

GLOBAL WINDS AND OCEAN CURRENTS

Science Reading

Scroll Through

To take a peek inside!

Global Winds and Ocean Currents

Ocean Currents

Have you ever wondered how the water in the ocean moves and why it's so important for our planet? Ocean currents are like giant rivers flowing through the oceans, shaping climate and supporting marine life. They can be divided into two main types: surface currents and deep currents.

The wind mainly drives surface currents. When the wind blows across the ocean's surface, it pushes the water, creating surface currents. However, these currents don't move in straight lines. Due to the Coriolis effect, caused by Earth's rotation, surface currents curve to the left in the Northern Hemisphere, they curve to the right, while in the Southern Hemisphere, they curve to the left (Diagram 1). These curved currents form large circular patterns in the oceans called gyres. Surface currents play a major role in moving warm water from the equator toward the poles and bringing cooler water back toward the equator, helping to balance temperatures across the planet. For example, the Gulf Stream carries warm water from the Caribbean up the east coast of North America, keeping coastal cities like New York and Boston warmer in winter than inland areas at the same latitude.

Diagram 1: Surface currents, driven by wind, carry warm water away from the equator toward the poles and curve due to the Coriolis effect—turning right in the Northern Hemisphere and left in the Southern Hemisphere. These curved paths form large ocean gyres that help distribute heat around the planet.

Deep currents form due to differences in water density, which are influenced by temperature and salinity. Colder, saltier water is denser and sinks, while warmer, less salty water rises. These deep currents move slowly but carry vast amounts of heat and stabilize Earth's climate.

Global Winds

Have you ever wondered how winds affect the weather we experience every day? Global winds are powerful air currents that move across the Earth, shaping weather patterns and influencing ocean currents. Let's explore how these winds work and why they are so important.

Global winds are large-scale air movements that consistently flow in specific directions around the Earth. These winds form because the sun heats different parts of the Earth unevenly. Near the equator, the sun's rays hit directly, warming the air and causing it to rise. Meanwhile, cooler air from the poles sinks because it is less heated. This temperature difference creates variations in air pressure, which sets air in motion and forms winds.

One important factor affecting global winds is the Coriolis effect. Because the Earth rotates, winds do not travel in straight lines but instead curve as they move. In the Northern Hemisphere, winds curve to the right, and in the Southern Hemisphere, they curve to the left. This effect shapes global wind patterns and weather systems across the planet.

Winds are also influenced by differences in air density. Air moves from areas of high pressure to areas of low pressure. This movement is affected by the Coriolis effect, which causes winds to curve. In the Northern Hemisphere, winds curve to the right, and in the Southern Hemisphere, they curve to the left. This effect shapes global wind patterns and weather systems across the planet.

