



**Big Idea:** The mighty sturgeon has been on earth for more than 250 million years and can grow to over 6 metres in length. How could one of the longest surviving animal species that grows to the length of a small bus be relatively unknown? This first lesson will introduce the white sturgeon and some of its basic characteristics.

**Objectives:** Students will...

- be introduced to the white sturgeon (*Acipenser transmontanus*) as a species of fish in the Fraser River
- learn the basic anatomy and life history of the white sturgeon
- draw a picture of a white sturgeon using a grid

**Curricula Links:** Science, Math, Language Arts, Art

**Suggested Grade Levels:** 4 - 6

**Materials:**

- Sturgeon Anticipation Guide (Appendix 1.1)
- Sturgeon Anticipation Guide Answers (Appendix 1.2)
- 'Dinosaurs of the Fraser River' (Appendix 1.3)
- Grid Instructions (Appendix 1.4)
- Grid Diagram (Appendix 1.5)
- Roll paper (optional)
- 100 squares of paper (optional)

## Lesson 1 - Meet the White Sturgeon

### Opening Motivator:

Inform students that they are going to be involved in a detailed study of a fish called the white sturgeon. To check students' prior knowledge of the white sturgeon, complete the Sturgeon Anticipation Guide (Appendix 1.1). The students should answer 'True' or 'False' in the 'Before' column (left hand side of the chart) to indicate if they believe the statement to be true or false. The 'After' column will be filled in after the students have read more general information about the white sturgeon.

### Classroom Activities:

1) Once students have completed their responses, hand out the 'The White Sturgeon: Dinosaurs of the Fraser River' sheet (Appendix 1.3) to each student. Have the students read the information sheet and confirm whether each statement in the anticipation guide is true or false. They are to then fill in the 'After' column with 'True' or 'False'. If the fact on the anticipation guide is false, have students rewrite the statement to make it correct. Also, encourage students to add more information to the true statements.

**Teaching Tip:** While individually reading the information, have your students underline or highlight the information that connects with the facts in the anticipation guide. This will provide the students with practice in identifying important information - and allows you to quickly check if students are identifying irrelevant facts. Also, interacting with the text in a kinesthetic manner may assist some students in understanding or remembering the information.

2) As a class, discuss the results from the 'After' column of the Sturgeon Anticipation Guide. You can use the answer key (Appendix 1.2) to guide the discussion. Double check that students have rewritten the false statements to reflect a true fact about the white sturgeon.

3) In their Science notebooks, start a new page and title it "Questions I Still Have About the White Sturgeon." On this page, ask students to write down questions they may now



have about the white sturgeon. These questions will serve as a guide for subsequent lessons or topics for early finishers to answer independently. These questions can also be collated / posted on a bulletin board to be utilized as an independent research station.

**Teaching Tip:** *Using the students questions to guide subsequent lessons provides students with a sense of ownership in shaping their learning. It also provides the teacher with insight to what connections the students are making during the unit.*

4) Hand out one copy of the grid instructions (Appendix 1.4) and the grid diagram (Appendix 1.5) to each student. Instruct students to...

- Look at the grid instruction page and find the first set of coordinates - A1.
- Look inside the square beside A1. Students will see a curved sketch line.
- Look on the grid diagram and find square (A1). Ask students to duplicate the sketch lines from the instruction page into square A1 with the same curved line.
- Repeat for the remaining sets of coordinates (A2 - E18).

Hint: Some coordinates are missing as those squares are to be left blank (e.g. D10 to D13). Remind students to carefully match the coordinates on both pages.

As an extension of the above grid activity, you can challenge your students to create a large scale drawing of a sturgeon. Instead of using the grid diagram, students will duplicate sketch lines on individual squares of paper. To begin, provide each student with 2 or 3 pairs of coordinates (there are 68 in total) and 2 or 3 squares of blank white paper (see hint below). Instruct students to...

