

# Fish Metamorphosis Wheel

## Outcome:

2-1-09: Compare the appearance of young and mature animals of the same type.

## Materials:

- colouring utensils
- scissors
- glue
- brass fasteners
- light-coloured construction paper or cardstock

## Teacher's Instructions:

1. Make a class set of pages 3 and 4 on cardstock or light-coloured construction paper. This will yield 2 metamorphosis wheels per student - one catfish and one sturgeon.
2. Hand out pages 3 and 4 to each student. Ask them to colour and cut out the pictures of the life stages along with both wheels and tabs. Ask students to cut out the wheels A and B and the 'window' in the wheel labeled A.
3. Ask students to place the pictures of the life stages in the correct order and glue them in the boxes on the wheels labeled B. An Answer key is provided on page 5.
4. For each wheel, place the wheel labeled A directly on top of the wheel labeled B. Bind the two together with a brass fastener where + marks the spot to make wheels.
5. Students can view the life cycles through the 'window' on wheel A by turning wheel B.

## Teacher Background Information:

A **life cycle** is the continuous sequence of changes undergone by an organism from one primary form to the development of the same form again.

**Metamorphosis** means transformation; it involves the loss of the features which mark an individual as a larva, and the attainment of those which characterize it as an adult.

**Complete metamorphosis** consists of four stages: 1) egg, 2) larva, 3) pupa, and 4) adult. It commonly occurs in insects where the earliest stage of development looks significantly different from the adult.

**Incomplete metamorphosis** occurs where there are fewer than four stages, which is the case for many fish. Shortly after they hatch, many fish essentially have all the features of an adult.

A typical fish life cycle starts with an **egg**. The egg hatches into what is called a **yolk sac fry** - a larval stage where the fish has an attached yolk that provides it with nourishment for its first week or two. The true **larval** stage begins when the fish has absorbed the yolk and starts feeding for itself. When the fish gets bigger and looks very much like an adult, it is considered a **juvenile**. Once the fish matures and can reproduce and lay eggs, it becomes an **adult**.

*Continued on page 2*

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## Teacher Background Information (Cont'd.):

**Catfish** are different from many other fish in that the male catfish cares for the eggs and yolk sac larvae. Catfish eggs are 3.5-4.0 mm in diameter. They are laid in a gelatinous mass in a nest constructed by the male catfish in holes or burrows, under rocks, logs, or overhanging riverbanks. The eggs are yellow when laid but become browner as hatching nears. They hatch in 5-10 days. The male catfish fans water over the eggs to aerate and clean them; once they hatch, he protects the young for several days until they swim off to feed. The yolk sac larvae have large yolks and are about 6-10 mm in length. Their bodies are transparent with some pigmentation on the tops of their heads. Their barbels or whiskers are very long compared to their head. Their tails change from a club-shape to more obvious double lobes which are quite rounded. The yolk sac larvae stay on the bottom for 2-5 days, and then swim to the surface to feed. Catfish do not exhibit a post-yolk sac larval stage.

Juvenile catfish are 15-42 mm in length. They look very much like an adult with their sharply-pointed forked tail. Younger juveniles are nearly white with small brown spots that are more obvious over their fins. The darker colour spreads as they grow older.

Catfish mature and become adults when they are 5-8 years old. They are dusty-grey to dark grey-blue in colour, often with scattered spots. Adults can weigh over 14 kilograms!

The prehistoric-looking **lake sturgeon** is one of the largest freshwater fish in North America, reaching lengths of 2.5 meters and weighing more than 140 kilograms! It starts its life as a sticky, tiny (about 3 mm), dark egg that attaches to rocks and logs or wherever it lands when laid by the adult female. The sturgeon egg is unusual in that it has holes in its surface - up to 13 of them - called micropyles, which allow sperm to rapidly penetrate the egg as it tumbles through the water. The egg hatches in 5-8 days. Newly hatched, the little 8 mm yolk sac fry has a huge yolk. Its eyes and body lack pigment but the yolk sac is covered with fine black spots.

