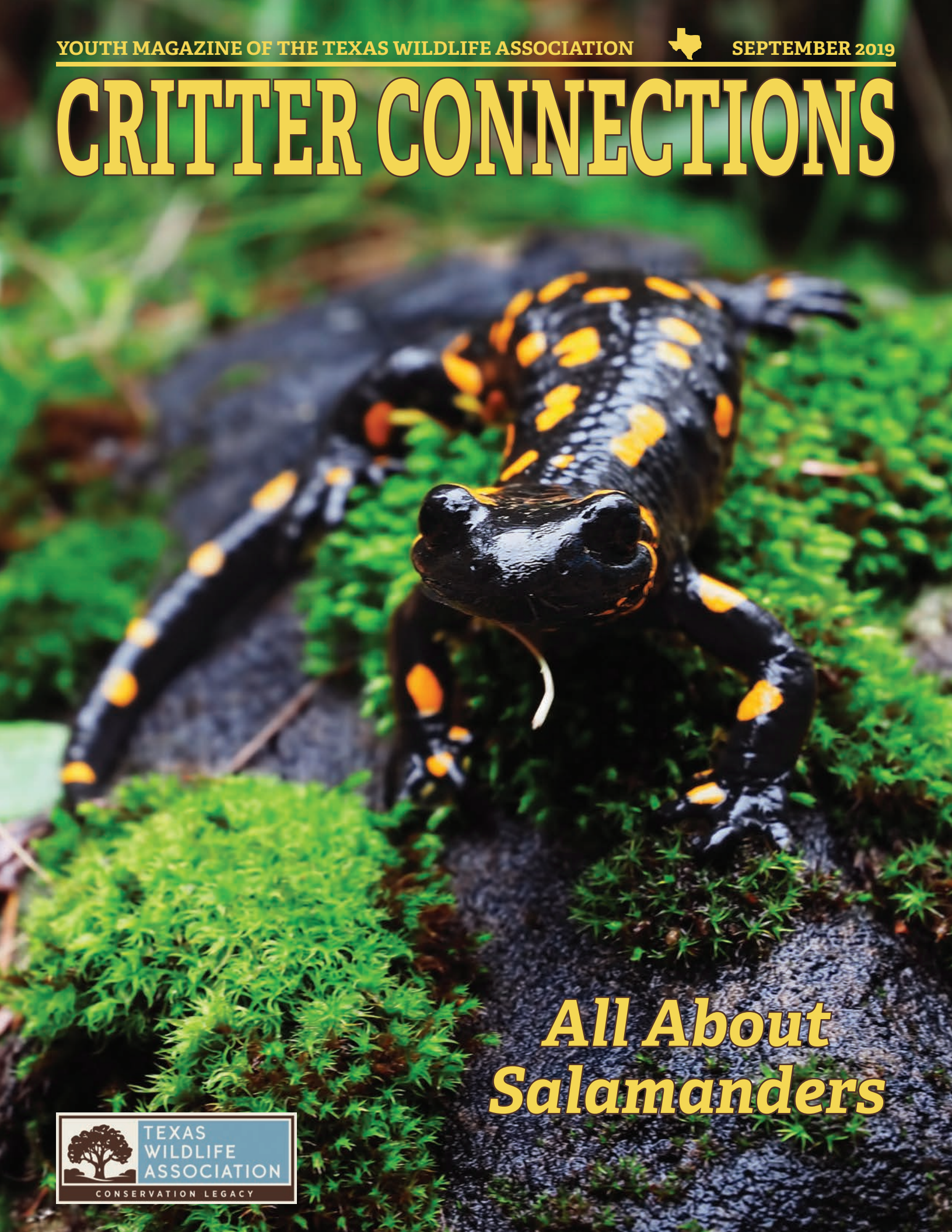




CRITTER CONNECTIONS



*All About
Salamanders*



Moss



Photo source: Maik Schumacher

Mosses are in a separate group than flowering plants and conifers, or plants with cones like pine trees. Mosses grow close to the ground in beds or mats in moist, shady locations. They do not grow very tall because they lack a structure called vascular tissue. Vascular tissues are structures found in other plants that are responsible for transporting water and nutrients. Without these structures, the moss is unable to grow beyond a few centimeters tall.

