LESSON 15: THE LIFE CYCLE OF A FISH

TEACHER GUIDE

BACKGROUND INFORMATION

- All living things go through a "life cycle". This can be defined as the stages through which a creature enters and passes during its life.
- For humans, life cycle phases might include: embryo to fetus to infant to baby to toddler to child to pre-teen to teenager to adult and finally, to elderly.
- Although every living thing goes through a life cycle, the duration of that life cycle varies widely amongst species. For example, bacteria may go through their entire lifecycle in thirty minutes, whereas a tree may take several thousand years to complete its lifecycle.
- Fish reproduce by laying eggs. Generally, the female will lay an immense number of eggs, and the male will then fertilize those eggs. Fish lay many eggs because the survival rate of each individual egg is very low. By laying so many eggs, the probability that a few will survive increases.
- Once a fish has hatched from its egg, it is called a larval fish. During this stage, a fish feeds from the yolk that has remained attached to its body from inside its egg.
- After the yolk has been fully consumed by the young fish, the fish is considered to be a fry. During this stage, the fish is still very young, but is now able to feed for itself.

- The next stage in a fish's development is called the juvenile stage. This is the transition period from a fry to an adult fish. Fish are not yet able to reproduce when they are juvenile fish.
- Finally, when fish are able to reproduce, they are considered adults. Fish will then undergo reproduction, just as their parents did.
- These new fish will pass through the same lifecycle their parents did and the cycle repeats!

LESSON OBJECTIVES

- To recognize that animals go through a series of changes throughout their lives.
- To understand that this series of changes is called the "life cycle".
- To have a basic understanding of the five main stages a fish goes through.
- To understand that different characteristics distinguish the stages from one another.
- To understand that the lifecycles of different species may be similar to one another; they simply appear different in different species.

LESSON MATERIALS

- A sheet of scratch paper for each student.
- A pencil for each student.
- Two blank sheets of paper for each student.
- Scotch tape to share amongst the students.
- Optional: coloring utensils (such as colored pencils) and rulers.

ASSESSMENT ANSWER KEY

1) What a fish looks like, what a fish is able to do, as well as how old a fish is all distinguish the stages of its lifecycle. (D)
2) A juvenile fish is on its way to becoming an adult fish. While a fish is still a juvenile, it is not capable of reproduction. Once that fish becomes an adult, it will be capable of reproduction.
3) Students' answers will vary depending on the fish they choose.

STUDENT GUIDE –WHAT STAGES DOES A FISH GO THROUGH DURING ITS LIFE?

VOCABULARY

Life Cycle – the stages an animal goes through from before its birth until its death.

Reproduce – to create new, baby animals.

LECTURE AND DISCUSSION

- Ask the class: who has, or has ever had a pet? Who got that pet when it was very young (such as a kitten or a puppy)? Does that pet look the same now as it did when you first got it?
- Animals change throughout their lives, just like people do.
- Everyone in the class has grown from a baby, to a toddler, and is now a child. Everyone will continue to grow into a teenager, then an adult, and finally on to be elderly. People look different in each of these stages.
- The fish in our aquaponics system change throughout their lives just like any other animal.
- A fish starts its life in an egg. Ask the class: what other animals start their lives in eggs? Other animals that start their lives as eggs include:
    - Chickens
    - Frogs
    - Ostriches

- Lizards
- Alligators
- Lady bugs
- Spiders
- Humans actually start as eggs inside their mother's body.
- And so many more!

- Once the fish hatch from their eggs, they are called larval fish.
  - Larval fish have the yolk from their egg still attached to them.
    - Ask the class: what is a yolk? What does a yolk do?
      - A yolk is the yellow part inside an egg. Egg yolks are a source of food for the young animal.
  - The larval fish feed off of the yolk until the yolk is gone and they are old enough to get food for themselves.
- After the larval stage, fish become fry.
  - Fish are called fry when they are very young, but are no longer feeding from their yolk.
- While the fish are developing from being fry, to becoming adult fish, they are called juveniles. In this stage, the fish are "growing up".
- Fish become adults when they are ready to reproduce.
- When a fish is an adult fish, it is in the final stage of its development. Once a fish reaches this stage, it will reproduce to create new fish. These new fish will go through the same lifecycle their parents did.

