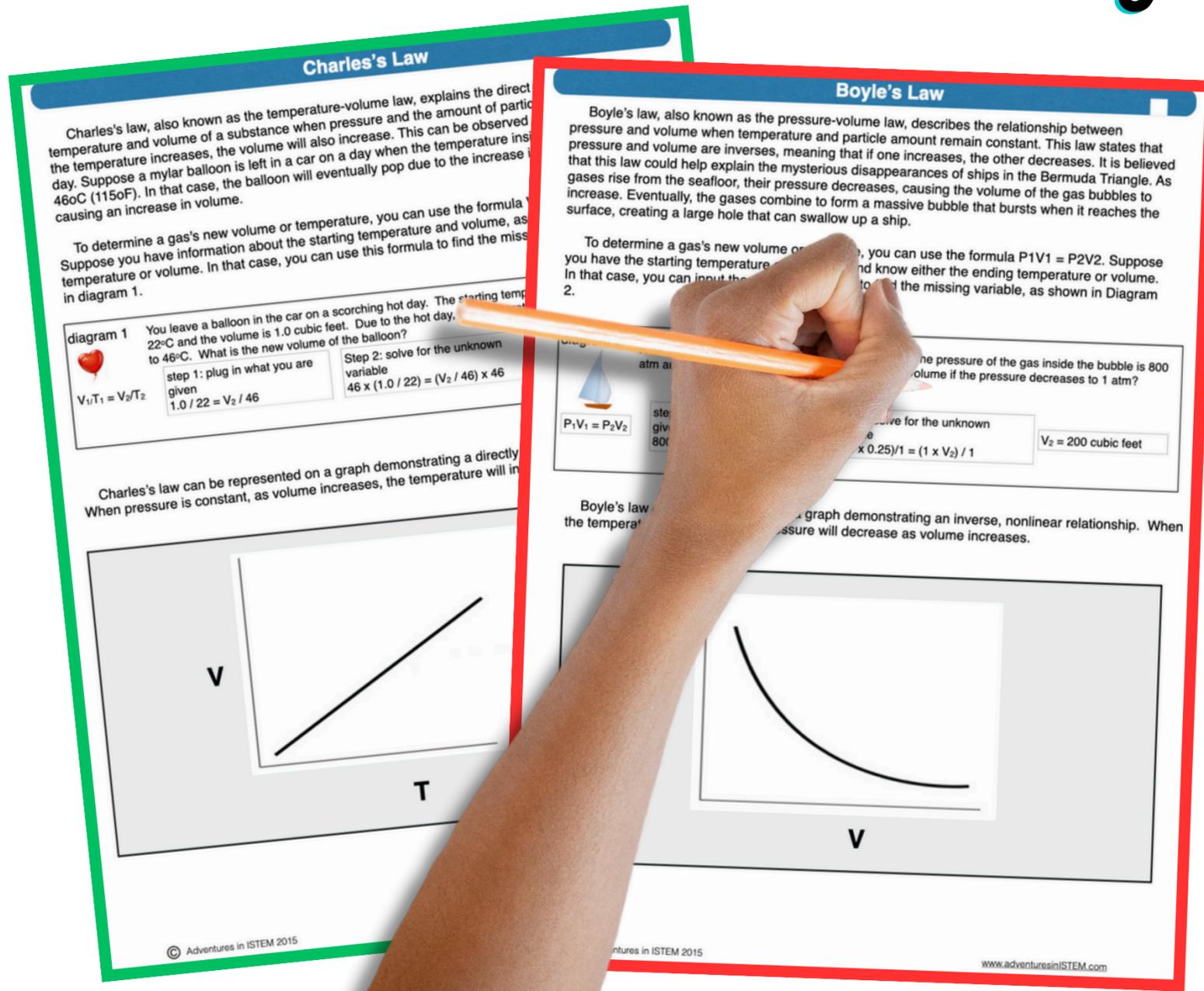


GAS LAWS

(CHARLES'S LAW, BOYLE'S LAW, GAY-LUSSAC'S LAW)

Science Reading



Scroll Through

To take a peek inside!

Help students learn about Charles's law, Boyle's law, and Gay-Lussac's law and test their comprehension with these easy to read science reading passages.

Why? SCIENCE READING PASSAGES?