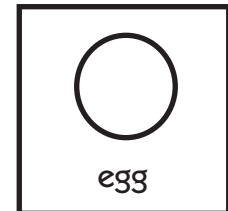
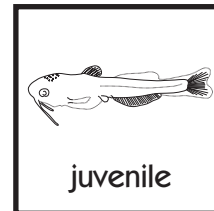
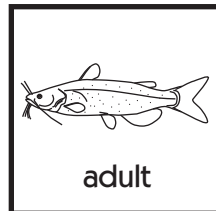
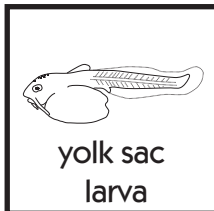
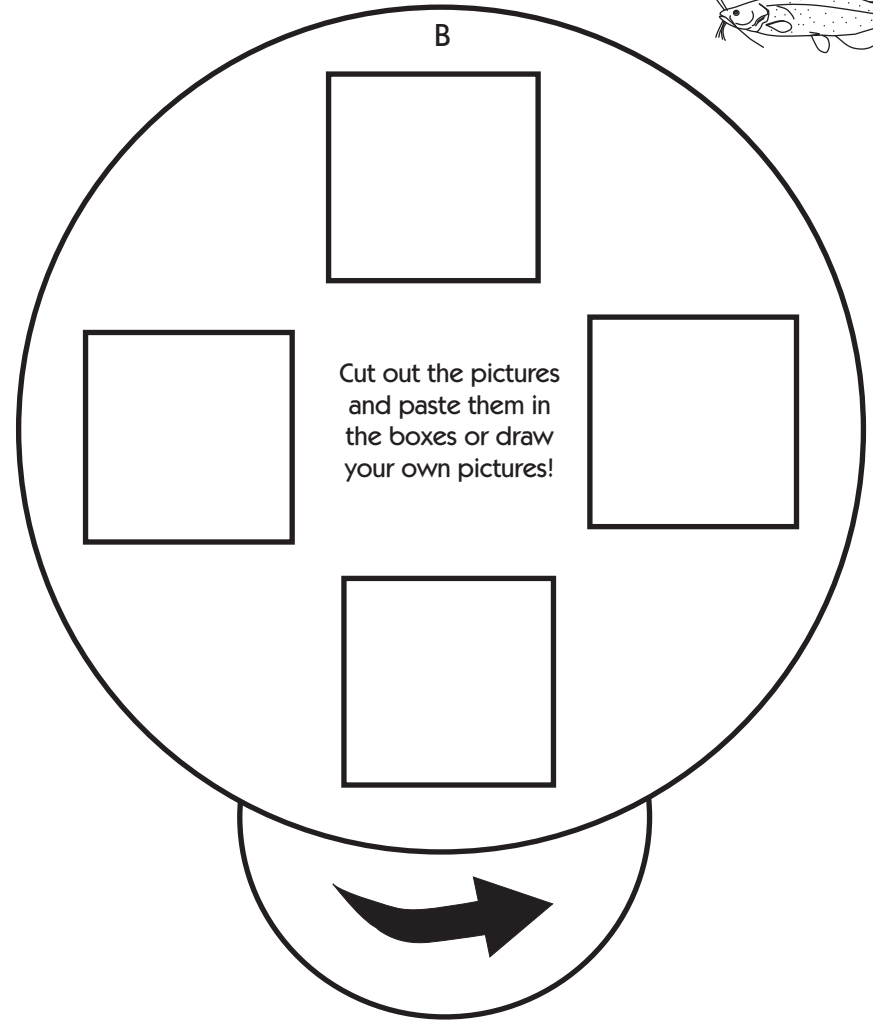
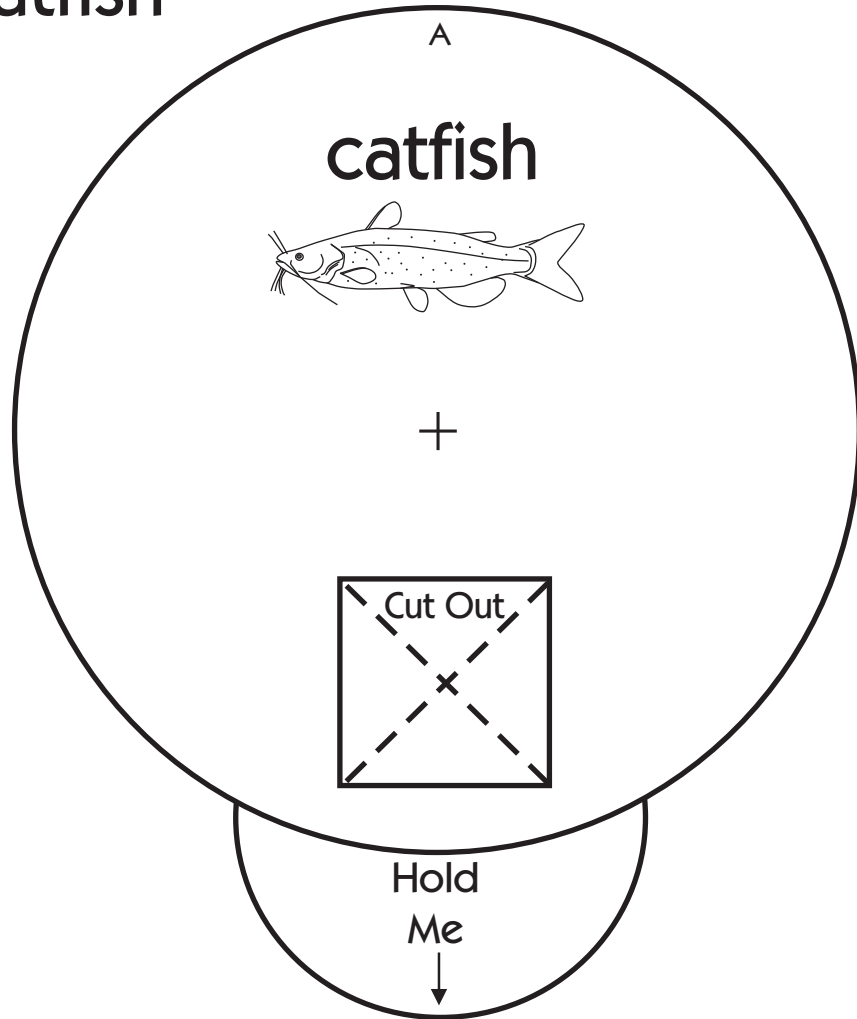
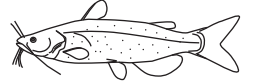
The larval stage begins when the tiny sturgeon has absorbed the yolk sac, about 9-18 days after hatching. At this time, the sturgeon is about 22 mm long, its four barbels appear, its nasal opening is evident, its snout is longer and more slender, and its back is completely covered with small evenly-spaced black dots. A dark band extends from its snout through its eye and blends into the pigmentation near the fin on its back. At this stage, a young sturgeon looks like a miniature of an adult.