- Label the back of each square of paper with the pairs of coordinates they are assigned. (Writing the coordinates at the top of the page will make it easier to identify which way to assemble the pieces).

- Duplicate / enlarge the sketch lines from each pair of coordinates on one of the squares. (If students are using large squares of paper, they will need to also increase the thickness of the lines).
- Assemble the completed squares on a piece of roll paper. DO NOT GLUE YET. Check that the squares are in the correct order. Fill in the empty areas with blank squares of paper. Once all pieces of paper are in their proper place, start at one end and glue the squares to the roll paper.

Hint: To make a 4.25 metre drawing, use 8.5 inch squares of paper. To make a 5.5 metre drawing, use 11 inch squares of paper. Some sturgeon achieve 4-5 metres in length, so this will provide a realistic view of the sturgeon's size.

## Conclusion and Reflections:

Provide the following sentence starter for the students "The most interesting fact I learned about the white sturgeon is ..." Students should elaborate on this to explain why they chose this fact as most interesting (e.g. The most interesting fact I learned about the white sturgeon is that they can grow to be 6 metres long. When I first looked at the picture on the information sheet, I thought it was the size of a salmon. After finishing the class drawing and seeing how long 5.5 metres is, I was amazed that a fish in the Fraser River can grow to be that big. I thought only animals that live in the ocean could grow that to be that large).

## Extension Ideas:

1) Create a logo for your study of the sturgeon and title it "Save the Sturgeon." Students can also draw a cartoon or mascot that might be used throughout the unit, especially during the stewardship lesson (e.g. Stuie the Sturgeon says don't pollute the Fraser River!!).

2) Compare/contrast the white sturgeon with other fish (e.g. salmon) that live in the Fraser River. Students can begin with comparing and contrasting the anatomy and life history (this can continue throughout the rest of the unit).

3) Examine what local / world events occurred 100-120 years ago. This is what was happening when some current resident sturgeon of the Fraser River were young.



4) Label the exterior anatomy of the attached sturgeon picture (found in appendix 1.6). Answers for this handout, starting at the eye and going clockwise, are: Eye, Gills, Scutes, Dorsal fin, Tail, Caudal fin, Anal fin, Pelvic fin, Pectoral fin, Mouth, Barbels

### **Web Links:**

- 1) The [Fraser River Sturgeon Conservation Society](http://www.rickhansen.com/Fishing/Fraser/) website has general information about the white sturgeon and provides information on the local effort to save the Fraser River sturgeon. <http://www.rickhansen.com/Fishing/Fraser/>
- 2) The [B.C. Fisheries](http://www.bcfisheries.gov.bc.ca/fishhabitats/Sturgeon/Sturgeon.htm) website focuses on the white sturgeon. It has many facts and some great photos. <http://www.bcfisheries.gov.bc.ca/fishhabitats/Sturgeon/Sturgeon.htm>
- 3) The [Environment Canada website](http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=123) examines species at risk with specific information about the white sturgeon. This site also has a lot of detailed information. [http://www.sararegistry.gc.ca/species/speciesDetails\\_e.cfm?sid=123](http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=123)
- 4) The [Nechako White Sturgeon](http://www.nechakosturgeon.org/index.html) website is one of the few websites that is geared toward children. Many of the descriptions of the sturgeon's habitat, life cycle, threats, etc. do not use technical terms. When technical terms are used, a brief explanation is provided. <http://www.nechakosturgeon.org/index.html>



## Appendix 1.1 - Sturgeon Anticipation Guide

1) Before: Write True or False in the 'Before' column (on the left side) to indicate if you believe each statement to be true or false.

Before	Statement About the White Sturgeon	After
	1. The white sturgeon lives in the Fraser River.	
	2. The largest white sturgeon ever caught was 4 metres in length.	
	3. White sturgeon have 2 rows of teeth.	
	4. The body of the white sturgeon is covered with scales.	
	5. Scientists estimate that white sturgeon have lived on earth for over 200 million years.	
	6. White sturgeon swallow their prey whole (they don't chew before swallowing).	
	7. The heaviest white sturgeon weighed ever recorded was 180 kg (396 lbs). This is heavier than the largest football player in the CFL.	
	8. White sturgeon live to a maximum of 50 years old.	