- ✓ Increase science literacy in the classroom
- ✓ Simple passages to help students comprehend the information
- ✓ Note-taking template to help students interact with the reading
- ✓ Worksheets to review and apply their knowledge
- ✓ Reinforcement task cards to continue their understanding

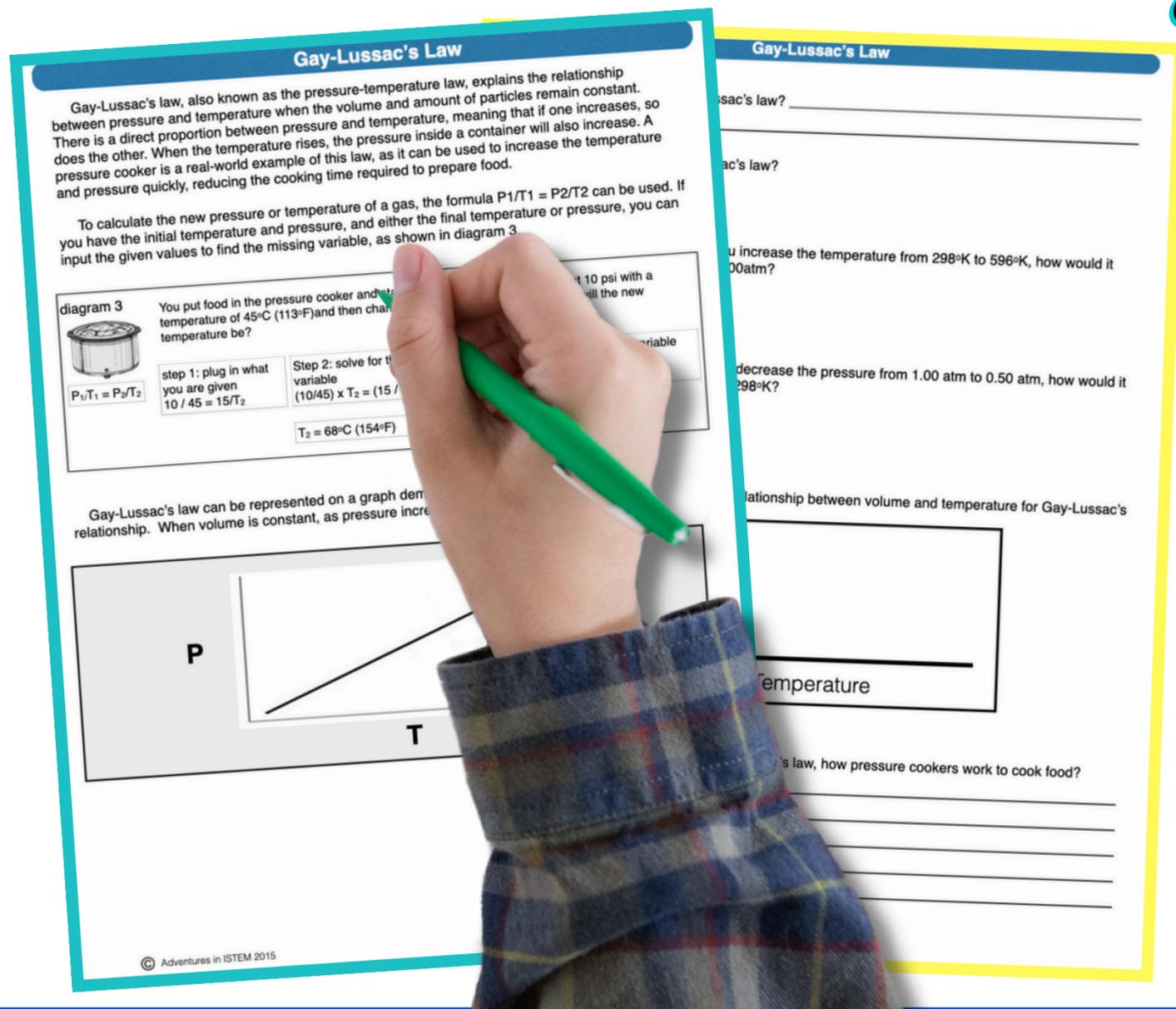


These were awesome review sheets for my students after I had taught the lesson. I also used this digitally for my students who were home sick. I highly recommend this product. - Karla

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Science Reading



What Are *students* Doing?

