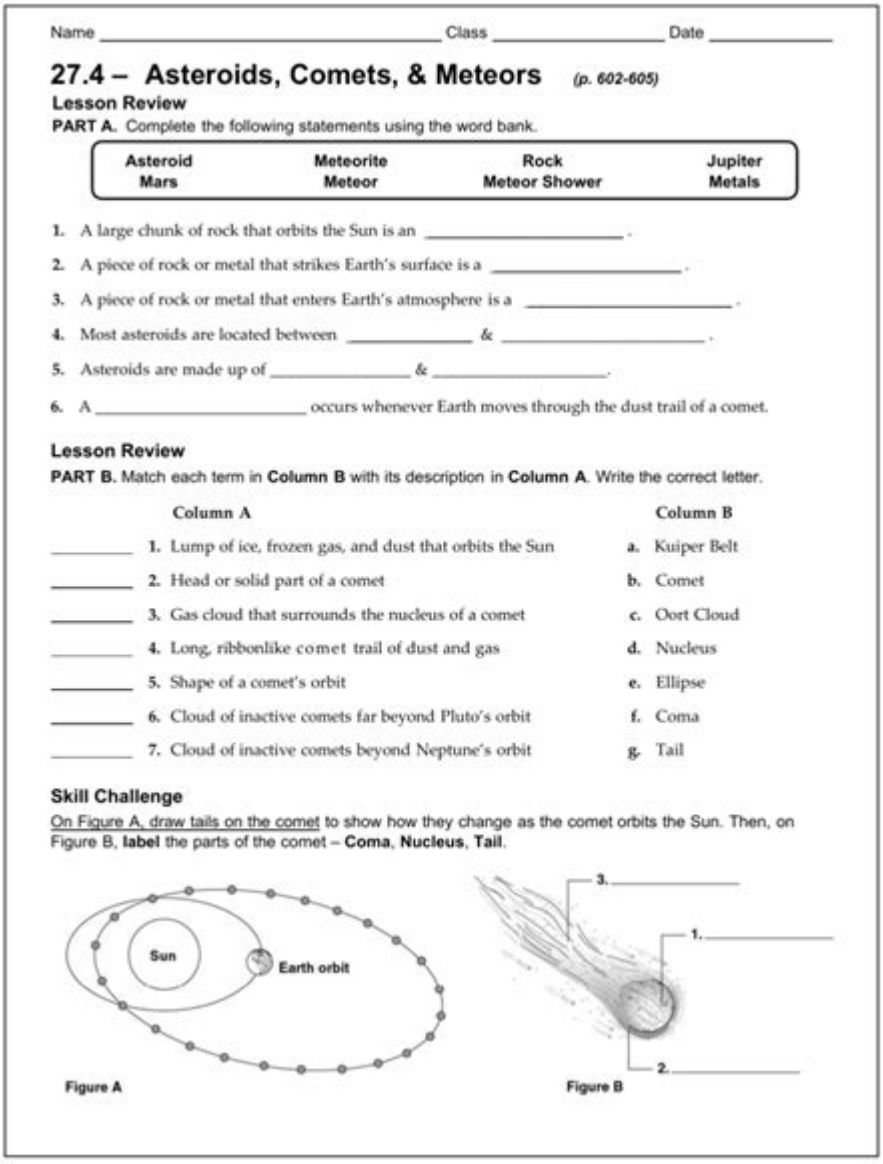
Comets Asteroids And Meteors Worksheet



Name _____ Class _____ Date _____

27.4 – Asteroids, Comets, & Meteors *(p. 602-605)*

Lesson Review

PART A. Complete the following statements using the word bank.

Asteroid	**Meteorite**	**Rock**	**Jupiter**
Mars	**Meteor**	**Meteor Shower**	**Metals**

1. A large chunk of rock that orbits the Sun is an _____.
2. A piece of rock or metal that strikes Earth's surface is a _____.
3. A piece of rock or metal that enters Earth's atmosphere is a _____.
4. Most asteroids are located between _____ & _____.
5. Asteroids are made up of _____ & _____.
6. A _____ occurs whenever Earth moves through the dust trail of a comet.

