

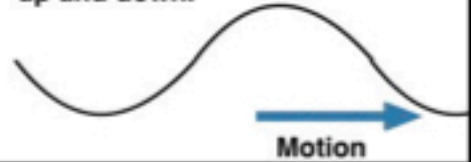
Short Reading Passages

Longitudinal and Transverse Waves

Big Idea Question: What is the difference between longitudinal and transverse waves?

Have you ever sat in a bounce house or on a trampoline while someone was bouncing? You are moving in an up and down motion. This type of motion is typical of transverse waves. Transverse waves are waves that travel at right angles to the direction of their motion. They look like little rollercoaster hills as they go up and down. The particles in them travel perpendicular to the direction of the wave. These type of waves can spread through solids but not liquids and gases. You can demonstrate a transverse wave using some rope. To start, tie one end of the rope to an object. Then, hold the other end of the rope. Last, move your hand up and down. The motion the rope makes represents the motion of transverse waves. You can see a picture of transverse waves. Some examples of transverse waves are light waves, water waves, and radio waves.

Diagram 1: Transverse waves move up and down.



Longitudinal waves have a different motion. They give you a rocking back and forth motion. The waves move in the same direction as the motion of the particles. The particles move back and forth along the path of the wave. Longitudinal waves can travel through solids, liquids, and gas. If you have ever been on a roller coaster, you have experienced longitudinal waves in action. As the roller coaster moves back and forth, the coils in the spring move back and forth. You can see a picture of longitudinal waves. Some examples of longitudinal waves are sound waves, seismic waves, and radio waves.

Diagram 2: Longitudinal waves move back and forth along the path of motion.



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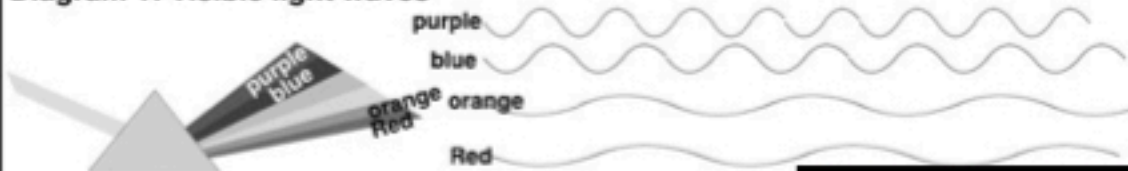
Types of Waves

Big Idea Question: What are the characteristics of the different types of waves?

There are many different types of waves. Some of them are transverse waves and some of them are longitudinal waves. Listed below are some of the main types of waves.

Visible Light Waves: One type of transverse wave is light waves. Light waves move up and down at various rates. The length of wave determines the color we see. Long wavelengths correspond to the red side of the spectrum while short wavelengths are on the blue side of the spectrum. Scientists use wavelengths when determining if objects in space are moving toward us or away from us. Those objects that are moving toward us have a blue shift while objects that are moving away from us have a red shift. This shift is one piece of evidence used to support the theory that the universe is still expanding.

Diagram 1: Visible light waves



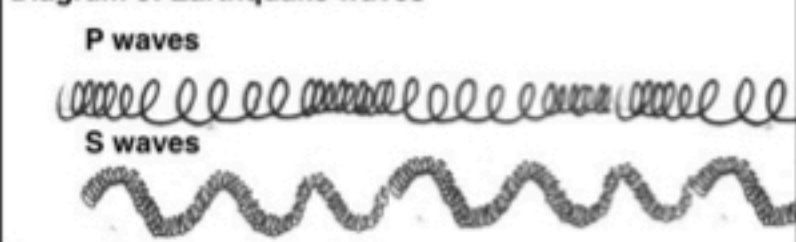
Sound Waves: One type of longitudinal wave is sound waves. When sound waves travel through the air, the vibration can happen in many ways. You can hear a speaker vibrate when sound comes out of it. You can feel your ear drum vibrate when the sound vibrates your ear drum it goes into your brain. You can also feel the vibration of loud sound waves as they pass through your body. Sound frequency correlates to the waves frequency. Low frequency gives a low pitch. High frequency gives a high pitch.

