Amphibians & YOU

A look at the Amphibian Crisis

Virginia Bourdeau, 4-H Specialist
Order the Student and Leader guides from the 4-H Mall
Amphibians at Fair? Yes!

Youth enrolled in this project may participate in fair with a static educational exhibit in Conservation.

411 200 05(____) Conservation, an educational exhibit relating to conservation and ecology of amphibians.

Exhibits may not exceed 30” in width, 24” deep (front to back) and 36” high. Include explanation to the judge as outlined under Educational Display in fair book.
Chapter 1 - Amphibians

Survivor Animal

Activity 1- Turn into a Frog!
Activity 2- Camo-frog
Activity 3- Build an Animal
Activity 4- Amphibian Skin
Activity 5- Amphibian Populations

Pacific Tree Frog
Chapter 2-

- Water Quality & Conservation
- The Amazing Sponge!
- From Faucet to Frogs
- Where Does my Water Go?

Bullfrog
Chapter 3- Take Action!

Roughskin Newt

- WANTED…ALIVE: Amphibian Crisis Ad Campaign
- Prime Real Estate
- Field Study- with the assistance of resource book Pacific North West (PNW)
Field Study:

- Connecting 4-H youth to the natural world is an important goal.
- The book *Amphibians of Oregon Washington and British Columbia* will assist with identification and provides guidance on planning local surveys.
A reference for Oregon from Lone Pine publishing includes:

- Frogs, Toads & Salamanders
- Description of life histories, habitats, and vulnerabilities of PNW amphibians
- Chapter on *Planning Amphibian Surveys* compliments field study information in the 4-H curriculum
Illustrations and explanations

- Pictures of key identifying characteristics

Toes long and straight with rounded toe pads, that are used for clinging to smooth surfaces.
Illustrations and explanations

- Pictures of egg masses for frogs & egg strings for toads
- Life phases:
  - Hatchlings
  - Larvae (aquatic salamanders)
  - Tadpoles (frogs and toads)
  - Juveniles
Keys to life stages:
eggs, hatchlings, larvae, tadpoles, & adults
## Confusing Species Compared

### Identifying Amphibians

### Confusing Species Comparisons

<table>
<thead>
<tr>
<th>Northwestern Salamander</th>
<th>Long-toed Salamander</th>
<th>Roughskin Newt</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hatches in early to mid spring; develops slowly; may be found in mid spring to mid summer.</strong></td>
<td><strong>Hatches in winter to early spring; develops quickly; only found in early to mid spring.</strong></td>
<td><strong>Hatches in mid spring through summer; develops quickly, but may be found in late spring to late summer.</strong></td>
</tr>
<tr>
<td>Head is small, only slightly wider than body; head length is about one-fifth of TL (top view).</td>
<td>Head is large, distinctly wider than body; head length is about one-third of TL (top view).</td>
<td>Head is large, distinctly wider than body; head length is about one-fifth of TL (top view).</td>
</tr>
<tr>
<td>Snout is broad; eyes look</td>
<td>Snout is broad; eyes look</td>
<td>Snout is narrow; eyes look</td>
</tr>
</tbody>
</table>
Adaptations are a behavior or feature that an animal or plant develops to help them survive in a specific habitat.

Amphibians have many interesting adaptations.
Page 13: What is an Amphibian?

- *amphi* means double or circular in Greek
- *bios* is life in Greek
- This refer to frogs, toad and aquatic salamanders who start life in the water. They hatch from an egg as a larval form with gills.
Page 13: What is an Amphibian?

- As the frog, toad or aquatic salamanders larval form matures they metamorphose into a form that can live on land. However, these animals must return to the water to reproduce.

- Fully terrestrial salamanders lay their eggs on land. The young complete most of their development within the egg and hatch as small versions of the adult.

Ensatina juvenile, terrestrial salamander found in Western Oregon
To teach about frog metamorphosis, purchase models like these from science museum stores or online.
Amphibians have no special protective covering on their skin unlike fish & reptile’s scales, bird’s feathers or mammal’s hair.

