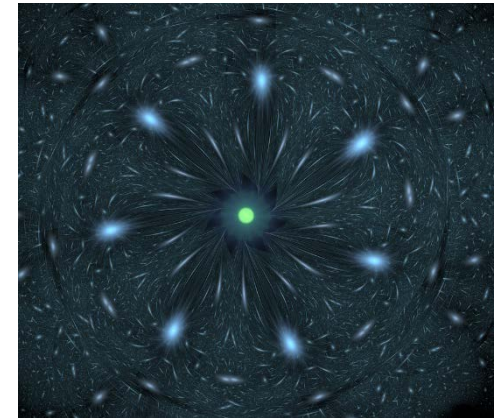
Travelling to **distant** galaxies is still in the **realm** of science fiction. Despite much progress in space exploration in previous decades, we are still only able to **traverse** the local backyard, our solar system. It has been **theorised** that the **exploration** of deep space and distant galaxies is a possibility with the use of **wormholes**.





## Travelling through a wormhole

This concept appears regularly in science fiction – characters or spacecraft moving **instantaneously** through **space-time** to reach the other side of the universe. This is a useful concept for science fiction writers, and is used as a **plot device** allowing them to keep the narrative going at a **brisk pace**. Science fiction is so much more interesting when the hero doesn't have to travel across the galaxy for thousands of **generations**. Is this incredible concept possible?



Moving instantaneously through space time could be considered a **paradox**.



## Travelling through a wormhole



Wormholes are a **theoretical** possibility – there is a chance they exist, but we do not yet know for sure. Even if these secret **interstellar passageways** exist, it seems very unlikely that we would be able to use them as highways.



## Fill in the gaps

This concept appears regularly in \_\_\_\_\_ – characters or spacecraft moving \_\_\_\_\_ through \_\_\_\_\_ to reach the other side of the universe. This is a useful concept for science fiction writers, and is used as a \_\_\_\_\_ device allowing them to keep the \_\_\_\_\_ going at a brisk pace. Science fiction is so much more interesting when the hero doesn't have to travel across the galaxy for thousands of \_\_\_\_\_.



