Metamorphosis Matching

Audience/Group Setting
Event setting – this is a simple tabletop activity that could be set up either indoors or outdoors. This activity is appropriate for audiences of all ages, but works best for visitors aged 6 and older.

Goal
To recognize the changes in appearance of various amphibians throughout their life cycle and during metamorphosis.

Objectives
By the end of this activity, participants will be able to:
- Match a picture of the larval stage of an animal to a picture of its adult stage.
- Recognize bodily changes that occur in amphibians during metamorphosis.

Big Idea/ Main Message
Metamorphosis is an amazing process that happens in all amphibians (a defining characteristic), but does not happen in humans or other mammals.

Conservation Action/ Behavior Addressed
Look, listen, and learn: educate yourself and your family about amphibians.
With more than 6,000 frogs, toads, newts, salamanders, and caecilians worldwide, there's a lot to learn. Pick up a book, hop around the Internet, or watch your favorite animal television show to educate yourself and your family about amphibians.

Background Information
Definition of metamorphosis: A change in the form of an animal during normal development after the embryonic stage (i.e., after birth or hatching). Metamorphosis includes, in insects, the transformation of a caterpillar into a butterfly and, in amphibians, the changing of a tadpole into a frog. Metamorphosis is usually (but not always) accompanied by a change of habitat or behavior.

After hatching into a larval form, most amphibians undergo a dramatic change known as metamorphosis. During this change, the larvae of the amphibian slowly changes from a fish-like, water-dwelling animal to a terrestrial animal that is better suited to living on land. Most amphibians lose their gills, and the tails of frogs and toads disappear. Since they lose their gills, they develop lungs to breathe oxygen on land. Frogs grow legs to replace their tails, but salamanders keep their tails after the legs form. The length of time required for metamorphosis varies widely among different species. For tadpoles that hatch in short-lived puddles of rain on the desert sand, such as the flat-headed frog of Australia, it may be as brief as 8 days. In the European common frog, metamorphosis takes about 16 weeks, and in the marbled salamander, it is completed within 6 months.

Materials Needed
- Illustrations of amphibians from various points in their life (example: tadpole and frog pictures from the same species). Mark the back of each picture with the name of the animal and if the picture is the juvenile or adult form. Examples of animals to use:

    1. Leopard Frog
    2. Newt
    3. Salamander
- Pictures or illustrations of other animals, including humans, that people might already recognize as changing from juvenile to adult forms. Again, marking the type of organism and juvenile or adult on the back of the picture. Examples you can use are:
    1. Pictures of 1 or 2 different people (possibly staff members) as a baby and adult
    2. Beetle
    3. Butterfly
    4. Crab

Staff

This activity could be supervised by a volunteer or staff, but with instructions, could also run on its own.

Length of Activity:

~5-10 minutes

Set up

- Ahead of time: Prepare the pictures (possibly laminated) and any instructions for visitors if the activity is going to be self-run.
- Day of: Place the pictures on a table, scrambled so that they are not next to their "match." Place instructions on the table with the cards.

Procedures

1. As visitors approach the table, discuss how amphibians have the unique characteristic of "metamorphosis" and explain what this is.
2. Using first a familiar organism, such as the pictures of humans, point out the picture of the juvenile form of that organism (i.e. human baby) and ask the visitor if they can find the adult "match" for this baby.
3. After the visitor successfully finds the match (they might need some guidance), have the visitor then try to match the rest of the animals with their juvenile and adult forms.
4. The visitor can check their answers once they have matched up their pictures by checking the back of the cards.

Activity Extensions/Modifications

Classroom Use Modification:

- Have the students bring in (or provide) photos of people in different suits/ outfits/ gears, such as a scuba-diving wetsuit with flippers, spacesuit, hang-glider's outfit with kite, etc.
- Have the students form into groups and hand out a photo of a suit to each group. Ask the students to:
    - Name the environment where the suit is used. How is this setting different than our usual environment?
    - Name features of the suit that enable the wearer to venture into the setting.
    - Have each group present their findings to everyone else.
- Instructor should guide students' understanding that metamorphosis is about an organism using different environments/ behaviors during different life stages. While we do not have this ability to permanently change our natural forms, we use technology and innovation to temporarily "metamorphose," giving us the ability to explore places/ do things outside of

our normal realm, as in the seas, skies, and space. Kids will see how different body forms function in various environments, and hopefully will be even more amazed that amphibians (and insects) undergo metamorphosis.

Bonus Challenge:
The instructor can show pictures (or the real, live thing if possible) of an axolotl, and ask the students to think of reasons why this salamander still has its gills when it developed legs as an adult.

National Science Education Standards

This activity is aligned to the K-8 Life Science Content Standards.

- Structure & Function in living systems
- Diversity & Adaptations of organisms
- Form & Function
- Reproduction & Heredity
- Change, Constancy & Measurement
- Systems, Order & Organization

Note: Activity materials adapted from and used with permission of Adopt-A-Pond Curriculum and Toronto Zoo.