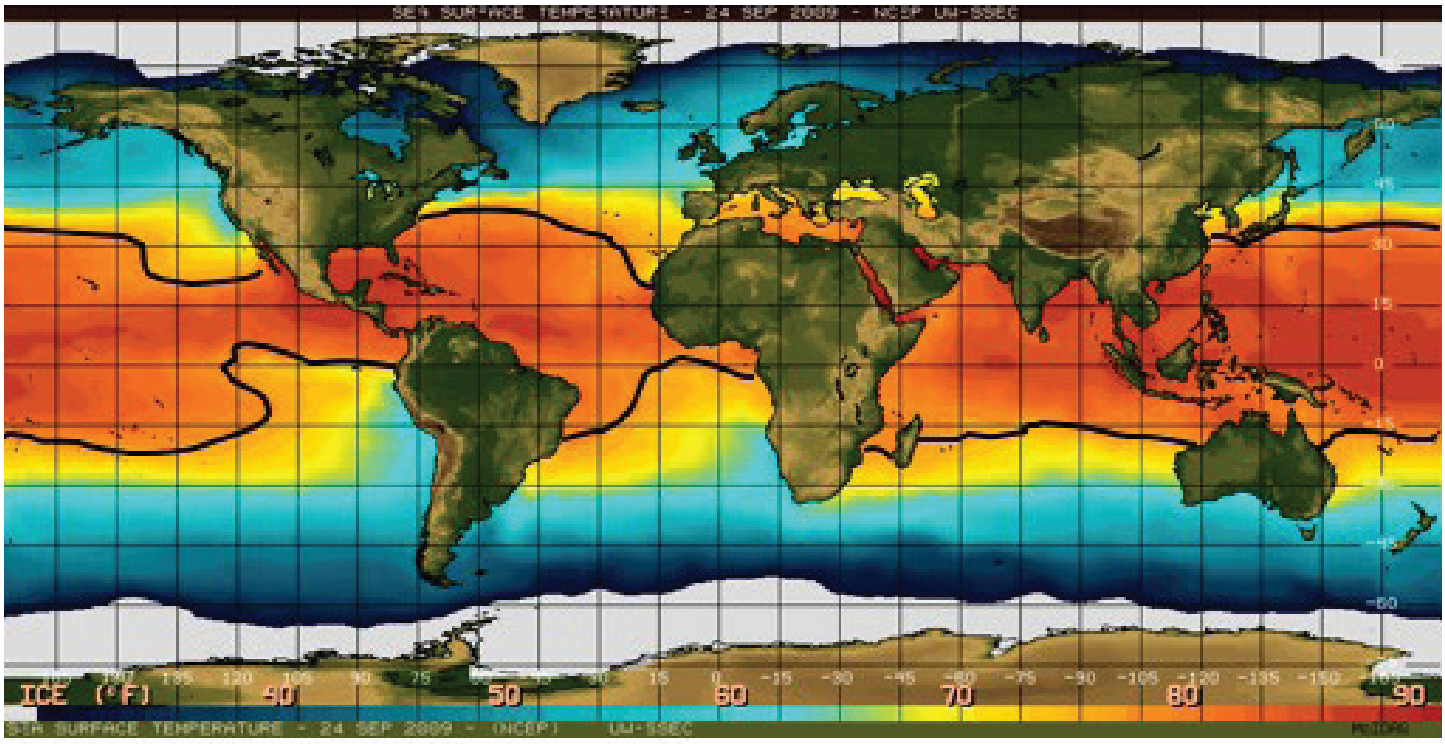
NAME: _____ **DATE:** ____/____/____

CLIMATE CHANGE & HURRICANES



PART 1: BACKGROUND READING

Development of a tropical depression into a mature hurricane requires heat energy from the ocean surface. For this reason, hurricanes do not usually develop over land or outside of the warm tropical oceans where the sea surface temperature (SST) is colder than ~26.5°C (~80°F). In the image below, the orange areas indicate where the sea surface temperature was at least 26.5°C (79.7°F) on September 24, 2009.

In the North Atlantic Ocean, this area extends westward along a narrow swath from the west coast of Africa to the northern tip of South America. At the western end of this swath, the warm water also extends northward through the Caribbean Sea and into both the Gulf of Mexico and Sargasso Sea (off the east coast of Florida). The size of the warm water area changes with the seasons. In the North Atlantic Ocean, September generally has the largest area of the warmest water; earlier or later in the year, the area of warm sea surface temperatures is smaller. It is not a coincidence that the peak of the Atlantic hurricane season also occurs in September.

Sea Surface Temperature (SST) image for the global ocean, based on data gathered on September 24, 2009. Blue and green colors indicate cooler waters (less than 15.6°C [60°F]) while orange and red colors, outlined by the black curves, indicate warmer waters (at least 26.5°C [~80°F]). Image courtesy of the Space Science and Engineering Center, University of Wisconsin-Madison. Heat is transferred from the ocean to the atmosphere when water at the ocean's surface evaporates to become water vapor. This causes the ocean to cool slightly. The heat transferred to the atmosphere from the ocean is stored in the water vapor as latent heat. It is important to note, however, that underneath a hurricane, other processes within the ocean usually cause the sea surface to cool much more than evaporation does, as described in Interaction between a Hurricane and the Ocean.

(Reading passage adapted from http://www.hurricanescience.org/science/science/development/)

VOCABULARY

1. Tropical

2. Tropical Depression:

3. Latent Heat

1. What are the temperature conditions necessary for a hurricane to form? At what latitudes do hurricanes normally form? Why?

2. At what time of year are hurricanes most likely to form? Why?

3. What is latent heat and why is it important to hurricane development?

PART 2: DATA ANALYSIS

Answer the following questions based on the maps of Sea Surface temperatures in the Atlantic.

1. Which months comprise hurricane season, and why?

2. How might that change on a planet where SST is elevated for longer periods, and in more places?

DISCUSSION QUESTIONS

1. Extrapolate into the future. Who is most likely to be affected by these hurricanes?

2. How can we prepare for, and help, the people in harm's way?

CLAIMS-EVIDENCE-REASONING: CLIMATE CHANGE & HURRICANES

TOPIC: HOW DOES CLIMATE CHANGE AFFECT THE FORMATION OF HURRICANES?

CLAIM: WHAT IS YOUR ANSWER TO THE QUESTION?

EVIDENCE: WHAT IS A SPECIFIC OBSERVATION FROM THE VIDEO THAT SUPPORTS YOUR CLAIM?

REASONING: HOW DOES EVIDENCE SUPPORT YOUR CLAIM? WHAT IS THE SCIENCE PRINCIPLE THAT EXPLAINS WHY