Name_____

DATA Nugget

Won't you be my urchin?

Featured scientist: Sarah W. Davies from University of Texas at Austin

Research Background:

Imagine you are snorkeling on a coral reef! You see lots of plants and animals living together. Some animals, such as sharks, eat other animals. They are called **predators.** Other animals, like anemones and the fish that live in them, protect each other from predators. There are also **herbivores**, such as urchins, on the reef that eat plants and algae. All of these plants and animals, and many more, need the coral reef to survive.

Corals are animals that build coral reefs. When you look at a coral you may see what looks like one large rock. In fact, corals are made up of thousands of tiny animals, called polyps. Coral polyps are white, but they look brown and green because algae live inside them. Algae produce food for the coral so it can grow big, and the coral provide the algae a safe home. Sadly, corals around the world are dying. Scientists want to figure out ways to help corals since they are such important animals.

Corals are picky and only like to live in certain places. Corals compete with algae for space to grow. Sarah is a marine biologist who became interested in corals because they are such important animals on the reef. She wanted to understand how to help corals. She thought that if there were more herbivores eating algae on the reef then corals would have less competition. Then they would have more space to grow.

Sarah set up an experiment where she put tiles in bins out on the reef. Tiles provided space for animals to grow, including corals (Figure 1). Sarah also put sea urchins in half

Figure 1: Experimental setup with tiles in bins. Some bins have sea urchins and some do not.

Figure 2: Scientist Sarah scuba diving on the coral reef for fieldwork.

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of the bins. Sea urchins are important herbivores and one of the species that like to eat algae. The other half of the bins had no urchins so the algae would be free to grow there. She had 4 bins with urchins and 4 bins with no urchins. After a few months, Sarah counted how many corals were growing on tiles. She counted corals found in the bins with and without sea urchins. Because sea urchins eat algae, they should free up space for coral to grow. Sarah expected that more corals would grow on the tiles in sea urchin bins compared to the bins with no sea urchins.

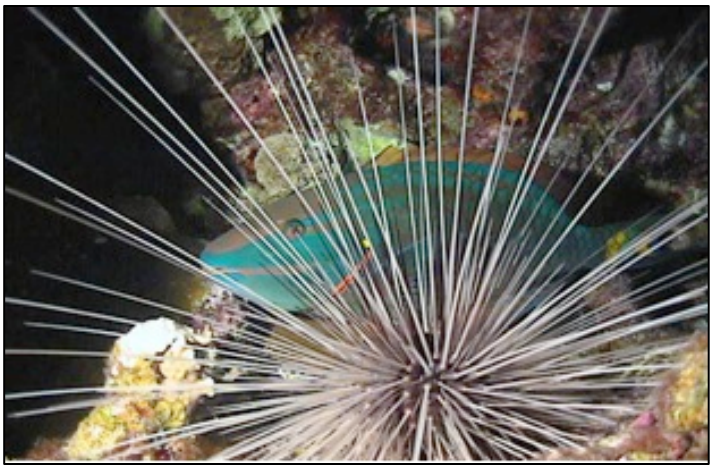

Figure 3: The vegetarian sea urchin *Diadema antillarum.*

Scientific Question: How does the presence of urchins affect corals?

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

Draw a food web for the coral reef ecosystem:

1. Include **corals**, **urchins**, and **algae** in your food web. Write out the name of each species and put a box around each.
2. Add arrows to connect the boxes. Arrows represent the interactions between the species in the ecosystem. For example, you can use arrows to show who eats who, or to show competition between different species. Use the direction of the arrow to show the direction of the relationship.
3. Once you have drawn your arrows, label them with the type of interaction. For example, label an arrow with the words “eaten by” if the arrow connects a species to the species that consumes it.

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Scientific Data:

Complete the table and use the data below to answer the scientific question:

Treatment in the bin	**Bin #**	**Number of corals on tile**
Sea urchins present	1	8
Sea urchins present	2	12
Sea urchins present	3	10
Sea urchins present	4	25
No sea urchins	5	1
No sea urchins	6	3
No sea urchins	7	6
No sea urchins	8	11

Average number of corals on tile when urchins present	
Average number of corals on tile when there are no sea urchins	

What data will you graph to answer the question?

Independent variable: _____

_____

Dependent variable: _____

_____

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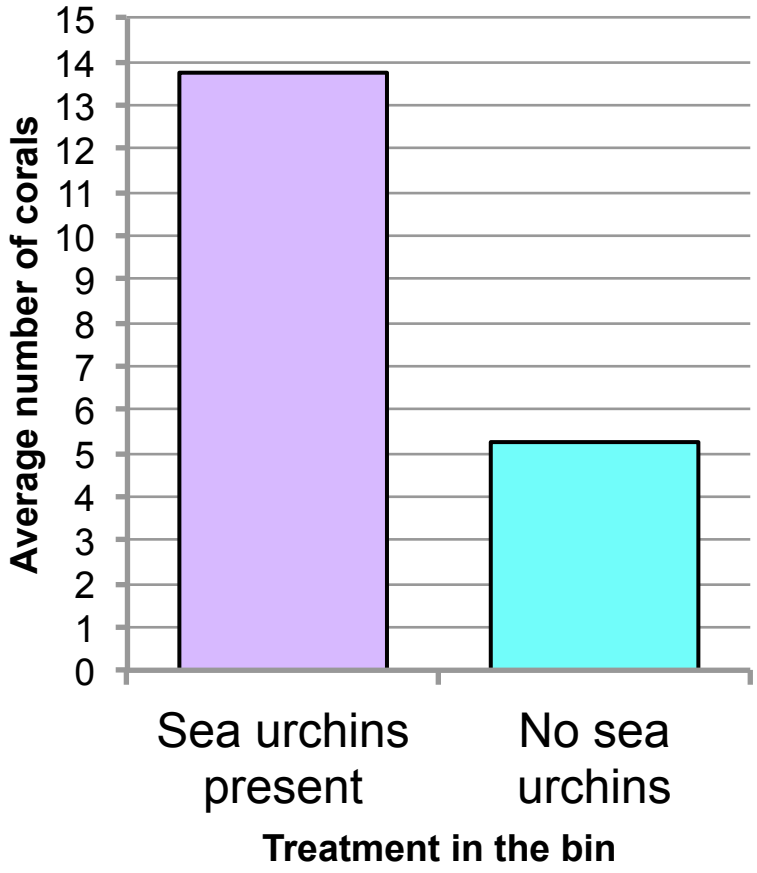
Below is a graph of the data: Identify any changes, trends, or differences you see in the graph or table. On your graph, draw an arrow pointing out what you identified. Write one sentence about what you see next to each arrow.



Interpret the data:

Make a claim that answers the scientific question.

What evidence was used to write your claim? Reference specific parts of the table or graph.

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Explain your reasoning and why the evidence supports your claim. Connect the data back to what you learned about the relationships between coral, algae, and urchins.

What do the data from this study tell us about Sarah's hypothesis?

Your next steps as a scientist: Science is an ongoing process. Can you list other variables that the scientist could change in a new experiment?

From your list, write a new question you think should be investigated.

What future data should be collected to answer your question? Create a data table you might use and include predictions if you have some.