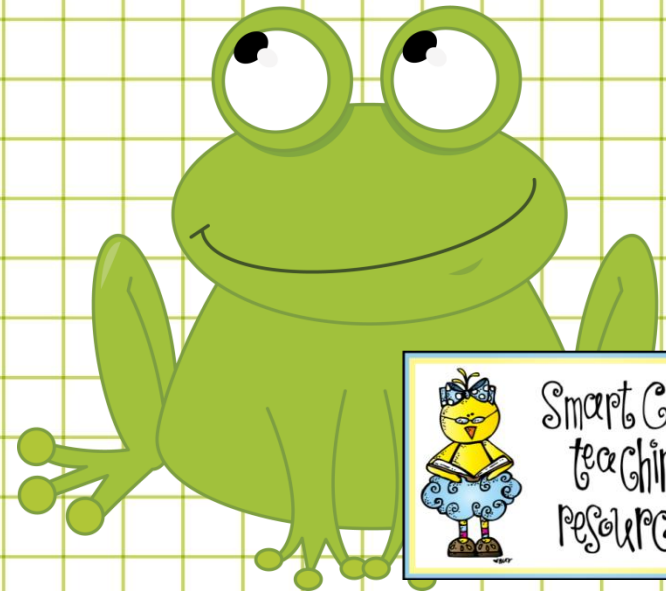


Engineering

a Frog

STEM Activity Pack

Students choose cards in order to engineer a new species of frog that meets the requirements of each one! Once their frogs are engineered, students need to complete an informational report about this new species of frog! A great, integrated activity pack to use when learning about animal adaptations!



Smart Chick
teaching
resources

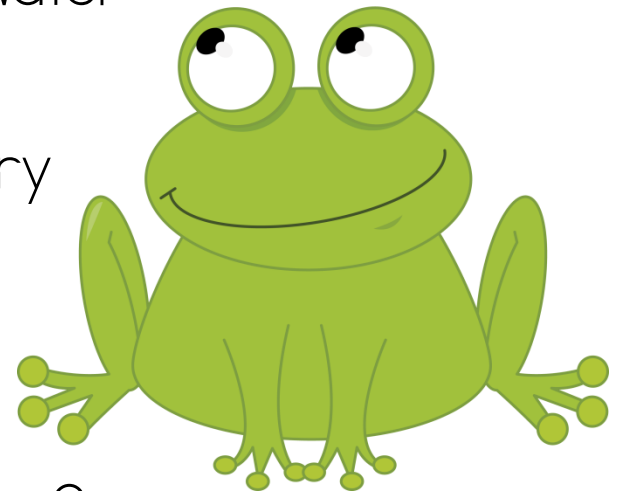
Teacher Notes & Tips

- Copy the cards onto different colors of paper and then cut them out. The kids have to glue one of each color card to their grid sheet. It makes it easier for the kids to know they picked one of each type of card!
- Print the frog engineering diagram on white cardstock for better durability when drawing and coloring.
- Once the cards have been chosen and the diagram sections are complete, students can work on the writing pages. They can cut them in half and put them in any order (as long as the cover one is on top).
- Project the "What is a Frog?" page and the "Engineer a Frog" student direction sheet on the projector. You could also make them into posters for students to reference or copy them.
- Let the kids make a model of the frog they have engineered using model magic once they have written their reports.
- There are symbols on the different cards that correspond with a certain type of frog (there is a key included).

What is a frog?

A frog is an amphibian. There are many unique features that make a frog, well, a frog! Frogs...