**Fill in the gaps by scanning the text and using the vocabulary from the lesson.**

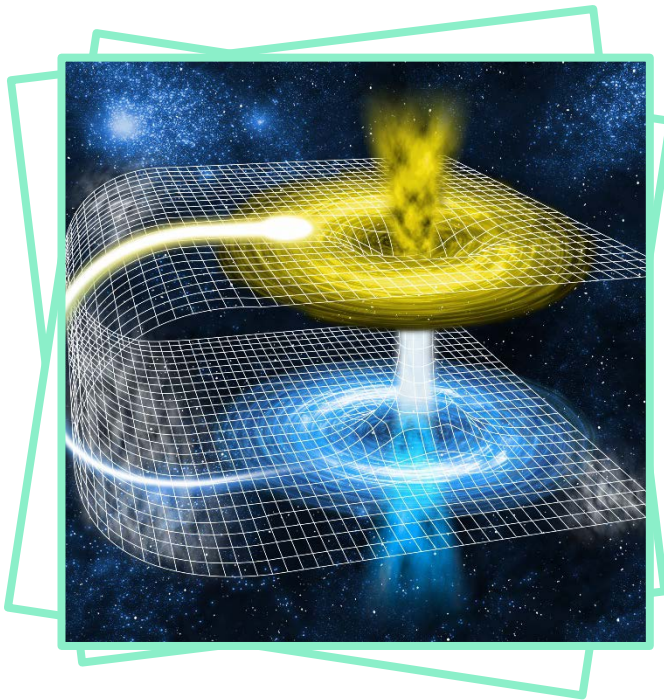


## Respond to the images

**What might some of the benefits of learning to use wormholes be for space exploration and scientific discovery?**

**Explain some of them to your teacher.**

**Use the pictures below to guide your response.**





## Wormholes: True or false?

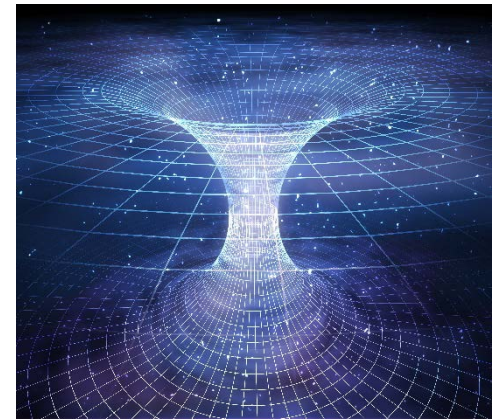
	TRUE	FALSE
1. Wormholes have been proven to exist.	<input type="checkbox"/>	<input type="checkbox"/>
2. We are currently able to explore beyond our solar system.	<input type="checkbox"/>	<input type="checkbox"/>
3. It would take thousands of generations to travel to some galaxies.	<input type="checkbox"/>	<input type="checkbox"/>
4. Einstein discovered the existence of wormholes.	<input type="checkbox"/>	<input type="checkbox"/>
5. The concept of wormholes comes up regularly in science fiction stories.	<input type="checkbox"/>	<input type="checkbox"/>
6. It seems unlikely that wormholes could be used for interstellar travel.	<input type="checkbox"/>	<input type="checkbox"/>



## Travelling through a wormhole

In simple terms, a wormhole is a tunnel which connects two different points in space. It can be thought of as a **shortcut** through space and time which could be used to **traverse** the universe.

Einstein's Theory of Relativity supports the possibility of a wormhole. He **theorised** that **gravity** is the **consequence** of a **warping** of space time – according to this theory mass **deforms** the space time in its area. The **manifestation** of a wormhole would be dependent on a body with **negative mass** which would warp space time, allowing for travel between two locations to take place.

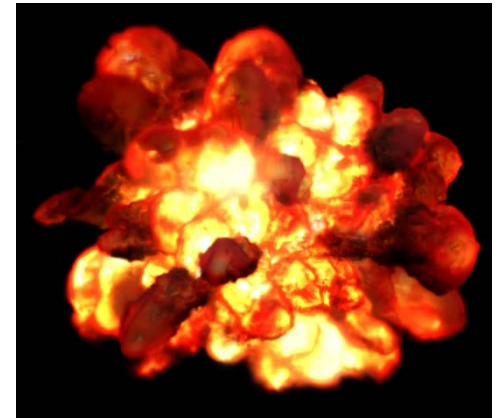




## Travelling through a wormhole

Based on our understanding of physics it does not appear that wormholes would be able to **arise** independently. They would be able to **spontaneously** appear into existence, but are also thought to be highly **unstable**. The **insertion** of any foreign matter might cause them to **collapse** in on themselves.

**Negative mass** particles have never been seen in reality, and neither have wormholes. One reason for this may be that these **spontaneous** wormholes would exist for an small length of time – only up to 30 seconds. That isn't a very long window to spot them!



Wormholes are believed to be highly unstable.



## Travelling through a wormhole

If it were to collapse after you entered, it would likely kill you. Other theories speculate that you might end up in a different time or **era**. Some theorise that a person entering a wormhole could end up in a different universe entirely. It is hard to imagine what this could lead to. The possibilities are **mind-bending** and **limitless**.



## Respond

**Give a brief response to each of the questions below.**

What theory supports the possibility of a wormhole?

How are wormholes formed?

What could happen if you were to enter a wormhole?

A vertical sheet of lined paper with a blue binding edge on the left and horizontal lines for writing. The paper is currently blank.



## Describe

Use your understanding of the article to describe what a wormhole is.



1

Explain to the teacher what a wormhole is in your own words.



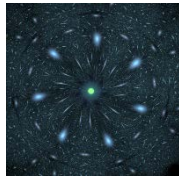
## Discuss a wormhole's effect on people

Discuss the possibilities of a wormhole if they were able to.



1

Explain to the teacher what a wormhole is in your own words.



