

Physical properties and motion of:

COMETS

ASTEROIDS

METERIODS

MOONS

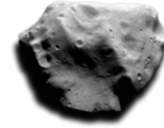
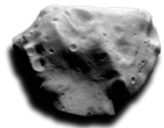
Physical properties and motion of:

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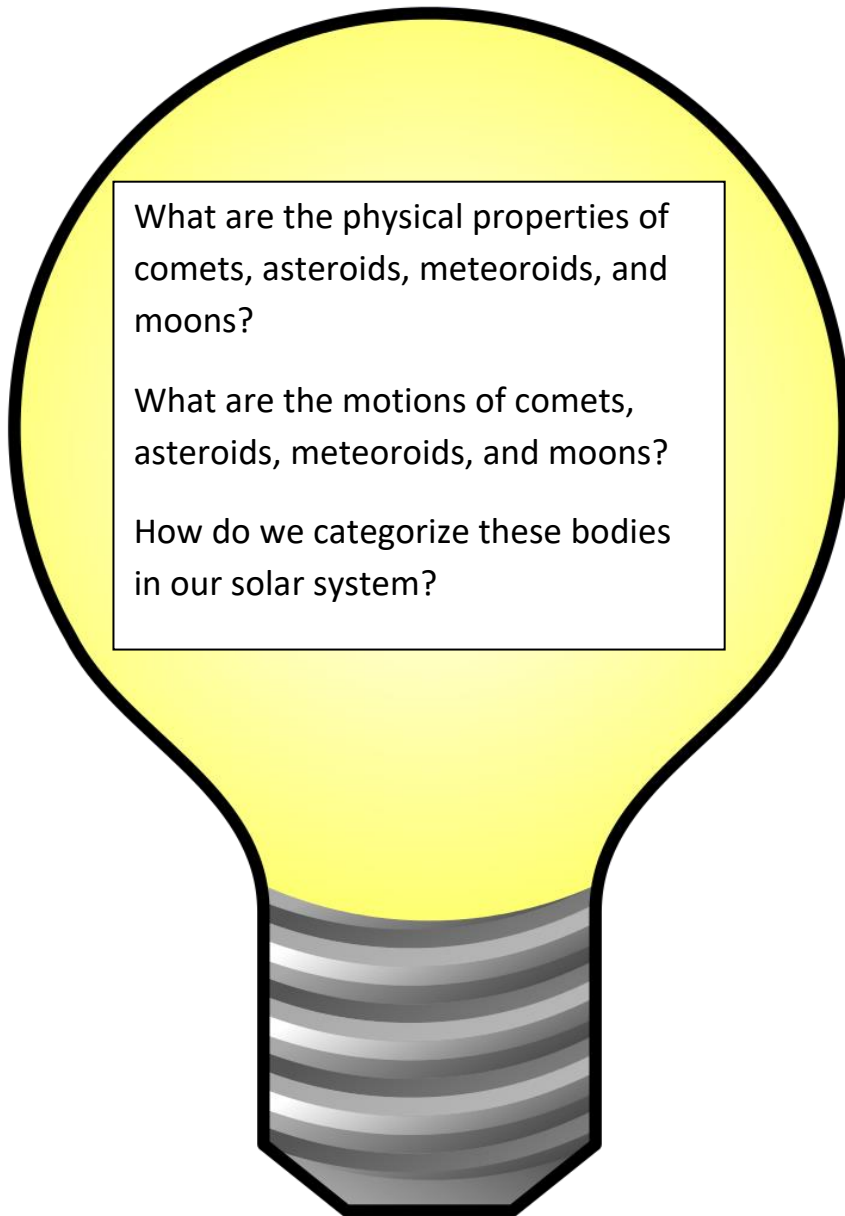
ASTEROIDS

METERIODS

MOONS



Overarching Question: What are physical properties and motion of asteroids, comets, meteoroids, and moons?

