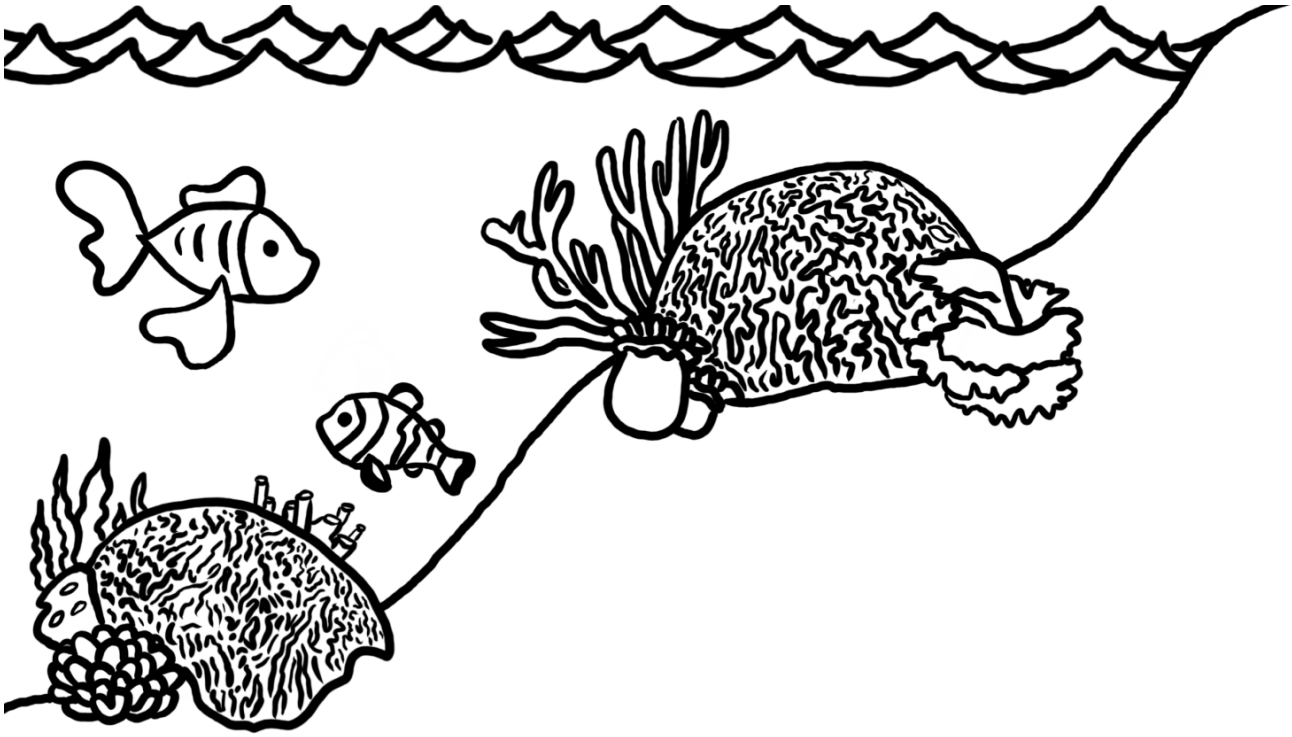
# The Coral Microbiome

by Maya Weissman

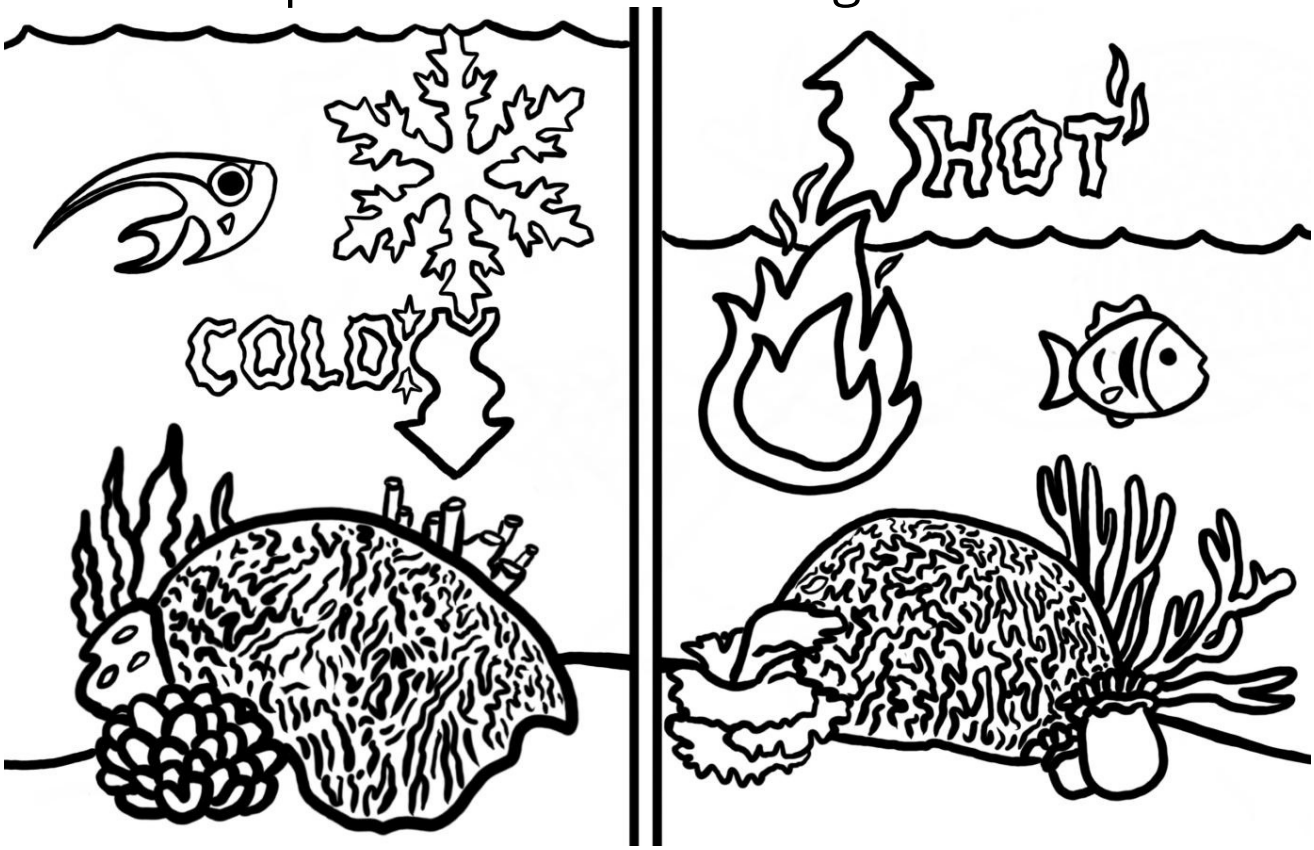
**Coral** are living animals made up of little organisms called **polyps**. Coral reefs support some of the most diverse **ecosystems** in the world.

This particular coral is called *Pseudodiploria strigosa*, but it is more commonly known as brain coral!

