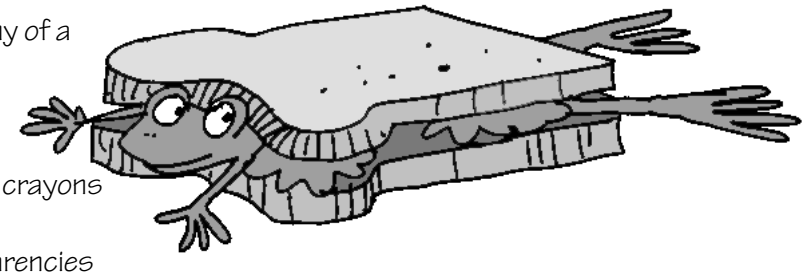
Frog Sandwich



Outcome: Students learn about the anatomy of a frog by listening to a teacher explain while creating a booklet of the systems of a frog.

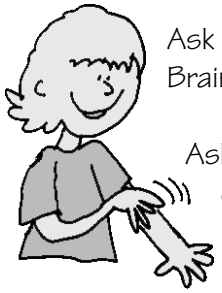
Supplies for each student: sandwich copy, crayons

Supplies for the teacher: overhead transparencies

Prepare: Following the Teacher Background on pages 28-29 are duplication masters for a student booklet. Copy and collate student pages 1-10. Reverse page 10 so that the printing faces out. Staple where indicated on page 1. Cut apart to create three booklets. Color a sample booklet.

Create overhead transparencies using the masters that follow on pages 25-27.

Procedure:



Ask students to imagine it is possible to see below the smooth skin of a frog. Brainstorm what they might see.

Ask a student to put her right hand on her left forearm and squeeze. Describe for the class what is felt. She feels the muscles in the forearm. Talk about the purpose of muscles (support organs, allow for movement, and control posture).

If a student places his right hand on his left wrist and squeezes gently, he can feel bones . Brainstorm where else in the body bones can easily be felt (skull-*cranium, jaw-mandible, collarbone-clavicle, breastbone-sternum, backbone-vertebrae, ribs, etc.).

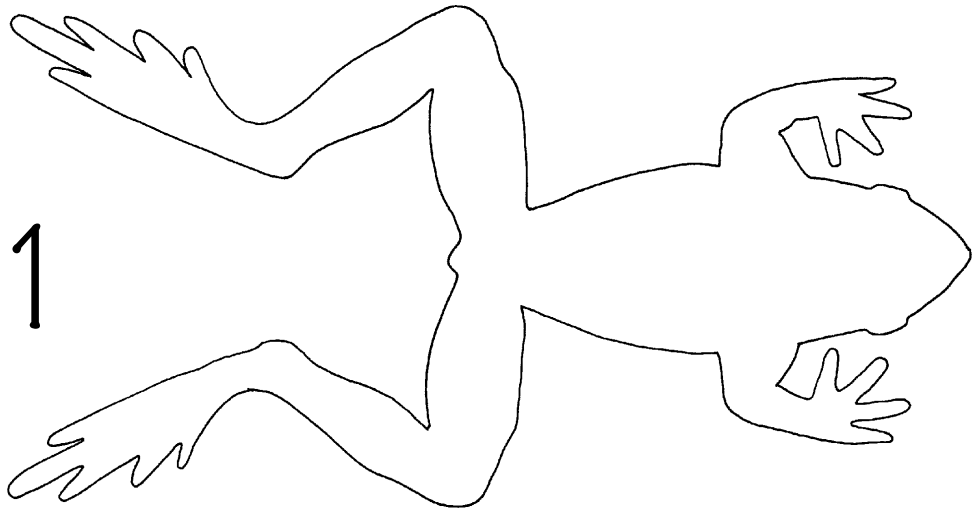
If a student places her hands on her stomach, she is feeling muscles over internal organs. Ask students to list those organs (stomach and intestines). Has any student had a stomach ache?

Explain that students will create a booklet that shows the different systems that make up a frog. The top layer is the outside of the frog. This is followed by a layer of muscles, bones, and systems not easy to see like nervous, respiratory, and digestive. The booklet then has bones, muscles, and the outside of a frog.

Hand out a booklet to each student and use the teacher background that follows to describe each layer of a frog as students color and label each page. Use the overhead transparencies to aid students in labeling the most important structures in each system. Whenever possible, talk about how the systems in a frog are like and not like the systems in a human child.