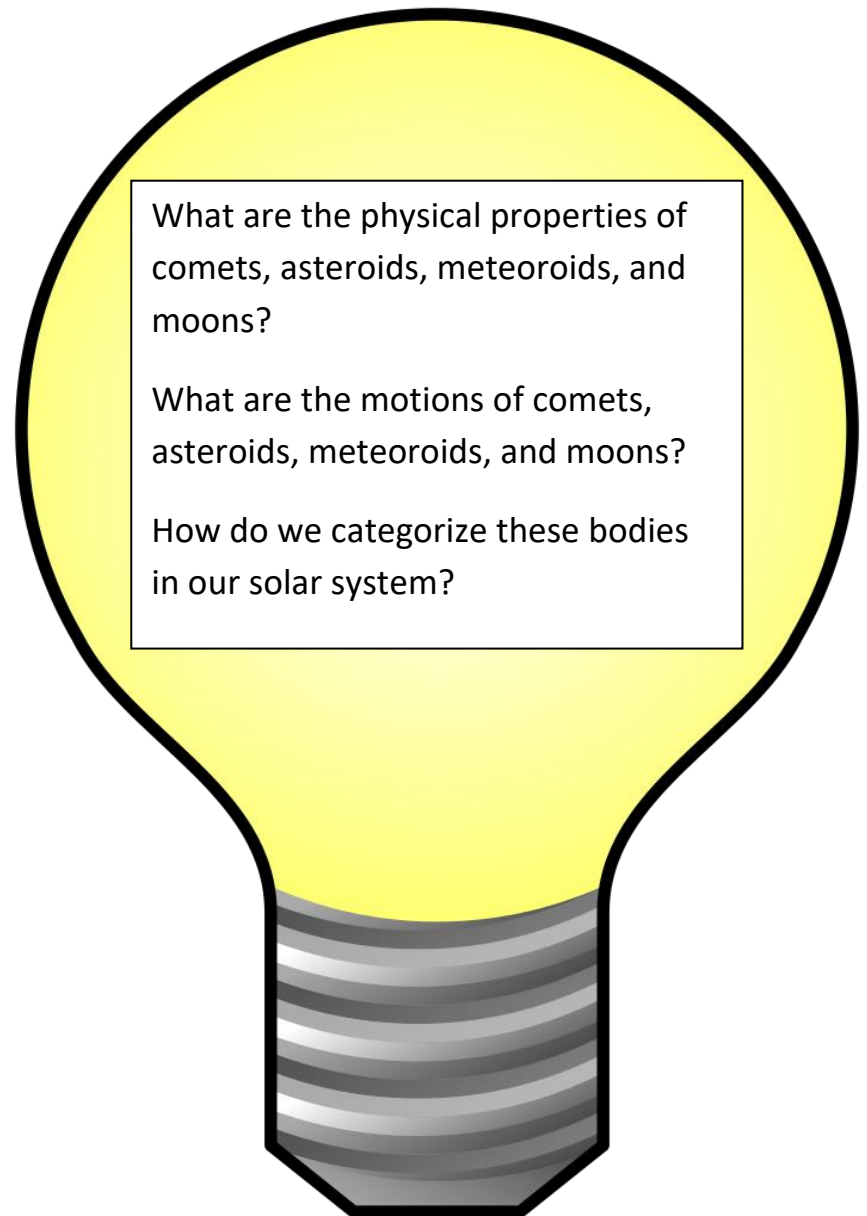


What are the physical properties of comets, asteroids, meteoroids, and moons?

What are the motions of comets, asteroids, meteoroids, and moons?

How do we categorize these bodies in our solar system?

Overarching Question: What are physical properties and motion of asteroids, comets, meteoroids, and moons?



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Line of Evidence – Graphic Organizer

We filled out the graphic organizer to challenge our knowledge about the physical properties and motions of bodies in our solar system.

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Line of Evidence – Creating Comets

Comets are made of rock, ice, and frozen gas. When they travel near the sun, their gas burns and creates a tail. The class created dirty balls of ice to represent comets in the solar system.

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Line of Evidence – Note Pages

Drawing personal pictures on our notes pages with various facts around the page helps us remember each body discussed in this unit. Drawing are detailed and facts must be accurate and discussed in the unit.

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Big Aha Thesis Statement

Bodies in our solar system, such as comets, asteroids, meteoroids, and moons, can be categorized by their physical properties and motion.

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Engage – Graphic Organizer

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Comets, Asteroids, Meteoroids, and Moons

Physical Properties	Motion

Comets, Asteroids, Meteoroids, and Moons

Motion

Physical Properties

Physical Properties	Motion

Explore – Creating Comets Lab

Materials:

1. Balloons
2. Balls of ice
3. Flour
4. Brown sugar
5. Food coloring
6. Snow cone syrup
7. Gloves
8. Styrofoam plates
9. Small Styrofoam cups
10. Spoons

Directions:

1. Gather one pair of gloves, one plate, and two cups each.
2. Once you have your ball of ice, DO NOT touch anything until you're instructed further.
3. Put on your gloves and examine the ball of ice to describe their physical properties. Think about how these properties relate to comets, asteroids, meteoroids, and moons.
4. Choose two different types of materials to use in your experiment.