2) After: After reading more information on the white sturgeon, write True or False in the 'After' column (on the right side). If the statement is incorrect, correct the fact in the space beneath.





## Appendix 1.2 - Answers for Sturgeon Anticipation Guide

1. True. The white sturgeon live in the Fraser River, from the foothills of the Rocky Mountains to the Pacific Ocean (Vancouver). White sturgeon usually stay in the fresh water of the Fraser and rarely go into the Pacific Ocean.
2. False. The longest white sturgeon on record is over 6 metres in length. This is equal to the length of approximately 4 or 5 students, head to toe.
3. False. The white sturgeon have no teeth at all. Their mouth extends out like a vacuum cleaner hose, and they siphon up food from the bottom of the river.
4. False. Most fish have scales, but the white sturgeon have none. They have rows of bony plates, called scutes, that act like armored plates on the outside of the body.
5. True. There is evidence that white sturgeon swam in fresh water during prehistoric times. Imagine, this species swimming up a river while Tyrannosaurus Rex is walking along the riverbank. Sadly, human beings have almost wiped out the white sturgeon in 100 years through over fishing and destruction of their habitat. If time (and student understanding) permits, draw a line on your chalk board that is 2.5 m long. On this line, every 1 cm equals 100,000 years, and the whole line equals the time sturgeon have been on the planet (2.5 million years). Draw the thinnest line possible at one end to show the time taken by humans to decimate sturgeon populations.
6. True. The white sturgeon suction up their food and with a mouth that looks like a vacuum cleaner hose and break up the food into pieces in their muscular stomach (like the gizzards of birds).
7. False. The white sturgeon can weigh as much as 860 kilograms, the average weight of 32 grade 3's, 27 grade 4's, 25 grade 5's, 23 grade 6's, 21 grade 7's (these estimates are based on average statistics).
8. False. The oldest recorded age of a white sturgeon was estimated at 150-160 years, which is 30-35 years older than the oldest human (Jeanne Calment, 122 years).





## Appendix 1.3 - The White Sturgeon: Dinosaurs of the Fraser River

The **white sturgeon** is the largest freshwater fish in North America, and one of five different types of sturgeon in Canada. In British Columbia, the white sturgeon can be found in the **Fraser River** system, all the way from the Rocky Mountains to Vancouver.

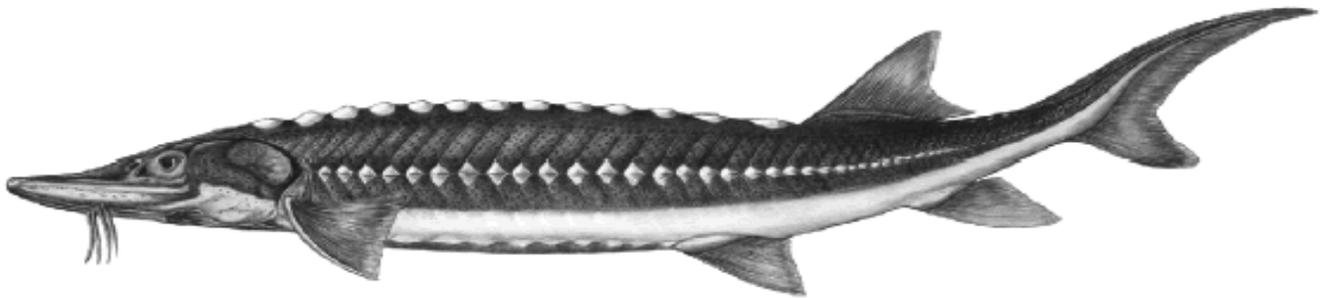


Figure 1. The white sturgeon, *Acipenser transmontanus*. (Drawing by Loucas - of a specimen from the Nechako River, a tributary of the Fraser River.)

