

Connected Learning Team Primary

Year 5

Science Package

Comets, Asteroids and Meteorites
Gas Giants

2 weeks

EARTH AND SPACE

Lesson 1

We are **learning** to (WALT):

Identify what Comets, Asteroids and Meteorites are.

I am **successful** when (WILF):

I can **define** the movement and formation of all three.

Comets, Asteroids and Meteorites.

While traveling through space, **asteroids** sometimes collide with each other and break up into smaller fragments. **Comets** shed dust as they roam the solar system. These 'break ups' result in numerous small particles and fragments, called **meteoroids**, which orbit the sun.

Comets

- **Comets** are composed of four parts;
 - a) **Nucleus** – solid core of ice, gas and rock dust particles.
Can measure several km across.
 - b) **Coma** – gas and dust vaporised by the sun from the nucleus. Can measure 1 million km.
 - c) **Dust tail** – dust particles.
 - d) **Ion tail** – gases converted by solar winds. Tails can be over 100 million km long.
- There may be as many as 100 million **comets** that orbit the sun!
- If the orbit of a **comet** crosses the orbit of a planet they will collide and leave impact craters on each other.
- We can see comets because their comas and tails reflect sunlight.
- **Comets** orbit the sun on a regular basis, so they reappear after a period of time. For example, Halley's Comet appears every 76 years.
- Scientists believe that **comets** are left over debris that formed the outer planets billions of years ago.

Asteroids

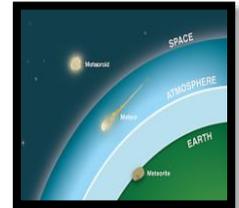
- Small planet-like bodies that revolve around the sun.
- There are thought to be millions of asteroids in the **asteroid belt** that range in size from 6 m to 900 km in size.
- We can see **asteroids** because they reflect sunlight.
- Scientists believe that **asteroids** are left over materials from the formation of the planets.



- Some scientists believe that an **asteroid** collided with Earth 65 million years ago and this led to changes in the environment which caused the extinction of the dinosaurs.

Meteoroids -> Meteors -> Meteorites

- **Meteoroids** originate from asteroid collisions, so they are basically smaller chunks of rocky material, that have been smashed off the original asteroids.
- **Meteoroids** orbit the sun between other planets.
- When meteoroids are pulled by Earth's gravity into its atmosphere, they become **meteors**!
- **Meteors** travel at high speed which causes friction which heats them up, resulting in a glow and trail of gases. *Falling Star or Shooting Star!*
- Most glow for only a few seconds or minutes and, disintegrate before reaching Earth.
- Most **meteors** are about the size of a pebble.
- Millions of meteors can occur in Earth's atmosphere each day.
- A **meteor** that reaches Earth's surface is called a **meteorite**.



Comets Asteroids and Meteorites

1. Complete the table of similarities and differences.

| | Comets | Asteroids | Meteoroids |
|--|---------------|------------------|-------------------|
| Movement (How and where do they move)? | | | |
| Formation (When and how were they formed)? | | | |
| Interesting facts | | | |

2. On a piece of paper, can you now draw the relationship between a **meteoroid**, a **meteor** and a **meteorite**.

Making Your Asteroids

Ingredients:

- Potatoes:

Enough to make 4 to 8 cups of mashed potatoes. You can use frozen mashed potatoes. Or you can use fresh mashed potatoes.

- 1 cup grated cheddar (or other kind) cheese

Note: *The cheese will make the asteroids more delicious, but when it melts, the asteroids might go flat. If you want more realistic asteroids that don't taste quite as interesting, leave out the cheese.*

- 1/4 cup (1/2 stick) of butter or margarine
- Salt and pepper, to your taste
- Extra butter or margarine to grease the cookie sheet and, if you like, to melt over the hot asteroids before you eat them

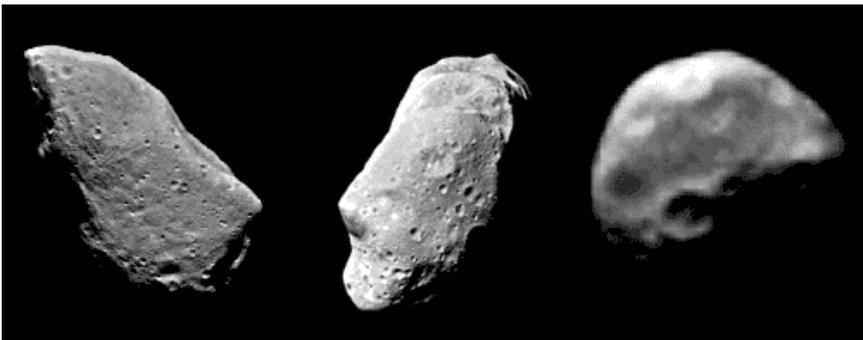
Utensils:

- Depending on how you make your mashed potatoes, you might need a pot and a potato masher or electric mixer
- Mixing bowl and spoon
- Oven mittens
- Cookie sheet

Process:

1. Turn on your oven to 375° Fahrenheit (190 Celsius).

2. Take a little slice of the butter or margarine and rub it evenly on the cookie sheet so the asteroids won't stick. (You might want to use a paper towel for this, so your fingers don't get all messy—yet!)
3. Make the mashed potatoes. Make a lot (8 cups) or a little (4 cups).
4. Add the cheese (if you want), butter, salt and pepper to the potatoes and mix well. The mixture should stick together. If it's too dry, add a little milk. If it's too moist, add a little flour (start with 2 tablespoons).
5. Take a handful of potatoes (about 1/2 cup or more) and shape it into your own idea of an interesting asteroid shape. Use your fingers to poke dents in it for craters.