- ✓ **Marking the text**
- ✓ **Filling in the guided note-taking template**
- ✓ **Reviewing and applying their knowledge**
- ✓ **Reinforcing their understanding**

Resource includes

- ✓ 3 Reading Passages
- ✓ 3 Note-taking guides
- ✓ 3 Comprehension Worksheets
- ✓ 4 Task cards
- ✓ Answer key
- ✓ Digital version

GAS LAWS

(CHARLES'S LAW, BOYLE'S LAW, GAY-LUSSAC'S LAW)

Science Reading

The tablet screen shows a digital reading passage titled "Charles's Law" with a note-taking guide. The passage includes a definition of Charles's Law, a formula $V_1/T_1 = V_2/T_2$, and a diagram illustrating a balloon's volume change with temperature. The note-taking guide has columns for "QUESTION" and "KEY DETAILS", and a "SYNTHESIS SENTENCE" section at the bottom.

Directions: 1. Read the information on the left. 2. Use the red circles on the left to identify key words. 3. Answer the questions and key details onto the right. 4. Write a one sentence synthesis statement that explains the big idea of the text.

TOPIC Charles's Law **GUIDING QUESTION** What is Charles's Law?

QUESTION	KEY DETAILS
What is Charles's law?	Add text
What is the formula for Charles's law?	

diagram 1 You leave a balloon in the car on a scorching hot day. The starting temperature of the balloon is 22°C and the volume is 1.0 cubic feet. Due to the hot day, the temperature of the balloon increases to 46°C. What is the new volume of the balloon?

step 1: plug in what you are given step 2: solve for the unknown variable $V_2 = 2.1$ cubic feet

$$V_1/T_1 = V_2/T_2 \quad 1.0 / 22 = V_2 / 46 \quad 46 \times (1.0 / 22) = (V_2 / 46) \times 46$$

SYNTHESIS SENTENCE: (BIG IDEA OF THE TEXT IN ONE SENTENCE)

Add text

GAS LAWS

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Science Reading

Charles's Law

Define:
What is the definition of Charles's law?

Describe:
What is the formula for Charles's law?

Solve:
If the pressure is kept constant, if you increase the temperature from 298°K to 460°K, how will the volume be affected?
If the pressure is kept constant, if you decrease the volume from 46L to 22L, how will the temperature be affected?

Graph:
Draw a graph that demonstrates the relationship between volume and temperature. The x-axis is labeled 'Temperature' and the y-axis is labeled 'Volume'. The graph shows a directly related linear relationship.

Explanation:
Explain, using your knowledge of Charles's law, what would happen if the temperature outside and it snowed?

Charles's Law

Charles's law, also known as the temperature-volume law, explains the direct relationship between temperature and volume of a substance when pressure and the amount of particles are constant. If the temperature increases, the volume will also increase. This can be observed with balloons on a hot day. Suppose a mylar balloon is left in a car on a day when the temperature inside the vehicle is over 46°C (115°F). In that case, the balloon will eventually pop due to the increase in temperature, causing an increase in volume.

To find a gas's new volume or temperature, you can use the formula $V_1/T_1 = V_2/T_2$. If you have information about the starting temperature and volume, as well as the ending temperature, you can use this formula to find the missing variable, as shown below.

Example: A balloon in the car on a scorching hot day. The starting temperature of the balloon is 22°C and the volume is 1.0 cubic feet. Due to the hot day, the temperature of the balloon increases to 46°C. What is the new volume of the balloon?

Step 1: plug in what you are given
 $22 = V_2 / 46$

Step 2: solve for the unknown variable
 $46 \times (1.0 / 22) = (V_2 / 46) \times 46$

$V_2 = 2.1$ cubic feet

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Different ways to use the science readings

- ✓ Substitute plan on days you will be out
- ✓ Introduction of the material at the beginning of the unit
- ✓ During the explain phase of the 5E model
- ✓ As part of a science station
- ✓ For reteach to reinforcing their understanding
- ✓ During the review at the end of the unit

Each topic *includes*



One to two page science reading passage to teach the topic.



Notes with questions to guide their reading



Comprehension worksheets to review the information using multiple levels of questioning



Task cards to extend their learning and for extra review



Answer keys to easily check the student knowledge



Digital version for more flexibility on how to use the lesson



Lesson Design to help you differentiate the lesson in your classroom

Boyle's Law

Define:
What is the definition of Boyle's law? _____

Describe:
What is the formula for Boyle's law? _____

Solve:
If the temperature is kept constant, if you increase the pressure from 1.00 atm to 1.50 atm, how would it affect the volume if it started at 3.00L?