Sturgeon grow very slowly, but can grow to an enormous size. The largest white sturgeon weighed was an amazing 860 kilograms (1900 pounds) and was over 8 metres in length. White sturgeon larger than 620 kilograms (1360 pounds) and 6 metres in length have been caught in the Fraser River.

Sturgeon have been on earth for about 250 million years. They have survived ice ages, extinction of dinosaurs, and many changes to their environment. White sturgeon can live for a very long time; the oldest sturgeon ever recorded was about 160 years old.





The white sturgeon is different from most fish because it does not have scales on the outside of its body. Can you think of another type of fish that does not have scales? Instead of scales, it has five rows of bony plates, called **scutes**, along its back, sides, and belly. The scutes are on the outside of the body and are very sharp when the sturgeon is young. This helps to protect young sturgeon from **predators**. Over time, as a sturgeon grows, the scutes become dull and worn and are not as important for protection.

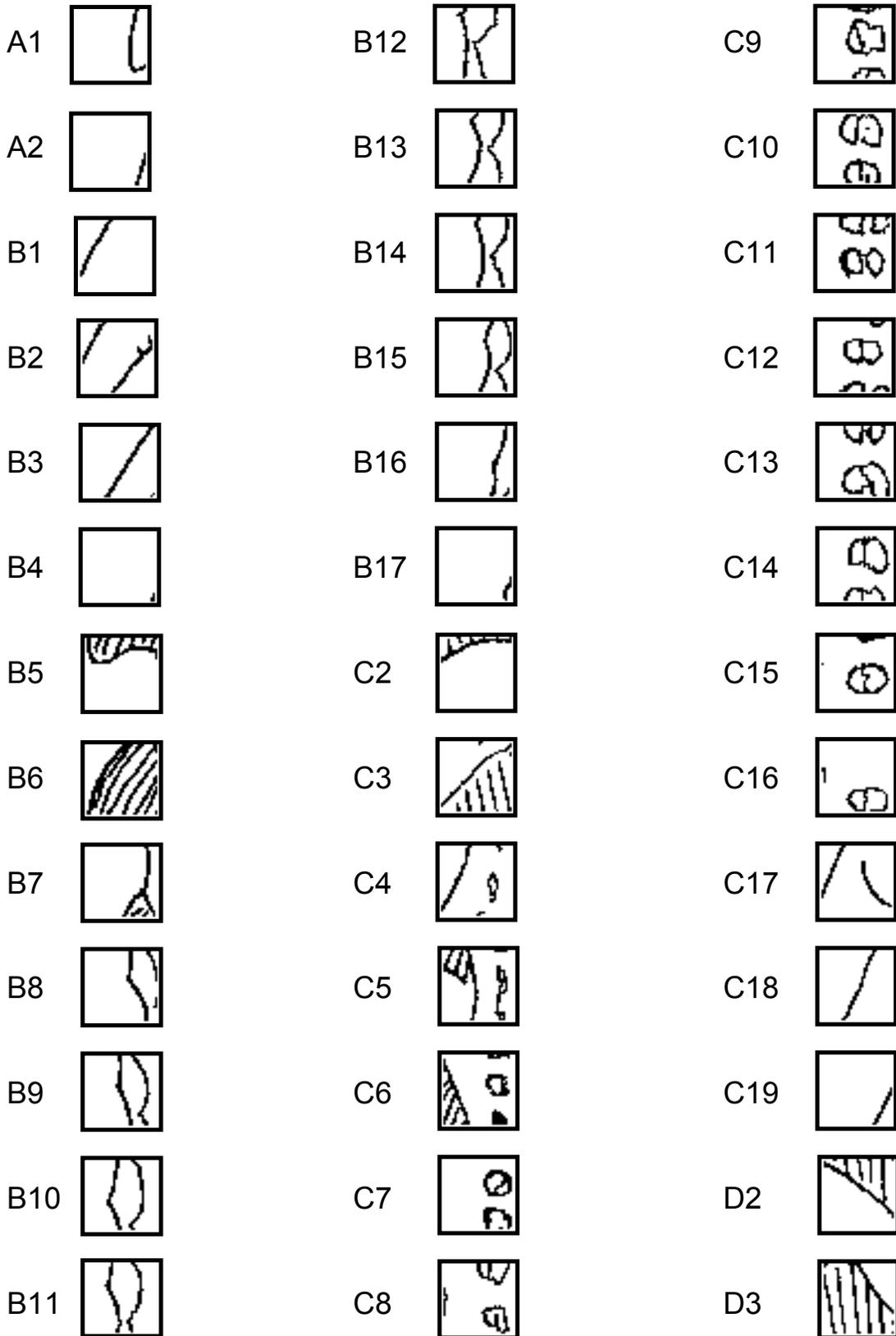


