

Contents



1. The Solar System
2. Fractions
3. Exploring Electricity
4. What is an Ecosystem?
5. Do you Want to Be an Explorer?
6. Learning Magic with Gandalf the Grey
7. Exploring the World of Dinosaurs
8. Building Robots with WALL-E
9. Bodies are Cool
10. How to tell a story
11. The Science of Baking
12. Building Miniature Models with Geppetto



1. The Solar System

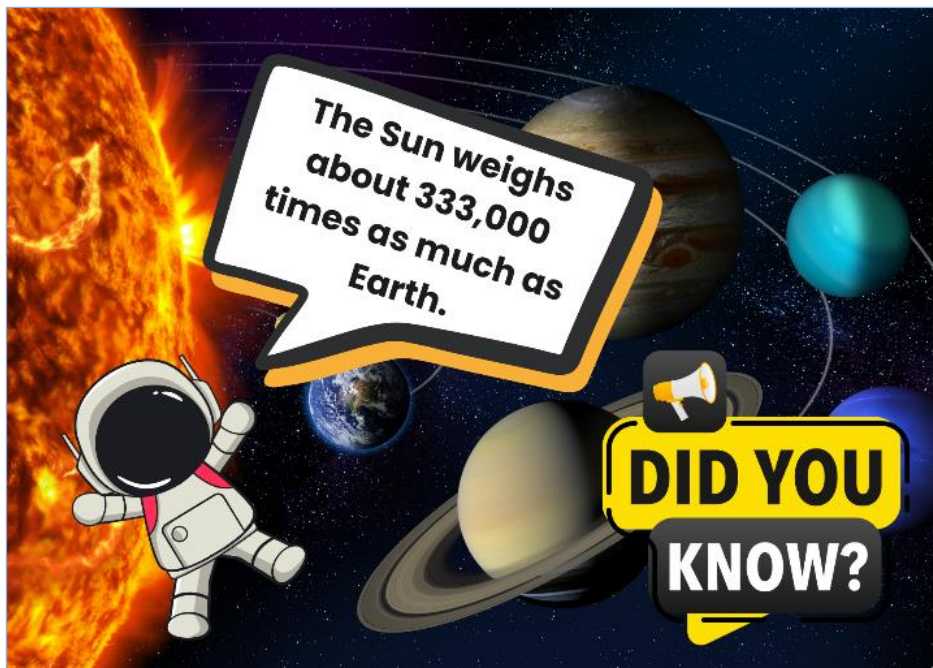
Key Vocabulary:

1. **Solar System:** The Sun and everything that orbits around it, like planets and moons
2. **Moons:** Objects that orbit planets
3. **Asteroids:** Small rocks that move around the Sun, mainly between Mars and Jupiter



Introduction: The solar system has the Sun, planets, moons and asteroids.

Body: The Sun provides light and heat for life on Earth. There are eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune. Each planet has unique features; for example, Saturn has rings, Jupiter is the largest planet, and Mars is known as the Red Planet. Studying the solar system helps us learn about space and the chance of life on other planets.



Conclusion: Learning about the solar system helps us understand space and find out if there could be life on other planets.



1. The Solar System

Discussion Questions:

1. Why is the Sun important for life on Earth?
2. If you could visit any planet, which would it be and why?
3. How is studying a solar system help us to learn about the universe?

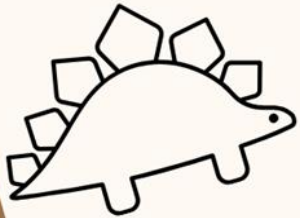
Critical Thinking Question:

Imagine discovering a new planet. What would you name it and why?

Example Sentence : I would name it _____ because...

Example Answer : I would name it Aqua because it is blue and looks like a sea!

Draw your pet
dinosaur!