Diagram 2: Sound waves



Earthquake Waves: Earthquakes produce two types of body waves, P waves and S waves. Primary waves, otherwise known as P waves, travel the fastest. They push and pull the rock and liquid core as they travel through them. S waves, are transverse waves. They can only travel through solids. They move perpendicular to the way the wave is traveling. Scientists used the difference in speed between P and S waves to determine that Earth had a liquid core. Scientists also use the difference in speed between P and S waves to discover the location of the Earthquakes epicenter.

Diagram 3: Earthquake waves



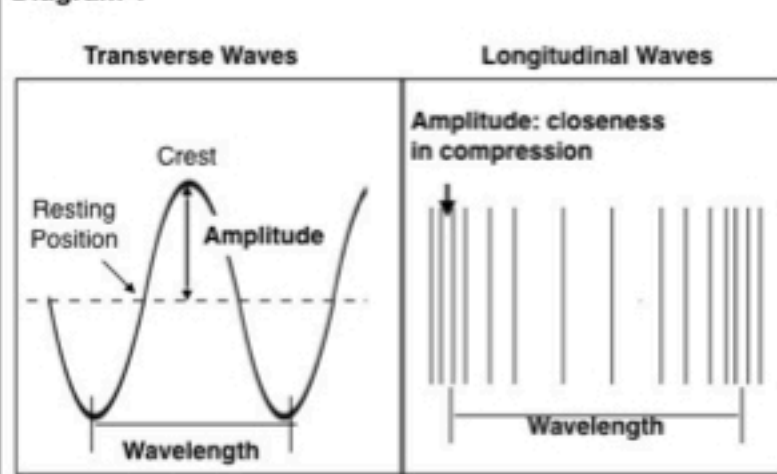
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Measuring Waves

Big Idea Question: How are waves measured?

Quicksilver's in Memory of Eddie Aikau, otherwise known as the Big Wave Contest, is one of the most famous big wave surfing competitions in the World. It has only been held once in 1984 due to the wave height requirement. Surfers have been waiting for the winter hoping that the conditions will be perfect for the contest that today is the day. But how do they know that the wave height has reached at least 20 feet?

Diagram 1



When people measure waves they look at the frequency (diagram 1). A wave's amplitude is the distance between the height of the crest and the resting position. In a transverse wave, the amplitude is the difference between the height of the crest and the resting position. The greater the amplitude, the greater the energy. So when the amplitude is 20 feet, the wave is 20 feet high. In a longitudinal wave, the amplitude measures the closeness of the compressions. The closer they are, the greater the amplitude. A wave's wavelength is the distance between two points on adjacent waves. The closer the points are, the greater the wavelength. A wave's frequency is measured by counting the number of waves that pass through a point in 1 second and is measured in hertz (Hz). The greater the number of waves passing in 1 second, the greater the frequency.

Note-taking Templates

Name: _____ Class: _____ Topic: measuring waves Date: _____ Big Idea Question: How are waves measured?	
Questions	Notes
How can you find the amplitude and wavelength of a wave?	
How do you measure the frequency of a wave?	
How can you calculate the speed of a wave?	
Summary: <hr/> <hr/> <hr/> <hr/> <hr/>	

Comprehension Worksheets with answer key

Longitudinal and Transverse Waves

Define:

1. What are transverse waves? _____

2. What are longitudinal waves? _____

Identify: Label each picture correctly to identify if it shows a transverse wave or a longitudinal wave.



This is a _____



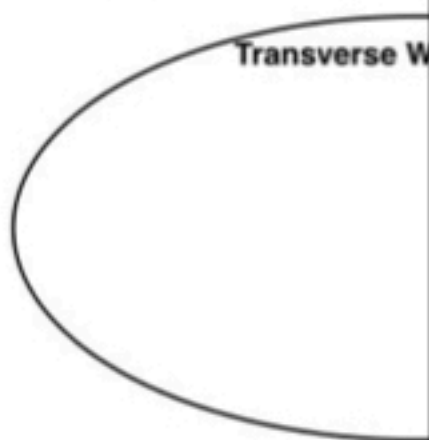
This is a _____

Particle movement



This is a _____ wave.