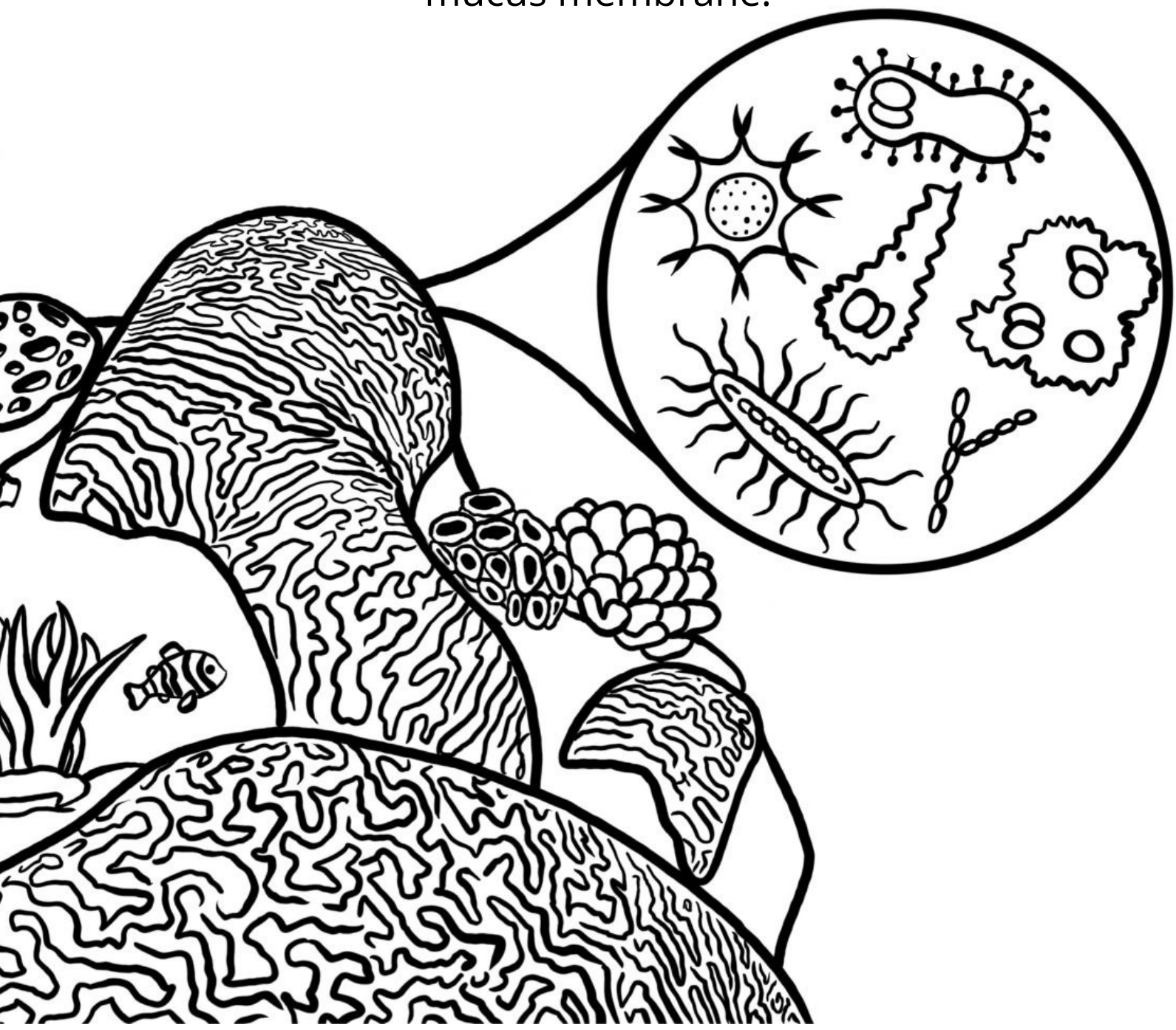
Coral that are deeper in the ocean are **outer reefs.**
Coral that are closer to shore are **inner reefs**.



Outer reefs are cooler than inner reefs, but their temperature doesn't change as much.

