**University of Arkansas**

**College of Education**

**Lesson Plan Format**

**COE Course**

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| **Unit Title: Astronomy** | **Lesson Title: Asteroids, Meteors, and Comets** |
| **Subject Area: Science** | **Grade Level:    6th Grade** |

1. **Pre-assessment and Planning**

Students have already had multiple lessons on asteroids, meteors, and comets. This lesson will use whole class instruction and cooperative learning games to increase student understanding of these astronomy concepts.

Cooperative learning groups will be organized by table groups in order to prevent large disparities in learning ability.

* adjust teacher talk when explaining activity to increase comprehensibility (face the students, pause frequently, speak at a moderate speed)
* decrease details needed to learn main concepts
* reduce length of assignment
* pair verbal directions with visual clues
* provide additional examples

1. **Objective(s)**

ESS 10.6.6 Comets/Meteors/Asteroid- Compare and contrast comets, meteors, and asteroids by size, orbits, nucleus, mass.

* + I will be able to categorize comets, meteors, and asteroids by examining their size, orbits, nucleus, and mass.

1. **Assessment** 
   * Observe groups demonstrating the activity to make sure the concepts are understood.
   * Engage in questioning during the cooperative activity
   * Review the Venn Diagram completed previously

**Venn Diagram Worksheets:**

**http://www.asc-csa.gc.ca/pdf/edu\_astro-teachers\_differences.pdf**

**http://www.asc-csa.gc.ca/pdf/edu\_astro-students\_differences.pdf**

1. **Engaging the Learner**

Model how to play the meteor, asteroid, and comet board game.

Play the following song a few times during the game:

<http://www.youtube.com/watch?v=Rg_UJoyMHcs>

**How can we tell the difference between celestial bodies?**

By examining their size, orbits, nucleus, and mass, we can determine what type of celestial body we are examining.

**Why is it important to know about the objects in our solar system?**

These objects give clues to the history of the solar system and the universe. They represent potential resources for space travel. They pose potential threats to life on Earth.

* Connect future learning to past knowledge- relative positioning, phases of the moon, measuring space distance and speed

1. **Methods, Activities and Resources**

**Methods**

* Whole class instruction- during the introduction, Prezi presentation, and closure
* Cooperative groups- playing the meteor game
* Closure
  + Review of lesson referring to the objectives
    - I will be able to categorize comets, meteors, and asteroids by examining their size, orbits, nucleus, and mass.
  + Solicit summary of learning from students/feedback to students
  + Preview of next lesson- Science Test

**Activities**

* Engaging the learner- 7 min
* Distribute materials Board game and cards/set up science notebook- 3 min
* Meteor, Asteroid, and Comet Game- 25 min
* Reading review

**Resources**

* Computer/Microsoft Office/Internet/overhead camera/projector
* Resources for classroom use and to extend content knowledge and pedagogy
* Links:

<http://www.youtube.com/watch?v=Rg_UJoyMHcs>

* Printed handouts
  + **http://www.asc-csa.gc.ca/pdf/edu\_astro-teachers\_differences.pdf**
  + **http://www.asc-csa.gc.ca/pdf/edu\_astro-students\_differences.pdf**

1. **Potential Adaptations to the Lesson {PAL}**

* Technology fails- Utilize the whiteboard to outline the instructions and give the presentation using printed materials and the overhead projector
* Material grasped or completed faster or slower than expected- If slower than expected, remove or delay the cooperative game in the lesson. If the lesson is faster than expected, allow the students to play the meteor game and rotate roles on who is the Galactic Questioner.

1. **Collaboration**

* This lesson was made with coordination from my mentor teacher.

What is a comet made out of?

1. *ice, gas, rock, and dust*
2. rock and metal
3. metal and ice

Where do comets come from?

a. comet belt

*b. the Oort cloud or the Kuiper belt*

c. the Kuiper belt or the comet belt

What are the names of the comet’s tails?

1. dust tail and gas tail
2. Oort tail and Kuiper tail
3. *Ion tail, dust tail, and gas tail*

Where does a comet’s tail always point?