Here are a few real asteroids to give you some ideas. (These rocks are not all the same size, even though they look nearly so in these pictures!) The one on the left is Gaspra, in the middle is Ida, and at the right is Dactyl (which is actually a tiny "moon" of Ida). All these pictures were taken by the spacecraft Galileo.

6. Set the asteroid on the greased cookie sheet.

7. Put the cookie sheet full of asteroids in the hot oven for about 20 to 25 minutes, or until they are brown. Using the hot pads or oven-mitt, remove the cookie sheet from the oven, and using the large spoon, transfer the asteroids to a serving plate.
8. Enjoy your asteroids!

Reflection: On a scale of 1 to 4 (1 being the least and 4 being the highest), how will you rate your learning today? Did the asteroids turn out to be tasty?

EARTH AND SPACE

Lesson 2

We are **learning** to (WALT):

Identify Gas Planets and their moons.

I am **successful** when (WILF):

I can **demonstrate** my knowledge of gas planets by answering the questions in the grid.

Gas Planets (Gas Giants)

The four largest (and furthest out) planets of the Solar system – Jupiter, Saturn, Uranus and Neptune are called Gas Giants. These planets are mainly composed of helium and hydrogen gases and liquids. Due to their great distances from the Sun, they contain more ice forms than the planets closer to the Sun.

The Gas Planets

Jupiter

Size – Jupiter is the largest planet in the solar system, with a diameter eleven times the size of Earth.



Distance from sun – Jupiter is the fifth planet from the sun.

Orbits sun – Jupiter takes 12 years to orbit the sun.

Rotates on axis – Jupiter rotates very quickly on its axis; one Jupiter day is 10 hours long.

Surface – Jupiter has a surface of thick red, brown, yellow and white clouds which have darker and lighter areas. This is what gives Jupiter its striped appearance.

Moons and Rings – Jupiter has 63 moons and three rings composed of dust particles which surround it.

- Jupiter features a Great Red Spot, which is a swirling mass of gas.

Saturn

Size – Saturn is the second largest planet, with a diameter ten times the size of Earth.

Distance from sun – Saturn is the sixth planet from the sun.



Orbits sun – Saturn takes 29.5 years to orbit the sun.

Rotates on axis – Saturn rotates on its axis quickly too, every 10 hours and 39 minutes.

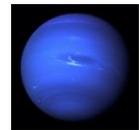
Moons – Saturn has 60 known moons.

Rings – Saturn is well known for its spectacular rings. It has several wide flat rings made up of smaller ringlets. These are composed of small pieces of ice which shine as they move.

Uranus

Size – Uranus is the third largest planet and has a diameter four times that of Earth.

Distance from sun – Uranus is the seventh planet from the sun.



Orbits sun – Uranus takes 84 Earth years to orbit the sun.

Rotates on axis – Uranus rotates on its axis every 17 hours and 14 minutes.

Moons – Uranus has 27 known moons/satellites. One moon, Miranda has strange regions on its surface composed of parallel and criss-crossed ridges and canyons.

- Uranus is surrounded by clouds of blue-green gas.
- Uranus orbits the sun on its side at a tilt of 90°.

Neptune

Size – Neptune is the fourth largest planet and has a diameter four times that of Earth.

Distance from sun – Neptune is the eighth and furthest planet from the sun, it is very cold with no oxygen in its air.



Orbits sun – Neptune takes about 165 Earth years to orbit the sun.

Rotates on axis – Neptune rotates on its axis every 16 hours and 7 minutes.

Moons and Rings – Neptune's 13 moons and several faint rings are composed of dust particles.

- Neptune has thick bright blue clouds, blown by winds at speeds of 1100 km per hour

The Gas Planets

1. Compare the table using information about the gas giants.

| | Jupiter | Saturn | Uranus | Neptune |
|--|---------|--------|--------|---------|
| How long is one day? (Time taken in Earth days to rotate on its axis) | | | | |
| Time taken (in Earth days to orbit the sun) | | | | |
| An interesting feature | | | | |

2. Give two reasons why Jupiter, Saturn, Uranus and Neptune are called the Gas Giants!

a) _____

b) _____

3. Why do all the gas giants have ring systems?

4. Draw a scaled drawing of the **Earth** beside the **four gas giants**.

Think carefully before you draw the Earth.

Reflection:

On a scale of 1 to 4 (1 being the least and 4 being the highest), how will you rate your learning today? Can you take your learning further? Be imaginative and creative and make 3 D models of your gas giant planets.