5. Pour the chosen material into a cup, then return to your seat.
6. Pour the materials onto your plate then roll your ball of ice around on the plate. The materials should begin to stick to the ball of ice, giving it a colored, dirty look, like a comet.
7. Get the other two materials you did not use the first round, and pour them into your cup.
8. Put the materials on your plate and roll your ball of ice around in the materials again.
9. You may use non-sharp objects found around the classroom to chisel and indent your crater. These materials can include unsharpened pencils or the plastic spoons used to scoop out the material.
10. When you're done, clean up the materials you used, leaving only your plate and comet.
11. Complete the Creating Comets worksheet and turn it in to the teacher when it's completed.

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10. When you're done, clean up the materials you used, leaving only your plate and comet.
11. Complete the Creating Comets worksheet and turn it in to the teacher when it's completed.

Explore – Creating Comets Lab

Name: _____

Answer the following questions in complete sentences. Use your prior knowledge of comets to correctly answer the questions, only referencing the notes pages when needed.

Creating Comets

Post-experiment questions

1. What similarities and/or differences did you between the comets made in class and actual comets that we discussed before?
2. Do you think this activity was a helpful experiment for better understanding the physical properties of comets?
3. How could this activity be adapted for asteroids, meteoroids, and moons?
4. Draw a picture of what your comet looked like. Include details such as craters and colors that your crater had.
5. Name your comet and discuss how often we would be able to see this comet from the Earth. Why that many years? Where is this comet located in our solar system? Reference the comet note page if needed.

Explore – Creating Comets Lab

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Answer the following questions in complete sentences. Use your prior knowledge of comets to correctly answer the questions, only referencing the notes pages when needed.

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Explore - Creating Comets Lab CER

Claim (Write a sentence stating what physical properties and motion of bodies in our solar system are.)

Evidence (Provide specific physical properties and motion phrases about exact bodies in our solar system: comets, asteroids, meteoroids, and moons. Give details describing the physical properties and motion of these bodies in our solar system.)

Reasoning (Explain how your evidence supports your claim. Using the physical properties and motion of bodies in our solar system, categorize them based on these factors.)

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ANSWER KEY Explore – Creating Comets Lab CER

Claim (Write a sentence stating what physical properties and motion of bodies in our solar system are.)

Physical properties are descriptions of what something looks and feels like. Motion is how something moves throughout the universe

Evidence (Provide specific physical properties and motion phrases about exact bodies in our solar system: comets, asteroids, meteoroids, and moons. Give details describing the physical properties and motion of these bodies in our solar system.)

Comets are large bodies made from rock, ice, and frozen gas, asteroids are made of rocks and minerals, meteoroids are made of rock and space debris. Moons are objects that revolve around planets, while comets orbit around the sun and asteroids orbit between the sun and Jupiter, in the Asteroid Belt. The physical properties of these objects directly impact their motion.

Reasoning (Explain how your evidence supports your claim. Using the physical properties and motion of bodies in our solar system, categorize them based on these factors.)

Comets, asteroids, meteoroids, and moons are all bodies in our solar system that have different physical properties and motion. These can be categorized by being made of mainly rock, like asteroids and moons, and having a tail, like comets and meteoroids. You can categorize them by their motion, putting comets and asteroids together because they both orbit around the sun, and meteoroids and moons separately because meteoroids go everywhere in space, while moons orbit a specific object, like Earth.

ANSWER KEY Explore – Creating Comets Lab CER

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Explain – Comets Note Page

Comets

a large body in space made of rock, ice, and frozen gas

oval orbits around the sun, so they spend most of their time away from the sun.

center is called a nucleus. (made of rock and frozen gases)

When it comes near the sun, the gas burns and creates the tail.

Halley's comet can be seen from Earth every 75 years

A hand-drawn diagram of a comet. At the bottom left is a grey, irregularly shaped nucleus with several smaller grey spots inside. A long, bright orange and yellow tail extends from the nucleus towards the top right. The tail has a gradient from yellow at the base to orange at the tip. Several smaller, grey, irregularly shaped objects are scattered in the background, representing other celestial bodies. Lines connect various parts of the diagram to text labels.

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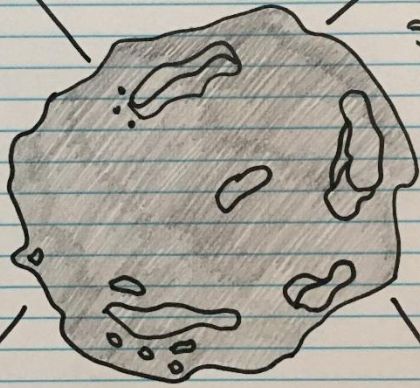
When it comes near the sun, the gas burns and creates the tail.