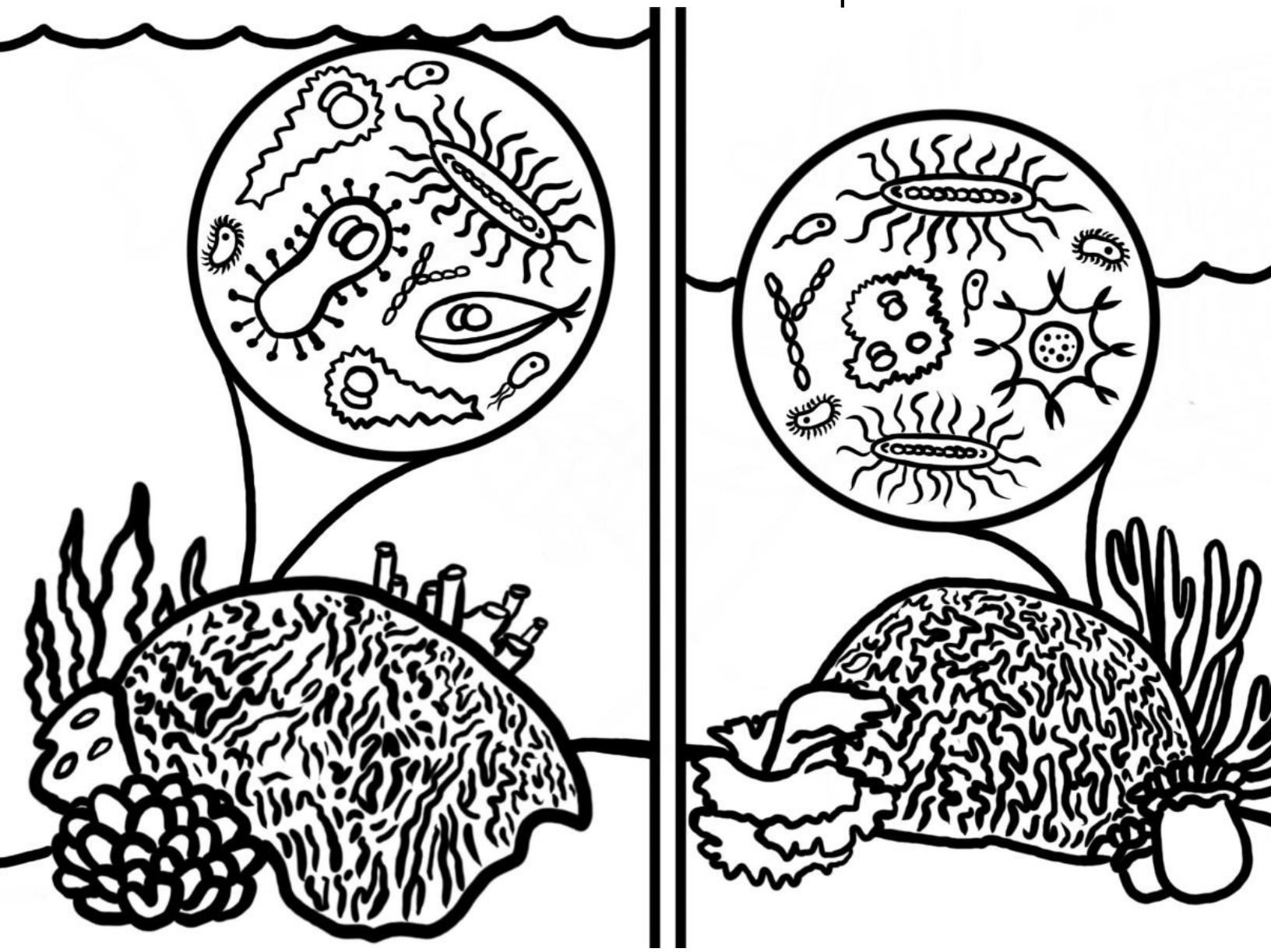


Coral have a **microbiome**: a group of different **microbes** living on them and helping them survive. The coral's microbiome lives