The root structure of mosses is also different from other types of plants. Instead of typical roots, mosses have thin root-like structures called rhizoids that function to anchor the plants in the soil and absorb water and nutrients. Mosses do not produce flowers or cones, instead they reproduce by releasing spores like fungi or mushrooms.

Moss is good for the environment in many ways. Because it covers the ground in large patches, it aids to prevent soil erosion. Moss also acts like a sponge and is able to absorb large amounts of water and slowly release the water into the surrounding environment. This keeps the moss damp which makes it a good ground covering for amphibians like salamanders. Moss also provides habitat for many small organisms like invertebrates, and birds use soft, spongy moss to line their nests.

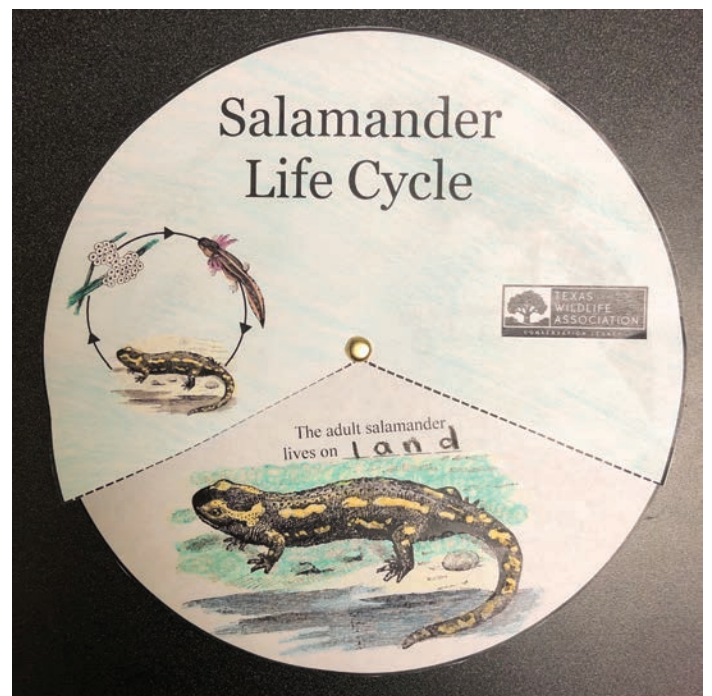
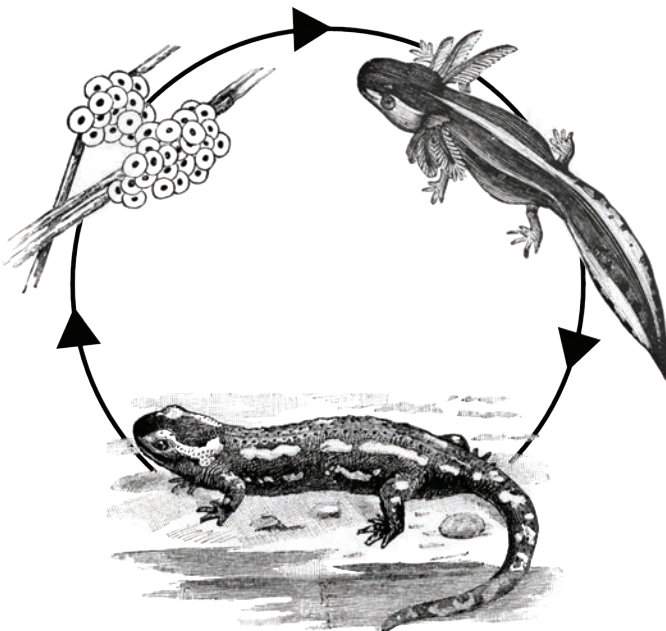


Photo source: Romey Swanson

Salamander Life Cycle Craft

Download the craft and follow the steps here:

<http://bit.ly/CCLifeCycle>



Did you know...

- ... that some species of salamander are poisonous?
- ... that the largest salamander in the world lives in China and can grow over 5 feet long?
- ... that some salamanders can regrow lost limbs?
- ... that the word salamander comes from the Old French word salamandre which means fiery beast?
- ... that some salamanders have a tongue that is 10 times longer than their body?
- ... that there are more species of salamander in the United States than anywhere else in the world?
- ... that a type of salamander called a siren has both lungs and gills?
- ... that salamanders are opportunistic predators which means they eat different prey depending on what is available?