Compare: Fill in the Venn diagram



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Types of Waves

Define:

1. Visible light waves: _____

2. Sound waves: _____

3. Earthquake P waves: _____

4. Earthquake S waves: _____

Identify: Is the wave a longitudinal wave or transverse

Sound Waves Transverse / Longitudinal	
Visible Light Waves Transverse / Longitudinal	

Apply:

Scientists have discovered that our closest galaxies have this information and your understanding of visible light moving toward us or away from us? explain



A tuba produces a deep, low sound while a piccolo produces a high-pitched sound. What type of frequency would each of them have and why?

Measuring Waves

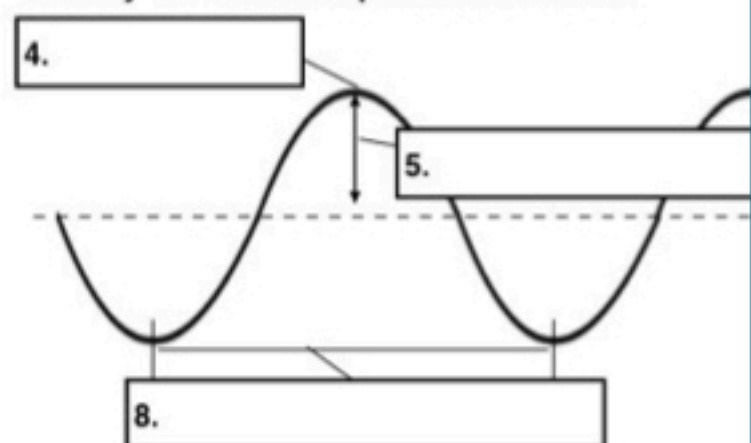
Define:

1. Amplitude: _____

2. Wavelength: _____

3. Frequency: _____

Identify the different parts of the wave



9. Order the waves in level of frequency with highest frequency.



Digital Version

Directions: Follow the directions on each side to complete this guided reading activity notebook.

WAVES

1. Answer the questions on the left. 2. Use the labels on the right to identify if the pictures represent longitudinal or transverse waves. 3. Compare longitudinal and transverse waves by dragging the labels and pictures to the appropriate area.

Why are the transverse waves?

Add text

Compare transverse waves to longitudinal waves by dragging the pictures and labels below to the correct area.

Longitudinal Both Transverse

What are longitudinal waves?

Add text

2. Read the information on the left. 3. Use the red circles on the left to identify key words. 4. Answer the questions by putting answers and key details onto the left. 5. Write a one sentence synthesis statement that explains the big idea of the text.

There are many different types of waves. Some of them are transverse waves and some of them are longitudinal waves. Label below are some of the main types of waves.

Visible Light Waves One type of transverse wave is light waves. Light waves move up and down at various sides. The length of wave determines the color we see. Long wavelengths correspond to the red side of the spectrum while short wavelengths are on the blue side of the spectrum. Scientists use knowledge when determining if objects in space are moving toward us or away from us. These objects that are moving toward us have a red shift. The shift is a piece of evidence used to support the theory that the universe is still expanding.

Sound Waves One type of longitudinal wave is sound waves. When an object in an object it sends waves through the air. The vibration can happen in many ways. Your voice sends waves when you speak. A stereo speaker vibrates when sound comes out of it. You can detect these vibrations with your ear drum. When the sound vibrates your ear drum it gives the your brain what they signal your brain. You can also feel the vibration of loud sound waves as they vibrate your body. The pitch of the sound correlates to the wave frequency. Low frequency waves are low pitch and high frequency waves are high pitch.

3. Read the information on the left. 4. Use the red circles on the left to identify key words. 5. Answer the questions by putting answers and key details onto the left. 6. Write a one sentence synthesis statement that explains the big idea of the text.

Longitudinal and Transverse waves

QUESTION KEY DETAILS

Add text

Describe the characteristics of transverse waves.

What is the difference between longitudinal and transverse waves?

QUESTION KEY DETAILS

Add text

Describe the characteristics of longitudinal waves.

