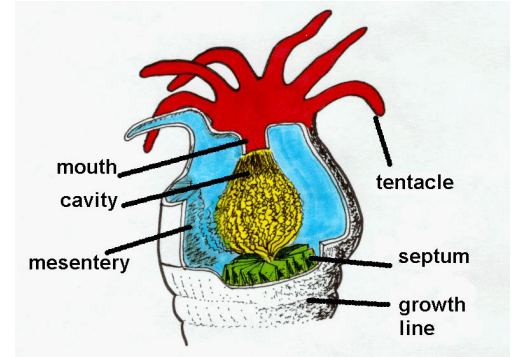


CORAL REEF AND CLIMATE CHANGE HOMEWORK

Background:

Corals are animals that build coral reefs. Coral reefs are home to many species of animals – fish, sharks, sea turtles, and anemones all use corals for habitat! Coral is white, but they look brown and green because certain types of small plants, called algae, live inside them. The algae produce food for the coral so it can grow big, and the coral provide the algae a safe home. The algae and coral form a **mutualism** where both partners benefit each other and do better together than they would alone.



When the water gets too warm, algae can no longer live inside coral. The corals turn from green to white because it does not have algae living in it, called **coral bleaching**. **Climate change** has been causing the Earth's air and oceans to get warmer. With warmer oceans, coral bleaching is happening more often. If the water stays too warm, bleached corals will die without their algae mutualists.

Carly is a scientist who wanted to study coral bleaching so she could help protect corals and coral reefs. One day, Carly observed an interesting pattern. Corals on one part of a reef were bleaching while corals on another part of the reef stayed healthy. She wondered, why? Why can some coral and their algae still work together when the water is warm, while others cannot?

Ocean water that is closer to the shore (**inshore**) gets warmer than water further away (**offshore**). Perhaps corals and algae from inshore reefs are used to warm water. She wondered whether inshore coral was better able to work with their algae in warm water because they are used to these temperatures. If so, inshore corals and algae may bleach less often than offshore corals and algae.

Carly designed an experiment to test this. She collected 15 corals from inshore and 15 from offshore reefs in the Florida Keys. She brought them into an aquarium lab for research. She cut each coral in half and put half of each coral into tanks with normal water and the other half into tanks with heaters. The normal water temperature was 27°C and is a temperature that both inshore and offshore corals experience during the year. The warm water tanks were 31°C and are a temperature that inshore corals experience, but offshore corals never experienced in the past but may experience with climate change in the future. After six weeks she recorded the number of corals that bleached in each tank.

Scientific Question: What are the differences in coral bleaching for inshore and offshore reefs when grown in warm water?

What is the hypothesis? Find the hypothesis in the Research Background and write it below. A hypothesis is a proposed explanation for an observation, which can then be tested with experimentation or other types of studies.

Draw Carly's Set up for her Procedure in the Box Below:

Scientific Data: Use the data below to answer the scientific question.

Corals From	Tank Type	# Bleached Corals / Total
Inshore reef	Normal	0 / 15
Offshore reef	Normal	0 / 15
Inshore reef	Heater	5 / 15
Offshore reef	Heater	10 / 15

Variables:

What is the independent variable (what was changed in the experiment)? This will be your x axis.

What is your dependent variable (the variable that is dependent on the independent variable)? This will be your y axis.

Data: Graph your results below using the data above.

Interpret the data:

1) What trends, changes, or differences do you see in the table or on the graph?

2) Make a claim that answers the scientific question.

3) Support your claim using data as evidence. Reference specific parts of the table or graph.

4) Explain your reasoning and how the data supports your claim. Connect the data back to how warm water affects the mutualism between coral and algae.

5) *Your next steps as a scientist:* Science is an ongoing process. What new questions do you think Carly should explore in her future research? What future data should be collected to answer these questions?

6) *Apply this research:* How does this experiment help scientists understand the effects of climate change?