The little sturgeon is considered a juvenile when it is between 196 mm and 762 mm in length. The juvenile stage lasts from about the age of one year to the onset of maturity at about 15 years old. At age 1 (about 196 mm), the sturgeon's tube-like sucking mouth and barbels are fully developed, and it has five rows of bony plates (called scutes) on its body. The scutes have well-developed keels terminating in a sharp, pointed hook or spur. In larger (greater than 1 metre), older sturgeon, this hook will wear off and skin will grow over it.

As an adult, the sturgeon has lost its large blotches and is olive-brown to grey on its back and sides, and white on its belly. Its scutes are worn and thin. It is more round in cross-section than the more angled shape of the juvenile. Its snout has also shortened. Because adult sturgeon grow so large (over 2 meters), they have no predators except humans. They are much older than other fish when they mature (15-20 years) and they do not lay eggs every year.

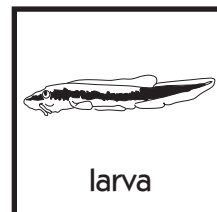
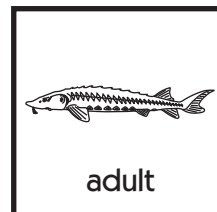
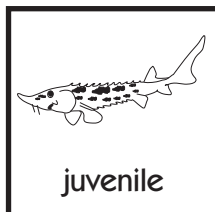
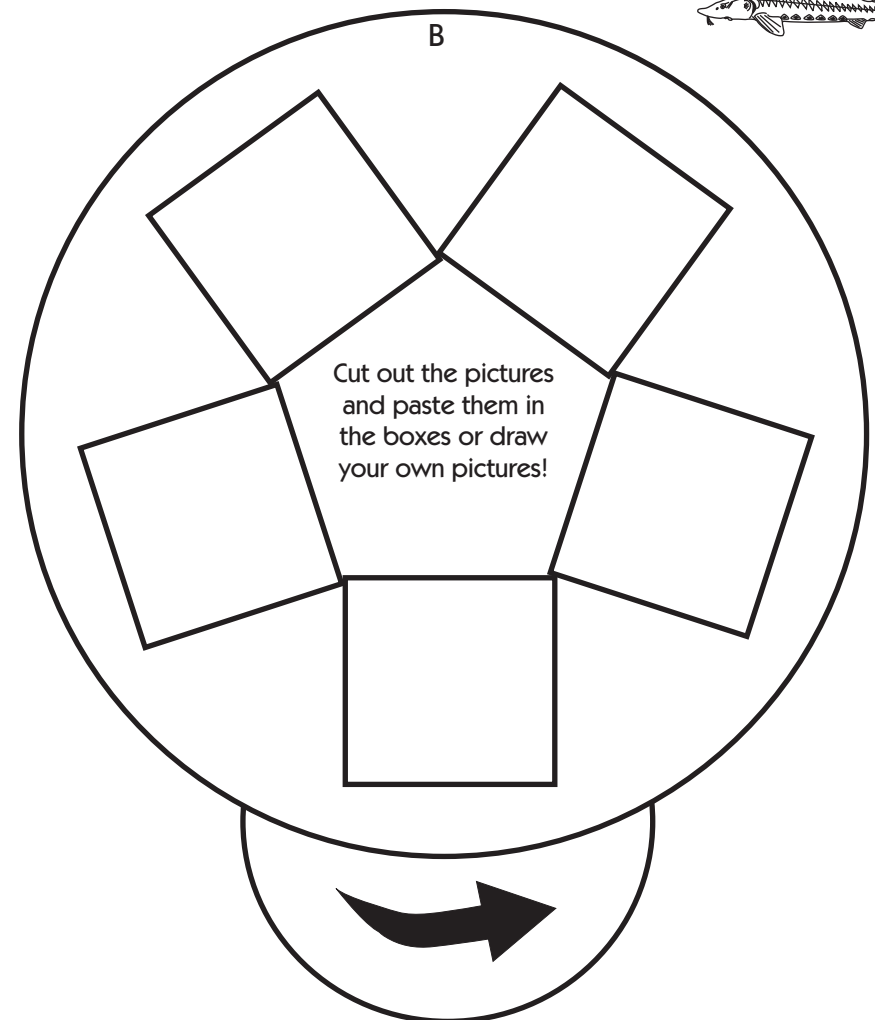
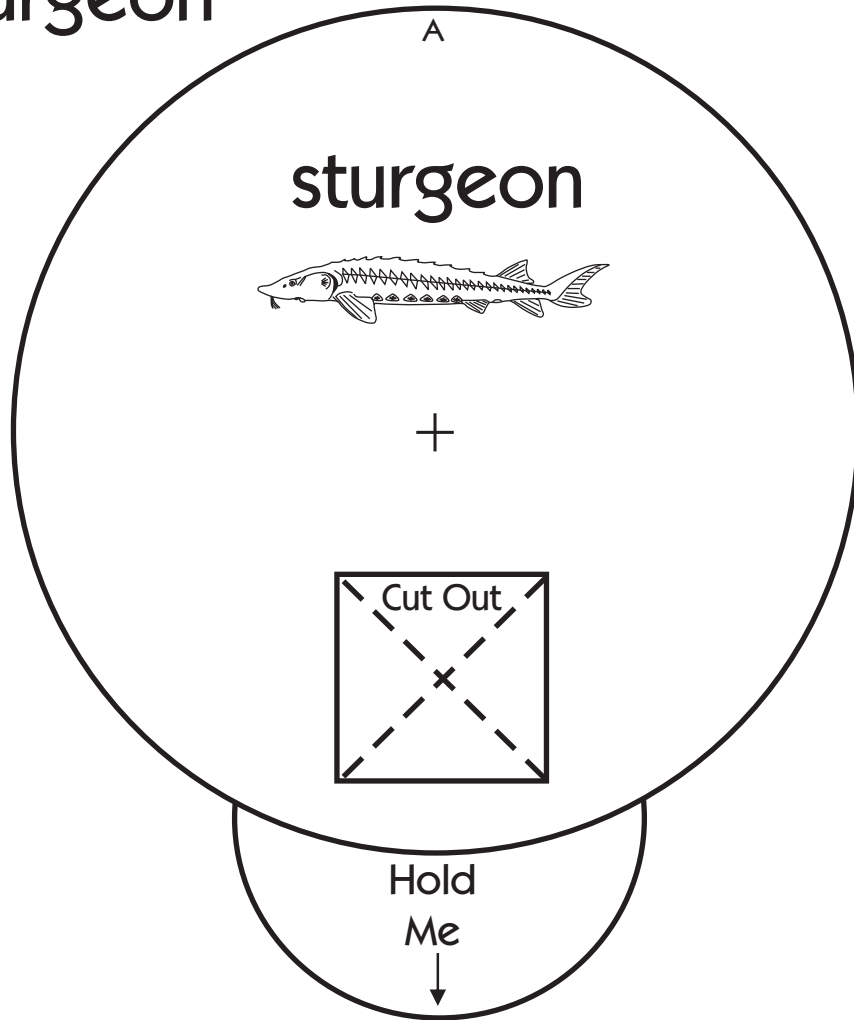
# Fish Metamorphosis Wheel