What is the difference between transverse and longitudinal waves?

QUESTION KEY DETAILS

Add text

Diagram 1: Transverse waves move at right angles to the motion. The particles move up and down.

Diagram 2: Longitudinal waves move in the direction of motion. The particles move back and forth along the path of motion.

4. Define the words on the left. 5. Use the labels on the right to identify if the waves are longitudinal or transverse. 6. Answer the two questions at the bottom.

Define visible light waves

Add text

Define sound waves

Add text

Define earthquake P waves

Add text

Define earthquake S waves

Add text

5. Read the information on the left. 6. Use the red circles on the left to identify key words. 7. Answer the questions by putting answers and key details onto the left. 8. Write a one sentence synthesis statement that explains the big idea of the text.

Scientists in the 19th century discovered that light waves are transverse waves. They discovered that light waves move up and down at various sides. The length of wave determines the color we see. Long wavelengths correspond to the red side of the spectrum while short wavelengths are on the blue side of the spectrum. Scientists use knowledge when determining if objects in space are moving toward us or away from us. These objects that are moving toward us have a red shift. The shift is a piece of evidence used to support the theory that the universe is still expanding.

6. Read the information on the left. 7. Use the red circles on the left to identify key words. 8. Answer the questions by putting answers and key details onto the left. 9. Write a one sentence synthesis statement that explains the big idea of the text.

Earthquake Waves: Earthquakes produce two types of body waves, primary waves and secondary waves. Primary waves, otherwise known as P waves, travel the fastest. They are longitudinal waves that push and pull the rock and fluid in as they travel through them. Secondary waves, also known as S waves, are transverse waves. They can only travel through solids. They move the rock perpendicular to the way the waves is traveling. Scientists used the difference between the P waves and S waves to determine that Earth had a liquid core. Scientists also use the P waves and S waves as a way to discover the location of the Earthquake epicenter.

7. Define the words on the left. 8. Use the labels on the right to identify the different parts of the wave. 9. Number the waves in order starting with the highest frequency. 10. Solve the problems below.

Define Amplitude

Add text

Define wavelength

Add text

Define frequency

8. Read the information on the left. 9. Use the red circles on the left to identify key words. 10. Answer the questions by putting answers and key details onto the left. 11. Write a one sentence synthesis statement that explains the big idea of the text.

Transverse Waves: Longitudinal waves move at right angles to the motion. The particles move up and down. Longitudinal waves move in the direction of motion. The particles move back and forth along the path of motion.

9. Read the information on the left. 10. Use the red circles on the left to identify key words. 11. Answer the questions by putting answers and key details onto the left. 12. Write a one sentence synthesis statement that explains the big idea of the text.

How can you find the amplitude and wavelength of a wave?

QUESTION KEY DETAILS

Add text

How do you measure the frequency of a wave?

QUESTION KEY DETAILS

Add text

10. Read the information on the left. 11. Use the red circles on the left to identify key words. 12. Answer the questions by putting answers and key details onto the left. 13. Write a one sentence synthesis statement that explains the big idea of the text.

How can you find the amplitude and wavelength of a wave?

QUESTION KEY DETAILS

Add text

How do you measure the frequency of a wave?

QUESTION KEY DETAILS

Add text

11. Read the information on the left. 12. Use the red circles on the left to identify key words. 13. Answer the questions by putting answers and key details onto the left. 14. Write a one sentence synthesis statement that explains the big idea of the text.

How can you find the amplitude and wavelength of a wave?

QUESTION KEY DETAILS

Add text

How do you measure the frequency of a wave?

QUESTION KEY DETAILS

Add text

12. Read the information on the left. 13. Use the red circles on the left to identify key words. 14. Answer the questions by putting answers and key details onto the left. 15. Write a one sentence synthesis statement that explains the big idea of the text.

How can you find the amplitude and wavelength of a wave?

QUESTION KEY DETAILS

Add text

How do you measure the frequency of a wave?

QUESTION KEY DETAILS

Add text

13. Read the information on the left. 14. Use the red circles on the left to identify key words. 15. Answer the questions by putting answers and key details onto the left. 16. Write a one sentence synthesis statement that explains the big idea of the text.