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Reading Passages

Notes

Worksheets

Task Cards

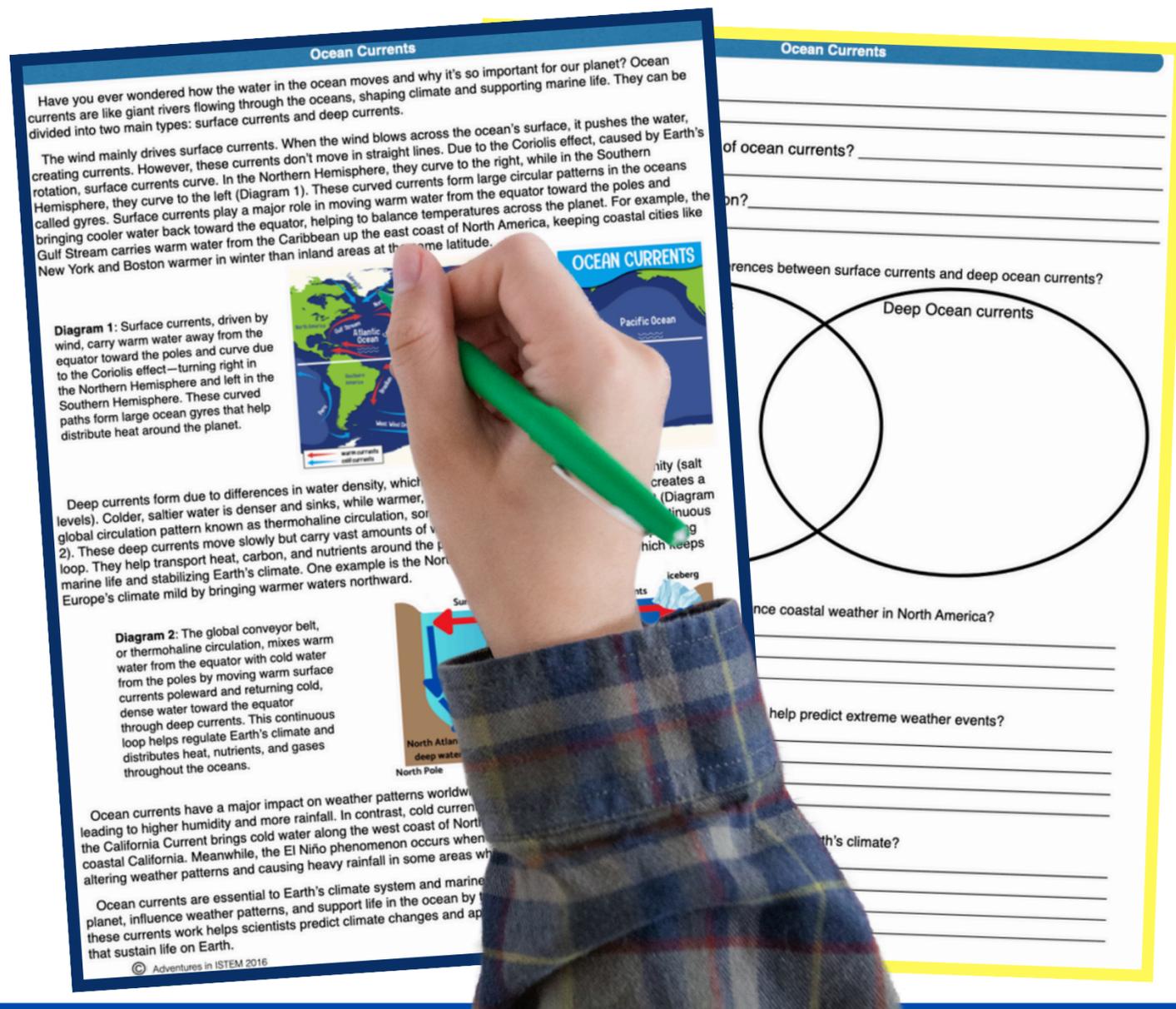
Global winds help distribute heat and moisture across the planet, affecting everything from weather patterns to ocean currents. They also influence climate patterns, such as the formation of rainforests and deserts. Understanding global winds is essential for studying Earth's climate system.

Help students learn about the Coriolis Effect and how it affects global winds, ocean currents, and climate and then test their comprehension with these easy to read science reading passages.

Readings with Questions

GLOBAL WINDS AND OCEAN CURRENTS

Science Reading



Topics Included



Global winds



Ocean currents



Climate

Each topic *includes*



One 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

Global Winds

Class: _____
Date: _____

Question: How do global winds shape our weather and climate?

Notes

Define / Describe:

1. What are global winds?
2. What is the Coriolis effect?
3. Describe the different types of global winds and where they are located.

Label:

4. Identify on the globe, the different types of global winds (Polar Easterlies, Westerlies, Trade winds).

Global Winds

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Global winds are large-scale air movements that consistently flow in specific directions around the Earth. These winds form because the sun heats different parts of the Earth unevenly. Near the equator, the sun's rays hit directly, warming the air and causing it to rise. Meanwhile, cooler air from the poles sinks because it is less heated. This temperature difference creates variations in air pressure, which sets air in motion and forms winds.

One important factor affecting global winds is the Coriolis effect. Because the Earth rotates, winds do not travel in straight lines but instead curve as they move. In the Northern Hemisphere, winds curve to the right, while in the Southern Hemisphere, they curve to the left. This effect shapes global wind patterns and influences the movement of storms and weather systems across the planet.

