For Creative Minds

This For Creative Minds educational section contains activities to engage children in learning while making it fun at the same time. The activities build on the underlying subjects introduced in the story. While older children may be able to do these activities on their own, we encourage adults to work with the young children in their lives. Even if the adults have long forgotten or never learned this information, they can still work through the activities and be experts in their children's eyes! Exposure to these concepts at a young age helps to build a strong foundation for easier comprehension later in life. This section may be photocopied or printed from our website by the owner of this book for educational, non-commercial uses. Cross-curricular teaching activities for use at home or in the classroom, interactive quizzes, and more are available online. Go to www.ArbordalePublishing.com and click on the book's cover to explore all the links.

Salamander Classification

Salamanders belong to one of the five classes of animals with backbones (vertebrates): amphibians, birds, fish, mammals or reptiles. Use the following information to determine where salamanders belong. The answer is below.

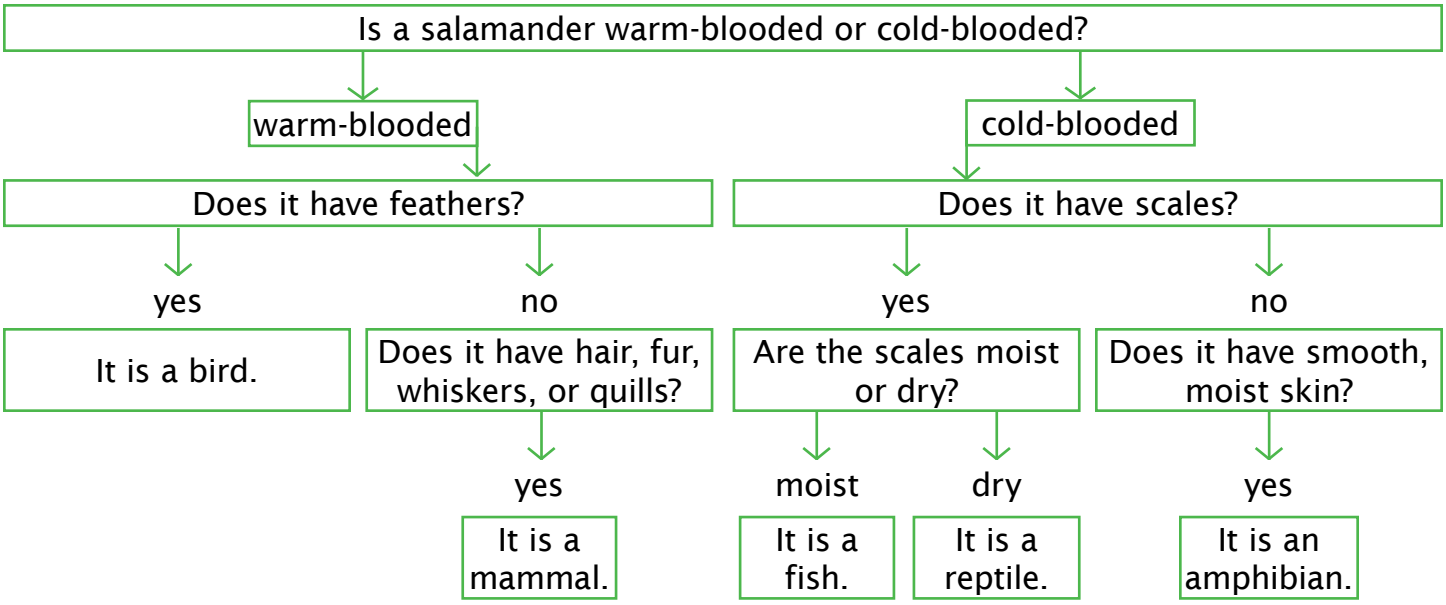
Salamanders hatch from eggs and spend the first part of their lives in water, breathing oxygen from the water through gills. They do not look like their parents when they hatch.

As they grow, their bodies change to look like their parents and they move onto land.

On land, they breathe oxygen through their lungs.

