

Members of Our Solar System



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Name: _____



UNIT CHALLENGE

The unit challenges help students explore the big picture themes that tie together each unit of challenge presents students with an open-ended task with no single correct solution. Working in _____ on.

NOTE: In order to use this activity with your class for a particular Ignite! unit, you should plan on having students study the Ignite! movies from most of the topics in that unit. Otherwise, students will not have enough information to complete the challenge activity.

- 15 minutes at the start of unit to organize students into groups and review the challenge, and for the groups to discuss and record their initial thoughts and current knowledge of the issues.
- 20 minutes at the end of the unit for student groups to complete their responses to the challenge.
- *Optional:* 20-30 minutes for student groups to present their responses to the class.

_____ : Before studying any of the unit's topics or movies:

1. divide your class into teams of 3 to 4 students;
2. reproduce the unit challenge worksheet and distribute to students;
3. decide whether teams will give oral presentations and/or written statements in response to their challenge;
4. read the challenge(s) out loud and make sure that all terms and concepts are understood;
5. ask groups to complete Part One of their worksheets (Getting Started). They should discuss and write down their thoughts, based on their current knowledge for how they might respond to the selected challenge.

_____ : Over the next few days or weeks, as you are using the Ignite! _____ occasionally remind students to record on their worksheets any information _____ movies that might help them to develop or support their response to the challenge. They should record this information in Part Two of their worksheets (Taking Notes).

_____ : Give your students 20 minutes to discuss and write up their _____ challenge. They can use the space provided in Part Three of their worksheets (Preparing _____ der allowing them to review some of the movies from the unit. Then, _____ entations of their responses (2 to 3 minutes each) and/or submit their written

Name: _____



Members of Our Solar System

Solar System Guide

Background: So far, human beings have traveled only as far as the Moon. But as new technologies for space travel are developed, it is possible that people might someday be able to travel throughout the Solar System. What might they find along the way?

Challenge: Imagine that you are leading a tour from Earth to the outer edges of our Solar System. Describe all the planets and other types of objects you might come across.

Tips:

- Remember: you're leaving from Earth and moving away from the Sun.
- Are there any objects that you could find, and even touch, before you leave Earth?
- Be sure that you describe them in the correct order.

PART ONE – Getting Started

Directions: Based on what you already know, talk with the other members of your group about how you might respond to this challenge. Write your thoughts in the box below. You can change your mind later, after you have reviewed the Ignite! movies in this unit.

Notes:

Name: _____



PART TWO – Taking Notes

Directions: As you view and discuss the Ignite! movies in this unit, be on the lookout for information that will help you develop a response to your challenge. Record that information in the box below. Use additional paper if necessary.

Notes:

PART THREE – Preparing Your Response

Directions: Depending on your teacher's instructions, work with your group to create a written or oral response to your challenge. Decide on what you want to communicate, and be sure to support your statements with evidence from the Ignite! movies. Use the space below for your response. Use additional paper if necessary.

Notes:



1. Our Solar System and the Inner Planets

Class: _____

Type Instruction: Whole Class

Learning Objective(s): Students know the names and key characteristics of the inner planets.

Length of time: 10 Minutes

Ignite! Movies:

- Differences in Distances
- Inner Planets

Teacher Instructions: Play Ignite! movies with students and complete the following activity.

Part One: Students take notes from Ignite! movies.

Part Two: Students take notes to use in class discussion.

Target Vocabulary/Key Terms:

- *crust*
- *outer planets*
- *revolution*
- *inner planets*
- *planet*
- *rotation*

Notes:



Name: _____



Inner Planets

Directions: Fill in the blank portions of the following chart.

| |
|---|
| Mercury |
| Position from the Sun: _____ Period of Rotation: 58.6 Earth days Period of Revolution: 87.9 Earth days Temperature Range: _____ Other Features: Mercury has no atmosphere. |
| Venus |
| Position from the Sun: 2nd Period of Rotation: 243 Earth days Period of Revolution: 224.7 Earth days Temperature Range: 462°C Other Features: _____ |
| Earth |
| Position from the Sun: _____ Period of Rotation: 23.93 Earth hours Period of Revolution: 365.26 Earth days Temperature Range: _____ Other Features: Earth supports life and has liquid water. |
| Mars |
| Position from the Sun: 4th Period of Rotation: 24.6 Earth hours Period of Revolution: 686.98 Earth days Temperature Range: -133°C to 20°C Other Features: _____ |

Discussion Question

Directions: As a class, discuss the following:

- How are the inner planets similar to one another?
- What might be causing this similarity?