ACTIVITY

- Bring the students in groups to the aquaponics system.
- Have each student pick out a fish they like. Each student should attempt to identify which stage of the life cycle their fish is in.
- Ask each student to try to study their fish the best they can, because they will be asked to draw it later.
- Once every student has identified a fish, have each student sketch their fish on a scratch sheet of paper. The students should also label their fish's stage and give it a name. This is simply to keep it fresh in the students' memories.
- While the students are sketching their fish, write each of the five stages on the board along with information about each stage (such as appearance and abilities of the fish).
- Give each student two sheets of paper. Have each student tape the two sheets of paper together, attaching them at the short ends. This should create a long sheet of paper that could be used for a timeline.
- Have the students divide their paper into five sections of roughly equal size. Consider letting the students use a ruler and a pencil to section off their paper. If two sheets of 8.5'' by 11'' were used, the students should create five approximately 8.5'' by 4'' sections.
- Have the students then divide their papers in half lengthwise, giving a total of ten sections.
- In the top left section (when the paper is positioned lengthwise), the students should draw a picture of an egg, label it as such, and write a sentence describing that stage.
- The section immediately to the egg section's right will be the larval phase,

followed by the fry phase, then the juvenile phase and finally the adult phase. Each of these sections should be labeled and described. The student should copy their original sketch, including their fish's name, into the box that corresponds with their fish's stage of development. This will create a timeline of the lifecycle of a fish.

- Below each of the fish cycle sections, the students should create a box for the corresponding phase in human development. These boxes should follow a similar format to the fish row (labeling and description). For example, below the egg phase, a student might draw a pregnant woman. The human would be a fetus at this phase and might be described as still being inside the womb. The womb is similar to the egg in that the baby is still protected by a barrier. As another example, below the fry phase, the student might draw a toddler. The human now might be described as just learning how to perform tasks such as eating and walking on its own.
- Have the students name their human as well.
- A student might use the human life cycle phases: fetus, baby, toddler, child and adult to correspond with the fish phases.
- It could also be fun to have the student list something that changes in each of the human life cycle phases. For example, when a person changes from toddler to child, they might be allowed to play outside without supervision. When a person changes from a child to an adult, they can live in their own house.
- Consider letting some or all of the students present their finished creations.

CONCLUSION

- Living things go through physical changes throughout their lives, fish are no exception.
- The stages a living creature goes through make up its lifecycle.
- The first stage of a fish's lifecycle is the egg phase.
- Once the fish hatch, they are called larval fish. They eat from their yolk in this phase.
- The third stage of a fish's development is the fry stage. They are still very young fish at this point.
- Fish are called juveniles once they progress past the fry stage.
- The final stage is the adult stage. In this stage, the fish are able to reproduce.

EXTENSION

- Science – This lesson teaches a fish's life as beginning in the egg. This omits how the egg is made, through reproduction. This lesson could be expanded by teaching basic reproduction. Additionally, teaching reproduction opens the topic of reproductive strategies. Fish lay a vast number of eggs, in hopes that a few will survive. Humans, on the other hand, have relatively few children, assuming that they will survive.

- Writing – As an activity associated with this lesson, the students could be asked to write a story about the "life of a fish". The story would begin with their fish in the egg, and progress to adulthood. The students should use all five key life stage terms taught in this lesson.

Name_____ Date_____

ASSESSMENT 15 – LIFE CYCLE OF FISH

1. What makes each stage of a fish's life different? (Circle one)
    A. How the fish looks.
    B. What the fish is able to do.
    C. How old the fish is.
    D. All of the above.
    E. None of the above.

2. Describe what makes a juvenile fish different from an adult fish. (In your own words)

3. In what stage do you think your fish is in? Why do you think this?