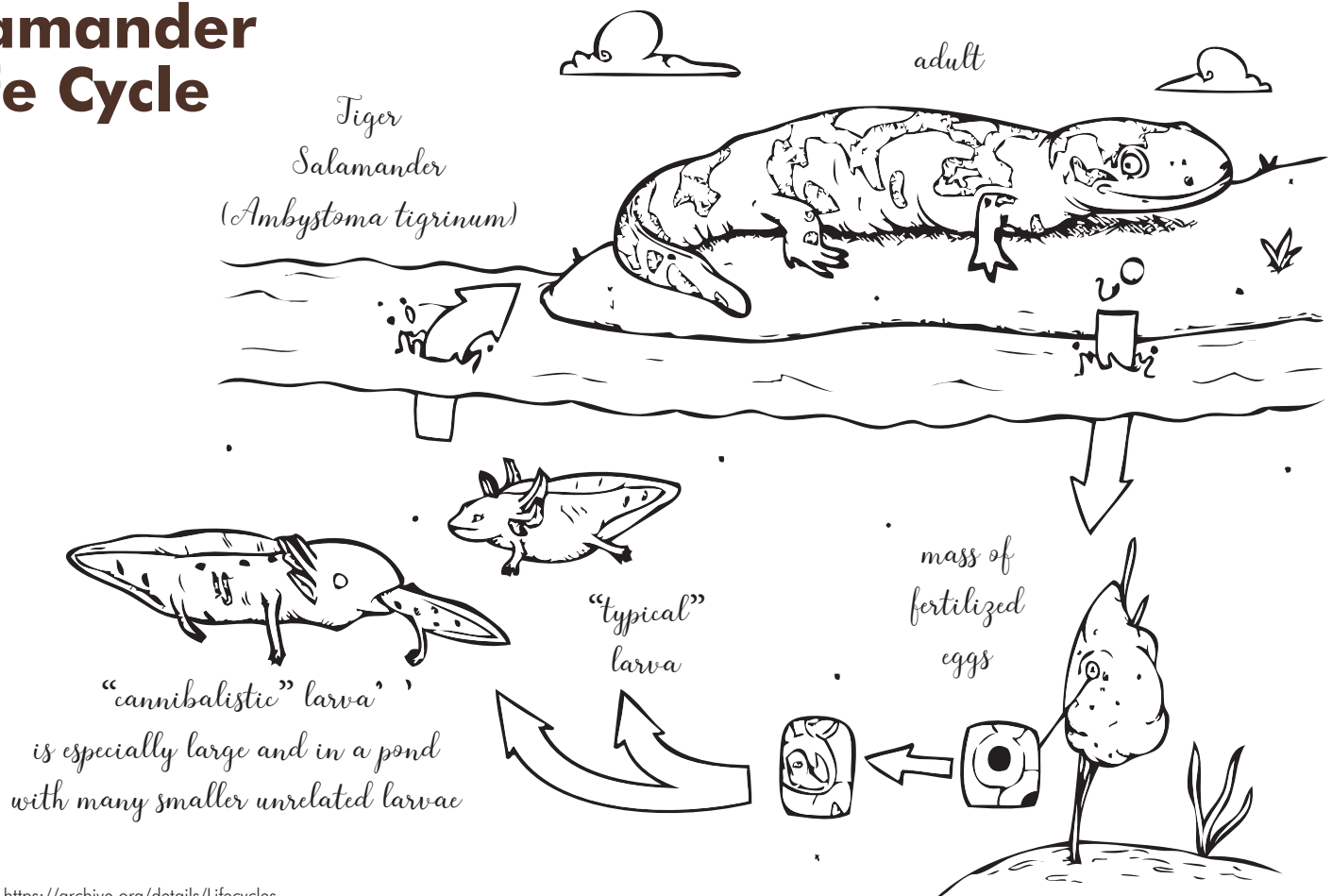


Eastern Tiger Salamander

Photo source: Peter Paplanus

Color Me

Tiger Salamander Life Cycle





Texas Salamanders

By Elanor Dean

There are over 20 species or types of salamander in Texas. In fact, the United States has the highest diversity of salamander species in the world. Salamanders are found in other parts of the world too and can range in size from the 2 cm long minute salamanders that live in Mexico to the 1.8m long Chinese giant salamander. The salamander order includes newts, waterdogs and eel-like creatures called sirens and amphiumas.

