Rivers

6–8 ACTIVITY GUIDE

Shedd AQUARIUM

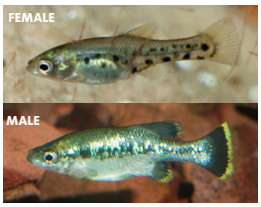
Name _____

Animals Are Uniquely Adapted to River Ecosystems

Sharpen your skills of observation

Observation vs. inference: One of the biggest misconceptions that happen when making an observation is accidentally making an inference instead. An **observation** is data collected through the use of senses or tools only. Often, instead of describing what is being seen, human brains jump to thinking about why that phenomenon is happening, an **inference**.

1 ***EXAMPLE: Find the butterfly goodeids. Look up into the floating plants or back by the rocks and see if you spot any small fish.***



Inference: The parents are protecting the babies and keeping them safe and together.

Why isn't this statement an observation? The statement gives a reason for what is being seen. An observation should only describe what is being seen. Read the observation below and write what you notice is different about this observation vs. the initial statement above.

Observation: A group of small fish are together in the same area. There are larger fish among the small group of fish. The large fish swim toward different large fish when they approach the group of small fish.

What do you notice is different about this statement?

_____

_____

From this observation, one might infer that the large fish are the adults. This would then lead to prediction and design of a research plan to better understand this behavior. By collecting what are strictly observations, these notes can be used as data by any scientist to help support, refute (which means to go against), or revise scientific theories.

2 ***Now you try! Find the American paddlefish. Spend a few minutes observing the fish and record your observations below.***

Observations of the American paddlefish:

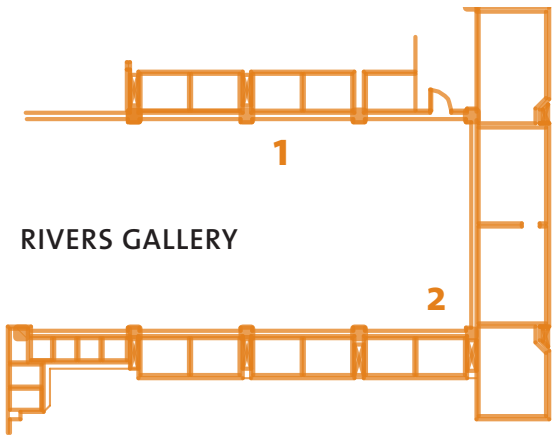
1 _____

2 _____

3 _____

The rostrum that gave the paddlefish its name

The rostrum is the flat extension on the front of the paddlefish's face. Use your observations and your classmates' observations to write a prediction about what the rostrum (paddle) is used for and how. Support your prediction with your observations. Here is a sample response structure you can use to help write your prediction.



Supporting and Refuting Scientific Theories

Use your observations and other data to support or refute scientific theories

Scientists have been analyzing data and the fossil record of the American paddlefish to better understand the purpose of its rostrum.

3 ***Read these initial theories on how paddlefish use their rostrums to eat. Using your own observations and through analyzing the claims made, which theory do you support?***

Hypothetical theory 1:	Hypothetical theory 2:
American paddlefish use their rostrums to acquire food from the riverbed. The shape of the paddle would be an ideal tool for turning over rocks and pebbles, allowing paddlefish to ingest small animals as they swim above the rocks.	American paddlefish use sensors in their rostrums to detect small fishes and plankton in the water, enabling them to swim toward their prey and ingest the animals while on the move.

Which theory do you think your observations support? Why?

Additional data

Paddlefish anatomy hasn't changed much since the time of the dinosaurs! Scientists can analyze fossils to better understand rostrum use. Scientists have found paddlefish fossils with knightia (NYE-tee-ah) fish in their stomachs. Knightia were schooling fish that swam in large schools in rivers and lakes and ate plankton.

Based on this new information, which theory do you think is better supported by your observations and the fossil record?

Did you change your theory? *(Circle one)* ***Yes No Why or why not?***

This just in!

Research has shown that rostrums contain electroreceptors similar to those of sharks and rays. These clusters of electroreceptive organs are called ampullae.

These organs can detect the electricity emitted by fishes or plankton when they use their muscles. These receptors can even tell the difference between the electrical signals emitted from different sources—like plankton vs. fishes.

Based on all the information you have collected, write a claim for which theory you think best identifies the way paddlefish's rostrums helps them find food.

Be sure your claim includes evidence from your own observations, the fossil evidence and the rostrum research evidence.