- are vertebrates (animals with a backbone)
- are cold-blooded (body temperature is same as outside temperature)
- begin their lives in water as eggs and tadpoles
- live their adult lives on land and in water
- lay eggs
- are found all over the world, in every climate, except for Antarctica
- live in fresh water
- are carnivores (eat meat)

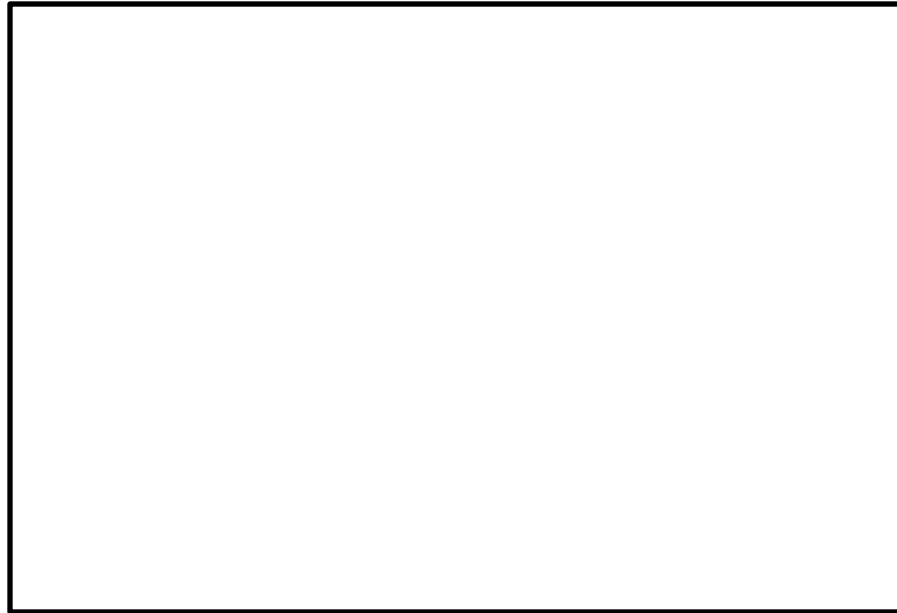
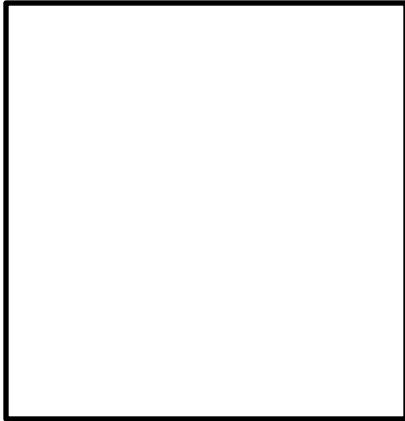


Did you know a toad is actually a type of frog?

Engineer a Frog

Now it is time to engineer a brand new species of frog! Follow these steps to engineer your frog:

1. Choose the type of feet. Read the card and draw the front and back feet into the correct boxes of the diagram. Do **not** color anything until step #5!
2. Choose the type of head. Read the card and draw the head in the correct box of the diagram.
3. Choose the body shape. Read the card and draw the body into the box in the middle of the diagram.
4. Choose the coloration/camouflage. Read the card carefully and then color in your frog using crayons or colored pencils.
5. Cut out the six boxes carefully and assemble your frog.
6. Choose the ecosystem for your frog. Read the information about the ecosystem and then place your frog into a colored picture of this ecosystem on 11 x 17 paper.
7. Fill in the informational pages about the frog you engineered! Cut out these information sheets and staple them together when you are finished!



Use these boxes to engineer the parts of your frog! You will cut these out when they are drawn and colored.



My Frog Engineering Cards

<p>Glue the Feet Card Here</p>	<p>Glue the Head Card Here</p>	<p>Glue the Body Shape Card Here</p>
<p>Glue the Color and Camouflage Card Here</p>	<p>Glue the Ecosystem Card Here</p>	<p><i>Glue one of each of your frog engineering cards into the five boxes of the grid.</i></p>

Once your grid is filled and your frog engineering diagram is complete, you will need to name your frog.