Global winds can be categorized into different types based on their location on Earth and the direction in which they move (Diagram 1). These winds form consistent patterns that help move air, moisture, and energy around the globe. Trade winds blow from east to west near the equator and are some of the most reliable winds on Earth. They help steer tropical storms and hurricanes across the oceans and bring warm, moist air to tropical regions, contributing to heavy rainfall in places like the Amazon and Southeast Asia. Prevailing westerlies blow from west to east in the mid-latitudes, between about 30° and 60° latitude. These winds are responsible for moving weather systems across much of the United States and Europe, often bringing changes in temperature and precipitation. Polar easterlies blow from east to west near the poles and carry cold, dry air toward the lower latitudes. Although they are weaker than other global winds, polar easterlies play a key role in shaping the climate of the Arctic and Antarctic regions. Together, these wind systems help transport air, moisture, and energy around the globe, which influences the weather and climate in different regions.

Diagram 1: Global winds are large-scale air patterns that move in consistent directions and help transport air masses, moisture, and energy around the Earth. Trade winds, prevailing westerlies, and polar easterlies each affect weather in different regions by moving warm or cold air and influencing storms and precipitation.

Global winds help distribute heat and moisture across the planet, which influences the formation of storms and weather patterns. For example, the trade winds help drive the movement of weather systems in North America and Europe. Understanding how these winds work can help us understand weather changes and study climate dynamics.

Global winds are a crucial part of Earth's climate system. They help distribute heat and moisture across the planet, and drive natural processes essential for life. By understanding how these winds work, we can gain insight into the forces that govern our planet's environment.

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global winds currents and climates digital reading

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Background Layout Theme Transition

Define / Describe:

1. What are global winds?
Add text
2. What is the Coriolis effect?
Add text
3. Describe the different types of global winds and where they are located.
Add text

Label:

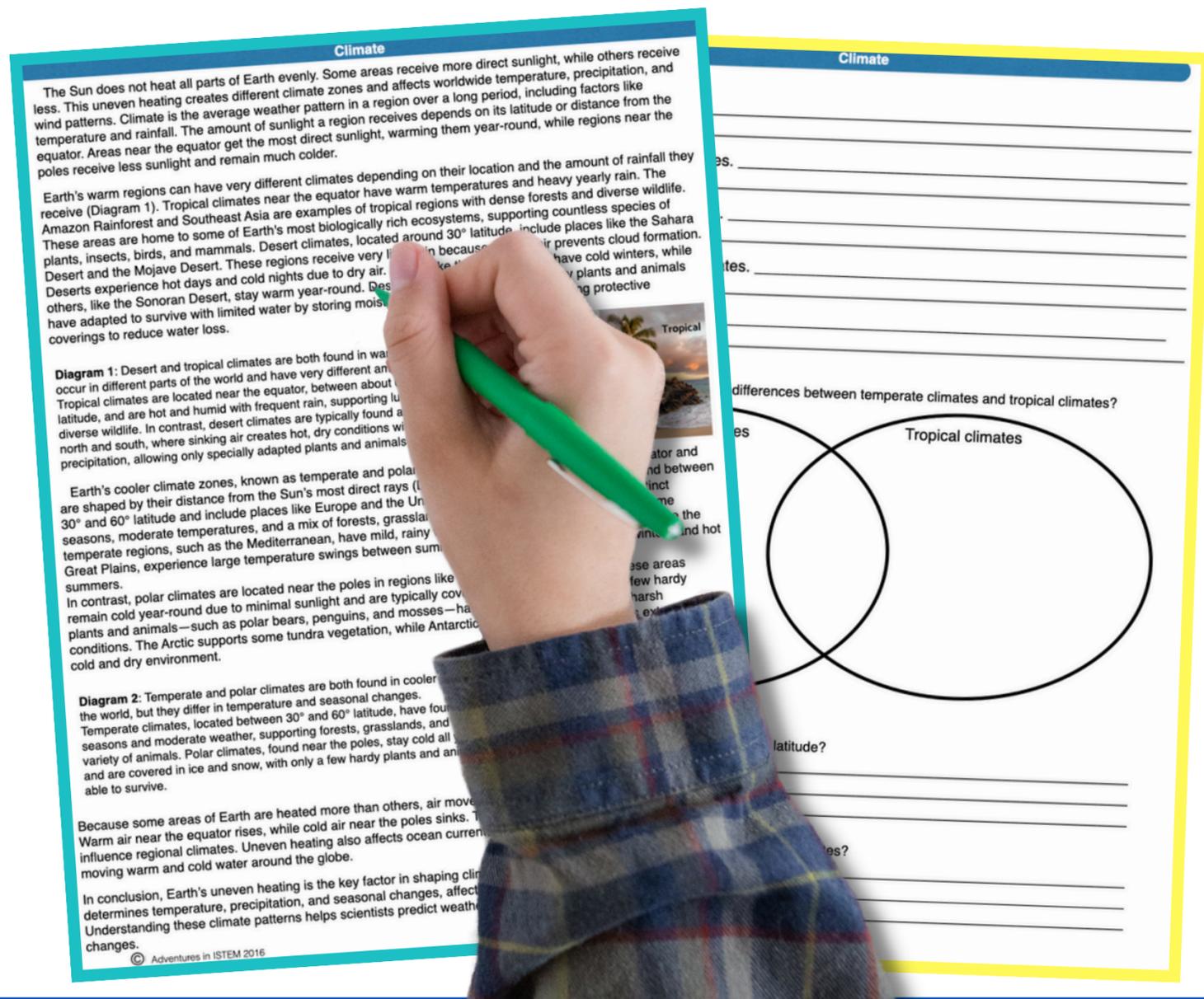
4. Identify on the globe, the different types of global winds (Polar Easterlies, Westerlies, Trade winds).
Add text

Elaborate / Extend:

5. How do trade winds affect tropical storms?
Add text
6. What role do prevailing westerlies play in U.S. weather?
Add text

GLOBAL WINDS AND OCEAN CURRENTS

Science Reading



What Are *students* Doing?

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

GLOBAL WINDS AND OCEAN CURRENTS

Science Reading

Ocean Currents

Define / Describe:

1. What are ocean currents?
2. What are the two main types of ocean currents?
3. What is thermohaline circulation?

Compare:

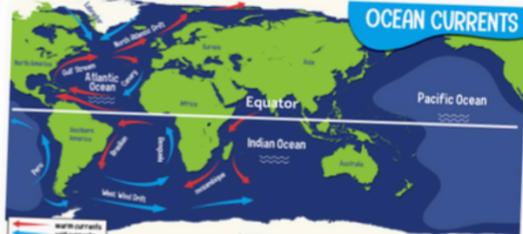
4. What are some similarities and differences between surface currents and deep currents?

Elaborate / Extend:

5. How does the California Current influence the climate of the western United States?
6. How does understanding ocean currents help us understand Earth's climate?
7. What role do ocean currents play in the global climate system?

Have you ever wondered how the water in the ocean moves and why it's so important for our planet? Ocean currents are like giant rivers flowing through the oceans, shaping climate and supporting marine life. They can be divided into two main types: surface currents and deep currents.

The wind mainly drives surface currents. When the wind blows across the ocean's surface, it pushes the water, creating currents. However, these currents don't move in straight lines. Due to the Coriolis effect, caused by Earth's rotation, surface currents curve. In the Northern Hemisphere, they curve to the right, while in the Southern Hemisphere, they curve to the left (Diagram 1). These curved currents form large circular patterns in the oceans called gyres. Surface currents play a major role in moving warm water from the equator toward the poles and bringing cold water back toward the equator, helping to balance temperatures across the planet. For example, the Gulf Stream carries warm water from the Caribbean up the east coast of North America, keeping coastal cities like Boston warmer in winter than inland areas at the same latitude.



Surface currents are driven by wind. Wind blowing across the ocean's surface pushes the water, creating currents. However, these currents don't move in straight lines. Due to the Coriolis effect, caused by Earth's rotation, surface currents curve. In the Northern Hemisphere, they curve to the right, while in the Southern Hemisphere, they curve to the left in the Northern Hemisphere and right in the Southern Hemisphere. These curved currents form large circular patterns in the oceans called gyres that help balance temperatures across the planet.

Deep currents form due to differences in water density, which are influenced by temperature and salinity (salt content). Colder, saltier water is denser and sinks, while warmer, less salty water rises. This movement creates a global circulation pattern known as thermohaline circulation, sometimes called the global conveyor belt (Diagram 2). These deep currents move slowly but carry vast amounts of water, connecting all the oceans in a continuous loop. They help transport heat, carbon, and nutrients around the planet, making them essential for supporting marine life and stabilizing Earth's climate. One example is the North Atlantic Deep Water Current, which keeps Europe's climate mild by bringing warmer waters northward.

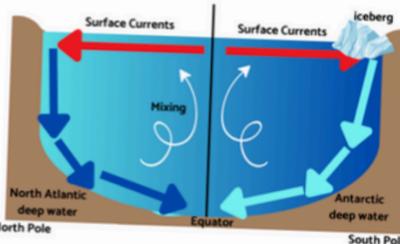


Diagram 2: The global conveyor belt, or thermohaline circulation, mixes warm water from the equator with cold water from the poles by moving warm surface currents poleward and returning cold, dense water toward the equator through deep currents. This continuous loop helps regulate Earth's climate and distributes heat, nutrients, and gases throughout the oceans.

Ocean currents have a major impact on weather patterns worldwide. Warm currents increase evaporation, leading to higher humidity and more rainfall. In contrast, cold currents often result in drier conditions. For example, the California Current brings cold water along the west coast of North America, leading to dry, cool conditions in coastal California. Meanwhile, the El Niño phenomenon occurs when warm water shifts across the Pacific Ocean, altering weather patterns and causing heavy rainfall in some areas while leading to droughts in others.

Ocean currents are essential to Earth's climate system and marine ecosystems. They move heat around the planet, influence weather patterns, and support life in the ocean by transporting nutrients. Understanding how these currents work helps scientists predict climate changes and appreciate the complex, interconnected systems that sustain life on Earth.

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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

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



“My students and I absolutely loved this resource!!! The way this was planned out with the reading, diagrams, and questions was perfect. I mainly used this with my students but they used it one day with a substitute and they wrote to tell me how great it was! (I think they thought I created it so I have to tell them otherwise!)” -

Nicole

GLOBAL WINDS AND OCEAN CURRENTS

Science Reading

Global Winds **Answer Key**

Define / Describe:

1. What are global winds? Large-scale air movements that consistently flow in specific directions.
2. What is the Coriolis effect? The curving of winds due to Earth's rotation.
3. Describe the different types of global winds and where they are located. Trade winds blow from east to west near the equator and help move tropical storms across the oceans. Prevailing westerlies blow from west to east in the mid-latitudes, between 30° and 60°, and often carry weather systems across the United States and Europe. Polar easterlies blow from east to west near the poles and bring cold, dry air toward lower latitudes, influencing the frigid climates of the Arctic and Antarctic regions.

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Diagram 1: Global winds are large-scale air patterns that move in consistent directions and help transport air masses, moisture, and energy around the Earth. Trade winds, prevailing westerlies, and polar easterlies each affect weather in different regions by moving warm or cold air and influencing storms and precipitation.

Global winds help distribute heat and moisture across the planet, affecting everything from changes to storm formation. They also influence ocean currents, which regulate global climate. For example, the trade winds help drive the movement of warm ocean currents like the Gulf Stream, which affects weather in North America and Europe. Understanding these patterns allows scientists to predict weather changes and study climate dynamics.

Global winds are a crucial part of Earth's climate system. They shape weather, influence regional climates, and drive natural processes essential for life. By understanding global wind patterns, we gain insight into the forces that govern our planet's environment and improve weather forecasting.

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



“I love using reading passages in my science classes because I am able to reinforce all the learning strategies they have learned in the past and give the students more understanding of the information provided.” – Suzzane



“I was really glad to find a bundle that included so many of our objectives since we do not have a curriculum” – Amanda



“This article kept my 8th graders engaged while reviewing this topic” Brower Power Science

