Name_____ **Date**_____

K (What do you know)	W (What do you want to know)	L (What have you learned)

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Flow of Energy Activity Sheet

Purpose: Students will learn that there is more energy in warm/hot water than in cold water. This activity will simulate the movement of energy from warm/hot water to cold water. This principle can be applied to the movement of the energy in air during a hurricane.

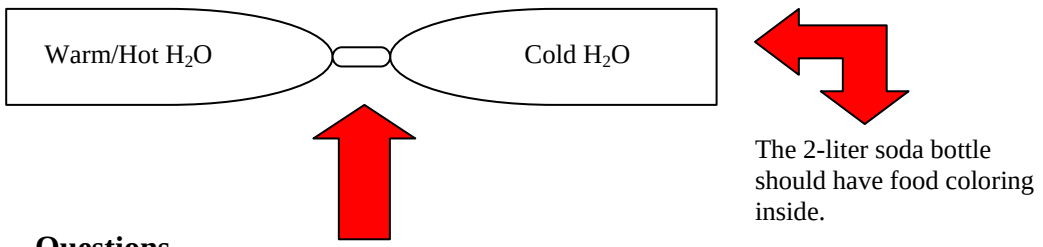
Materials:
- Two 2-liter soda bottles
- Tornado tube connector
- Water (warm/hot & cold)
- Food coloring
- Aluminum pan
- Funnel

Hypothesis: Predict what will happen when warm/hot water comes into contact with cold water.

If warm/hot water comes in contact with cold water, then…….

Procedures:
- Fill one 2-liter soda bottle ¾ full with cold water.
- Fill the second 2-liter soda bottle ¾ full with warm/hot water.
- Add 3-4 drops of food coloring to the 2-liter soda bottle with cold water.
- Add the tornado tube connector to the 2-liter soda bottle with cold water.
- **Carefully** hold the 2-liter soda bottle with cold water horizontally, and connect the 2-liter bottle with warm/hot water.

Note- the above step should take place over an aluminum pan to catch dripping water between the two 2-liter bottles.
- Record your observations.



Questions

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1. Was your hypothesis correct or incorrect? Explain.

2. What occurred when the water was mixed in the two 2-liter bottles?

3. Why the food coloring used in the activity?

4. In your own words, explain how the activity applies to the movement of energy in air during a hurricane.

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Hurricane Tracking Map Data

Directions-

1. Listen to the latest hurricane advisory from your teacher.
2. Determine the hurricane latitude (for example, 15.5 degrees North).
3. Find that latitude along the vertical axis of the hurricane-tracking map and mark the location on the axis.
4. Determine the hurricane longitude (for example, 45 degrees West).
5. Find that longitude along the horizontal axis of the hurricane-tracking map and mark the location on the axis.
6. Follow the vertical and horizontal marks into the center of the map until they intersect. Mark that location with a dot.
7. Label each dot with the date and time and wind speed (mph).
8. Repeat steps 1 through 7 for each advisory given from your teacher.

Hurricane Tracking Data

Time	Latitude (North)	Longitude (West)	Wind Speed (mph)
6:00 A.M.	24.3	66.0	70
6:00 A.M.	25.0	71.1	90
6:00 A.M.	25.5	73.0	110
6:00 A.M.	25.5	74.2	120
6:00 A.M.	25.4	75.8	125
6:00 A.M.	25.4	78.0	135

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Have Fun!

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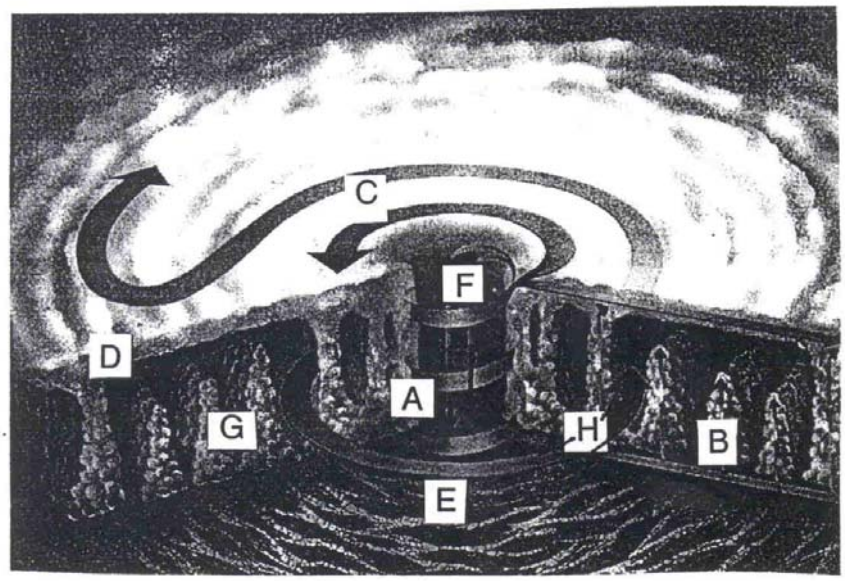
Anatomy of a Storm