## Catfish



# Fish Metamorphosis Wheel

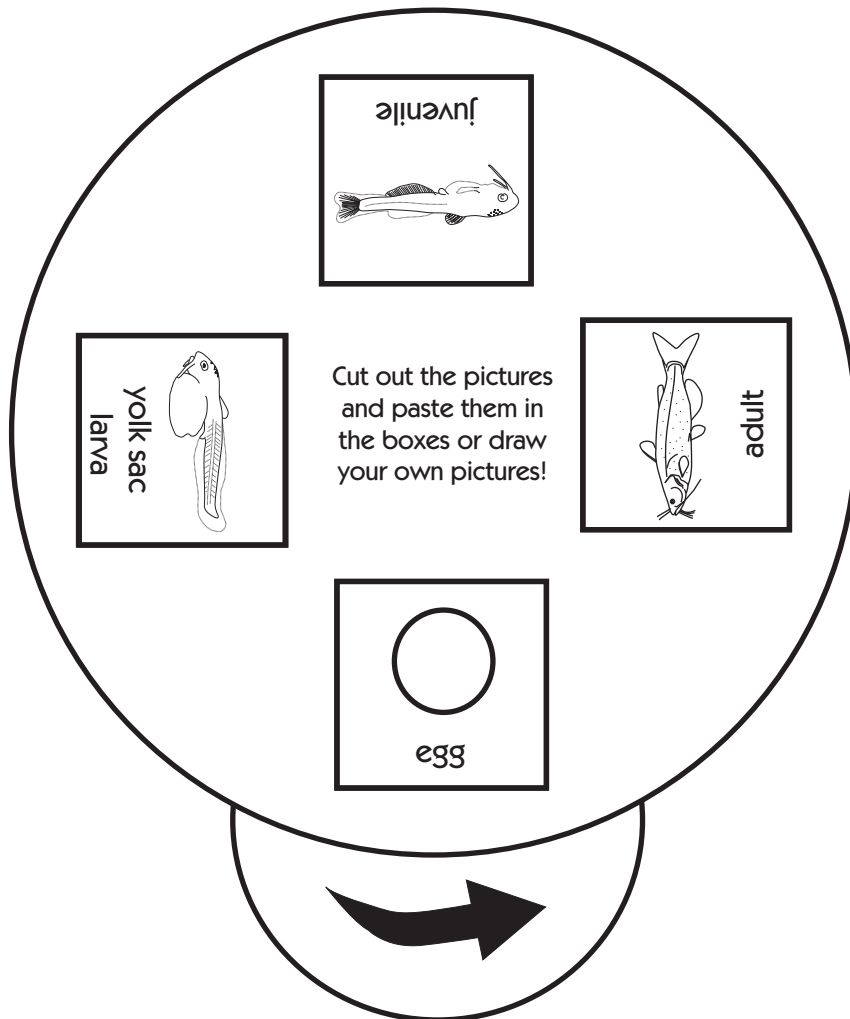
Sturgeon



# Fish Metamorphosis Wheel

## Answer Key

Catfish



Sturgeon