* Correct science terms provided for the teacher and very capable students.

overhead transparency master



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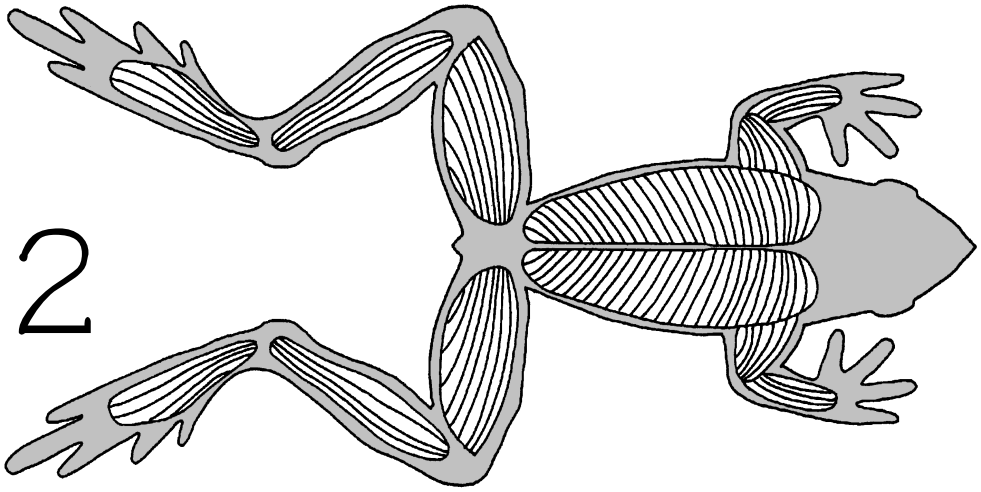
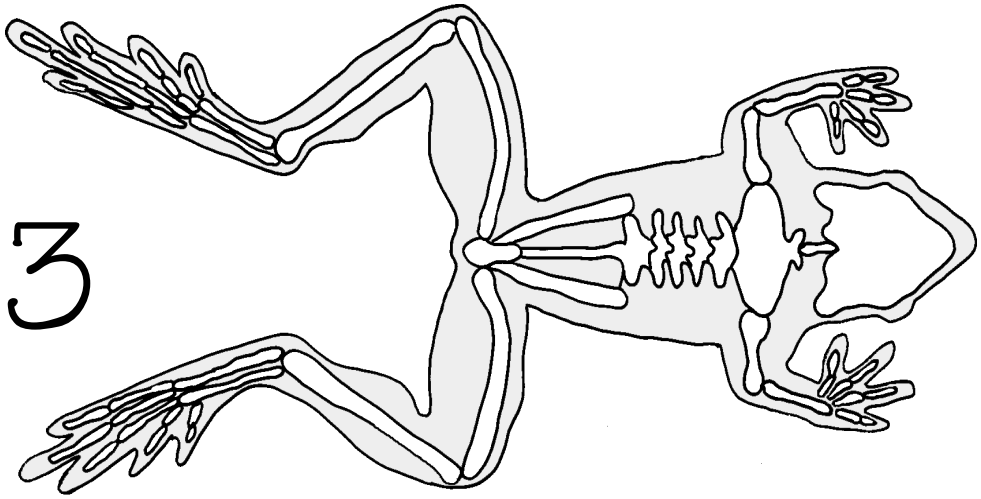
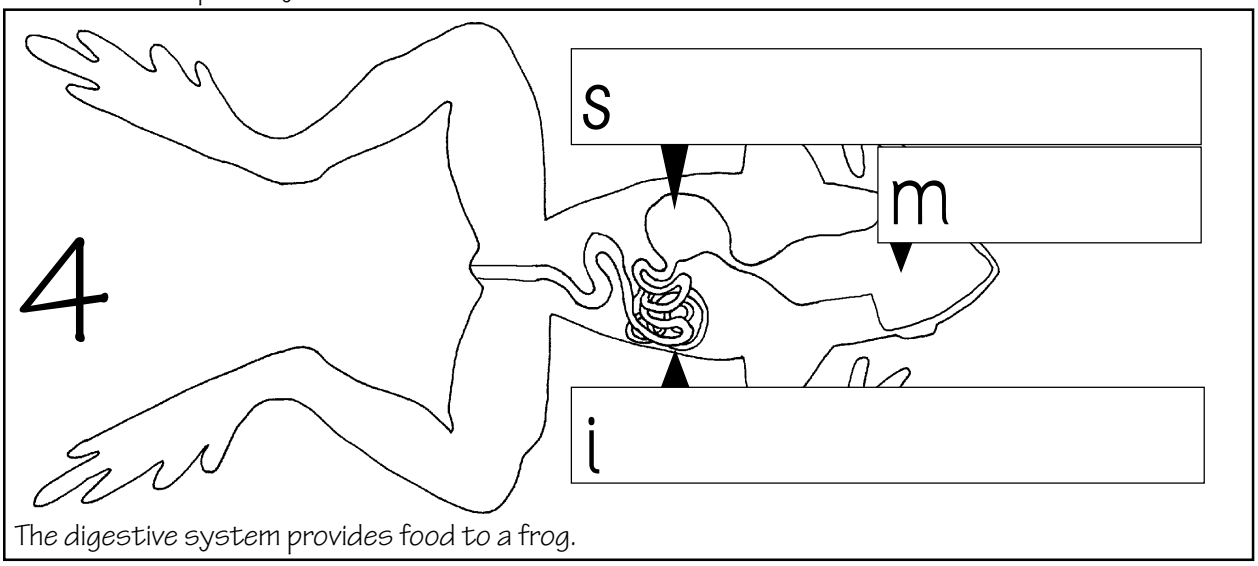
A frog's covering protects it from its environment.



