

EXPLORE

9 | Living Life Cycles

GRADE LEVEL

3-6

60-90
minutes

Developmental Modifications: Older students may focus on the different types of life cycles that organisms undergo and create skits that allow students to compare and contrast organisms.

summary

Students study the life cycles of aquatic insects, discuss the importance of wetlands as habitat and create a skit about life cycles.

objectives

- Become familiar with the life cycle of a wetland macroinvertebrate.
- Explain the role of the wetland in a species' life cycle.
- Present the life cycle of a macroinvertebrate.
- Demonstrate an understanding of the importance of macroinvertebrates in a wetland.

prerequisite

Wetland Observation, Bugs in the Mud or Critical Critters

vocabulary

Molt: to shed hair, feathers, outer skin, or horns with the cast-off parts being replaced by a new growth

Nymph: the immature stage of an insect that has incomplete metamorphosis

Metamorphosis: the process of basic and usually rather sudden change in the form and habits of some animals during transformation from an immature stage (as a tadpole or a caterpillar) to an adult stage (as a frog or a butterfly)

Larva: the wingless form of an insect that hatches from the egg and does not resemble the adult (larvae - plural)

Pupa: insect in the non-feeding stage of metamorphosis between nymph and adult, often characterized by enclosure in a cell or cocoon (pupae - plural)

setting**subjects**

Life Science

standards

This Great Lakes in My World activity is aligned to the Common Core State Standards and to state learning standards in:

Illinois
Indiana
Michigan
Minnesota
New York
Ohio
Pennsylvania
Wisconsin

This alignment is available on your Great Lakes in My World CD in the "Standards" folder and on-line at <http://www.greatlakes.org/GLIMWstandards>.

materials

- Journals
- Poster board
- Pencils
- Markers
- Research materials: books, internet, experts

background

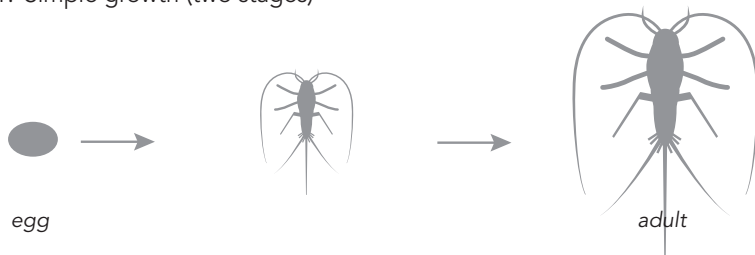
Wetlands provide rich habitat for a wide diversity of life. They are an essential breeding ground for many animals, providing critical food, shelter and water for young. Whether for laying eggs, or finding food, many organisms spend all or part of their lives in or near a wetland. Insects and amphibians are

two groups that frequently use wetlands as a place for their offspring to spend part or all of their life cycles. Wetlands that are connected to a Great Lake provide breeding grounds for some lake species, increasing the diversity of life in and around the lake.

Insect Life Cycles

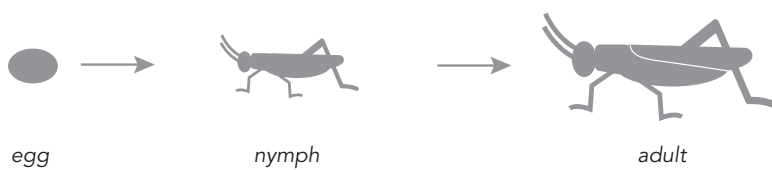
Once insects hatch, they follow one of three growth cycles, depending on their species.

1. Simple growth (two stages)



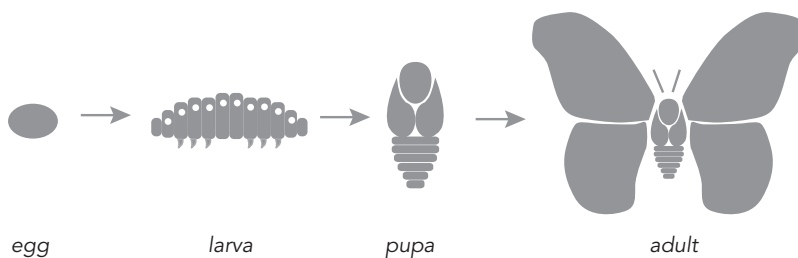
Examples: springtails and silverfish. The young look just like their parents, but are smaller. As they get older, they get larger. There are not many insects with simple growth.

2. Incomplete metamorphosis (three stages)



Examples: grasshoppers, dragonflies. The young, called nymphs, are wingless. They may or may not look like their parents, depending on the species. As they get older, they repeatedly molt. During their last molt, they emerge as winged adults.

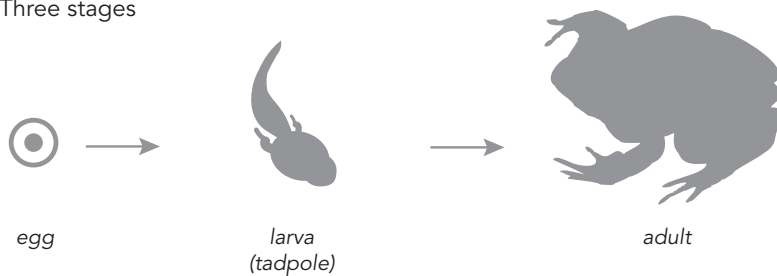
3. Complete metamorphosis (four stages)



Examples: butterflies, beetles, mosquitoes, caddisfly. The wormlike young, called larvae (singular - larva), look nothing like their parents. They have no wings or compound eyes. Their job is to simply eat. As they grow, they repeatedly molt. Once they stop, they become pupae (singular - pupa), and some spin a cocoon. As pupae, their bodies change greatly, and they emerge as adults. Most insects have complete metamorphosis.