If the temperature is kept constant, if you increase the volume from 3.00 L to 4.00 L, how would it affect the pressure if it started at 1.00atm?

Boyle's Law

Boyle's law, also known as the pressure-volume law, describes the relationship between pressure and volume when temperature and particle amount remain constant. This law states that that pressure and volume are inverses, meaning that if one increases, the other decreases. It is believed that this law could help explain the mysterious disappearances of ships in the Bermuda Triangle. As gases rise from the seafloor, their pressure decreases, causing the volume of the gas bubbles to increase. Eventually, the gases combine to form a massive bubble that bursts when it reaches the surface, creating a large hole that can swallow up a ship.

To determine a gas's new volume or pressure, you can use the formula $P_1V_1 = P_2V_2$. Suppose you have the starting temperature and volume and know either the ending temperature or volume. In that case, you can input the given information to find the missing variable, as shown in Diagram 2.

Diagram 2

A methane bubble of gas escapes the ocean floor. The pressure of the gas inside the bubble is 800 atm and the volume is 0.25 cubic feet. What is the volume if the pressure decreases to 1 atm?

$P_1V_1 = P_2V_2$

step 1: plug in what you are given
 $800 \times 0.25 = 1 \times V_2$

Step 2: solve for the unknown variable
 $(800 \times 0.25) / 1 = (1 \times V_2) / 1$

$V_2 = 200$ cubic feet

Boyle's law can be represented on a graph demonstrating that if the temperature is constant, the pressure will decrease as the volume increases.

Directions: 1. Answer the questions

TASK 1
If a gas initially has a volume of 4 liters at a pressure of 2 atm, what would happen to the volume if the pressure increased to 6 atm?

TASK 2
If a gas occupies a volume of 5 liters at a temperature of 300 °K, what would happen to the volume if the temperature was increased to 350 °K?

Add text

Add text

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GAS LAWS

(CHARLES'S LAW, BOYLE'S LAW, GAY-LUSSAC'S LAW)

Science Reading

Boyle's Law

Boyle's law, also known as the pressure-volume law, describes the relationship between pressure and volume when temperature and particle amount remain constant. This law states that pressure and volume are inverses, meaning that if one increases, the other decreases. It is believed that this law could help explain the mysterious disappearances of ships in the Bermuda Triangle. As gases rise from the seafloor, their pressure decreases, causing the volume of the gas bubbles to increase. Eventually, the gases combine to form a massive bubble that bursts when it reaches the surface, creating a large hole that can swallow up a ship.

To determine a gas's new volume or pressure, you can use the formula $P_1V_1 = P_2V_2$. Suppose you have the starting temperature and volume and know either the ending temperature or volume. In that case, you can input the given information to find the missing variable, as shown in Diagram 2.

Diagram 2 A methane bubble of gas escapes the ocean at a depth where the pressure is 800 atm and the volume is 0.25 cubic feet. What is the volume of the bubble at 1 atm?

Step 1: plug in what you are given
 $800 \times 0.25 = 1 \times V_2$

Step 2: solve for the unknown variable
 $(800 \times 0.25) = 1 \times V_2$

$V_2 = 2.1$ cubic feet

Boyle's law can be represented on a graph demonstrating an inverse relationship. When the temperature is constant, the pressure will decrease as the volume increases.

Charles's Law

The temperature-volume law, explains the direct relationship between volume and temperature when pressure and the amount of particles are constant. If the volume will also increase. This can be observed with balloons on a hot day. If you are sitting in a car on a day when the temperature inside the vehicle is over 100 degrees Fahrenheit, the air inside the car will eventually pop due to the increase in temperature.

To determine a gas's new volume or temperature, you can use the formula $V_1/T_1 = V_2/T_2$. Suppose you have the starting temperature and volume, as well as the ending temperature or volume. In that case, you can use this formula to find the missing variable, as shown in Diagram 3.

Diagram 3 A balloon is inflated to a volume of 46 cubic feet at a temperature of 22 degrees Celsius. On a scorching hot day, the starting temperature of the balloon is 1.0 degrees Celsius. Due to the hot day, the temperature of the balloon increases to 46 degrees Celsius. What is the new volume of the balloon?

Step 2: solve for the unknown variable
 $46 \times (1.0 / 22) = (V_2 / 46) \times 46$

$V_2 = 2.1$ cubic feet

Charles's law can be represented on a graph demonstrating a directly related linear relationship. When the pressure is constant, as the temperature increases, the volume will increase.