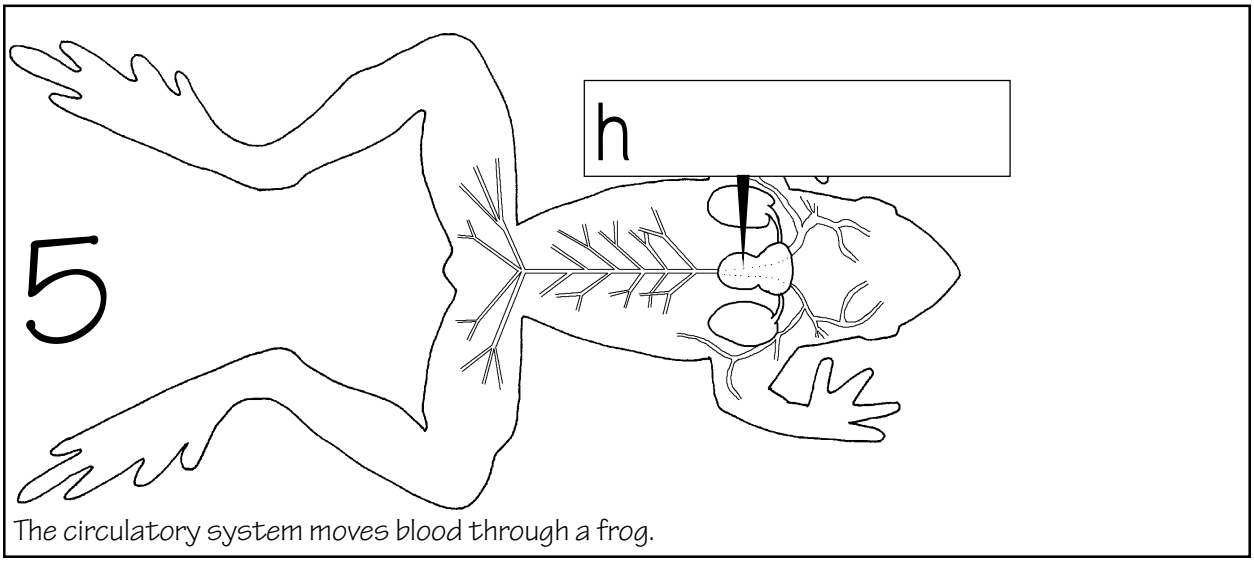
Muscles help a frog move.



