

LO: To understand how sound waves and light waves react differently in space.

<https://www.bbc.co.uk/bitesize/topics/zdrrd2p/articles/zxymp39> - enter this address into your computer.

Read the information below and watch the short video highlighted in yellow then answer the questions.

Do Waves Hold the Secrets of Space?

Imagine that you're just about to take your first spacewalk. As you go through the hatch, the International Space Station (ISS) is moving at around 17,000 miles per hour. The earth's surface is 250 miles below you.

You're sweating, and your heart is hammering loudly. The voices of your crew crackle on the radio. But outside of your spacesuit, everything's quiet. There's **no noise at all**.

So what's the story here traveller? Light travels across space, but what about sound?

Tim Peake and Fran Scott explain why you can't hear anything in space. Archive: ESA, NASA

1. When astronauts are spacewalking, they can hear voices of their crew on the radio, but what could be heard outside the spacesuit?
2. What sorts of things make the noises in the ISS?
3. What would happen if an alarm clock went off in space?
4. Explain, from what you have learnt from the video, how sound is made.

Now, read the following information and answer questions 5-8.

The Story of Star Light

Although sound waves can't travel in space, light waves can. That's why everything we know about the Universe comes from light.

Light travels at an amazing 299,792 kilometres per second. It can go seven-and-a-half times around the world in one second. But even at this speed, it takes light over 100,000 years to travel across our galaxy alone. The entire Universe is so big that many stars are already dead by the time their light reaches us.

Scientists have discovered that each star has its own unique light reading. Even though we could never visit them, we can use their light to study them. Written in the starlight is information about a star's age, surface temperature and the direction it's heading.

Astronomers have used light to reveal even more about space. They have discovered alien worlds, the age of our Universe and even the forces at play around a black hole. In short, light is helping us unlock some of space's greatest mysteries.

5. Which sorts of 'waves' can travel in a air-less environment?
6. How long does light take to travel $7\frac{1}{2}$ times around the world?
7. What might have happened to many stars by the time the light reaches us and we see them?
8. What three things can we learn about stars from their light?