Lesson Review

PART B. Match each term in **Column B** with its description in **Column A**. Write the correct letter.

Column A	Column B
_____ 1. Lump of ice, frozen gas, and dust that orbits the Sun	a. Kuiper Belt
_____ 2. Head or solid part of a comet	b. Comet
_____ 3. Gas cloud that surrounds the nucleus of a comet	c. Oort Cloud
_____ 4. Long, ribbonlike comet trail of dust and gas	d. Nucleus
_____ 5. Shape of a comet's orbit	e. Ellipse
_____ 6. Cloud of inactive comets far beyond Pluto's orbit	f. Coma
_____ 7. Cloud of inactive comets beyond Neptune's orbit	g. Tail

Skill Challenge

On Figure A, draw tails on the comet to show how they change as the comet orbits the Sun. Then, on Figure B, **label** the parts of the comet – **Coma**, **Nucleus**, **Tail**.

Comets, Asteroids, and Meteors Worksheet

Understanding the cosmic bodies that populate our solar system is crucial for students and enthusiasts of astronomy. Among these celestial objects, comets, asteroids, and meteors play significant roles in our understanding of the universe. This article will provide a comprehensive worksheet that educates readers about these fascinating entities, detailing their characteristics, origins, and importance in the solar system. We will also present engaging activities to enhance learning and comprehension.

What Are Comets?

Comets are icy bodies that release gas or dust. They are often described as "dirty snowballs" because

they are composed primarily of ice, dust, and other organic compounds. When a comet approaches the Sun, it heats up and begins to emit gas and dust, forming a glowing coma and sometimes a tail.

Characteristics of Comets

1. Nucleus: The solid core of a comet, typically a few kilometers in diameter, made up of ice, rock, and dust.
2. Coma: The nebulous envelope around the nucleus, which can extend thousands of kilometers into space.
3. Tail: Comets often have two tails—a dust tail and an ion tail. The dust tail is made of small particles that reflect sunlight, while the ion tail consists of charged particles swept away by solar wind.

Types of Comets

Comets can be classified into several categories based on their orbits:

- Short-period comets: These comets have orbits that return to the Sun in less than 200 years. An example is Halley's Comet.
- Long-period comets: These have orbits that take more than 200 years to complete, often originating from the Oort Cloud.
- New comets: These are comets that are observed for the first time and may have unpredictable orbits.

What Are Asteroids?

Asteroids are rocky, airless remnants left over from the early formation of our solar system about 4.6 billion years ago. They mainly reside in the asteroid belt between Mars and Jupiter, though they can be found throughout the solar system.

Characteristics of Asteroids

1. Composition: Most asteroids are made up of rock and metal, with some containing carbon, silicon, and other elements.
2. Size: Asteroids vary in size, from a few meters to hundreds of kilometers in diameter.
3. Shape: Unlike planets, asteroids often have irregular shapes due to their small size and lack of significant gravitational force.

Types of Asteroids

Asteroids are classified into several categories:

- C-type (carbonaceous): These are the most common and are rich in carbon and other minerals.
- S-type (silicaceous): Composed primarily of silicate materials and metals, these asteroids are less common than C-types.
- M-type (metallic): These asteroids are composed mainly of metal, particularly nickel and iron.

What Are Meteors?

Meteors are the streaks of light produced when meteoroids—small particles from comets or asteroids—enter the Earth's atmosphere and burn up due to friction with the air. If a meteoroid survives its passage through the atmosphere and lands on the Earth, it is referred to as a meteorite.

Characteristics of Meteors

1. Speed: Meteors travel at incredibly high speeds, often exceeding 20 kilometers per second when entering the atmosphere.
2. Brightness: The brightness of a meteor can vary considerably, with some producing bright flashes that can be visible over great distances.
3. Duration: Most meteors last only a few seconds as they burn up in the atmosphere.

Types of Meteors

- Sporadic meteors: These meteors appear randomly throughout the year and are not associated with any particular meteor shower.
- Meteor showers: These occur when the Earth passes through a trail of debris left by a comet. Notable meteor showers include the Perseids, Leonids, and Geminids.