Sturgeon have no teeth but have a tube-like mouth that extends out of its body to **siphon** up food off the floor of the river. To find their food, white sturgeon have whisker-like extensions called **barbels** (rhymes with marbles) that detect both odors and movements in the water. They also have special **receptors** around their snout that help find live animals that are buried under the sand at the bottom of the river. When the sturgeon senses their **prey** (e.g. clams, shrimp, worms, insects) buried in the bottom of the river, its tube-like mouth extends out and suctions them up (just like a vacuum cleaner). The food is swallowed whole (dead or alive) and crushed into smaller pieces in its stomach.

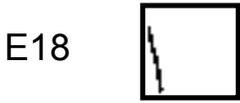
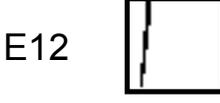
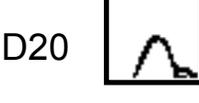
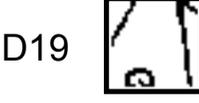
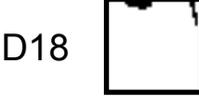
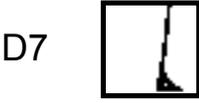
The incredible part of the white sturgeon story is that they have been on earth for over 250 million years and have survived some of the most drastic changes our earth has experienced. The sad part is that its population was almost wiped out by humans over a span of 100 years. How did this happen?



## Appendix 1.4 - Grid Drawing Instructions



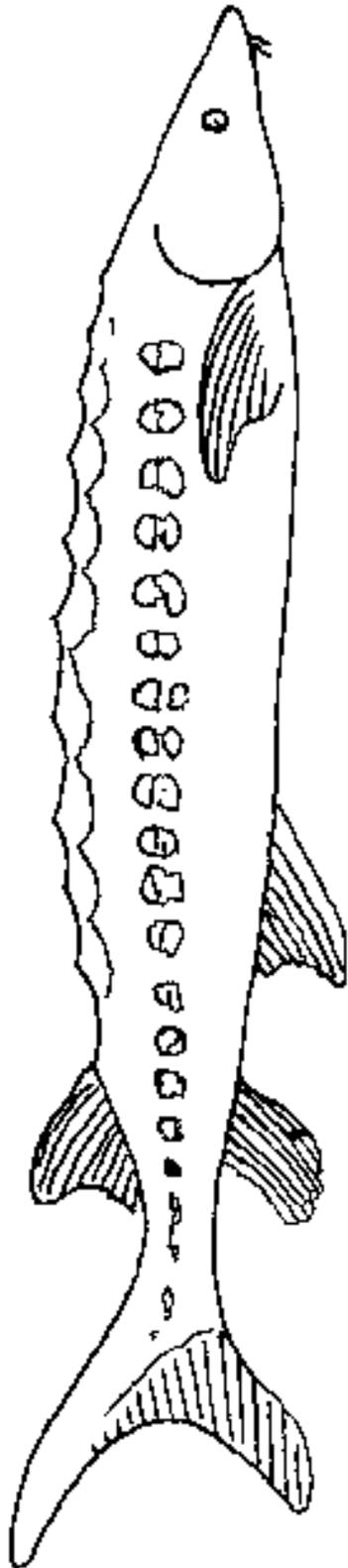
Appendix 1.4 (cont'd) - Grid Drawing Instructions