Use the space below to make notes before and during the discussion.



#2. Outer Planets of Solar System

Class: _____

Type Instruction: Whole Class

Learning Objective(s): Students know the names and key characteristics of the outer planets.

Length of Time: 10 Minutes

Ignite! Movies:

- Touring the Outer Planets
- Outer Planets

Teacher Instructions: Play Ignite! movies with students and complete the following activity.

Part One: Students complete sequencing activity.

Part Two: Students work in a group to create an advertisement they will present to the class. Teacher may want to assign a group to each of the outer planets, to make sure all planets are covered.

Target Vocabulary/Key Terms:

NA

Notes:



Name: _____



Outer Planets

Directions: Finish placing the outer planets in their correct sequence from the Sun (closest to the left, farthest to the right), and state one important fact about each.

- Neptune
- Saturn
- Uranus

| Name of Planet | Jupiter | | | | Pluto |
|----------------|--------------------------------|--|--|--|--------------------------------|
| Important Fact | Jupiter has at least 16 moons. | | | | Pluto has an elliptical orbit. |

Galactic Tour

Directions: The Outer Planet Tourism Bureau (O.P.T.B.) has asked you and your group to write a short radio advertisement urging people to take a Galactic Tour to one of the outer planets. What fascinating features will you emphasize to get people to visit? Be prepared to present your advertisement to the class.



#3. Pluto and Dwarf Planets

Class: _____

Type Instruction: Whole Class

Learning Objective(s): Students understand how and why Pluto was redefined as a dwarf planet.

Length of Time: 10 Minutes

Ignite! Movies:

- Change Some Definitions
- Dwarf Planet Pluto

Teacher Instructions: Play Ignite! movies with students and complete the following activity.

Part One: Students describe the new defining criteria for planets.

Part Two: Students write a persuasive argument for Pluto's reclassification.

Target Vocabulary/Key Terms:

- *classification*
- *dwarf planet*
- *gravity*
- *mass*
- *orbit*
- *outer planets*
- *planet*
- *satellite*
- *solar system*

Notes:





Name: _____

Change Some Definitions

Directions: List and describe the three criteria for a celestial body to be a planet.

1. _____

2. _____

3. _____

Arguing for Reclassification

Directions: Incorporating scientific vocabulary, write a brief persuasive argument to the scientific community about why Pluto should be reclassified as a dwarf planet.



4. Origin of Solar System

Class: _____

Type Instruction: Whole Class

Learning Objective(s): Students understand two theories of how our solar system was created: the planetesimal theory and the nebular theory.

Length of Time: 10 Minutes

Ignite! Movies:

- Formation of the Solar System
- The Nebular Theory

Teacher Instructions: Play Ignite! movies with students and complete the following activity.

Part One: Students create a caption explaining how the solar system began according to the nebular theory.

Part Two: Class discussion question about the nebular theory.

Target Vocabulary/Key Terms:

- *gravity*
- *nebular theory*
- *planetesimal theory*
- *nebula*
- *planetesimal*
- *solar system*

Notes:



Name: _____



The Nebular Theory

Directions: Fill in the caption so that Mister Bighead, as Mike Methodical, explains how the solar system began according to the nebular theory. Do not try to explain the whole theory, just select one part of it that you think is important.



The Nebular Theory

Directions: As a class, discuss the following:

- According to the nebular theory, what role did gravity play in forming our solar system?

Use the space below to make notes before and during the discussion.



Class: _____

Type Instruction: Whole Class

Learning Objective(s): Students understand layers and key characteristics of the Sun.

Length of Time: 10 Minutes

Ignite! Movies:

- Layers of the Sun
- Solar Storms

Teacher Instructions: Play Ignite! movies with students and complete the following activity.

Part One: Note taking activity.

Part Two: Class discussion questions.