How can you find the amplitude and wavelength of a wave?

QUESTION KEY DETAILS

Add text

How do you measure the frequency of a wave?

QUESTION KEY DETAILS

Add text

14. Read the information on the left. 15. Use the red circles on the left to identify key words. 16. Answer the questions by putting answers and key details onto the left. 17. Write a one sentence synthesis statement that explains the big idea of the text.

How can you find the amplitude and wavelength of a wave?

QUESTION KEY DETAILS

Add text

How do you measure the frequency of a wave?

QUESTION KEY DETAILS

Add text

15. Read the information on the left. 16. Use the red circles on the left to identify key words. 17. Answer the questions by putting answers and key details onto the left. 18. Write a one sentence synthesis statement that explains the big idea of the text.

How can you find the amplitude and wavelength of a wave?

QUESTION KEY DETAILS

Add text

How do you measure the frequency of a wave?

QUESTION KEY DETAILS

Add text

16. Read the information on the left. 17. Use the red circles on the left to identify key words. 18. Answer the questions by putting answers and key details onto the left. 19. Write a one sentence synthesis statement that explains the big idea of the text.

How can you find the amplitude and wavelength of a wave?

QUESTION KEY DETAILS

Add text

How do you measure the frequency of a wave?

QUESTION KEY DETAILS

Add text

17. Read the information on the left. 18. Use the red circles on the left to identify key words. 19. Answer the questions by putting answers and key details onto the left. 20. Write a one sentence synthesis statement that explains the big idea of the text.

How can you find the amplitude and wavelength of a wave?

QUESTION KEY DETAILS

Add text

How do you measure the frequency of a wave?

QUESTION KEY DETAILS

Add text

18. Read the information on the left. 19. Use the red circles on the left to identify key words. 20. Answer the questions by putting answers and key details onto the left. 21. Write a one sentence synthesis statement that explains the big idea of the text.

How can you find the amplitude and wavelength of a wave?

QUESTION KEY DETAILS

Add text

How do you measure the frequency of a wave?

QUESTION KEY DETAILS

Add text

19. Read the information on the left. 20. Use the red circles on the left to identify key words. 21. Answer the questions by putting answers and key details onto the left. 22. Write a one sentence synthesis statement that explains the big idea of the text.

How can you find the amplitude and wavelength of a wave?

QUESTION KEY DETAILS

Add text

How do you measure the frequency of a wave?

QUESTION KEY DETAILS

Add text

20. Read the information on the left. 21. Use the red circles on the left to identify key words. 22. Answer the questions by putting answers and key details onto the left. 23. Write a one sentence synthesis statement that explains the big idea of the text.

How can you find the amplitude and wavelength of a wave?

QUESTION KEY DETAILS

Add text

How do you measure the frequency of a wave?

QUESTION KEY DETAILS

Add text

21. Read the information on the left. 22. Use the red circles on the left to identify key words. 23. Answer the questions by putting answers and key details onto the left. 24. Write a one sentence synthesis statement that explains the big idea of the text.

How can you find the amplitude and wavelength of a wave?

QUESTION KEY DETAILS

Add text

How do you measure the frequency of a wave?

QUESTION KEY DETAILS

Add text

22. Read the information on the left. 23. Use the red circles on the left to identify key words. 24. Answer the questions by putting answers and key details onto the left. 25. Write a one sentence synthesis statement that explains the big idea of the text.

How can you find the amplitude and wavelength of a wave?

QUESTION KEY DETAILS

Add text

How do you measure the frequency of a wave?

QUESTION KEY DETAILS

Add text

23. Read the information on the left. 24. Use the red circles on the left to identify key words. 25. Answer the questions by putting answers and key details onto the left. 26. Write a one sentence synthesis statement that explains the big idea of the text.

How can you find the amplitude and wavelength of a wave?

QUESTION KEY DETAILS

Add text

How do you measure the frequency of a wave?

QUESTION KEY DETAILS

Add text

24. Read the information on the left. 25. Use the red circles on the left to identify key words. 26. Answer the questions by putting answers and key details onto the left. 27. Write a one sentence synthesis statement that explains the big idea of the text.