Halley's comet can be seen from Earth every 75 years

A hand-drawn diagram of a comet, identical to the one on the left page. It features a grey nucleus with internal spots, a long orange and yellow tail, and several smaller grey celestial bodies in the background. Lines connect the diagram to descriptive text labels.

Asteroids

a large body
in space made
of rock and
minerals.



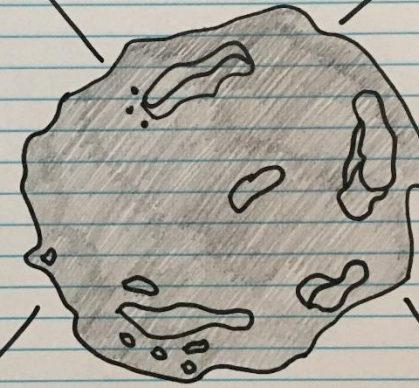
covered in
craters
From smaller
space debris
colliding
with them.

most orbit the
sun between Mars
and Jupiter in an
area called the
Asteroid Belt.

space craft
can pass
between them
without touching
anything
because they're
so far apart
from each other.

Asteroids

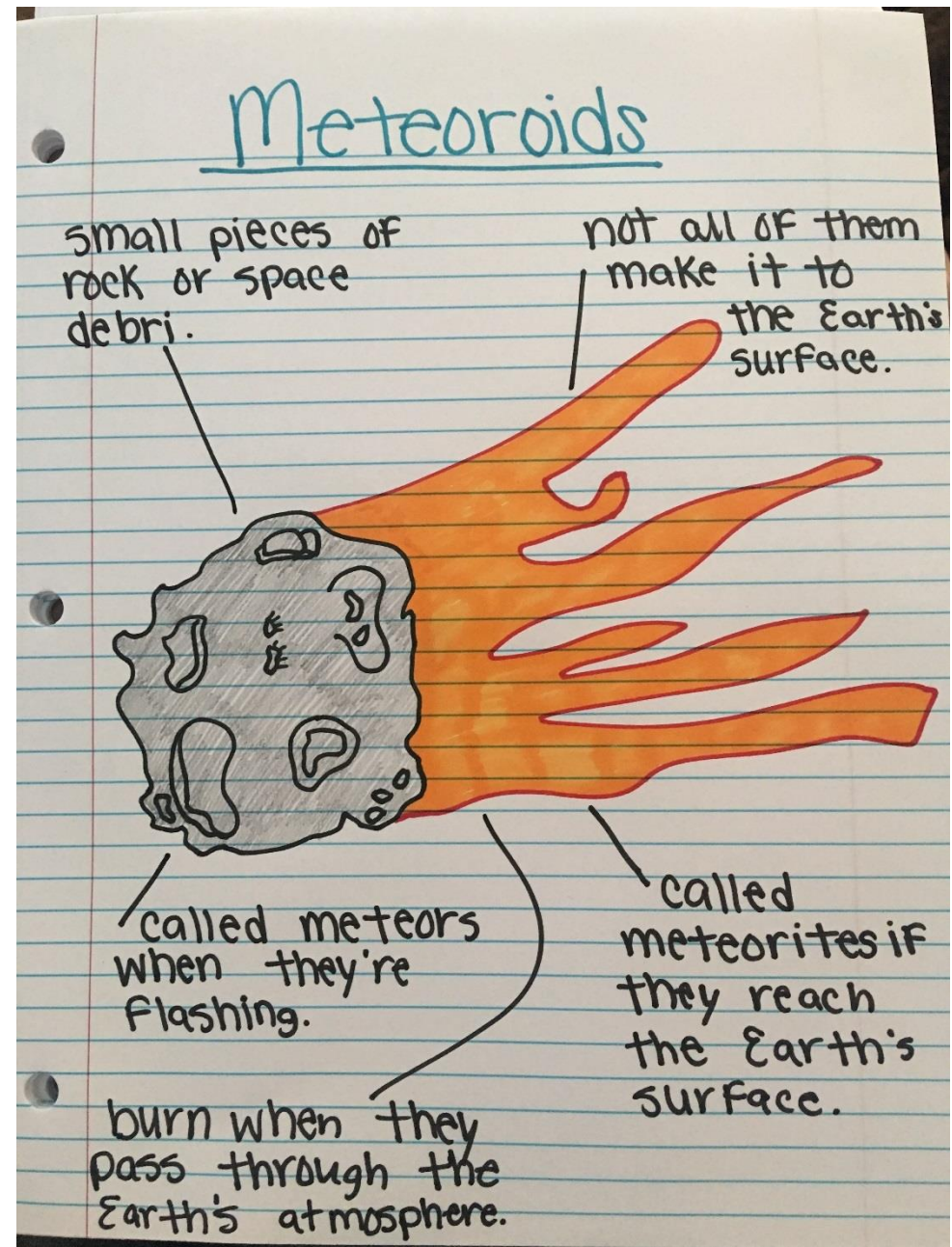
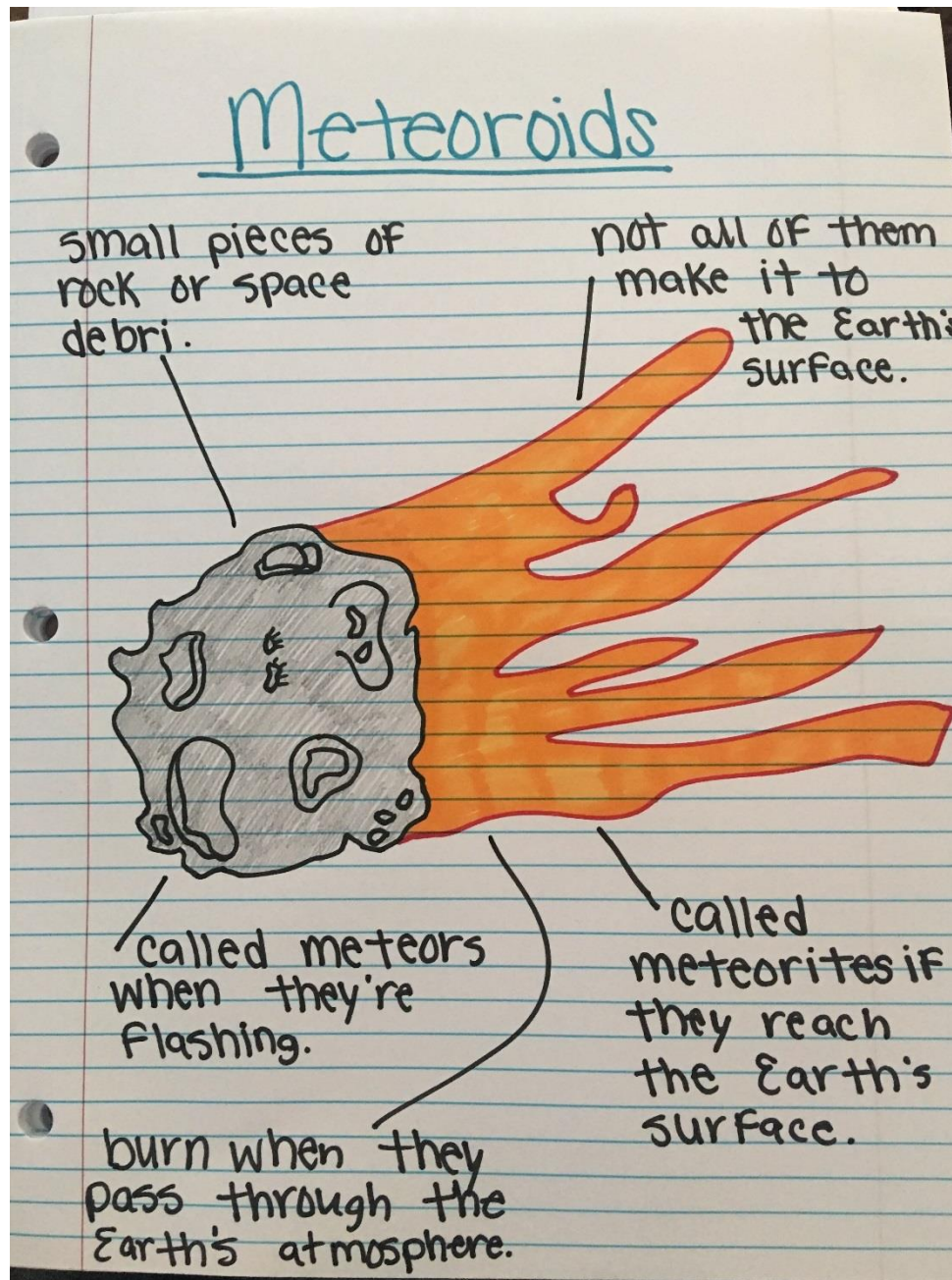
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minerals.