Importance of Comets, Asteroids, and Meteors

Understanding comets, asteroids, and meteors is essential for several reasons:

1. Scientific Research: Studying these celestial bodies can provide insights into the early solar system's formation and evolution.
2. Resource Potential: Asteroids are believed to contain valuable resources, such as metals and water, which could be mined for use in space exploration.
3. Planetary Defense: Monitoring asteroids and meteoroids helps protect Earth from potential impacts that could cause significant damage.

Activities for Learning

To enhance understanding of comets, asteroids, and meteors, here are some suggested activities:

1. Create a Model of a Comet

Materials Needed:
- Balloons
- Water
- Dirt or sand
- Small pebbles
- Tape

Instructions:
- Inflate a balloon and tie it off.
- Mix water, dirt or sand, and small pebbles in a bowl to create a "comet" mixture.
- Cover the balloon with the mixture and let it freeze.
- Once frozen, remove the balloon to reveal your comet model.

2. Meteor Shower Observation

Materials Needed:
- A clear night
- A comfortable spot to lie down
- A star chart or meteor shower calendar

Instructions:
- Check the meteor shower calendar for peak viewing times.
- Find a dark area away from city lights.
- Lie back and look up at the sky, marking the meteors you see on a sheet of paper.

3. Research Project on Asteroids

Instructions:
- Choose an asteroid to research.
- Gather information about its size, composition, orbit, and any missions that have visited it.
- Present your findings in a creative format, such as a poster or PowerPoint presentation.

Conclusion

Comets, asteroids, and meteors are captivating objects that enrich our understanding of the cosmos. Through studying their characteristics, origins, and impact on our solar system, we can appreciate the complexity of the universe. By engaging in hands-on activities and research, learners can deepen their knowledge and foster a lifelong interest in astronomy. This worksheet serves as a guide to explore the wonders of these celestial bodies and their significance in the grand tapestry of space.

Frequently Asked Questions

What is the primary difference between a comet and an asteroid?

Comets are composed mainly of ice and dust, often exhibiting a glowing coma and tail when they approach the Sun, whereas asteroids are primarily made of rock and metal and do not have a tail.

How do meteors differ from meteoroids and meteorites?

Meteoroids are small rocky or metallic bodies in space, meteors are the bright streaks of light produced when meteoroids enter the Earth's atmosphere and burn up, and meteorites are the remnants of meteoroids that survive their passage through the atmosphere and land on Earth.

What role do comets play in understanding the early solar system?

Comets are considered to be primitive building blocks of the solar system, preserving clues about its early conditions and the materials that formed planets.

What is the significance of the Kuiper Belt and Oort Cloud in relation to comets?

The Kuiper Belt is a region beyond Neptune that contains many icy bodies, including short-period comets, while the Oort Cloud is a distant spherical shell surrounding the solar system, believed to be the source of long-period comets.

Can asteroids pose a threat to Earth?

Yes, certain asteroids, particularly those classified as Near-Earth Objects (NEOs), have orbits that bring them close to Earth, posing a potential impact threat.

What are some famous comets that have been observed historically?

Some famous comets include Halley's Comet, which appears every 76 years, and Comet Hale-Bopp, which was visible to the naked eye in the late 1990s.

How are meteoroids classified based on their size?

Meteoroids are generally classified as small particles ranging from a grain of sand to a few meters in diameter; larger objects are classified as asteroids.

What can studying meteor showers tell us about comets?

Meteor showers occur when Earth passes through debris left by comets, allowing scientists to study the composition and behavior of these celestial bodies.

What is the process of a comet developing a tail?

As a comet approaches the Sun, the heat causes the ice to vaporize, releasing gas and dust, which forms a glowing tail that always points away from the Sun due to solar wind.

What educational activities can be included in a 'comets, asteroids, and meteors' worksheet?

Activities can include labeling diagrams, comparing and contrasting the three types of celestial bodies, conducting research on specific comets or asteroids, and calculating potential impact scenarios.

Comets Asteroids And Meteors Worksheet

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