Salamanders are amphibians like frogs and toads. Amphibians rely on water in order to survive in their environment and complete their life cycle. Amphibians are also cold-blooded or ectothermic which means they are unable to control their body temperature and rely on their environment. One difference between frogs and salamanders is that salamanders retain or keep their tail as an adult. A salamander's body looks like a lizard, which is a reptile with short legs and a long body and tail.

Like frogs, salamanders spend the first two stages of their life cycle in the water. Salamanders lay jelly-like eggs in water and when they hatch they enter the larval stage, which resembles or looks like a tadpole. As the larvae grows, its body and tail get longer and it grows legs. Many salamanders live in the water during the first two stages of their life cycle and move to land as an adult, but some salamanders spend their entire life in water. Newts have a juvenile stage called an **eft** where they live on land and after 2-3 years they return to the water and



Spotted Salamander eggs



Spotted Salamander larvae

complete metamorphosis into an adult. Salamander larvae and aquatic salamanders that live in the water have different adaptations than terrestrial or land-dwelling salamanders.

Aquatic salamanders and larvae have a longer tail that is flattened on the sides like a fish tail. The flat tail moves side to side allowing them to swim through the water. Salamanders that live underwater also have special structures to breathe called gills. In salamanders, the gills are exposed instead of being protected by a flap like fish. The gills are pinkish-red in color due to blood vessels running through them and have a feathery structure. The feathery appearance provides a large surface area for the gas exchange process which allows the salamander to breathe oxygen. This is important because water does not have as much oxygen as air, so the gills are branched to collect enough oxygen to survive.



Western Lesser Siren



San Marcos Salamander

Salamanders that live on land have different adaptations. Some salamanders climb trees, so they have special pads on their toes to help them climb, and they use their tails for balance. Instead of gills, land-dwelling salamanders breathe using lungs or through their skin. Salamanders need to live in damp environments because their skin must stay moist in order for them to breathe. Because of this, salamanders are highly affected by pollution in all stages of their life cycle. Temperature change can affect the amount of water in an area and polluted water will decrease the amount of oxygen available for them to breathe. Also, pollution can enter their body through their skin which can make them sick or even die.



Marbled Salamander



Salamanders have other adaptations that help them survive. Believe it or not, they are able to regrow lost limbs like their tail or leg and can even regenerate major organs inside their body. Some salamanders have bumps along the side of their body called **costal grooves**. These grooves increase the skin's surface area and create channels for water to flow and collect on their body. This is important to stop their skin from drying out. Their skin also has special glands which produce mucus to keep them slimy and moist. Talking about skin, salamanders shed their skin. Technically so do humans, but we shed our skin in tiny flakes instead of all at once. The skin begins to shed at the mouth and moves down their body so they can walk right out. Sometimes they will eat their old skin because it is a good source of nutrients.

Salamanders eat other things too. They are known as **opportunistic predators** which means they will eat different organisms depending on what is easily available. Larval and aquatic salamanders will eat organisms that live in the water like snails, shrimp, insect larvae and other aquatic invertebrates. Salamanders that live on land will eat organisms like insects, spiders, snails and worms. They will either grab their prey with their mouth or extend their long tongue just like a frog.



Spotted Salamander

Salamanders do have predators in the wild, but they have different ways of protecting themselves. Some salamanders use camouflage to blend into their environment while other species of salamander are poisonous. Poisonous salamanders are brightly colored with reds and yellows as a warning to predators to stay away. Predators know that they should not eat these salamanders, because they will get sick and may even die. The poison is produced from the same glands which keep their skin slimy. Having slimy skin also is an important defensive adaptation. Their bodies are smooth and slimy making them difficult for predators to catch.

