Name: \_\_\_\_\_

Partner(s): \_\_\_\_\_

Students will investigate which type of ice (land ice or sea ice) or thermal expansion poses a greater threat to sea level rise if large-scale melting and heating due to climate change occurs.

**Background:** A scientific report endorsed by the United Nations states that unless greenhouse gas emissions are curtailed, average global temperatures

may rise between one and three degrees Celsius (two and five degrees Fahrenheit) in the next 100 years. The ramifications of a temperature change even at the low end of this range would be severe. A one-degree Celsius (two-degree-Fahrenheit) change in temperature is predicted to result in a one-meter (three-foot) rise in sea level (**BUT WHY?**), which would displace millions of people in coastal cities and low-lying islands.

## Safety:

- Never taste or eat anything in the science room.
- Wash your hands and equipment thoroughly after completing this activity
- Safety glasses and aprons must be worn

## Materials:

- 2 Large Graduated Cylinders
- Water
- Ice Cubes
- Funnel
- Erlenmeyer Flask
- Glass rod
- Stopper with hole
- Food Coloring
- Thermometer

## Hypothesis:

Which do you think will affect sea levels more **and why**? Melting sea ice, melting ice located on land, or thermal expansion of water?

By how much more do you think (double, triple, 10%, 25%) and why?

Write a complete hypothesis using If/Then:

# Melting Ice, Thermal Expansion and Sea Level Rise

Name: \_\_\_\_\_ Partner(s): \_\_\_\_\_

# General Procedures (You may change these to suite your hypothesis): Procedure 1/2 (Land Ice / Sea Ice):

- 1) Place about 10 ice cubes in one of the graduated cylinders, then fill it about three-quarters of the way full of water. (Simulating sea ice.)
- 2) Fill up the other graduated cylinder to the exact same level as the first graduated cylinder.
- 3) Place the funnel in the top of the second graduated cylinder and put the same number of ice cubes in it as you did in the first cylinder. (Simulating land ice.)
- 4) Wait 15-30 minutes for the ice to melt and observe how much the water level has increased in both graduated cylinders.

## Procedure 3 (Thermal Expansion):

- 5) Build instrument for measuring thermal expansion as demonstrated.
- 6) Come up with a procedure for heating vessel and recording results.
- 7) Graph results. Water level rise vs Temperature Rise.

## **Results**:

Record all your results. Present them in a table or on a graph.

## Analysis/Discussion:

Was your hypothesis correct or incorrect? Explain why? Explain 3 sources of error. Explain anything that you suspect may have affected your experimental results.

## **Conclusion:**

Restate your hypothesis and whether it was correct or not. Why/why not?