Herpetologist: _____ Name of Frog: _____

Reasons for this name:

Choose the Type of Feet

Some frogs have long, strong legs with webbed back feet for swimming and jumping and smaller front legs with toes for gripping. ●

Some frogs have long legs and large, round toe pads on the front and back feet that help them cling to branches like suction cups. ▲

Some frogs have hard, horn-like growths on their hind legs/feet and short front legs/feet to help them burrow underground, especially in dry climates. ■

Some frogs have shortened front and back legs with short toes made for walking and climbing. ■

Some frogs have shorter front legs/feet and long, back legs/feet with extra webbing that puffs up with air and extends like a parachute. ★

All frogs have four toes on each of their front feet and five toes on each of their back feet.

Choose one of the cards. This can be a random choice, or you can pick the one you want – check with your teacher! You will need to make sure your frog has the type of feet that are described on the card. The type of feet will effect the way the frog you are engineering moves and what it can do. Draw your frog's type of feet into the boxes on the diagram page.

Choose the Type of Head

<p>Some frogs have longer round shaped heads that come to a rounded point at the nose. They have large eyes that sit above the head. They eat insects, small mammals, and fish. ●</p>	<p>Some frogs have narrower heads with more of an arrow shape, coming to a rounded point at the nose. They have large eyes that sit above the head. Adults eat insects and other small invertebrates. ▲</p>	<p>Some frogs have shorter snouts and flattened heads. The head is usually a lot smaller than the body. The eyes are smaller in size. They eat spiders, insects and worms. ■</p>
<p>Some frogs have shorter round shaped heads that are rounded at the nose. They have large eyes that sit above the head. They eat insects, earthworms, and small mammals. ■</p>	<p>Some frogs have narrow heads with a rounded shape that comes to a rounded point for the mouth. The eye are medium sized and sit on top of the head. They only eat insects. ★</p>	<p><i>Not all frogs have long, sticky tongues., some frogs have no tongues and instead grab their prey and shove it in their mouth.</i></p>

Choose one of the cards. This can be a random choice, or you can pick the one you want – check with your teacher! You will need to make sure your frog has the type of head that is described on the card. The type of head will effect the diet of the frog you are engineering and what it can eat. Draw your frog's type of head into the boxes on the diagram page.

Choose the Body Shape

<p>●</p> <p>Some frogs have a streamlined body shape allowing them to move quickly. They are muscular and strong, but not thick.</p>	<p>Some frogs have slim, narrow bodies. They can even appear to be delicate looking in terms of their body shape.</p> <p>▲</p>	<p>Some frogs have pear shaped bodies that are rounder toward the head and narrower toward the back. These frogs look plump.</p> <p>✚</p>
<p>■</p> <p>Some frogs have stubby bodies that are thick and stubby. They are described as "fat bodied". The body bulges out at the sides.</p>	<p>Some frogs have narrower and flattened bodies, that extend from the head like a rectangular prism. They have a slim look to them,</p> <p>★</p>	<p><i>Different types of frogs have different looks. They come in many different shapes and sizes.</i></p>

Choose one of the cards. This can be a random choice, or you can pick the one you want – check with your teacher! You will need to make sure your frog has the type of body shape that is described on the card. The body shape will effect the movement and look of the frog you are engineering and what it can do. Draw your frog's type of body shape into the center box on the diagram page.

Choose the Color and Camouflage

 <p>Shades of green are very common among frog species, allowing them to blend into many different types of habitats.</p>	<p>Some types of frogs are brightly colored in yellow, blue, orange, red or purple with bold stripes and spots to serve as warning colors.</p> 	<p>Some frogs can even  change their coloration according to light, temperature, humidity, or even mood. Fear or excitement can make them change colors.</p>
 <p>Shades of brown are also very common among frog species, allowing them to blend into many different wooded habitats.</p>	<p>Some frogs have dull colored backs with brightly colored bellies and they flash the belly color in order to confuse predators.</p> 	<p><i>All frogs have a specific type of coloration for a reason, either to hide or as a warning color.</i></p>

Choose one of the cards. This can be a random choice, or you can pick the one you want – check with your teacher! You will need to make sure your frog has the type of coloration and/or camouflage that are described on the card. The coloration and camouflage will effect the where the frog you are engineering lives and what it can do. Draw your frog’s coloration/camouflage into the boxes on the diagram page.