Target Vocabulary/Key Terms:

- *chromosphere*
- *corona*
- *solar flare*
- *solar wind*
- *core*
- *photosphere*
- *solar prominence*
- *sunspot*

Notes:



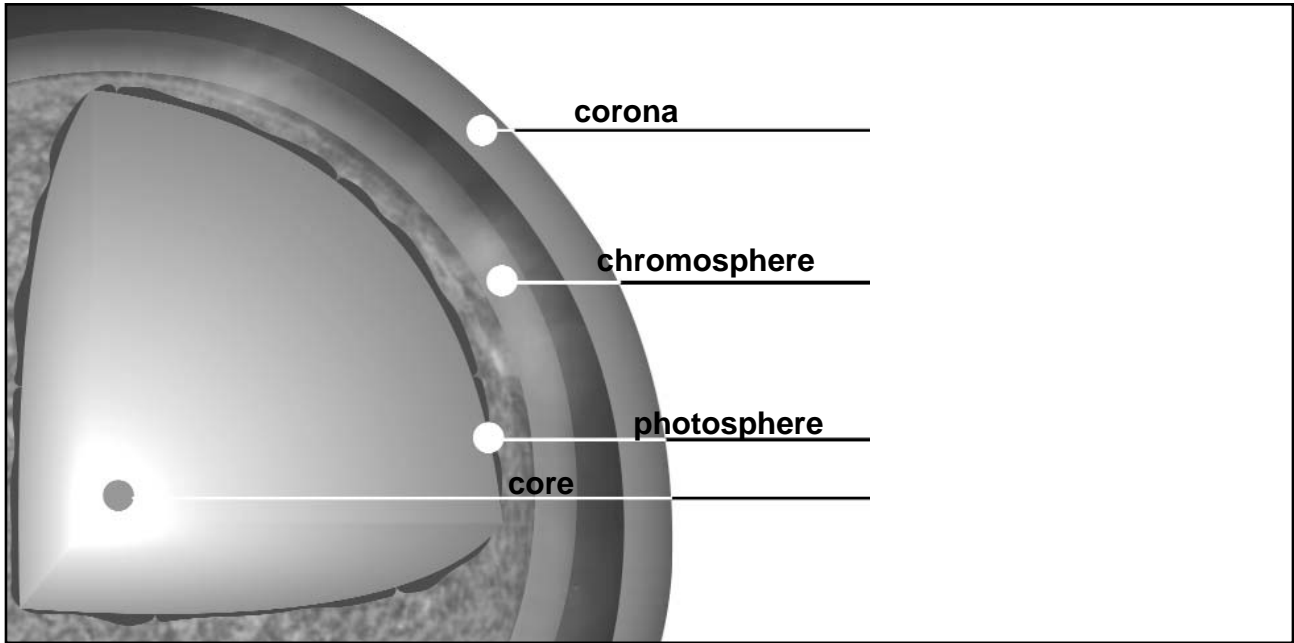


Name: _____

The Sun

Directions: List one key fact for each of the four layers of the Sun in the diagram below.

1. **chromosphere:**
2. **photosphere:**
3. **corona:**
4. **core:**



Sizing Up the Sun

Directions: As a class, discuss the following: the Sun is a million times the size of Earth!

- What does it mean to be a million of something?
- How much money is a million pennies?

Use the space below to make notes before and during the discussion.



Class: _____

Type Instruction: Whole Class

Learning Objective(s): Students understand key characteristics of comets.

Length of Time: 10 Minutes

Ignite! Movies:

- Comets Flying By
- Characteristics of Comets

Teacher Instructions: Play Ignite! movies with students and complete the following activity.

Part One: Students create a caption explaining comets.

Part Two: Class discussion questions.

Target Vocabulary/Key Terms:

- *coma*
- *elliptical*
- *orbit*
- *tail*
- *comet*
- *nucleus*
- *Oort cloud*

Notes:

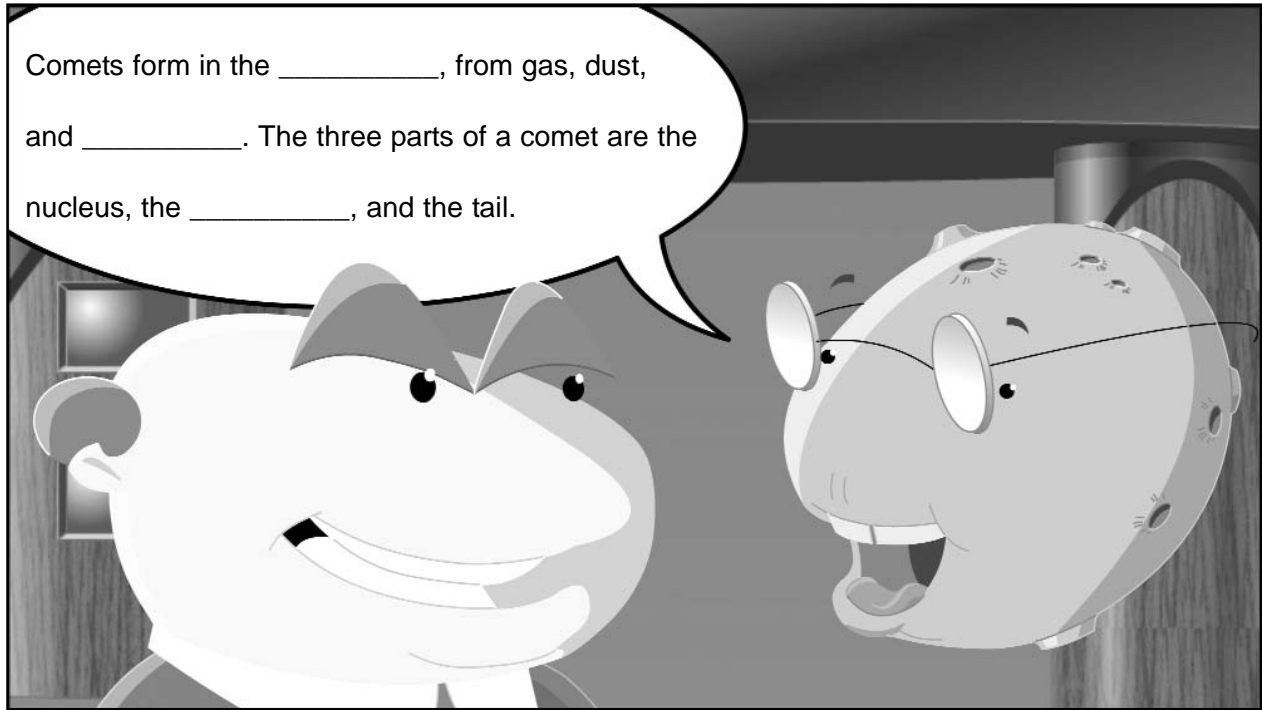


Name: _____



Comets

Directions: Fill in the word balloon so that Hubble explains comets to Mr. Bighead.



Talking about Comets

Directions: As a class, discuss the following questions:

- When a comet swings by Earth, which part of the comet makes it visible to us?
- Why do you think so?

Use the space below to make notes before and during the discussion.



#7. Meteors and Asteroids

Class: _____

Type Instruction: Whole Class

Learning Objective(s): Students understand the key characteristics and motions of meteors and asteroids.

Length of Time: 10 Minutes

Ignite! Movies:

- Asteroids and Meteoroids
- Asteroids and Meteoroids Song

Teacher Instructions: Play Ignite! movies with students and complete the following activity.

Part One: Students use information from Ignite! movies to complete the chart.

Part Two: Students use information from Part One to fill in the rhyming words to complete the phrases.

Target Vocabulary/Key Terms:

- *asteroid*
- *asteroid belt*
- *meteor*
- *meteorite*
- *meteoroid*

Notes:



Name: _____



Meteors and Asteroids

Directions: Define each of the terms listed below:

| |
|---|
| 1. asteroid: a chunk of rock and metal that orbits the Sun and is smaller than _____ |
| 2. meteoroid: the name given to an asteroid which breaks free of the _____ and fly through space |
| 3. meteor: a meteorite that enter Earth's _____ |
| 4. meteorite: a meteor that hits Earth's surface, leaving a hole called a _____ |

Guess the Rhyming Word!

Directions: Fill in the blanks with the rhyming word you think explains the following terms. Then, as a class, say the following rhyme several times as a mnemonic device for the differences between asteroids, meteoroids, meteors, and meteorites.

