HURRICANES

WHAT ARE THE DIFFERENCES BETWEEN HURRICANES, CYCLONES, AND TYPHOONS?

These three words all describe the same phenomenon: a tropical storm of fierce spiraling winds. Such storms occur around the world, but only between the equator and latitudes 30° north and south of it. When these storms occur in the Atlantic Ocean, they are called hurricanes. They are called cyclones in the Indian Ocean and typhoons in the Pacific Ocean. Cyclone is also a generic word for a whirlpool of wind.

In Australia, tropical storms of fierce spiraling winds are also known as willy-willies.

WHAT CAUSES A HURRICANE?

Hurricanes result from an increasingly strong storm system over water. When air over warm ocean water is heated by the Sun to about 81° Fahrenheit (27° Celsius), it rises in severely increased updrafts and low pressure. Numerous, large convection cells (circulation patterns of warm air rising, cooling, and condensing) go to work creating a widespread storm, lowering the air pressure more and more. The cells merge and great winds begin to blow as surrounding high pressure air moves in to equalize the low pressure. Winds tend to blow in the same direction, clockwise in the Northern Hemisphere and counterclockwise in the Southern Hemisphere, which creates a whirlpool, or cyclone. Meanwhile, the convection cell is constantly fed by the heat of condensing air and the wind, growing larger and stronger. When the winds reach a speed of about 75 miles (120 kilometers) per hour, the storm has become a hurricane.

Hurricanes can grow to be over 1,000 miles (1,600 kilometers) wide with wind speeds of 200 miles (320 kilometers) per hour.

ARE HURRICANES ONLY WIND STORMS?

Not only are hurricane winds ferocious, but vast amounts of rain pour down from the saturated clouds. In a single day, a hurricane can unleash as much precipitation as falls over a whole year in rainy Seattle, Washington.

The strong air currents of a hurricane also churn up vast amounts of ocean water, called **storm surges**, creating large waves weighing hundreds of tons. Coastal damage from these giant waves can easily equal or surpass the devastation of a hurricane's winds.

WHAT IS THE EYE OF A HURRICANE?

A hurricane is a spiral of winds racing up to 200 miles (320 kilometers) per hour, but in the middle of the whirlpool lies a calm center called the eye. As unbelievable as it sounds, the sheer force of the storm in its spiral formation allows some 10 to 30 miles (16 to 48 kilometers) at the center to remain unaffected. The weather within the eye of a hurricane is warm, still, and cloudless.

HURRICANE NAMES

In Chinese, *ta-feng* means “violent winds.” A mispronunciation of this word became the name for the violent cyclones in the Pacific Ocean: typhoons. The generic term *cyclone* was coined in 1844 and was meant to call to mind the whirling image of a coiled, striking snake. The word *hurricane* comes from the language of an extinct West Indian tribe, the Taino. *Huracan* meant “evil spirit” and was associated with the God of Evil who sent wind storms to punish people.

The custom of naming hurricanes began at least 150 years ago. Early names were taken from Christian saints traditionally honored the day a hurricane happened to take place. The 1825 hurricane Santa Ana was named for Saint Ann. From 1953 to 1979, hurricanes were christened with female names, beginning with the letter A and proceeding through the alphabet. One impact of the feminist revolution in the 1970s was to begin using male as well as female names. Now the names run through the alphabet alternating male and female.

29. In your own words, explain how a hurricane is formed. Use details from the passage to support your answer.

HURRICANES
CONSTRUCTED-RESPONSE SCORING GUIDE

Score	Description
4	Student gives a well-developed explanation in his or her own words of how a hurricane is formed. Response meaningfully uses relevant details from the passage as support.
3	Student gives a general explanation of how a hurricane is formed, but response lacks some supporting details from the passage. May contain minor misunderstandings/omissions.
2	Student gives a basic explanation of how a hurricane is formed, but response uses limited details from the passage as support. May contain some important misunderstandings/omissions.
1	Student makes a vague statement or gives a personal opinion with little or no support from the passage.
0	Response is totally incorrect or irrelevant.
Blank	No response.

Training Notes for Constructed-Response Item 29

Basic information on how a hurricane is formed:

- When air over warm ocean water heats to 81 degrees Fahrenheit, it rises, cools, and condenses. This causes severe updrafts and low pressure.
- High-pressure air rushes around into this low-pressure area and blows around in a clockwise direction in the Northern Hemisphere (called a hurricane) and counterclockwise in the Southern Hemisphere (called cyclone/whirlwind).
- Convection cells merge and are constantly fed by more condensed air, resulting in more high-pressure air moving in and thus growing stronger and faster.
- When wind speeds reach 75 miles per hour, it becomes a hurricane.

29. 4

A hurricane is formed when a growing storm passes over water. When air over the ocean heats up to about 81°F it starts to rise, and the air pressure starts to decrease rapidly. After rising, the air cools and condenses and continues to lower the air pressure. Surrounding high pressure air blows in to balance the low pressure. Winds typically blow in the same direction, and this creates a whirlpool which grows stronger and stronger as the air condenses. When the wind reaches a speed of 75 mph, the storm is considered a hurricane.

29. 4

How a hurricane is formed, starts with a storm system that is very strong over water. Once the air is heated the air rises. That causes updrafts and low pressure. The air pressure gets lower and lower till, winds begin to blow. The high pressure (that is surrounding the low pressure) tries to make the air pressure equal (like starting a fight) The wind starts to move clockwise (Northern Hemisphere) or counter clockwise (Southern Hemisphere). The winds form a whirlpool (or cyclone). The cells that formed the lower pressure then, get larger and larger because of the heat. Then the winds really speed up, once they reach 75 miles per hour it's a hurricane. So a hurricane is fast wind.

29. Hurricanes are formed by a storm system over water getting larger and larger. The air is heated to around 81° fahrenheit by the sun. The teperative severly increases. There are Cells large convection cells which is warm air rising up, cooling and condensing. This makes the storm get larger. The air pressure keeps rising, the cells merge togther creating great winds. These winds normally blow in the same direction. The cells are constantly fed by the heat of condensing air. The wind is meanwhile growing stronger and larger. When the wind speed reaches around 75 miles per hour the storm system has become a hurricane.

3

29. A hurricane is formed by air heated by the sun to about 81° Fahrenheit, which causes upward drafts and low pressure. Numbers and numbers of big circulating patterns of rising warm air, which cools, then condenses, start building a large spread storm. The circulating patterns rise, creating strong blowing winds. These circulating winds usually blow clockwise in the Northern Hemisphere, and counterclockwise in the Southern Hemisphere. Once these winds reach the speed of 75 miles per hour, the storm is a hurricane.

3

29. A hurricane needs precise conditions to be able to form. First ocean water must be heated to about 80° F by the sun. These temperatures must continue long enough for enough convection currents to form a storm. These currents will then merge into one, forming the massively destructive force of a hurricane. 2

29. 2

The sun heats water to a certain tempeature. The water evaporates, cools, and condensesinto a storm system. While water evaporates the air pressure lowers. Winds start to blow clockwise creating a cyclone. All this time the warm air and water is making the storm stronger. The winds jump to howling speed and a hurricane is born.

29. One way it can be formed is by water. Other ways are that air moves over warm ocean water and is then heated to about 81° fahrenheit by the sun.

1

29. I think a hurracane is formed by two air currants clashing togather. The warm water is what makes it spin so fast.

1