Choose an Ecosystem

Temperate Forest	Desert	Rain Forest
Wetland	Marsh	Boreal Forest

Choose one of the cards. This can be a random choice, or you can pick the one you want – check with your teacher! You will need to read more information about your ecosystem and be sure that the frog you engineer can survive in the ecosystem you have chosen. The ecosystem card will effect the coloration, and maybe even the size, of the frog you are engineering.

Temperate Forest

Temperate deciduous forests are forests in cool, rainy areas; they have trees that lose their leaves in fall and regrow them in spring. Temperate deciduous forests are found in the middle latitudes around the globe and have four distinct seasons: spring, summer, fall, and winter. In the Northern Hemisphere, these forests are found in North America, Europe, and Asia. In the Southern Hemisphere, there are smaller areas of these forests, in South America, Africa, and Australia. The growing season in these forests is about 6 months long.

The average temperature in temperate deciduous forests is roughly 75°F but gets as high as 86°F depending on the altitude of the forest. Forests higher in the mountains are colder. Deciduous forests receive from 2 to 5 feet of precipitation (both rain and snow) each year. Humidity in these forests is high, from 60% to 80%.

Marsh

Freshwater marshes are a type of wetland that is teeming with both animal and plant life. Freshwater marshes are usually low-lying, open areas located near creeks, streams, rivers and lakes, where water flows into the marsh. Marshes are especially common at the mouths of rivers. The water level in freshwater marshes usually ranges from 1 to 6 feet deep (for most of the year); this water is rich in minerals and the water level varies seasonally. In the United States, the biggest freshwater marsh in the United States is the Florida.

The waterlogged land in marshes supports many low-growing plants, like grasses and sedges; there are few trees in marshes. Some marsh plants are cattail, sawgrass, water lily, pickerel weed, spike rush, and bullrush.

Some animals live in the water (including fish, crabs, shrimp, tadpoles, insect larvae, etc.), some animals live at the surface of the water (like frogs, turtles, beavers, etc.), some animals live above the water (like birds, insects, frogs, etc.), and other animals live in the spongy areas of land surrounding the swamp (like raccoons, opossums, muskrats, deer snails, earthworms, etc.), using the marsh for feeding, shelter and/or nesting areas.

Desert

Deserts cover about one fifth (20 percent) of the earth's land area. The desert is a harsh environment with very little rainfall and extreme temperatures; a desert is defined as a region that gets less than ten inches of precipitation per year. Because of these dry conditions, there is limited plant and animal life in deserts. Desert plants (like cacti) are not abundant; neither is animal life.

Some deserts get both very hot (during the day) and very cold (during the night, when temperatures can drop well below freezing). Some deserts, however, are always cold (for example, the Gobi Desert in Asia, and the desert on the continent of Antarctica).

Different animals live in the different types of deserts. Animals that live in the desert have adaptations to cope with the lack of water, the extreme temperatures, and the shortage of food. To avoid daytime heat, many desert animals are nocturnal; they burrow beneath the surface or hide in the shade during the day, emerging at night to eat. Many desert animals do not have to drink at all; they get all the water they need from their food. Most desert animals are small.

The biggest desert is northern Africa's Sahara Desert; it covers roughly 3,500,000 square miles. The driest deserts are the Atacama desert of northern Chile, South America, and the Lut Desert in eastern Iran; these extreme deserts get less than half an inch of precipitation each year - and it is from condensed fog, and not from rain.

Rain Forest

Rainforests are very dense, warm, wet forests. They are havens for millions of plants and animals. Rainforests are extremely important in the ecology of the Earth. The plants of the rainforest generate much of the Earth's oxygen. These plants are also very important to people in other ways; many are used in new drugs that fight disease and illness.