Salamanders are cold-blooded. That means that they use the heat of the sun or surrounding water to warm themselves.

They have smooth, moist skin without fur, feathers, or scales. To keep their skin from drying out, they live in or near water. On land, they live in burrows and rotten logs to keep their skin moist.



Answer: Salamanders are amphibians

Spotted Salamander Life Cycle Sequencing

Put the spotted salamander life cycle events in order. The answer is below.

Adult: Adults are navy blue with yellow spots. Once the lungs and back legs are fully developed, the salamanders move onto land where they will live for the rest of their lives.

Egg: Adult female salamanders lay their eggs underwater in jiggly, jellybean-shaped masses. Each gooey egg container holds hundreds of eggs.

Embryo: The babies grow inside egg cases.

Larva: Larvae have front legs and breathe oxygen from the water through gills. They don't have hind legs yet.

Juvenile: As the salamanders grow, they change colors. First, they turn grey, then green like an olive. Their gills and short tail fins disappear and they grow back legs.

eggs

larva

juvenile

adult

embryo

Answers in order: egg, embryo, larva, juvenile, and adult

Salamander Nights

At the end of winter, once the ground has no ice layers, some adult salamanders start to come out. The air temperature could be just above freezing and the water temperature is very cold, maybe in the high 30s F (0-5 C). Sometimes there is still ice on the water.

On the first few rainy nights in the spring, salamanders travel to “wicked big puddles” (vernal pools) to breed. They may head to the same pool where they were born. Up to hundreds of these amphibians gather to find mates. They will cross roads or crawl over anything in their way.

The mass migration occurs over several days.

Vernal pools are seasonal wetlands that fill with water for four to five months, depending on how early the snow melts. The area is dry for the rest of the year, which does not allow for fish and many other permanent water animals to live. These pools act as nurseries for many amphibians (frogs, toads, newts, and salamanders). There is enough food in these pools for the tadpoles to eat, but no fish to eat the tadpoles.

The new adults crawl out in August.

Many parks and nature centers have “Salamander Night” events to see the salamanders and to help them cross roads safely. Call local parks or nature centers to see what events they might have or if they can provide locations and estimated dates for your area. You can also call the state-level government agency responsible for protecting the wildlife in your state (Department of Natural Resources, Wildlife Resources, Fish and Game, etc.).

When you go, please remember that wildlife is to be observed. Do not handle animals unless you are under the guidance of licensed officials or wildlife biologists. Do not expose animals to bug spray, sunblock, or pesticides.

An Environmental Biologist

Co-author J. Adam Frederick is a scientist and educator who studies salamanders and other aquatic organisms as part of his job. Because he works with living things found in the wild, he's called an environmental biologist. He shares how and when he decided to become a scientist:

"When I was five years old, I was visiting the beach with my family and grandparents. I walked down to the water and was knee-deep in the surf when I stepped on something hard. I reached down to grab it. I was so excited. I thought it was a really big shell. But, I couldn't move it. So, my dad and big brother helped me dig it up. Sand was stuck all over it but we could tell it was some kind of bone.

"When we got home, my dad and I took the bone to a biologist at the university where my dad worked. He told us it was part of the spine (vertebra) of a whale, probably a humpback.

"Finding that whalebone showed me that it's really worth observing nature closely because, wow, you could find something incredible! I still look for things today. Sometimes I find things, but not always.

"I knew I wanted to be a scientist by the time I was eight years old. About that time, I was really into reptiles. Even though my mother didn't like them, we had lots of pets: chameleons, geckos, armadillo lizards, and snakes—garter, rat, corn, and king. My oldest brother and I also had fish tanks with frogs and newts.

"Because I had all of these animals, I learned how to set up terrariums and what to put in there, and what not to put in there. I learned about life histories and read lots of books on the animals—about their anatomy, what to feed them, and what not to feed them. I started learning incredible amounts of biology on my own because of these animals."

Just as you might keep a science journal in school, working scientists keep journals too! What kinds of things do you see in Adam's journal?