Amphibian Life Cycles

Three stages



Frogs, toads and salamanders also go through metamorphosis. All three of these amphibians lay their eggs in moist or wet spots. Each hatch into larvae - called tadpoles or polliwogs. These have gills and a tail but no limbs. As they grow, tadpoles gradually lose their tails and gills and gradually grow lungs and legs. Eventually they are adults, and may or may not stay in the wetland, depending on the species.

Suggested Resources

National Audubon Society Field Guide to North American Insects and Spiders, Audubon Society Nature Guides Wetlands, Peterson First Guide to Insects of North America, video: Bugs Don't Bug Us

procedure

1. Discuss the life stages that humans undergo: baby, child, adolescent, young adult, adult, elder. Make the connection to other species that have changes throughout their lives.
2. In pairs, choose one insect from Bugs in the Mud or Critical Critters journal entries to study. Students should focus on insects rather than other invertebrates (snails, mites, etc.) because all insects go through similar life stages.
3. Have students create research questions about the species and its life cycle, using the journal pages. Students should use books, field guides, and/or the internet to research the questions in their journals:
4. In their research, students should look for pictures of their insect's life cycle and draw it in their journals.
5. Break students into groups according to insect choice. Each group should design a skit to act out the life stages of their insect. All students should act out each stage, so students recognize it is one insect going through multiple stages. In each stage, one student should explain what is happening and how the insect depends on the wetland during this part of its life. Students in grades 5-6 should have detailed explanations of each life stage, including both internal and external changes to body structures and functions, feeding, and habitat requirements.

Possible responses to #4 in Journal Pages. Some insects lay their eggs underwater. When the eggs hatch, the insects spend the first part of their lives underwater. Some insects remain aquatic as adults, while others move onto land. The eggs and bodies of aquatic insects are adapted for living underwater for all or part of their life cycles.

6. Students perform their skits for the class and present their research through diagrams and charts.

wrap-up

Discuss the journal questions as a class. In addition, discuss the following questions: How is a wetland a unique habitat that is able to support a high diversity of life? Why is it significant that a wetland is highly diverse? *In the Great Lakes watershed, wetlands allow the lakes to support a greater diversity of life. Some organisms, such as insects, spend time in both the wetlands and the lakes. Some lake organisms lay their eggs in wetlands. In the context of this unit, the biodiversity of wetlands is significant because the high level of diversity in a wetland is, in part, what allows it to successfully filter excess nutrients out of the water. It is this process that makes the water cleaner for the lakes and for drinking.*

extension

Choose other types of organisms and investigate their life cycles.

assessment

Rubric on page 247



We value your thoughts and feedback on Great Lakes in My World. Please let us know about any oversights, errors or omissions you find, or if there are things you or your students particularly like.

Send your comments to: education@greatlakes.org

9 | Living Life Cycles

FIRST NAME																				
LAST NAME																				

Choose one insect from your Bugs in the Mud or Critical Critters journal entries.

[1] Species Name.....

[2] In what stage of its life cycle did you find it? (Circle one)

EGG NYMPH LARVA PUPA ADULT

[3] In what stage(s) does this species live underwater?

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[4] What are your research questions about this species?.....

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[5] In what ways does this species' life cycle depend on the wetland?

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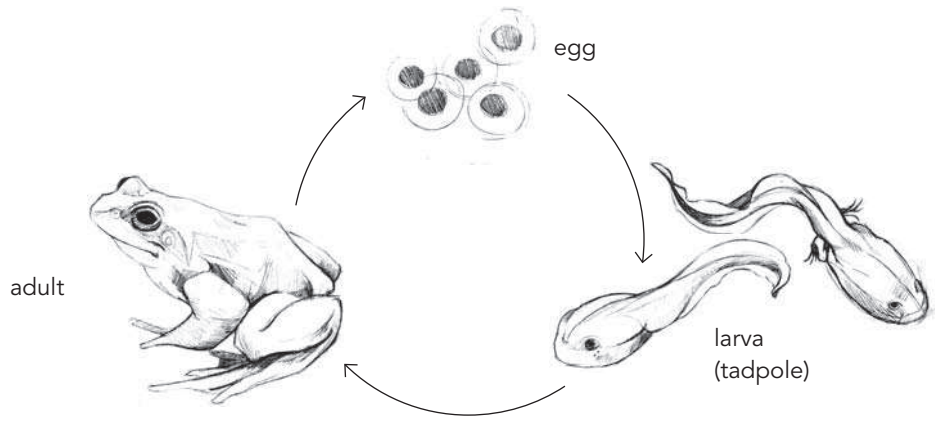
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[6] Draw the life cycle of your species like the example above. Use the words from question #2 that describe your species.

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