Tropical rainforests are located in a band around the equator mostly in the area between the Tropic of Cancer (23.5° N latitude) and the Tropic of Capricorn (23.5° S latitude). This 3,000 mile wide band is called the "tropics." Tropical rainforests are found in South America, West Africa, Australia, southern India, and Southeast Asia.

Different animals and plants live in different parts of the rain forest. The rain forest is divided into the following zones (from top to bottom):

Emergent: Giant trees that are much higher than the average canopy height. It houses many birds and insects.

Canopy: The upper parts of the trees. This leafy environment is full of life in a tropical rainforest and includes: insects, birds, reptiles, mammals, and more.

Understory: A dark, cool environment under the leaves but over the ground.

Forest Floor: Teeming with animal life, especially insects. The largest animals in the rainforest generally live here.

Boreal Forest

A boreal forest or northern coniferous forest, is a cold woodland or forest. This biome spans the northern parts of North America, Europe, and Asia. Taigas are generally located south of tundras and north of temperate deciduous forests and temperate grasslands. The boreal forest is the largest land biome on Earth, covering about 50 million acres of land, this is about 17% of the Earth's land area. It is also known as a taiga. Taiga is a Russian word for marshy pine forest.

The boreal forest is characterized by a cold, harsh climate, a low rate of precipitation (snow and rain), and short growing season. There are two types of taigas: open woodlands with widely spaced trees, and dense forests whose floor is generally in shade.

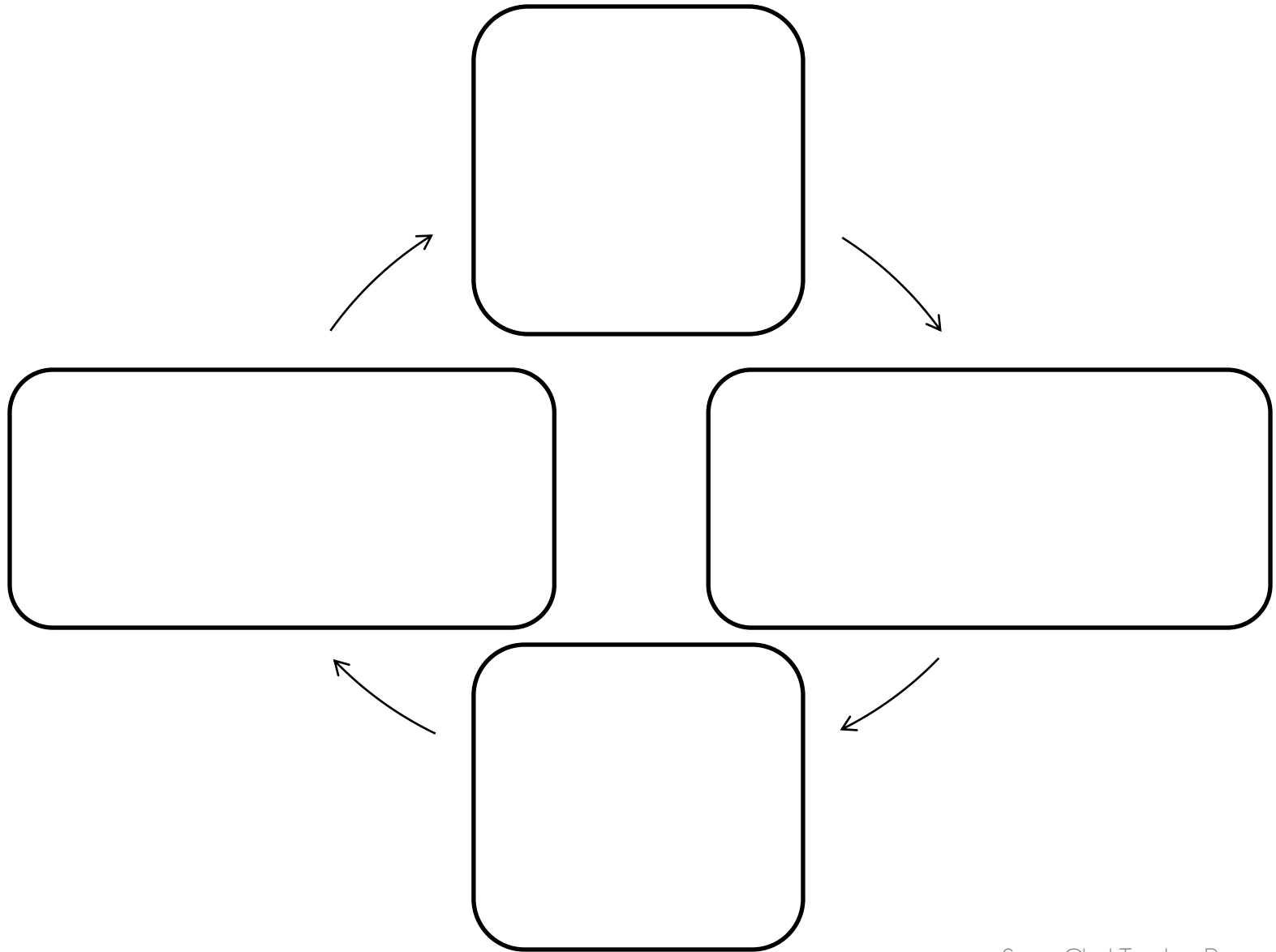
Boreal forests are relatively low in animal diversity because of the harsh winters. Some taiga animals are able to cope with the cold winter environment, but many migrate south to warmer climates during the winter and others go into hibernation.