How can you find the amplitude and wavelength of a wave?

QUESTION KEY DETAILS

Add text

How do you measure the frequency of a wave?

QUESTION KEY DETAILS

Add text

25. Read the information on the left. 26. Use the red circles on the left to identify key words. 27. Answer the questions by putting answers and key details onto the left. 28. Write a one sentence synthesis statement that explains the big idea of the text.

How can you find the amplitude and wavelength of a wave?

QUESTION KEY DETAILS

Add text

How do you measure the frequency of a wave?

QUESTION KEY DETAILS

Add text

26. Read the information on the left. 27. Use the red circles on the left to identify key words. 28. Answer the questions by putting answers and key details onto the left. 29. Write a one sentence synthesis statement that explains the big idea of the text.

How can you find the amplitude and wavelength of a wave?

QUESTION KEY DETAILS

Add text

How do you measure the frequency of a wave?

QUESTION KEY DETAILS

Add text

27. Read the information on the left. 28. Use the red circles on the left to identify key words. 29. Answer the questions by putting answers and key details onto the left. 30. Write a one sentence synthesis statement that explains the big idea of the text.

How can you find the amplitude and wavelength of a wave?

QUESTION KEY DETAILS

Add text

How do you measure the frequency of a wave?

QUESTION KEY DETAILS

Add text

28. Read the information on the left. 29. Use the red circles on the left to identify key words. 30. Answer the questions by putting answers and key details onto the left. 31. Write a one sentence synthesis statement that explains the big idea of the text.

How can you find the amplitude and wavelength of a wave?

QUESTION KEY DETAILS

Add text

How do you measure the frequency of a wave?

QUESTION KEY DETAILS

Add text

Extension Task Cards

TASK 1

What is the relationship between waves frequency and wave

TASK 2

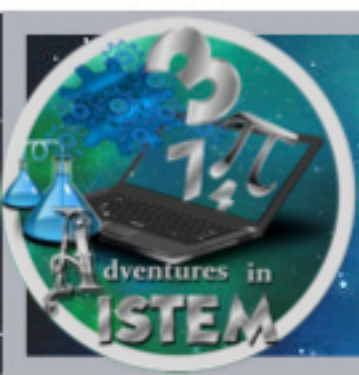
You are in a submarine and are heading 100 meters down. You notice that your bright red shirt looks more like a muddy brown. Based on your understanding of visible light, explain why it appears to have changed color.

TASK 3

How are visible light waves different from sound waves?

TASK 4

How are earthquake P waves different from earthquake S waves?



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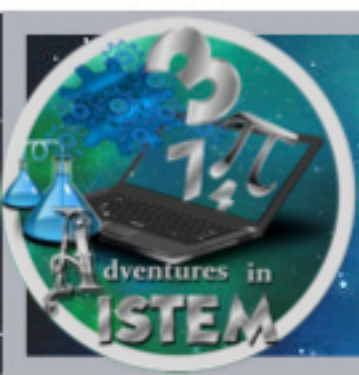
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of energy, atoms, periodic table,



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What You Will Need To Get Started:

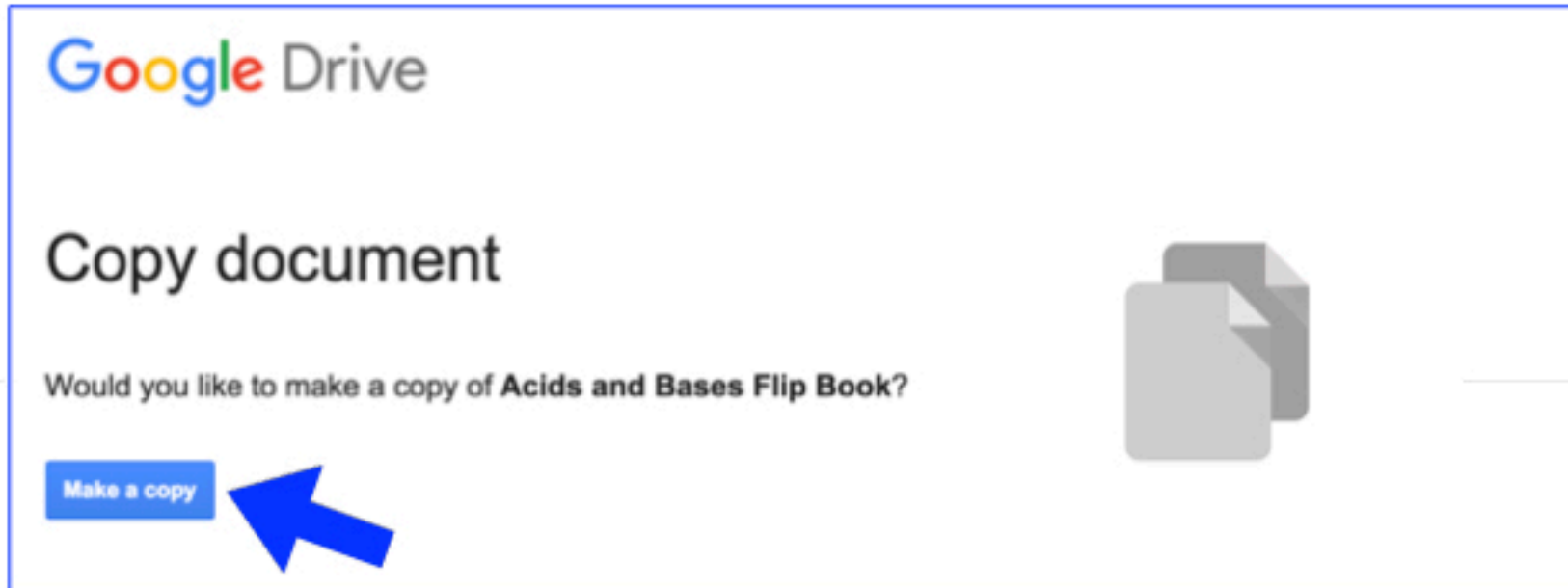
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Outer Planets Guided Reading Digital Notes

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4. Open the file on your Google Drive. The link will prompt you to make a copy



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Outer Planets

Big Idea Question: *Why are they called gas giants? What are some key characteristics?*

The outer solar system is made up of four gas giants. They are Jupiter, Saturn, Uranus, and Neptune. Since they are so far away from the Sun, they are able to hold onto their gas atmospheres and are made up mostly of gas but have solid rocky cores. Because they are so massive, they have a greater gravity than the terrestrial planets. They are also much colder than the terrestrial planets since they are so far away from the Sun. They also all have rings, and many planetary satellites.





Basic facts:

Jupiter: Largest planet in our solar system. Its mass is twice as much as the other seven planets combined. Now that's massive! It is made up mostly of hydrogen gas, and it is known for its massive storm—which is more like a hurricane that is the size of three Earths put together. Since it is made up of mostly gas, it is able to spin around pretty quickly. In one Earth day, Jupiter will have had three days. Now that's fast! It also has the most planetary satellites. To date, the number is at 67. It has the most gravity of all the planets.

Saturn: This planet is known for its many rings that circle it which are made of gas and ice. It is the least dense of all planets. In fact, if you put Saturn in a tub of water, it would actually float. It's amazing that something that massive could actually float. Crazy. Its atmosphere is mostly helium and hydrogen and its gravity pull could tear a comet apart if one got close enough.

Uranus: This planet does not reflect much light since it is so far from the sun. We know about it from our space probes that we sent out into space. The methane gas in its atmosphere is what gives it its greenish color. The rotation of Uranus is unique because it is so tilted it actually spins on its side. Its poles would be found in the same location as our equator, weird. This rotation causes one pole to be in complete darkness for half of its revolution. Could you imagine having night last half a year and a day lasting the other half?

Neptune: The outermost planet in the solar system. Its blue color is caused by its methane gas in its atmosphere. There is a hurricane-like storm that is the size of Earth. It has the fastest winds of any of the planets moving at more than 1,000 km/h (a high wind on Earth is considered 100km/hr).