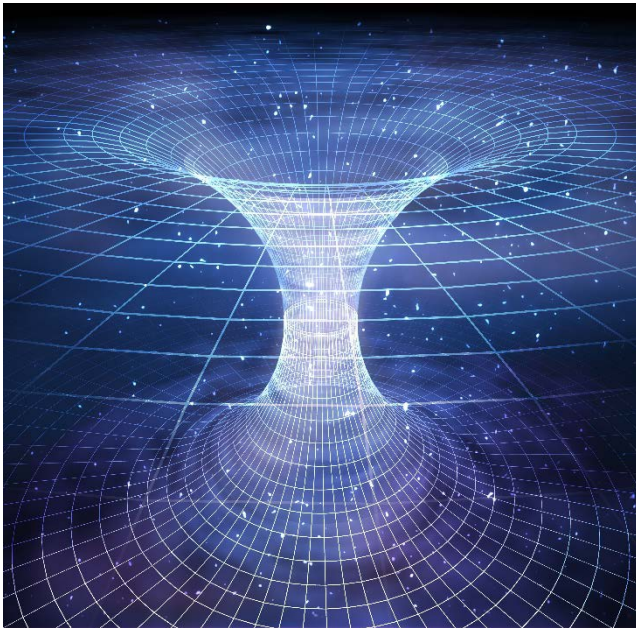
2

Discuss what could happen to a person if they entered a wormhole.



## Tell a story

**Imagine you entered a wormhole. Explain your experience based on your understanding of the article and from the previous step. Try to use your imagination and descriptive language.**



1

Explain to the teacher what a wormhole is in your own words.

2

Discuss what could happen to a person if they entered a wormhole.

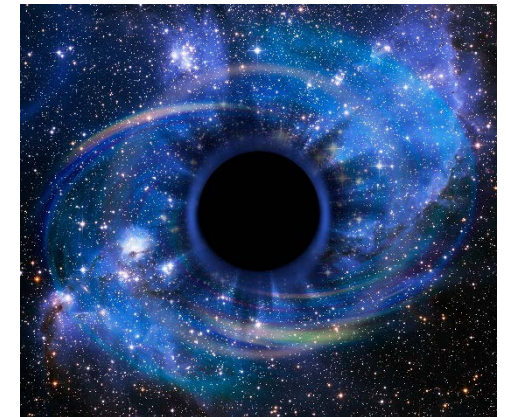
3

Share a few sentences describing your experience upon entering a wormhole.



## Travelling through a wormhole

Many more **realistic** voices claim that, considering all the **limitless possibilities** of other planets and stars, that other **lifeforms** would have learnt the possibilities of long distance space travel. Despite being able to observe a large part of the universe, there is no evidence of any alien race which has **mastered** the art of using wormholes to travel over long distances. This suggests that this **mode of travel** might just be a fantasy. The possibilities of this **phenomenon** would be endless.





## Travelling through a wormhole

Mastering the art of space travel would give us the means to explore the universe **endlessly**, **colonise** new planets and reach the next stage of human **potential**. It would **relieve** the pressures on Earth and answer many questions about the **origins** of life and our place in the universe.



Space is the next frontier in the journey of human understanding.



## Travelling through a wormhole

Despite the possibility of wormholes, it seems unlikely that they would be big enough for a spaceship, or even a person to travel through them. It does not seem possible that they would be able to **bridge the enormous distances** of the universe, or allow us to **bend reality** to reach distant corners of the galaxy. That **staggering** task is left for future generations of physicists and astronauts to consider and solve. For now, the **time warp** is a **theoretical possibility**, an interstellar highway left to the stories of science fiction.

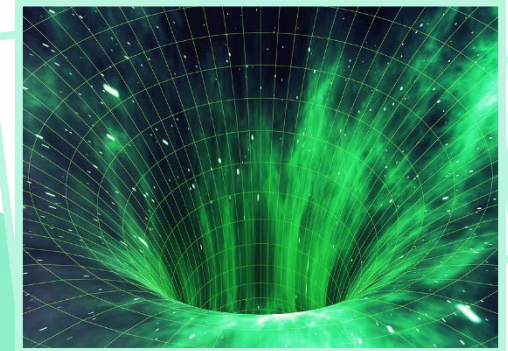


## Write a newspaper article

**A leading space agency has just discovered the actual existence of a wormhole in the solar system.**

**Write a short newspaper article about the discovery using your expert knowledge on the subject.**

A wormhole has just been discovered...





## Plan a story

Read the beginning of the science fiction story below.