Match the letters from the hurricane above with the terms below:

_____1. surge

_____2. ascending air

_____3. spiraling air

_____4. rain bands

_____5. eye

_____6. storm cap

_____7. decending air

_____8. eyewall

_____9. counterclockwise airflow

_____10. lowest air pressure

_____11. highest wind speeds

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Anatomy of a Storm Key

Match the letters from the hurricane above with the terms below:

____E_____1. surge

____B_____2. ascending air

____C_____3. spiraling air

____G_____4. rain bands

_____F____5. eye

_____D_____6. storm cap

_____F____7. decending air

_____A_____8. eyewall

_____H_____9. counterclockwise airflow

_____F_____10. lowest air pressure

_____A_____11. highest wind speeds

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Anatomy of a Storm Teacher Notes

What Is a Hurricane?

Many people say hurricanes, characterized by ferocious winds and heavy rain, are Mother Nature's most feared storms. They form over oceans in tropical regions, converting warm water and air into wind and waves. Weather satellites help forecasters judge a hurricane's movement and strength. Reconnaissance planes help us learn that goes on inside.

Wind Flow

* Ascending air: Heated by warm waters, humid air begins to rise. The ascending air creates wind and results in vast amounts of energy in the form of thunderstorms.

* Descending air: In the eye of the hurricane, air descends and creates low pressure, which suppresses cloud formation. That is why the eye is relatively calm and clear.

* Spiraling air: As warm, humid air spirals inward toward the center, it gains speed. That's why the eye wall contains the fastest-moving storms. The faster wind speeds grow, the larger and more dangerous a hurricane becomes.
* Pre-existing winds: These are winds not created by the hurricane. If they are moving in the same direction and at roughly the same speed, then the hurricane stays intact.

* Steering Currents: They push the hurricane forward. These winds stretch for hundreds of miles around the hurricane and account for 80 percent of the storm's motion.

Rain Bands

A hurricane is made up of numerous bands of thunderstorms. Known as rain bands, they spiral around the center of the hurricane. They hold vast amounts of rainwater because they feed off evaporated moisture from warm ocean waters.
Rain bands typically measure 3 to 30 miles wide and can stretch up to 300 miles long. Hurricanes contain one to 10 rain bands, depending on the size of the storm. Sometimes large gaps form between bands, where no rain falls at all.

Eye Wall

A swirl of fast-moving thunderstorm clouds surrounds the eye of a hurricane. This is called the eye wall, and it shapes and defines a hurricane's center. Its high concentration of energy drives the storm.
Thunderstorms in the eye wall absorb huge amounts of moisture from the ocean.

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Consequently, the fiercest winds and heaviest rains reside in this part of a hurricane. An extremely dense eye wall can reach 7 to 9 miles in height.

Eye
When scientists want to get up-close-and-personal readings on a hurricane, they hop on a reconnaissance plane and head directly for the eye of the beast. The eye is an unusual island of tranquil air in the center of a hurricane.
In the Earth's Northern Hemisphere, the hurricane eye is shaped by the storm's high-speed counterclockwise winds. In the Southern Hemisphere, the winds blow clockwise.

The eye is clear of clouds because low pressure, or sinking air, keeps clouds from forming. Air does not flow directly into the eye but spirals around it. That is why it seems generally calm and sunny in the eye of the storm. While sizes vary from storm to storm, a typical eye can measure 20 to 40 miles across.

Storm Cap
Upward-flowing winds and rain bands carry water vapor. When this vapor reaches a height of 40,000 feet or more, it forms a layer of clouds that act as a lid for a hurricane.

Storm Surge
The deceptively calm low-pressure center of a hurricane's eye masks the turbulence going on at the ocean's surface.
As high-pressure winds spiral inward, they pull ocean water towards the center of the storm. Low pressure in the eye does not have the strength to push down on the water. As a result, a large mound of water forms, known as a "storm surge", just under the eye wall area.

* In the open ocean: Storm surge may reach only a few feet high. Water still can spiral downward and flow away in underwater currents.

* In shallow water, or near land: The mound of water gets larger as a storm reaches shallower waters. When a storm surge makes landfall, it hits more like quick-rising floodwaters than like a tidal wave. A minimal hurricane's storm surge can reach 4-5 feet and cause light damage to coastal areas. A catastrophic hurricane's surge can rise as high as 18 feet and cause widespread severe flooding.

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T-Chart

Guess	Solutions
	

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T-Chart Key

Guess	Solutions
 Student responses will vary	Latitude Longitude Velocity Wind Speed Coordinates 

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