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Topics Included

✓ Charles's Law

✓ Boyle's Law

✓ Gay-Lussac's Law

GAS LAWS

(CHARLES'S LAW, BOYLE'S LAW,
GAY-LUSSAC'S LAW)

Science Reading

Gay-Lussac's Law

Gay-Lussac's law, also known as the pressure-temperature law, explains the relationship between pressure and temperature when the volume and amount of particles remain constant. There is a direct proportion between pressure and temperature, meaning that if one increases, so does the other. When the temperature rises, the pressure inside a container will also increase. A pressure cooker is a real-world example of this law, as it can be used to increase the temperature and pressure quickly, reducing the cooking time required to prepare food.

To calculate the new pressure or temperature of a gas, the formula $P_1/T_1 = P_2/T_2$ can be used. If you have the initial temperature and pressure, and either the final temperature or pressure, you can input the given values to find the missing variable, as shown in diagram 3.

diagram 3

You put food in the pressure cooker and start cooking. The pressure starts at 10 psi with a temperature of 45°C (113°F) and then changes to a pressure of 15 psi. What will the new temperature be?

Step 1: plug in what you are given $10 / 45 = 15 / T_2$	Step 2: solve for the unknown variable $(10/45) \times T_2 = (15 / T_2) \times T_2$	Step 2: solve for the unknown variable (continued) $((0.22) \times T_2) / (0.22) = 15 / (0.22)$
--	--	--

$T_2 = 68^\circ\text{C} (154^\circ\text{F})$

Gay-Lussac's law can be represented on a graph demonstrating a directly related relationship. When volume is constant, as pressure increases, the temperature

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Check out what teachers just like you have said about the science readings:



Using this resource allowed me to teach this subject area with fidelity. My students were able to understand the subject, even though we weren't in person.



Excellent resource! My students learned a lot from doing this activity!



Very thorough reading assignment. I used it with a substitute. It was easy for students and a substitute to use independently

HOW TO USE THE RESOURCE IN

3 simple steps

1

Print the PDF version, make copies, and hand out to students

2

Use the digital version by clicking the titles in the RED BOX to make your own copy (found at the end of the PDF)

3

Share the resource with your students using your favorite LMS (Google Classroom, Powerschool (schoolology), Canva...)