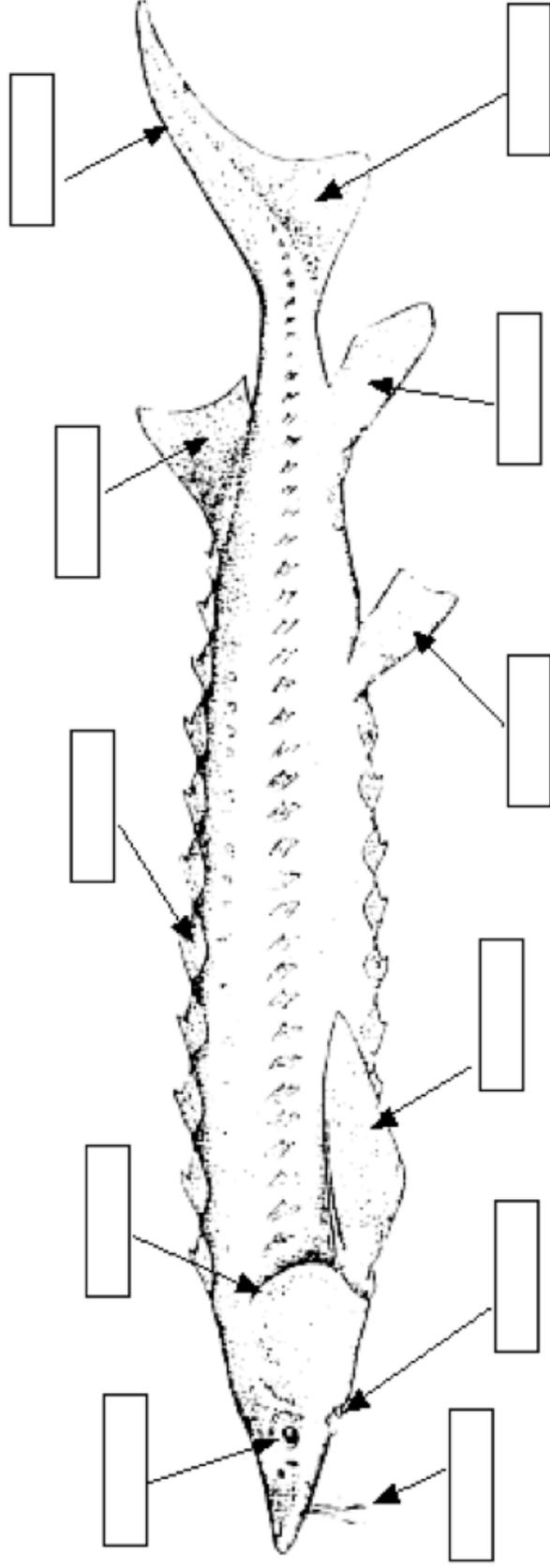
Appendix 1.5 - Grid to draw on for Grid Drawing  
(enlarge by 160 % onto 11x17 paper)

20					
19					
18					
17					
16					
15					
14					
13					
12					
11					
10					
9					
8					
7					
6					
5					
4					
3					
2					
1					
	A	B	C	D	E

Appendix 1.6 - Original Picture for Grid Drawing



# WHILE SWIMMING EXTERNAL FEATURES



Word Bank

Anal Fin    Barbels

Caudal Fin

Dorsal Fin

Eye

Gills

Mouth

Pectoral Fin

Pelvic Fin

Scutes

Tail