Talk to your teacher about what could happen next.  
What might some of the risks be if Captain Hursey steers the ship into the wormhole?

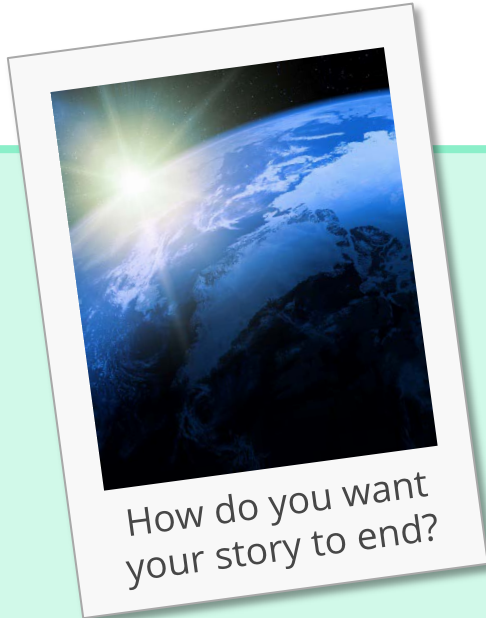
//

Our spaceship, the T356, was hurtling through space. Captain Hursey was unsure what to do. I looked at the rest of the crew – things were desperate. We were lost in the Selvan 478 galaxy, had taken damage in the asteroid storm and an unknown spacecraft had been pursuing us for some hours. Suddenly, a wormhole appeared before us... //





## Writing a story



It's time to write a short science fiction story.

Continue writing, taking the last slide as the starter for your story.

Science fiction stories often use a lot of descriptive vocabulary and have a spirit of adventure. What might the spaceship's crew find in the wormhole?

Try to use the vocabulary below in your tale.

instantaneous  
spontaneous

tunnel  
shortcut

time warp  
negative mass

manifestation  
reality



# Dictogloss

Your teacher is going to read to you.  
Write down what you hear them say.



abc





## Reflect on the goals

Go back to the second slide of the lesson and check if you have achieved all the goals of the lesson.

yes

no




## Reflect on this lesson

Think about everything you have seen in this lesson.  
What were the most difficult activities or words? The easiest?