on their surface as a mucus membrane.



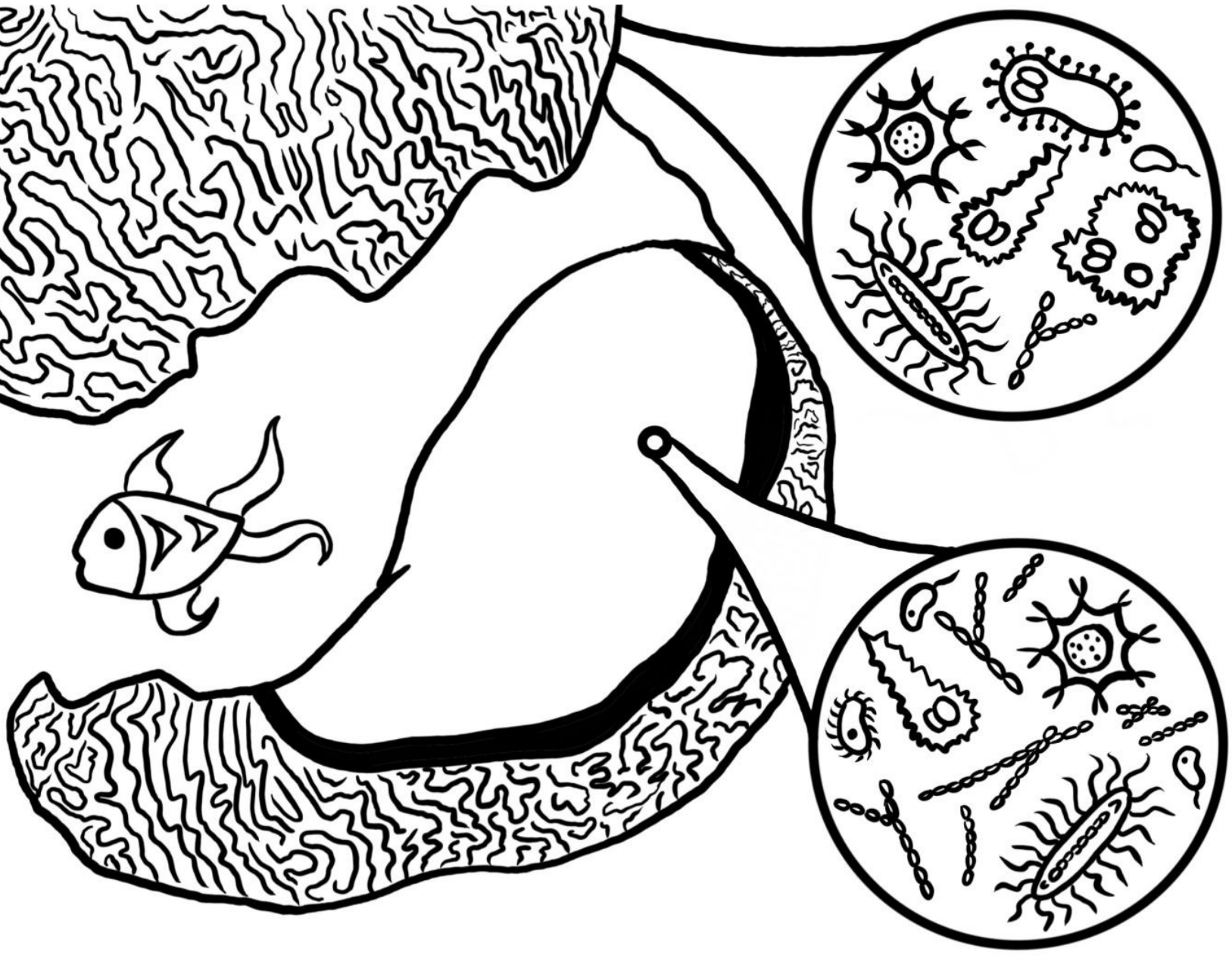
Humans have a microbiome too! Your microbiome lives in your stomach and helps you digest food.