When an asteroid leaves the asteroid belt
"meteoroid" is its new name,
we call it "meteor" when it enters Earth's atmosphere,
lighting the sky like _____,
and when a meteor hits Earth's surface,
crashing and ending its flight,
the name we give to the part
that lands here is _____.



#8. Comets, Meteors, and Asteroids

Class: _____

Type Instruction: Whole Class

Learning Objective(s): Students understand the key characteristics and motions of comets, meteors, and asteroids.

Length of time: 10 Minutes

Ignite! Movies:

- Objects in our Solar System
- Celestial Objects

Teacher Instructions: Play Ignite! movies with students and complete the following activity.

Part One: Students create a caption for the illustration

Part Two: Students complete statements with rhyming words.

Target Vocabulary/Key Terms:

NA

Notes:

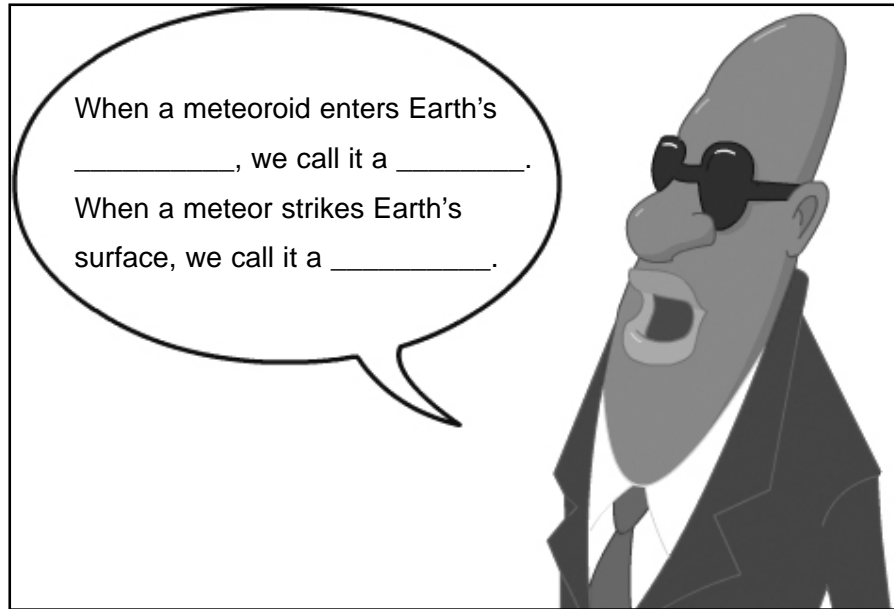


Name: _____



Comets, Meteors, and Asteroids

Directions: Fill in the blanks in the word balloon below.



Guess the Rhyming Word!

Directions: Fill in the blanks with the rhyming word you think explains the following terms. Then, as a class, say the following rhyme several times as a mnemonic device for the differences between comets and asteroids.

Comets orbit the sun
in a long elliptical _____,
but asteroids are less elliptical
and orbit together in a group.



#9. Space Exploration

Class: _____

Type Instruction: Whole Class

Learning Objective(s): Students understand key developments and missions in the history of space exploration.

Length of time: 10 Minutes

Ignite! Movies:

- Exploring Space
- Super Spacecraft

Teacher Instructions: Play Ignite! movies with students and complete the following activity.

Part One: Students complete a timeline.

Part Two: Students use their opinions and facts from Ignite! movies for discussion.

Target Vocabulary/Key Terms:

- *artificial satellite*
- *space shuttle*
- *space station*

Notes:





Name: _____

Space Exploration

Directions: Fill in the blanks to complete the timeline below on how different spacecraft advanced space exploration.

| Year | Spacecraft | Advancement in Space Exploration |
|------|------------|---|
| 1957 | _____ | First artificial satellite |
| 1969 | _____ | Neil Armstrong and Buzz Aldrin became the first humans to walk on the moon. |
| 1973 | Skylab | This _____ allowed astronauts to live for months at a time in space. |
| 1986 | _____ | This Soviet space station was used by American astronauts as well as Russian _____. |

Benefits of Space Exploration

Directions: As a class, discuss the following: the media pieces discuss specific benefits humans gain from space exploration, such as the improvements satellites have brought to weather forecasts and communication technology.

- Besides specific technological benefits, do you think space exploration benefits humans?
- How so?

Use the space below to make notes before and during the discussion.