Because salamanders rely on habitats that are damp or near water, it is important that there is plenty of clean water where



Western Slimy Salamander

they live. Water is a renewable resource which means that it is replenished naturally over time, but it must be conserved. Salamanders live in the water for the first two stages of their life cycle and sometimes as an adult too. It is so important to both conserve water as well as prevent water pollution to help the survival of salamanders. Many species are threatened or endangered because they are so sensitive to pollution. Brainstorm some ways that you can help conserve water and keep it clean for salamanders and other organisms that live in the water.



Western Slimy Salamander



Texas Blind Salamander



Smallmouth Salamander

WORD BANK

costal groove – the vertical grooves along the sides of salamanders, usually between the limbs

eft – the juvenile stage of a newt's life cycle

opportunistic predator – a predator that eats a variety of other animals depending on what is available

Sources: USDA Forest Service

Photos: Romney Swanson, Fredlyfish4, Brian Gratwicke, Peter Paplanus, Ryan Hagerty, Greg Schechtner,

Salamander Scramble

Created by Puzzlemaker at DiscoveryEducation.com

Part 1: Clue Unscramble

Use the clues to unscramble each word or phrase and enter your answers in the boxes.

Salamanders must live in a damp habitat that is close to _____.

TERWA

3	17	11		

Salamanders are able to regrow their _____, just like lizards.

LIAT

9		1	

A salamander is an _____, in the same animal group as frogs.

PBIHMANIA

	12				4		

Salamanders that live on land catch prey with their long _____.

TOGNUE

8				7	

Salamanders are _____ which means they cannot control their body temperature.

ODLC ELDOODB

10				13			

Salamanders that live in the water breathe using _____.

LIGLS

			5	

Salamanders have smooth _____ that they use to breathe.

KINS

		6	

A salamander is a _____ which means it hunts other animals.

EORATPDR

	16		14	2		15	

Part 2: Number Puzzle

To answer this question about salamanders, copy the letters from the numbered boxes above into the boxes below with the same number. **Why did the salamander feel lonely?**

1	2

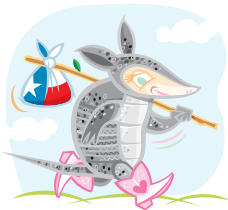
3	4	5

6	7	3	8

9	10

11	12	13

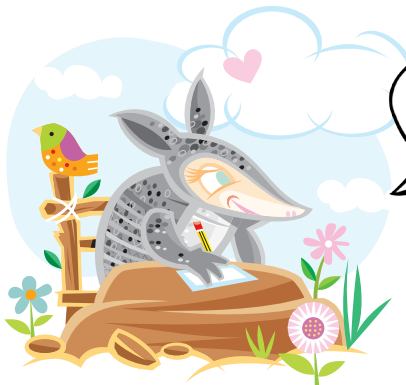
14	15	16	17



Nancy's Corner



Draw a picture of the salamander in the blank space.



Did you see a salamander?

How to help salamanders:

- Conserve water by turning off the tap while brushing your teeth.
- Participate in a trash clean-up day for a local water source.
- Minimize the use of pesticides.
- Reduce trash by using a reusable water bottle and lunchbox.
- Respect nature and its wildlife by not polluting habitats.
- Participate in a recycling program at school and at home.

Tips to find salamanders:

- Search in damp areas
- Search at night
- Search during or after rainy days
- Turn over logs and rocks, but be sure to gently put back
- If you find one, do not touch it

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Discovery Trunks

- * 2-week reservations
- * Seven wildlife topics
- * Hands-on materials and lessons
- * TEKS aligned for Grades K-8



L.A.N.D.S. Program

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- * Hands-on classroom activities
- * Field Investigation Days
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Distance Learning

- * 20-45 minute programs
- * Videoconferences & On-demand webinars
- * TEKS aligned for Grades K-8



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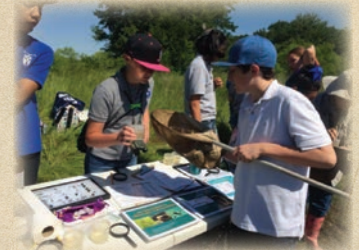
Wildlife by Design

- * Classroom Presentations
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- * Hands-on, inquiry-based learning
- * TEKS aligned for Grades K-8



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- * Study along the Trinity River
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TWA is a membership-based, non-profit organization whose goal is to educate all people, especially the youth of Texas about conservation, management and stewardship of wildlife and habitat on private land.

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