				
Distance from Sun	5 AU	9 AU	19 AU	30 AU
Rotation (day/night)	9 hours	10 hours	17 hours	16 hours
Revolution (year)	11 Earth years	29 Earth years	83 Earth years	163 Earth years
Diameter (size)	142,984 km	120,536 km	51,118 km	49,528 km
Density	1.33 g/cm ³	0.69 g/cm ³	1.27 g/cm ³	1.64 g/cm ³
Gravity	236% of Earth's	92% of Earth's	89% of Earth's	112% of Earth's
Planetary Satellites	67	62	27	14

The planet information is current as of April 2015

Name: _____ **Class:** _____
Topic: Outer Planets **Date:** _____
Big Idea Question: Why are they called gas giants? What are some key characteristics?

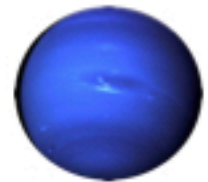
Questions	Notes
What do the outer planets have in common?	
What is a unique characteristic about each outer planet?	
Which planet is the most similar to Jupiter?	

Summary:

Outer Planets

1. Comparing the planets: Fill in the data table

	1	2	3	4
place the planets in order from closest to the Sun to furthest from the Sun				
place the planets in order from shortest day to longest day				
place the planets in order from shortest year to longest year				
place the planets in order from smallest size to largest size				
place the planets in order from least dense to most dense				
place the planets in order from least amount of planetary satellites to most amount of planetary satellites				



2. Using Patterns: Compare the number of planetary satellites to the diameter, location from the Sun, and the density. Which characteristic do you think has the most influence on how many planetary satellites an outer planet will have?

3. Why do you think the characteristic you choose in question 2 has more influence on the number of planetary satellites than the other characteristics? Explain.

4. Thinking beyond the table, what is another factor that could be influencing the number of planetary satellites the outer planets have? Explain.



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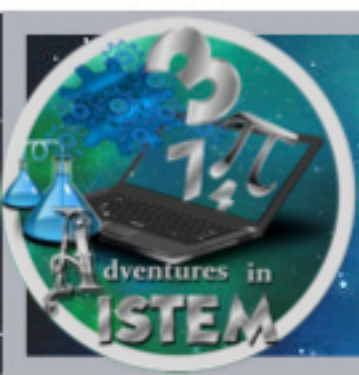
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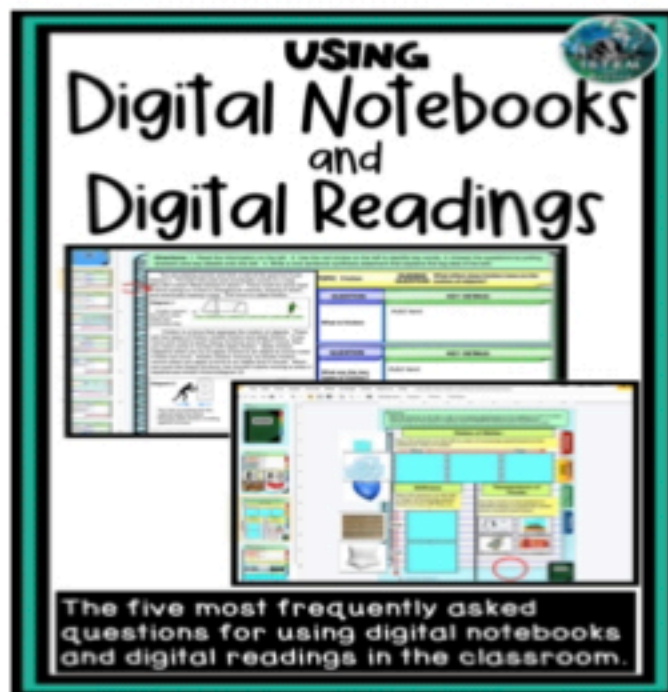




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Using Digital Products?

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I would also recommend checking out my Google Slide videos that demonstrate how to drag and drop pieces, write in the text boxes, add objects, and more. These are short videos that can easily be shared with students and parents. Click the picture for the link