* 1. towards the sun
  2. away from the Earth
  3. *away from the sun*

When does a comet get its tail?

1. when it gets close to Earth
2. *when it gets close to the sun*
3. when it gets close the comet cloud

How large can comets get?

1. 1-4 meters
2. 10-40 meters
3. 10-400meters
4. *10-4000meters*

The solid part of active comets is called

1. *coma*
2. tail

Can comets ever die out?

1. *Yes*
2. No

How many tails can comets have?

1. 1
2. 2
3. *3*

If an asteroid is observed to have a coma then it is classified as a comet

1. *true*
2. false

Short term comets take up to \_\_\_\_\_\_\_ years to orbit the sun

1. 20 years
2. 200 months
3. *200 years*

Long term comets can take up to \_\_\_\_\_\_\_ years to orbit the sun

1. 200
2. *30,000*
3. 4,000

The first person to predict an observable comet was

1. *Sir Edmund Halley*
2. Albert Einstein
3. Benjamin Franklin

The name of the famous comet that occurred in 1997 was the:

1. Halley’s Comet
2. *Hale-Bopp comet*
3. Kobe comet

Halley’s comet orbits the sun every

1. 7 years
2. *76 years*
3. 123 years

Where are most asteroids found?

1. between Jupiter and Saturn
2. between Earth and Mars
3. *between Mars and Jupiter*

How many different types of asteroids are there?

1. 1
2. 2
3. *3*

Which type of asteroid contains magnesium silicates?

1. M-type
2. *S-type*
3. C-type

Asteroids range in size from a large boulder to dwarf planets

1. *true*
2. false

Asteroids travel in

1. unpredictable orbits through the solar system
2. *predictable paths within belts*

What is an asteroid made out of?

1. ice, dust, and gas
2. *rock and metal*
3. metal and ice

Which type of asteroids contain carbon and are found in the outer belts?

1. M-type
2. *C-type*
3. S- type

The largest asteroid, Ceres, is

1. 430km in diameter
2. 756 km in diameters
3. *952km in diameter*

Some asteroids have moons

1. *True*
2. False

What is the name of a potato shaped asteroid with a moon called Dactyl?

1. Halley
2. Russet
3. *Ida*

A giant asteroid or comet was thought to cause the extinction of the dinosaurs

a. 50,000 years ago

*b. 65 million years ago*

c. 200 million years ago

A large celestial body with rock and ice is called an asteroid

*a. false*

b. true

What is the difference between an asteroid and a meteoroid?

*a. size*

b. location

c. composition

What is the smallest classification of asteroids ?

1. *10 meters*
2. 100 meters
3. 1000 meters

Which is in space?

a. meteorite

b. meteor

*c. meteoroid*

Which burns up in the atmosphere?

*A. meteor*

1. meteoroid
2. meteorite

A meteor’s size can range from

a. a car to a skyscraper

*b. a grain of sand to a boulder*

c. a pebble to a mountain

What is the largest a meteor can be?

1. 1 m
2. *10m*
3. 100m

\_\_\_\_\_\_\_\_\_\_\_\_\_ has traveled through

Atmosphere and impacts a planet’s surface

1. meteor
2. meteoroid
3. *meteorite*

Meteoroids contain ice and turn into shooting stars upon entering Earth’s atmosphere

1. true
2. *false*

\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are also called shooting stars.

1. *meteors*
2. meteorites
3. meteoroids

Meteoroids come from\_\_\_\_\_\_\_\_\_\_

1. outside of the solar system
2. old planets
3. collisions of comets and asteroids

Meteors are typically

1. *no larger than a grain of sand*
2. dog-sized rocks
3. large boulders

Meteors are often seen as

1. stars
2. particle in space
3. *streaks of light*

Meteoroids can be made of

1. rock
2. rock and ice
3. *rock and metal*

Where do meteoroids *not* occur?

1. Space
2. *Earth*
3. asteroid belts

Meteoroids have various orbits and velocities.

1. *True*
2. false