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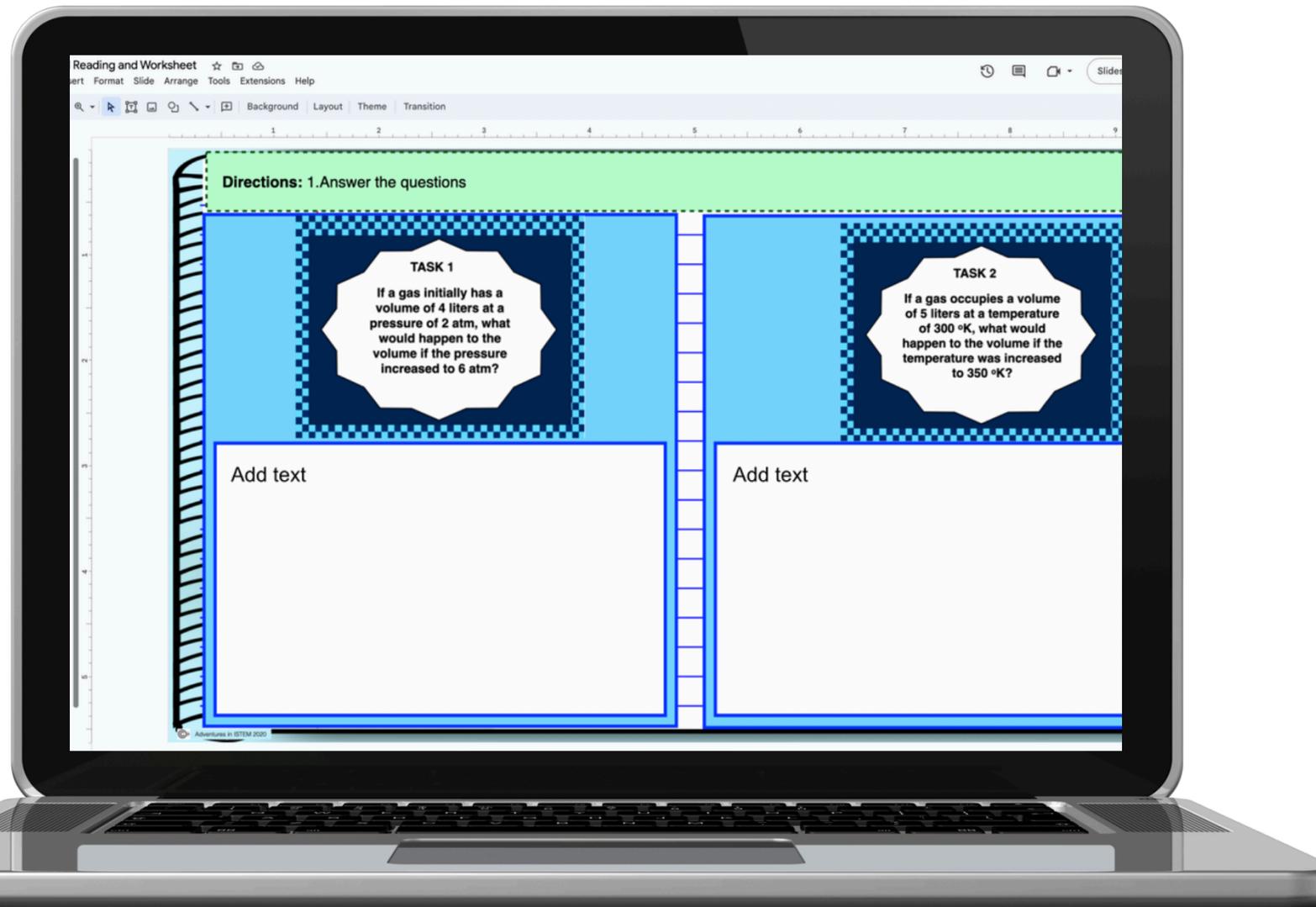
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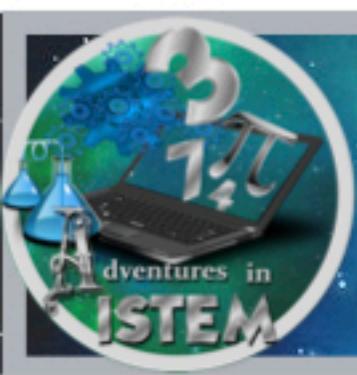
Waves

Reading Passages
Notes
Worksheets
Task Cards

Digital and Print

Science Reading Comprehension questions and Worksheets Bundle

Covers all NGSS MS-PS4



Free Sample

You can print the following pages for a free sample of what a science reading looks like and how you could use it in your classroom. Click the title in the red box for the digital version of the reading.

What You Will Need To Get Started:

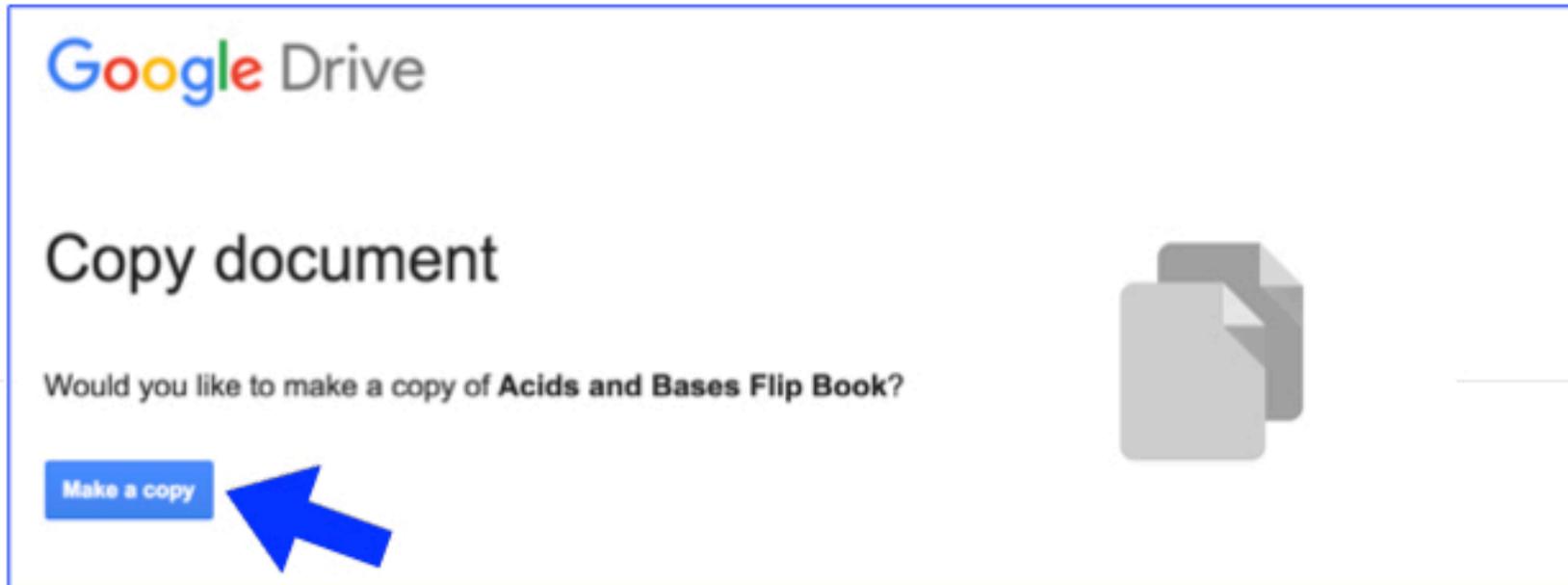
1. Download link for the Google Resource by clicking on the titles in the red box