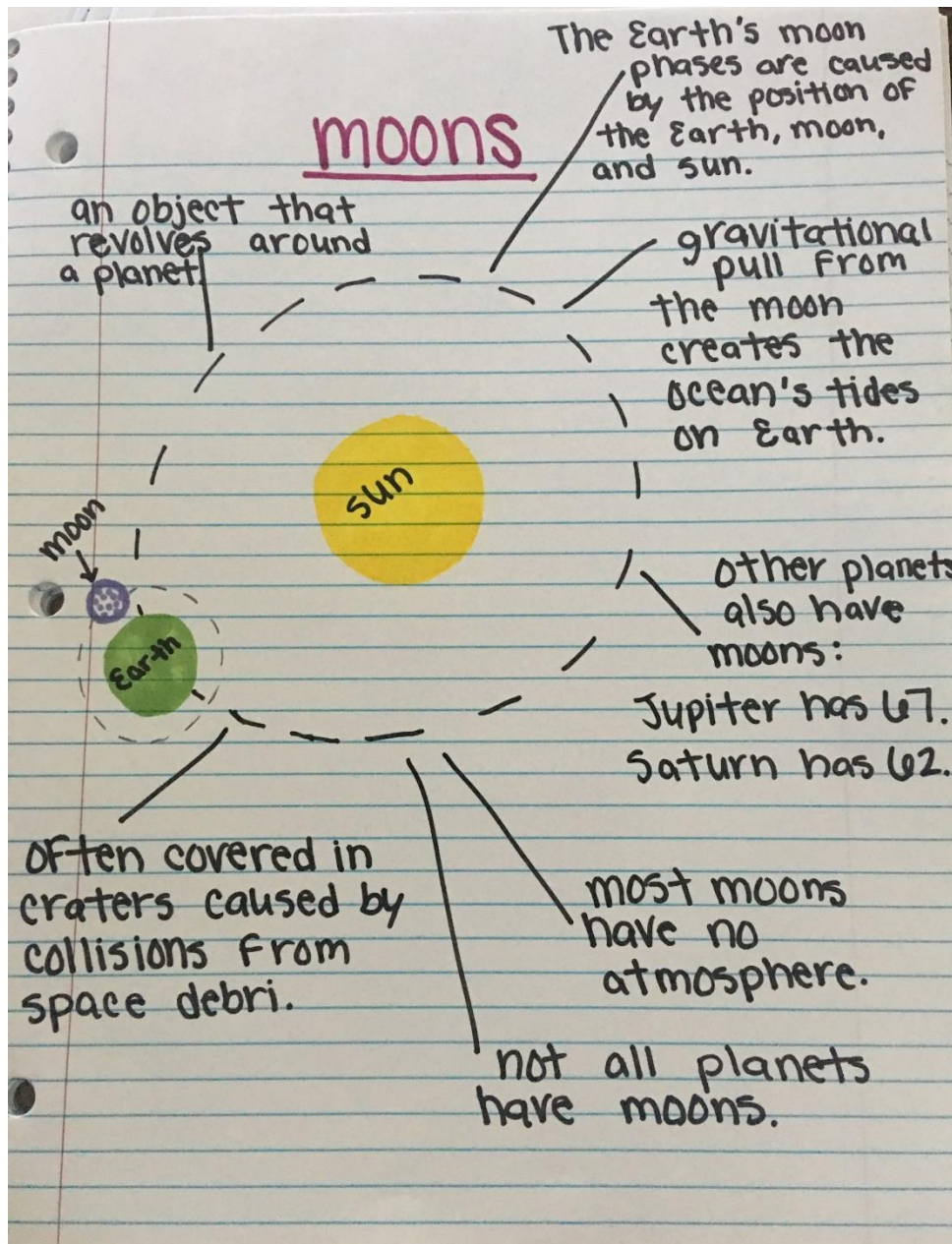
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From smaller
space debris
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with them.

