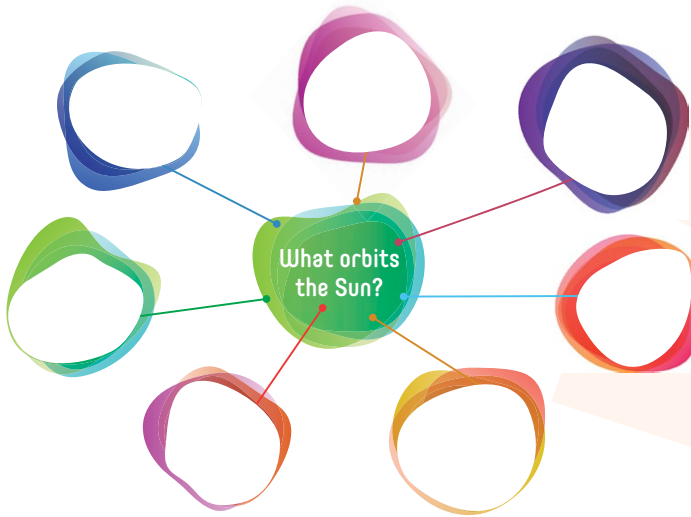




Why does the Earth move around the Sun?

01 In addition to the Earth, list the celestial objects that orbit the Sun below.



02 Read “Are you down-to-Earth?” Match the laws to their definitions.

- | | |
|-------------------------------------|--|
| 1. The first law of motion | a. Masses exert gravitational forces on one another. |
| 2. The second law of motion | b. The gravitational pull between two objects can lead one to curve. |
| 3. The law of universal gravitation | c. Moving objects don't stop. |

03 Read the text again. Write the letter of the definition next to its word.

- | | |
|-----------------------|--------------------------------|
| 1. substantiate _____ | a. no longer moving |
| 2. outweigh _____ | b. to fall sharply |
| 3. plunge _____ | c. to be heavier than |
| 4. standstill _____ | d. to prove |
| 5. hurtle _____ | e. the act of increasing speed |
| 6. acceleration _____ | f. to move with great speed |

Are you down-to-Earth?

Nowadays, we know that apples and other objects fall toward Earth due to its gravitational pull. Similarly, this same force keeps the planets orbiting the Sun. The explanations and the varying effects on the different masses can be found in several crucial laws of physics.

Firstly, Isaac Newton's law of universal gravitation proved that two masses exert a pull on one another. First **substantiated** on Earth, the law also comes into play in outer space since the celestial bodies in our Solar System are attracted to one another. However, as the Sun is millions of times more massive than the Earth, its influence on the Earth **outweighs** that of the Earth on the Sun.

Unlike the apple that **plunged** straight to Earth, the planets stay in space, orbiting the Sun. This comes from Newton's first law, which states that an object in motion stays in motion. Since the Earth is already propelled forward, it won't just come to a **standstill**. Instead, it continues accelerating. Were it not for the Sun, we would be **hurtling** into space. Newton's second law of motion states that the mutual gravitational pull of the Earth on the Sun causes the centripetal, or circular, **acceleration** of our planet around the Sun. As much as the Earth may try to jerk forward, it cannot go in a straight line, as it is tugged back toward the Sun, thus maintaining a continuous orbit.

04 With a classmate, think of a popular movie that theorizes about the impact of a heavenly body with Earth. Discuss the questions below.

- › In the movie, what object impacts or will impact our planet?
- › According to the movie, how does the impact affect Earth and its orbit?
- › What happens to life on Earth?





05 Read the sentences. Match the underlined words to their meanings.

a. future possibility

b. weak possibility

c. formal request for permission

d. strong possibility

e. informal request

f. polite request

1. It's very possible that my favorite professor will offer his astronomy class again next year.
2. I might take the astronomy class next year if there is space.
3. I can take an astronomy class next year as there is space.
4. Could you answer some questions I have about Newton?
5. Professor Adam, may I present a counterargument?
6. Hey, Eric! Can I ask you about that scientist guy?

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06 Complete the blanks with the best word to complete them. Create two sentences more of your own.

1. Hi Katie! _____ you help me study for the physics test?
2. Teacher, _____ I get your advice on my essay?
3. Grandma, _____ you give me advice on my essay?
4. It's extremely likely that we _____ go to the science museum next month.
5. It's somewhat likely that we _____ go to the science museum next month.
6. It's possible that we _____ go to the science museum next month.
7. _____
8. _____



07 Design an experiment for NASA that will prove Newton's law of gravity as it applies to the pull of the Sun on the Earth.



08 With a classmate, act out a role-play in which one of you is Isaac Newton and the other is a geocentrist. Brainstorm some arguments for your role.

Newton's arguments

Geocentrist's arguments