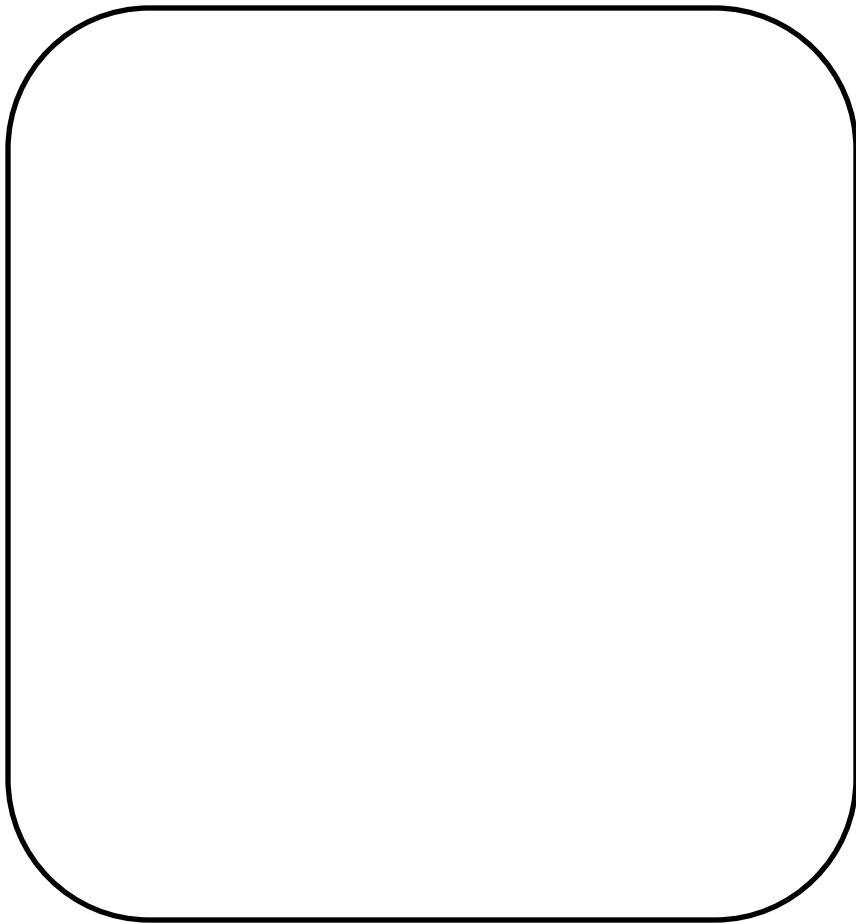
Wetland

Wetlands are warm, wet areas that are teeming with both animal and plant life; the water-logged land in swamps is often heavily forested, with trees like cypress and tupelo. Some animals live in the low-oxygen water (some fish, crayfish, shrimp, tadpoles, insect larvae, etc.), some animals live at the surface of the water (like alligators, Caiman, nutria, etc.), some animals live above the water (like birds, insects, frogs, etc.), and other animals live in the spongy areas of land surrounding the swamp (like raccoons, deer, earthworms, etc.).

Many wetland areas are really wet in the spring and fall, but are very dry in the summer and winter. These areas are prone to short-term flooding during rainstorms. Wetlands can often be found bordering other types of biomes.

