Storms Over Warm Water

Trace how ocean heat and moving air build a tropical cyclone.

8.10.C "describe the interactions between ocean currents and air masses that produce tropical cyclones, including typhoons and hurricanes."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Circle each ocean or air condition that affects a tropical cyclone. Draw an arrow from each circled condition to the effect it causes in the storm.

Ocean Energy for a Spinning Storm

1. Over tropical oceans, sunlight warms surface water. Warm ocean currents can carry heat into a region, helping keep surface water warm. When water is about 26.5°C or warmer and the warm layer is deep enough, evaporation adds water vapor to the air above it. This moist, warm air mass rises because it is less dense than nearby air. As it rises, the vapor cools and condenses into clouds. Condensation releases heat, which warms the rising air and helps more air rise from near the ocean surface. The process can build tall thunderstorms.

2. At the surface, air from surrounding areas moves toward the lower pressure under these storms. Earth's rotation makes this moving air curve, so thunderstorms can organize around a center. The direction of spin depends on the hemisphere: counterclockwise in the Northern Hemisphere and clockwise in the Southern Hemisphere. A tropical cyclone is the organized, rotating storm that can form when it stays over warm water. In the Atlantic and eastern Pacific it is called a hurricane. In the western North Pacific it is called a typhoon.

3. The cyclone strengthens while warm ocean water keeps supplying heat and water vapor. Rising air and released condensation heat lower pressure near the center, drawing in more moist air. The storm can weaken after it moves over cooler water, over land, or into dry air. Cooler water provides less evaporation, and land cuts off the storm's ocean source. A cold current can also cool the surface and limit this energy supply. Strong winds high in the atmosphere can also tilt or tear apart the storm's organized circulation pattern.

2 ANSWER WITH EVIDENCE

Use the passage

1. How can a warm ocean current help create conditions for a tropical cyclone?

2. Describe how rising moist air and condensation help a tropical cyclone grow stronger.

3. Why can the same type of storm be called a hurricane in one ocean basin and a typhoon in another? Name the two regions from the passage.

4. Explain two ways an ocean or air condition can weaken a tropical cyclone.

3 YOUR TURN

Your own words

Create a three-panel annotated sketch that shows a tropical cyclone's energy changes. In Panel 1, show a warm current and evaporation; in Panel 2, show rising air and a rotating storm; in Panel 3, show the storm moving over cooler water or a cold current and beginning to weaken. Write one caption under each panel.

ANSWER KEY

Storms Over Warm Water

GRADE 8 · TEKS 8.10.C

PART 1 · READ AND MARK

Circle each ocean or air condition that affects a tropical cyclone. Draw an arrow from each circled condition to the effect it causes in the storm. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	How can a warm ocean current help create conditions for a tropical cyclone?	**A warm ocean current carries heat into a region and helps keep surface water warm. Warm water increases evaporation and adds water vapor to the air.**
2	Describe how rising moist air and condensation help a tropical cyclone grow stronger.	**Warm, moist air rises, then cools and condenses into clouds. Condensation releases heat, warming the rising air and helping more air rise. This helps lower pressure and draw in more moist air.**
3	Why can the same type of storm be called a hurricane in one ocean basin and a typhoon in another? Name the two regions from the passage.	**They are regional names for a tropical cyclone. It is called a hurricane in the Atlantic and eastern Pacific, and a typhoon in the western North Pacific.**
4	Explain two ways an ocean or air condition can weaken a tropical cyclone.	**Cooler water or a cold current reduces evaporation and the storm's heat and water-vapor supply. Dry air can weaken the storm, and strong winds high in the atmosphere can disrupt its circulation.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Panel 1: Warm current below the ocean surface, with arrows showing evaporation into moist air. Caption: Warm water adds heat and water vapor to the air. Panel 2: Moist air rises into clouds, while curved arrows show air rotating toward a low-pressure center. Caption: Condensation releases heat and helps the storm strengthen. Panel 3: The storm moves over cooler water, with fewer upward evaporation arrows. Caption: Cooler water supplies less water vapor, so the cyclone weakens.

Accept equivalent cause-and-effect explanations that connect warm water or warm currents to evaporation, moist rising air, condensation, and lower pressure. For weakening, accept cooler water, cold currents, land, dry air, or strong upper-level winds when the student explains the effect on the storm.