\_\_\_\_\_

\_\_\_\_\_



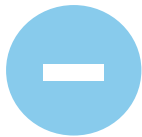
\_\_\_\_\_

\_\_\_\_\_



\_\_\_\_\_

\_\_\_\_\_



\_\_\_\_\_

\_\_\_\_\_

If you have time, go over  
the most difficult slides again





## Answer key

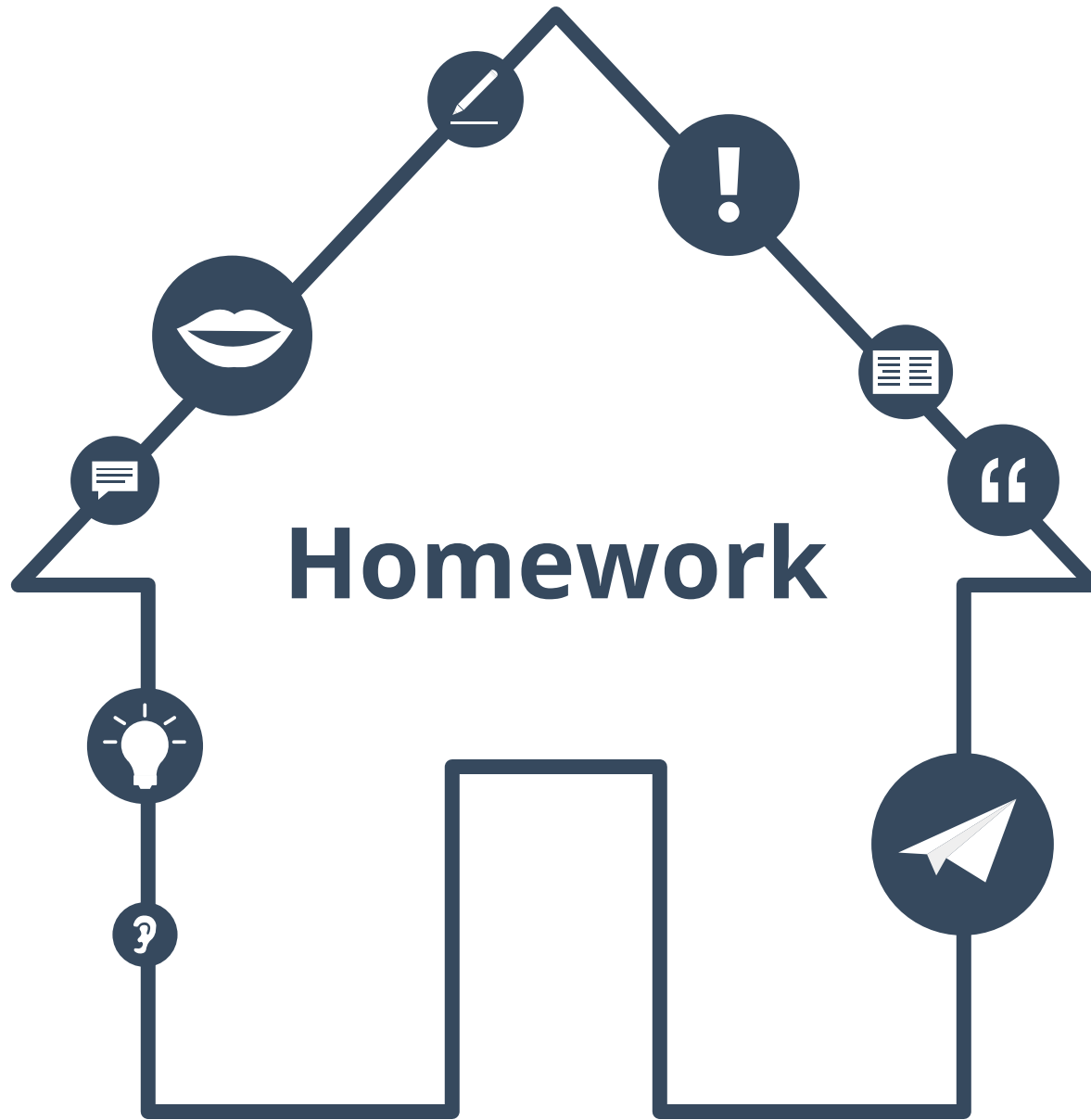
**Activity p. 1s1**  
science fiction, instantaneously, through space-time, plot, narrative, generations

**Activity p. 13**  
1. F, 2. F, 3. T, 4. F, 5. T, 6. T



## Transcription p. 27

Despite the possibility of wormholes, it seems unlikely that they would be big enough for a spaceship, or even a person to travel through them. It does not seem possible that they would be able to bridge the enormous distances of the universe, or allow us to bend reality to reach distant corners of the galaxy. That staggering task is left for future generations of physicists and astronauts to consider and solve. For now, the **time warp** is a theoretical possibility, an interstellar highway left to the stories of science fiction.





# Unscramble the sentences

A

Some theorise that a person entering a wormhole could...

It has been theorised that the exploration of deep space and...

The insertion of any foreign matter might...

Mastering the art of space travel would give us the means to explore the universe...

Despite being able to observe a large part of the universe, there is no evidence of any alien...

Even if these secret interstellar passageways exist...

B

...endlessly, colonise new planets and reach the next stage of human potential.

..., it seems very unlikely that we would be able to use them as highways.

...distant galaxies is a possibility with the use of wormholes.

...race which has mastered the art of using wormholes to travel over long distances.

...cause them to collapse in on themselves.

...end up in a different universe entirely.



## Write a speech

Summarise your learning from the lesson by writing a short speech on the theory of wormholes to present to your science class. Use the questions below to guide your response.

- 1) Where does the theory come from?
- 2) What dangers are presented by wormholes?
- 3) Is it likely that wormholes would actually help us travel through space?

<input type="radio"/>	
<input type="radio"/>	1)
<input type="radio"/>	
<input type="radio"/>	
<input type="radio"/>	
<input type="radio"/>	2)
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<input type="radio"/>	
<input type="radio"/>	3)
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