Life Cycle of My Frog





Discovered by:

Herpetologist

Describe the physical features of your frog in as much detail as possible,

Draw and label a diagram of your frog.

Type of Legs/Feet:

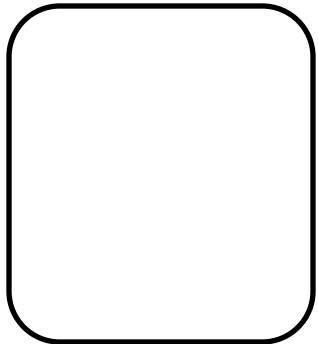
Facts about these legs/feet:

1.

2.

3.

Front Foot



Hind Foot



Shape of Body:

Facts about this shape of body:

1.

2.

3.

Sketch of body shape:

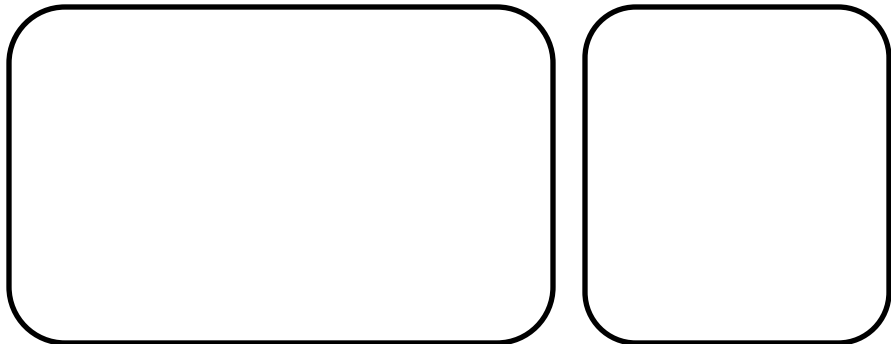


Shape of Head:

Facts about this head shape:

- 1.
- 2.
- 3.

Sketches of the head and eye:



Diet

What does this frog eat?

How does this frog catch its food?

Sketch of prey items:



Coloration of this frog:

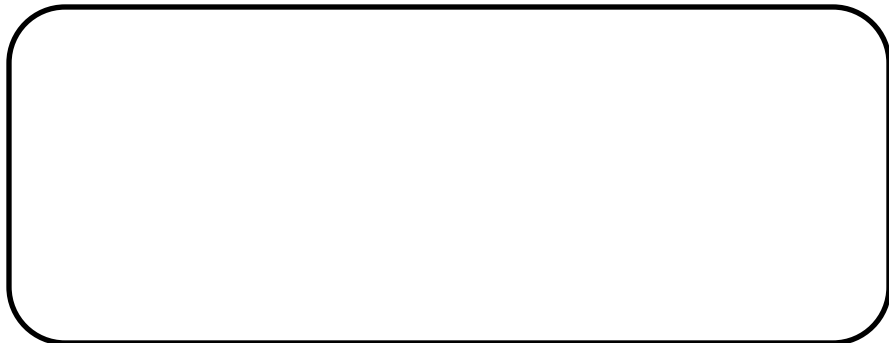
Reasons for this coloration pattern:

1.