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

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Teachers Guide

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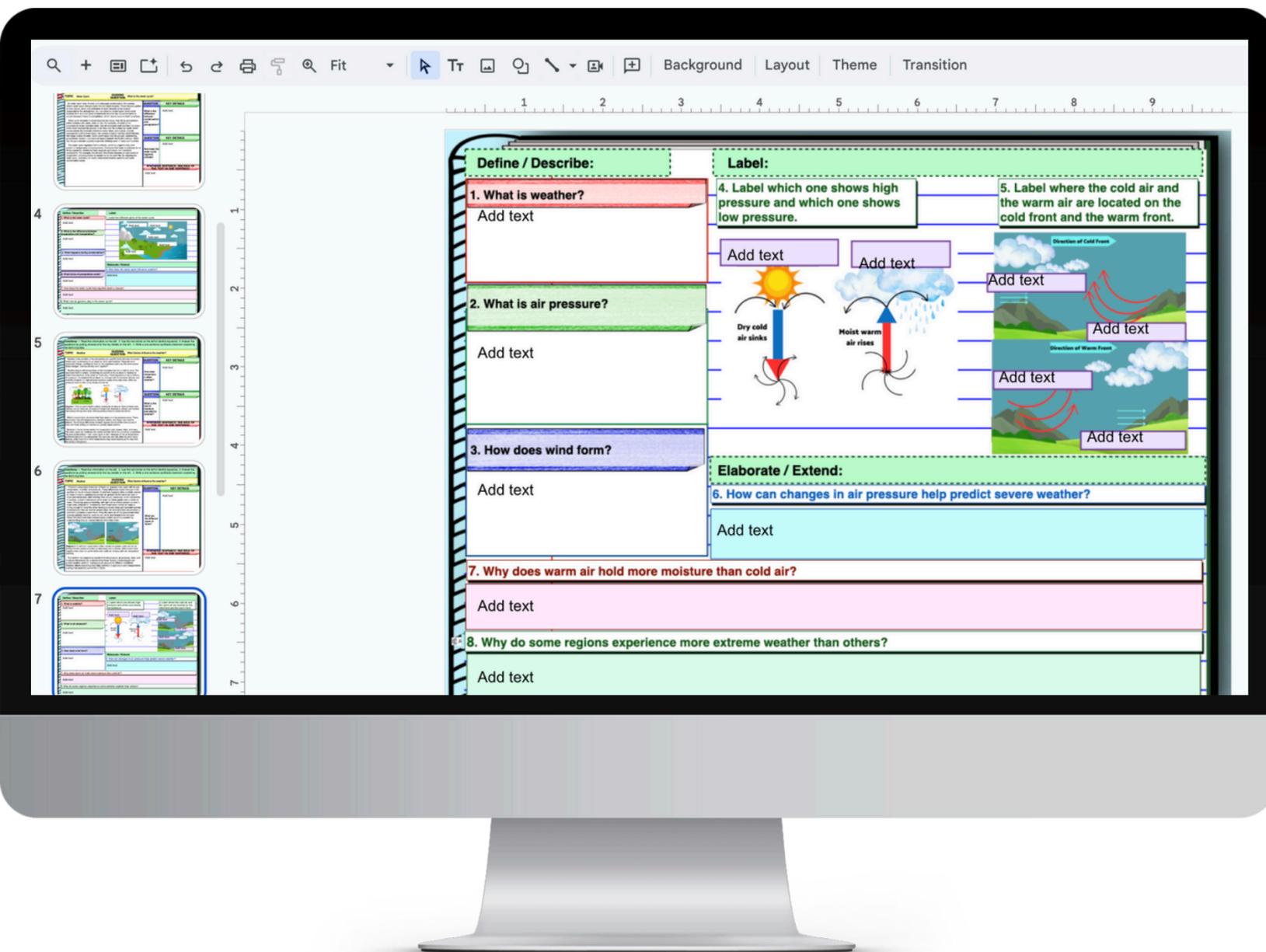
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Earth Science Standards

Earth and Space

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Earth's Systems

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Human Impact on the Environment

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Integrated Model by Grade Level

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Full Year

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Molecules to Organisms

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Ecosystems

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Evolution

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Physical Science Standards

Alternative Model by Topic

Earth Science

Full Year

- ✓ Reading Passages
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Life Science

Full Year

- ✓ Reading Passages
- ✓ Notes
- ✓ Worksheets
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Waves

NGSS MS-PS4

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- ✓ Worksheets
- ✓ Task Cards

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