**Microbes**, like all living things, need specific **environments** in order to survive. Different species of microbes need different temperatures.



Differences in temperature mean that the microbiomes of outer and inner coral can be **composed** of very different microbes. Can you circle the similarities and draw squares around the differences between the two microbiomes?

Big changes in ocean temperature can cause the coral microbiome to shift out of balance. When their microbiome is out of balance, coral can get very sick with **black band disease.**



Black band disease forms a band of dying coral cells that slowly eat up the whole coral, leaving behind dead, bleached coral.

We can help our coral reefs stay healthy by working hard to keep oceans cool!

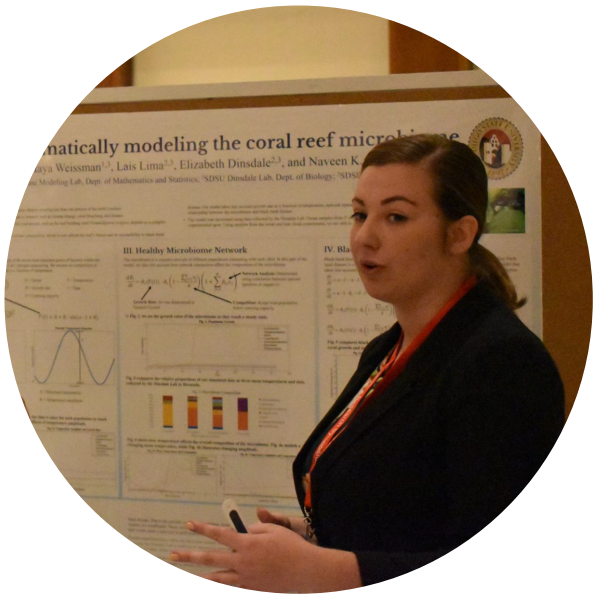
# About the Scientist:

# Maya Weissman

As a kid, I loved science, exploring nature, and letting my curiosity get me into trouble. As an undergraduate student at San Diego State, I knew I loved biology and math, but I wasn't always sure how to combine those two things.

Then I discovered mathematical modeling: an exciting mix of using the math tools that I enjoyed to answer the problems in biology I was interested in.

As a math modeler in Dr. Vaidya's Lab, I was able to work on a few of my own projects, including what you read about the coral microbiome! I have been able to share this research as an award winning presentation, a scientific publication, and now as a coloring book!



*This coloring book was developed for use in the classroom with national science and reading standards in mind. This book meets the following standards:*

**Next Generation Science Standards:**

LS1.1: Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.
LS1.5: Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.
LS2.1: Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.
LS2.2: Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.
LS2.4: Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
LS4.2: Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.
LS4.3: Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.
LS4.4: Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.
ESS2.2: Obtain and combine information to describe climates in different regions of the world.

**English Language Arts Common Core Standards:**

5.2: Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text.
5.3: Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.
5.4: Determine the meaning of general academic and domain-specific words and phrases in a relevant text.
5.7: Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.
3.10: By the end of the year, read and comprehend informational texts, including history/social studies, science, and technical texts.
3.7: Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).