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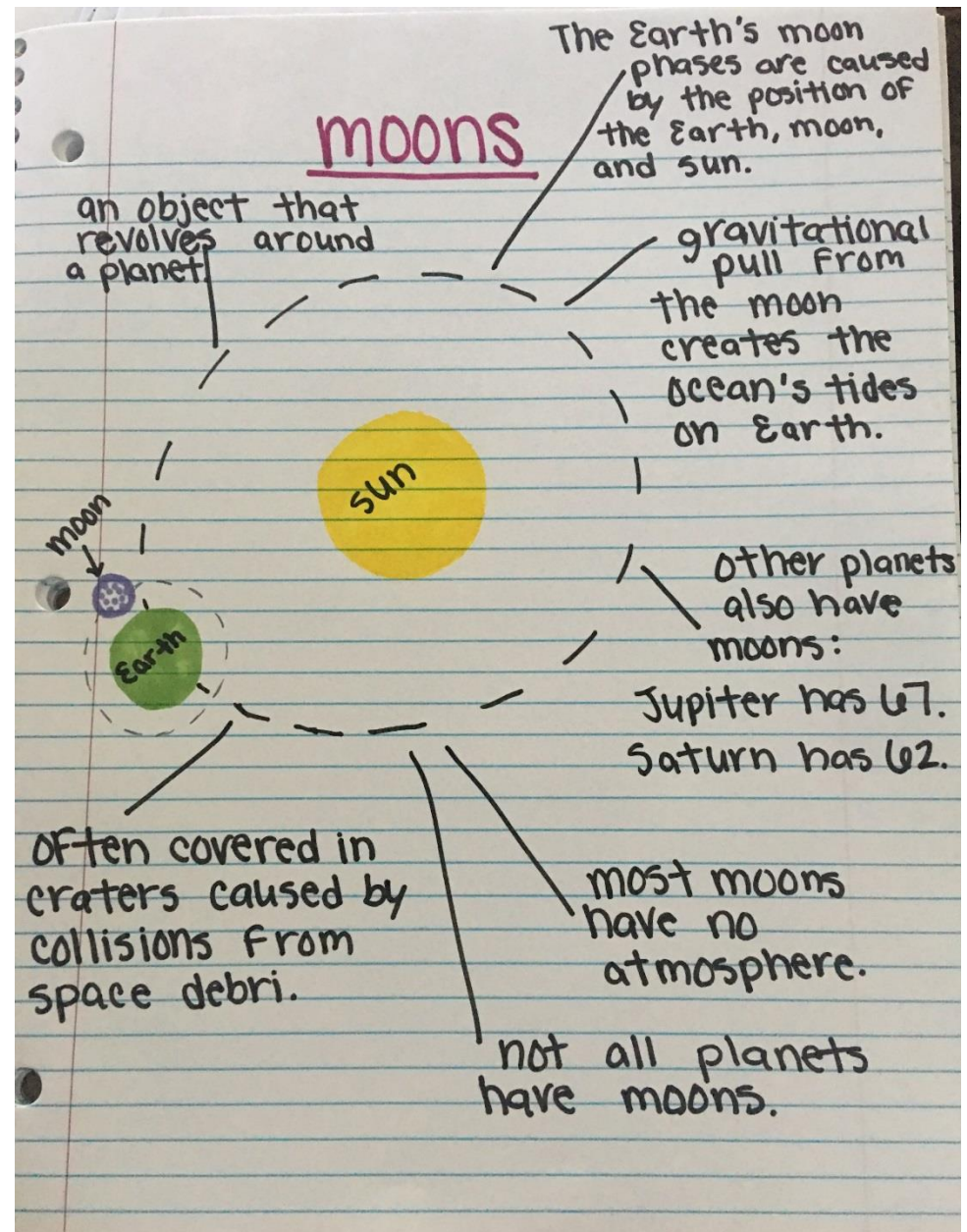
space craft
can pass
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Explain – Moons Note Page



Explain – Moons Note Page



Evaluate - Reading Questions

1. Asteroids orbit in the _____ between Mars and Jupiter.
2. The Earth's moon creates _____.
3. A large body in space made of rock, ice, and frozen gas:
 - a. Meteoroid
 - b. Asteroid
 - c. Comet
 - d. Moon
4. A large body in space made of rock and minerals:
 - a. Comet
 - b. Meteoroid
 - c. Asteroid
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5. Describe what occurs from the motion of a comet.

6. What occurs when meteoroids hit the Earth's atmosphere? What happens if they don't? What is it called if they reach the Earth's surface?

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ANSWER KEY Reading Questions

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Comets are surrounded by gas and dust. When a comet nears the sun, the gas burns up. This creates a tail behind the comet.

6. What occurs when meteoroids hit the Earth's atmosphere? What happens if they don't? What is it called if they reach the Earth's surface?

Meteoroids burn when they pass through our Earth's atmosphere. When they flash light, they're called meteors. Some meteoroids do not make it through the Earth's atmosphere and disappear. If a meteoroid actually reaches the Earth's surface, it's called a meteorite.

