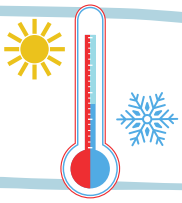
NAME: _____ DATE: _____

HANDS-ON SCIENCE!

OCEAN CURRENTS



How to use this package:

- **Vocabulary**: practice vocab words **before and after** class by:
  - using them for flashcards or matching
  - writing sentences, a paragraph or story
  - making a SketchNotes page
  - discussing them with your family
- **Guided Notes**: use these pages **in class** to learn about note-taking and to collect key information.
- **In-Class Activity:** use pages 7-8 **in class** as directed by the teacher.
- **Extension Activities:** pick and choose from some suggested activities to complete **after class** or get inspired to create your own!
- **Guided Notes Key**: check-in **after class** to be sure you captured all the big ideas.
- **Printing**: I recommend printing pages 3-8 double-sided and the rest as needed. The vocabulary words and definitions will line up back-to-back when double-sided and flipped on the long edge (pre-print they are mirrored).

PAGE INTENTIONALLY BLANK

Column A

Column B

SALINITY

DENSITY

THERMOHALINE

FRICTION

UPWELLING

DOWNWELLING

ABYSSAL OCEAN

PHYTOPLANKTON

LATITUDE

HUMIDITY

Column B

The mass of a substance per unit volume, often used to describe how compact a material is.

The resistance encountered when one object moves against another, transferring energy in the process.

The process of sinking surface water caused by winds pushing water toward the coast.

Microscopic marine plants that form the base of the marine food web and produce a significant portion of the Earth's oxygen.

Humidity is a measure of the amount of water vapor present in the air.

Column A

The concentration of salt and other dissolved minerals in water.

The movement of ocean water caused by variations in temperature and salinity.

The process of bringing cold, nutrient-rich water from deeper layers to the ocean's surface due to winds pushing surface water away from the coast.

The deep-sea region of the ocean, often referring to depths beyond 2,000 meters.

A set of horizontal lines on a globe that tell us how far north or south a location is from the equator.

OCEAN CURRENTS

NAME: _____ DATE: _____

WEEKLY TOPIC _____

Ocean _____ result from wind, temperature, _____, and density. Winds create _____ currents by transferring energy to water through _____. _____ and salinity differences, known as thermohaline circulation, affect _____ gradients which drive _____ water movement. It can take _____ of years for ocean water to resurface from the _____ ocean. Ocean currents shape global _____, _____, and weather.

_____ circulation is a vital oceanic process resulting from temperature and salinity _____. _____, dense water _____, initiating deep-sea currents that travel vast distances. As _____ water descends, _____ and less salty water _____ to replace it, completing the circulation loop.

NAME: _____ DATE: _____

WEEKLY TOPIC _____

Coastal _____ occurs when winds parallel to the coastline push surface waters _____ from the land, causing nutrient-rich cold water from _____ layers to replace it. This _____ surge stimulates the growth of _____ and fuels marine productivity. Coastal _____ arises when winds push surface water _____ the coast, leading to the _____ of warmer surface water. Downwelling transports _____ and heat deeper into the ocean.

Ocean currents impact _____ conditions by regulating _____ distribution and _____ exchange. Warm ocean currents transport heat from the _____ towards _____ latitudes, moderating temperatures in _____ areas. Cold currents contribute to _____ effects. Ocean currents impact evaporation rates, influencing _____ levels, and contributing to _____ patterns.

IN CLASS ACTIVITY

OCEAN CURRENTS

EARTH SCIENCE

THERMOHALINE CIRCULATION

Supplies: a clear container of room-temperature water, a beaker of warm/hot water, a beaker of ice water, food coloring (2 colors, red and blue preferred), a pipette or spoon.

Method: Which is more dense: hot water or cold water?

- Dye the cold water blue and use the pipette or spoon to slowly add it to one side of the container.
- Dye the hot water red and add it to the other side of the container.

Draw a picture of your container and label the liquids.

Questions:

What do you observe in this experiment?

How do temperature and salinity affect the density of water?

What is thermohaline circulation, and why is it important for Earth's climate?

TABLE CREW

Follow a Drop of Water

Write a story about a drop of water circulating in the ocean. Start with the drop raining down on the beach nearest your home and flowing to the ocean. Once it reaches the ocean, where does it circulate? Will it get caught in an upwelling or downwelling along your nearest coastline? Through which major currents does it flow? Will it travel to the abyssal ocean or one of the poles?

ONLINE CREW

Motion of the Ocean

Deep dive into the movement of the ocean in the North Atlantic. How does the ocean redistribute the suns energy around the Earth?

https://bit.ly/3EceTbT

ART CREW

Paint the Ocean Currents

Create an art piece that captures the movement and patterns of ocean currents.

OUTDOOR CREW

Beach Field Trip

Take a field trip to a beach to observe waves, tides, and currents firsthand, and discuss how these processes impact coastal ecosystems. Can't get to the beach? Create temporary art installations using natural materials to represent ocean currents.

NAME: _____ DATE: _____

WEEKLY TOPIC OCEAN CURRENTS

Ocean **currents** result from wind, temperature, **salinity**, and density. Winds create **surface** currents by transferring energy to water through **friction**. **Temperature** and salinity differences, known as thermohaline circulation, affect **density** gradients which drive **deep** water movement. It can take **hundreds** of years for ocean water to resurface from the **abyssal** ocean. Ocean currents shape global **climate**, **ecosystems**, and weather.

Thermohaline circulation is a vital oceanic process resulting from temperature and salinity **disparities**. **Cold**, dense water **sinks**, initiating deep-sea currents that travel vast distances. As **denser** water descends, **warmer** and less salty water **rises** to replace it, completing the circulation loop.

NAME: _____ DATE: _____

WEEKLY TOPIC OCEAN CURRENTS

Coastal **upwelling** occurs when winds parallel to the coastline push surface waters **away** from the land, causing nutrient-rich cold water from **deeper** layers to replace it. This **nutrient** surge stimulates the growth of **phytoplankton** and fuels marine productivity. Coastal **downwelling** arises when winds push surface water **toward** the coast, leading to the **sinking** of warmer surface water. Downwelling transports **oxygen** and heat deeper into the ocean.

Ocean currents impact **atmospheric** conditions by regulating **heat** distribution and **moisture** exchange. Warm ocean currents transport heat from the **equator** towards **higher** latitudes, moderating temperatures in **coastal** areas. Cold currents contribute to **cooling** effects. Ocean currents impact evaporation rates, influencing **humidity** levels, and contributing to **precipitation** patterns.