Most amphibians breathe (and take in moisture) through their skin. They have lungs which they also use to breathe. When they are submerged under water or buried in soil (such as during hibernation) they ONLY breathe through their skin.
Frog are amphibians with many interesting adaptations to survive in their habitats.

Activity 1 lets youth delve into these adaptations.

If you do not want to buy all the materials for this activity you can print a copy of the following 5 slides to make cards to use with the text on page 7 of the leader guide.
Turn in to a Frog

Nictitating membranes

Permeable skin
Turn in to a Frog

Tympanic membranes

Webbed feet

- In frogs and aquatic salamanders
Turn in to a Frog

Mucous Glands

Poison Glands
Turn in to a Frog

Skin properties: Medicine

Cold-blooded
Turn in to a Frog

Specialized tongue

Glucose
Activity 5: Amphibian Populations

About 40% of all amphibians species worldwide are declining or are already extinct.

- Declines in amphibian populations are due to factors such as:
  - Habitat destruction
  - Pollution
  - Climate change
  - Increased UV-B light exposure
  - Invasive species
  - Chytrid fungus
Activity 5:
Amphibian Populations

Factors that affect amphibian populations do not act alone.

“One possibility for the (Chytrid) fungal increase is climate change, which can also compromise the immune systems of amphibians.”
Andrew Blaustein, Professor of Zoology, Oregon State University
Activity 5: Amphibian Populations

What is Chytrid Fungus? There are approximately 1000 Chytrid species worldwide. A species discovered in 1999 only infects the skin of amphibians. It was named *Batrachochytrium dendrobatidis* - OR “*Bd*” for short. Infected amphibians develop chytridiomycosis. *Bd* infects the outer skin layers which contain a protein called keratin. Keratin is the material that makes the outside of skin tough, and is also what hair, feathers and claws are made of.
Activity 5: Amphibian Populations

The skin of infected amphibian becomes very thick due to microscopic changes in the keratin. These changes are deadly to amphibians. Amphibians breathe, “drink” water and absorb electrolytes like sodium and potassium through the skin, not the mouth.

The changes in the skin’s function create a variety of stresses that result in death.
Activity 5: Amphibian Populations

*Db* is transmitted by a form of the fungus called a zoospore. The zoospore has a single flagellum that helps the spore move thorough water.

It is hypothesized that *Db* can be moved between wet environments by people. Take precautions to disinfect boots and equipment if doing field studies with youth.

73.4° F
Activity 5: Amphibian Populations

- A mathematical model will be used to predict how a population of frogs, infected with Chytrid fungus, will change over time. The trial on page 18 of the Student Journal is most realistic.

- M & Ms will be used to represent a population of frogs.
Activity 5: Amphibian Populations

- For each pair of youth, place 40 M&Ms in a small cup. Provide a second container of around 20 M&Ms.
- Youth will pour out the 40 M&Ms onto the table.
- Frogs with an “M” facing up are infected with Chytrid fungus and die. Set these frogs aside.
Activity 5: Amphibian Populations

- Frogs with an “M” facing up are infected with Chytrid fungus & die = 9 frogs.
- Eight frogs survived and reproduce. For every two frogs that survived add one frog to the population from the second cup. Add 4 M&M frogs to this population. (No, a single frog cannot reproduce.)
Activity 5: Amphibian Populations

- Record the number of frogs that survived + those added to simulate reproduction as Generation 1 on the chart on page 18 of the student journal.
Activity 5: Amphibian Populations

- Place the living frogs back in the cup and repeat the trial for 8 generations.
- Record the number of live frogs, including those added by reproduction in each trial, on the chart for generations 2-8.
Activity 5: Amphibian Populations

- What patterns do you see?
- What is the limiting factor that continues to decrease the population?
- Could there be other factors too?
- What are the limitations of this model?
Using what you have learned, create an advertisement that will educate others about amphibians.
Thank you!

By educating yourself about amphibians and their population declines you can help spread the word and help others understand how important amphibians are to our world!