JUNIOR DEBATE

Intermediate | 중급





Contents

1. Roller Coasters: The Science Behind the Thrills
2. Cooking Chemistry
3. The Linguistic Jungle: The Evolution of languages
4. Marie Curie: A Pioneer in Science and Innovation
5. Building Wonders:
How Geometry Shapes Amazing Architecture
6. The World of Video Game Design
7. Exploring Marine Biology: Creatures of the Deep Sea
8. The Art of Animation: Bringing Characters to Life
9. The fascinating World of Astronomy:
Exploring the Universe
10. The World of Robotics: Technology and Innovation
11. The Marvels of Paleontology: Discovering Ancient Life
12. The Magic of Music: Exploring Musical Instruments



1. Roller Coasters: The Science Behind the Thrills

Key Vocabulary:

1. Potential Energy:
2. Kinetic Energy:
3. Gravity:
4. Inertia:

Roller coasters are thrilling rides that showcase fundamental physics principles. They provide excitement and demonstrate concepts like potential and kinetic energy, gravity, and inertia.



As roller coasters climb, they build potential energy, which changes to kinetic energy as they descend, propelling the ride through loops and turns. Gravity pulls the coaster down, while inertia keeps it moving along the track. Engineers design these rides to balance maximum thrill with safety, carefully calculating g-forces (**force of gravity**) and strength.

Modern roller coasters incorporate innovative elements like vertical drops and loops, showing how physics is used. Understanding the science behind roller coasters increases our appreciation of these exciting rides.



1. Roller Coasters: The Science Behind the Thrills

Discussion Questions:

1. How do engineers balance safety and excitement in roller coaster?
2. What role does gravity play in the experience of riding a roller coaster?
3. How do changes in a roller coaster's height and speed affect the forces that riders feel?

Critical Thinking Question:

If you had to divide a pizza for you and your friends, how would you do it and why?

JUNIOR DEBATE

Advanced | 고급

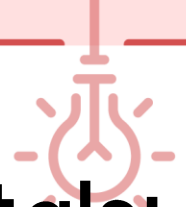


Contents



1. The Mathematics of Fractals: Nature's Hidden Patterns
2. The Language of Shakespeare: Exploring Elizabethan English
3. The Physics of Quantum Mechanics: Exploring the Quantum World
4. The Evolution of Political Thought: From Plato to Modern Democracy
5. The Chemistry of Nanomaterials: Small Particles, Big Implications
6. The Sociology of Globalization: Understanding Cultural Integration
7. The Evolution of Animation: From Celluloid to CGI
8. The Psychology of Emotions: Understanding Human Behavior
9. The Ecology of Rainforests: Biodiversity Hotspots
10. The History of Ancient Civilizations: From Mesopotamia to Rome
11. The Exploration of Outer Space: Beyond Earth's Boundaries
12. The Impact of Climate Change: Global Challenges and Solutions





1. The Mathematics of Fractals: Nature's Hidden Patterns

Key Vocabulary:

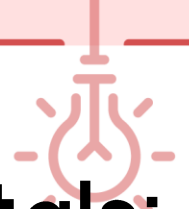
1. Fractals:
2. Recursive Equations:
3. Self-Similarity:
4. Fractal Dimension:
5. Iteration:

Fractals are intricate patterns found in nature and mathematics, appearing in forms like coastlines, snowflakes, and tree branches. They reveal complexity through simple geometric rules.



Mathematicians study fractals using recursive equations, where patterns repeat at various scales. The Mandelbrot set (**infinite complexity with consistent patterns at every scale**) illustrates infinite complexity with self-similarity. Key concepts include iteration (repeating patterns), self-similarity (consistent pattern at different scales), and fractal dimension (quantifying complexity). Applications extend to computer graphics for realistic landscapes and biology for structures like blood vessels.

Fractals connect art, nature, and science, unveiling hidden patterns that deepen our understanding of the universe. They highlight the intricate relationship between mathematical theory and natural phenomena.



1. The Mathematics of Fractals: Nature's Hidden Patterns

Discussion Questions:

1. How do recursive equations and iteration create fractal patterns in nature and mathematics?
2. What are some applications of fractal geometry in fields like computer graphics and biology?
3. Why is understanding fractals important in appreciating the complexity of natural phenomena?

Critical Thinking Question:

If you could create a new fractal pattern, what parts would it incorporate and how would you describe its self-similarity?