2.

3.

Sketch of coloration pattern:



Does this frog use camouflage? Why?

How does this frog use camouflage?

Sketch of camouflage in action:



Type of Ecosystem:

Facts about this Ecosystem:

- 1.
- 2.
- 3.
- 4.
- 5.

How is your frog adapted to live in this ecosystem? *Be sure to use evidence from the ecosystem information sheet.*

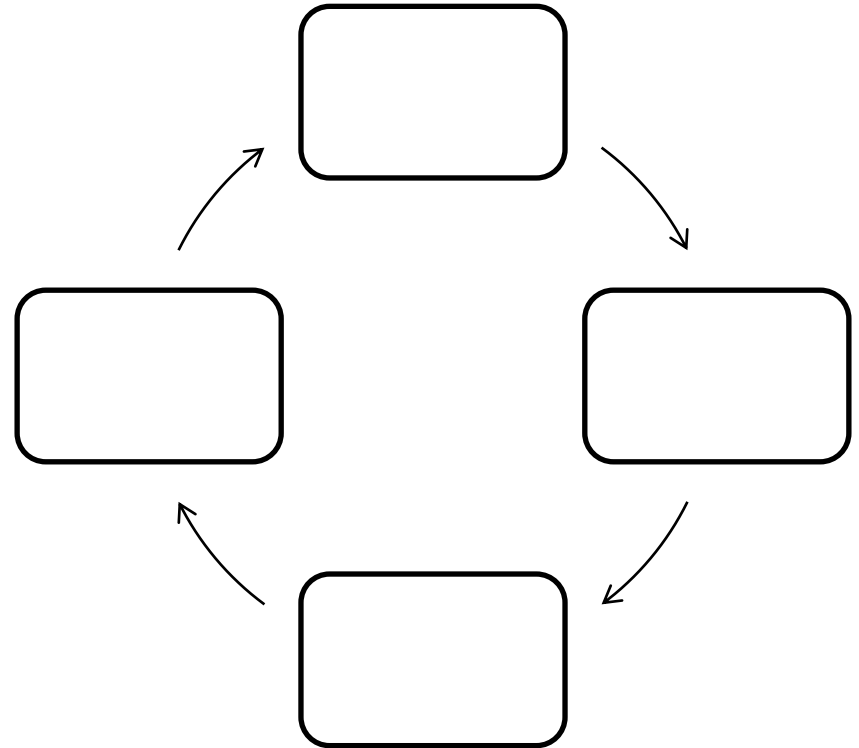
Draw your frog in its ecosystem.

Name of Engineered Frog:

Interesting Facts about this Frog:

- 1.
- 2.
- 3.
- 4.
- 5.

Describe and draw each part of the life cycle of this frog:



Type of frog in each box:

● Aquatic frogs	Tree frogs ▲	✚ Burrowing frogs
▬ Terrestrial frogs	★ Flying tree frogs	<i>You can choose to share this information with the students. It is likely they have engineered a frog that is a variety of these types.</i>

This is a KEY for the teacher. The students should be able to look at their frog and tell which type they chose for each part. The black shapes will help you identify the type of frog represented by each of the cards.

Thanks for your purchase!

This is a project my students complete during our **Animal Adaptations** unit. We keep African dwarf frog tadpoles in the classroom at this time as well. These tadpoles develop really quickly and they have some unique adaptations of their own! Here is a link to the grow-a-frog kits we use: <https://www.growafrog.com/TUBETOWN.html> The kids love them and they are pretty easy to take care of in the classroom!

We not only complete the activities in this pack, but I also let the kids make their frog out of Crayola model magic (an air drying modeling compound). We display the reports and models together on a bulletin board in the hallway.

Feel free to adjust this activity to fit your needs!

Credits:

