Climate Change Stations

Name: _____

Global climate has changed many times through Earth's history, with times of warming and cooling. The Earth's natural radiation balance occurs when we have the same amount of heat energy entering and leaving the atmosphere. When that balance is altered, the Earth's surface can become colder or warmer, leading to climate changes. Some of the causes of climate change that Earth has experienced in the past are modeled in different stations around the classroom. As you go through each station, record your observations and describe how the Earth's radiant balance would be affected.

Station 1: Earth's Wobbling

1. What happens when you spin the penny?

2. Earth can sometimes wobble in its orbit around the sun. This slight wobble can change the amount of solar radiation certain latitudes will receive. How could this affect global temperature?

Station 2: Earth's Orbit

1. Measure the distance from the sun to the Earth for each of the four dates.

Position Date	Distance in Centimeters
	_____ cm
	_____ cm
	_____ cm
	_____ cm

2. In the geologic past, the shape of the Earth's orbit has varied slightly, increasing or decreasing the distance from the sun. How could this affect global temperature?

Station 3: Tilt of the Earth's Axis

1. Throughout Earth's history, the angle of Earth's tilt in relation to the sun has changed from its present day angle. What do you observe when you change the tilt angle of the globe's axis?

2. How could this affect global temperature?

Station 4: Reflection of Sunlight

1. What did you observe?

2. How could this affect global temperature?

Station 5: The Greenhouse Effect

1. Observe the greenhouse effect set-up. Read and record the temperatures in the two bottles. Be sure to include the proper label (Fahrenheit or Celsius).

Bottle	Temperature
Plain Bottle	_____ °_____
Greenhouse Bottle	_____ °_____

2. How could this affect global temperature?

Station 6: The Position of the Continents

1. Look at the first illustration showing how the continents looked in the past as one large supercontinent called Pangaea. Pick a spot on Pangaea and follow what happened to that spot as the continents moved to their present day position.

   Describe the spot you chose and how its position changed over time. How might that affect the climate of a particular spot?

2. Consider that when the continents moved, ocean currents, global wind patterns and radiant energy absorption also changed.

   Write a statement describing how this change might affect the Earth's climate as a whole.

Conclusions - After conducting the investigations at each of the stations, answer the following questions.

1. Could the events that cause Earth's climate to change only happen one at a time or could several of them occur simultaneously? How would this affect the global climate?

2. One of the natural causes of climate change that was not discussed in the station labs was change in solar output, or the amount of energy the sun releases. Solar output varies slightly in approximately 11-year cycles. Do you think that this alone could cause an ice age? Justify your answer.

3. Part of the present day controversy surrounding global climate change is the extent of the role that humans are playing in it. Which of the past causes of global climate change do many scientists believe humans are affecting today? Explain the impact of human activities on this cause.