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Elaborate – Creating Craters Lab

Newton's Second Law of Motion. (2017, March 12). Retrieved March 18, 2017, from <http://www.imcpl.org/kids/blog/?p=8871>

Materials:

1. Pie dish
2. Flour
3. Hot chocolate mix
4. 3 spherical objects of different sizes
5. Spoon
6. Ruler

Instructions

1. Get one spoon, packet of hot chocolate, and pie pan with flour.
2. Lightly layer the hot chocolate mix on top of the flour layer. Use your spoon to evenly spread out (not mix). Set the spoon aside.
3. Choose three spherical objects from around the room to drop into your pan later. Size restrictions are no smaller than a dime and no bigger than an apple.
4. Hold up one object and drop it into the pan.
5. Record the width of your impact (in inches) and the depth of the impact (in inches) in the chart on the worksheet.
6. Drop object number two into the pan and measure the width and depth of the object.
7. Repeat the same thing for object three.

8. Go to the front of the classroom and get new flour and hot chocolate mix.
9. Repeat the dropping of objects with a different motion this time, such as spinning the object.
10. Fill out the table under trial two, recording the width and depth of each object dropped using this different dropping method.
11. Go to the front of the classroom, again, and get new flour and hot chocolate.
12. Repeat the same process, using a different dropping method. Record your data on your table under trial three.
13. Return all materials to the teacher and return to your seat to complete the worksheet with your group.



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Elaborate – Creating Craters Lab

Name: _____

Group Members: _____

Creating Craters Experiment

Record each trial here then answer the following questions.	Motion used	Material	Width of impact	Depth of impact
Trial 1				
Trial 2				
Trial 3				

Questions:

1. How did the motion used affect the size of the impact?
2. How did the size of the object affect the size of the impact? Would you have chosen other objects? Why or why not?
3. In our solar system, what objects can create a similar impact on other objects (planets)?
4. In our solar system, the motion of comets, asteroids, and moons have different effects on themselves and others. What are those?

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Elaborate – Creating Craters Lab CER

Claim (Write a sentence stating what causes larger craters to be created.)

Evidence (Provide evidence from the lab to support your claim. Describe the motions of each object used and what the results were for each.)

Reasoning (Explain how your evidence supports your claim. Describe how the physical properties and motion of the object directly impacted the size of the crater.)

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ANSWER KEY Elaborate – Creating Craters Lab CER

Claim (Write a sentence stating what causes larger craters to be created.)

Objects that weigh more dropped in a more motion-oriented way will create a larger “crater” in the flour. The physical properties, such as shape and weight of the object, and the motion, such as dropping, spinning, and laying it on its side, directly affect the size of the “crater” created during the experiment.

Evidence (Provide evidence from the lab to support your claim. Describe the positions of the Earth, moon, and sun that cause at least two phases of the moon.)

The physical properties of the objects, such as shape and weight, changed the width and depth of the crater created when dropping the object. When the grape, blueberry, and rock were dropped, the different types of motion (dropping, spinning, and dropping on its side) played a part in the size of the crater by changing the types of motion created.

Reasoning (Explain how your evidence supports your claim. Describe how the physical properties and motion of the object directly impacted the size of the crater.)

Motion of an object and physical properties of an object both impact the size of the crater created when dropping the object. Some objects used in the experiment were larger than other with rougher or smoother physical features, which directly impacted the width and depth of the crater that was created with the drop. In the universe, motion of objects like asteroids, comets, and meteoroids create craters like this every day. Each of those objects have diverse physical features and motion patterns.

ANSWER KEY Elaborate – Creating Craters Lab CER

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Big Ah-Ha Thesis

The purpose of this unit was to understand the physicals properties and motion of comets, asteroids, meteoroids, and moons. We completed a graphic organizer, note pages for each body, the Creating Comets lab, and the Creating Craters lab to gather the lines of evidence.

We completed the notes pages together in class, drawing our own version of each of the bodies in our solar system. Each students' drawings should be unique with great detail presented. We also created comets and craters in various labs to study the physical properties and motion of the objects.

Bodies in our solar system can be categorized by their physical properties and motion. Comets are large bodies made of rock, ice, and frozen gas. Their motion affects when the gas burns and creates a tail. When a comet gets close to the sun, the gas burns, creating the tail of fire we see. Asteroids are made of rock and orbit between the sun and Jupiter, in a space called the asteroid belt. Meteoroids are small pieces of rock and space debris that burn when they pass through the Earth's atmosphere. Moons are objects that revolve around a planet. They're often covered in craters cause by collisions from other space debris, such as comets, asteroids, and meteoroids. The motion of all of these objects directly affect their physical features.

Each of our learning activities are lines of evidence, helping us explain and categorize the comets, asteroids, meteoroids, and moons by their physical properties and motion.

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