Outer Planets Guided Reading Digital Notes

2. Access to the Internet and a Google Account (Free)

3. Google accounts or Microsoft OneDrive accounts for your students to save their work

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



5. This new copy is now yours to edit and share with your students

6. Printer access if you choose to print the finished product as an actual flip book

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 know 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).

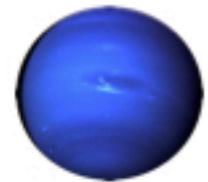
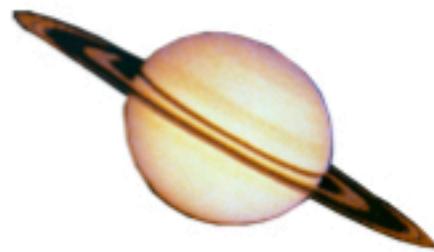
				
Distance from Sun	5 AU	9 AU	19 AU	30 AU
Rotation (day/night)	9 hours	10 hours	17 hours	16 hours
Revolution (year)	11 Earth years	29 Earth years	83 Earth years	163 Earth years
Diameter (size)	142,984 km	120,536 km	51,118 km	49,528 km
Density	1.33 g/cm ³	0.69 g/cm ³	1.27 g/cm ³	1.64 g/cm ³
Gravity	236%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

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?

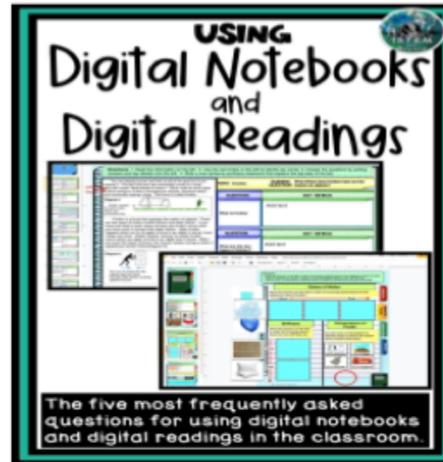
3. Why do you think the characteristic you choose in question 2 has more influence on the number of planetary satellites than the other characteristics? Explain.

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

Digital Resources

Using Digital Products?

If you are new to using digital lessons than I recommend to check out my blog post that contains the most frequently asked questions. Click the picture for the link.



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



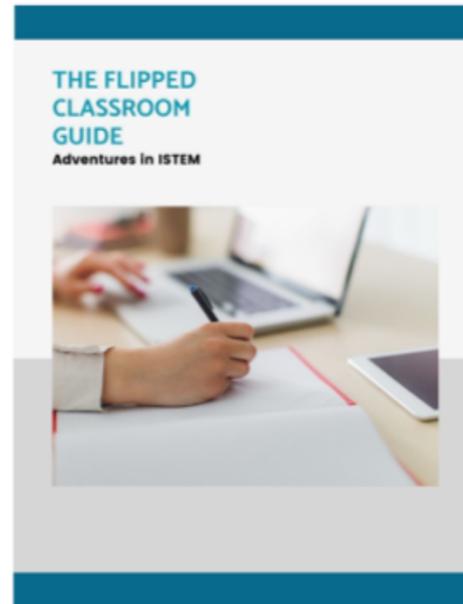
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