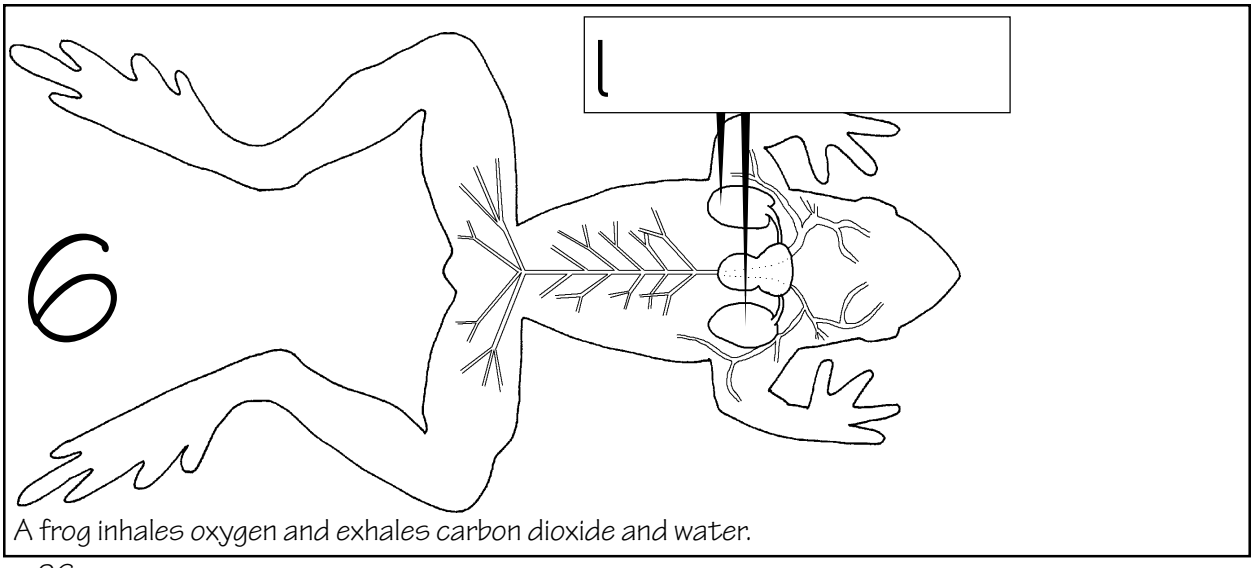
Bones support a frog.



The digestive system provides food to a frog.



The circulatory system moves blood through a frog.



A frog inhales oxygen and exhales carbon dioxide and water.

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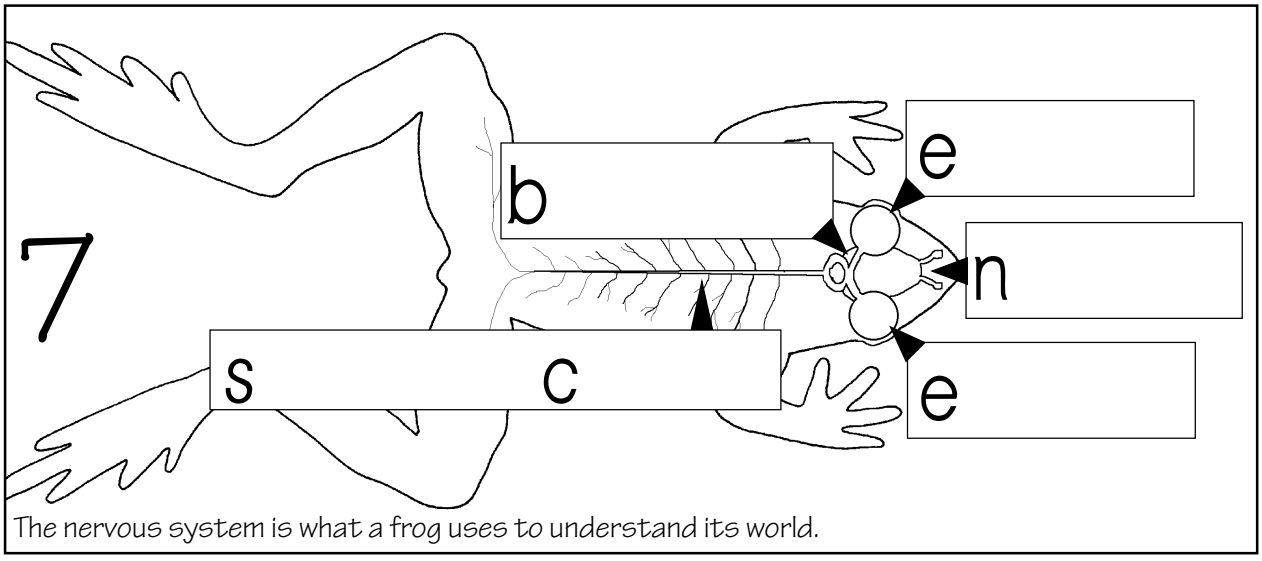
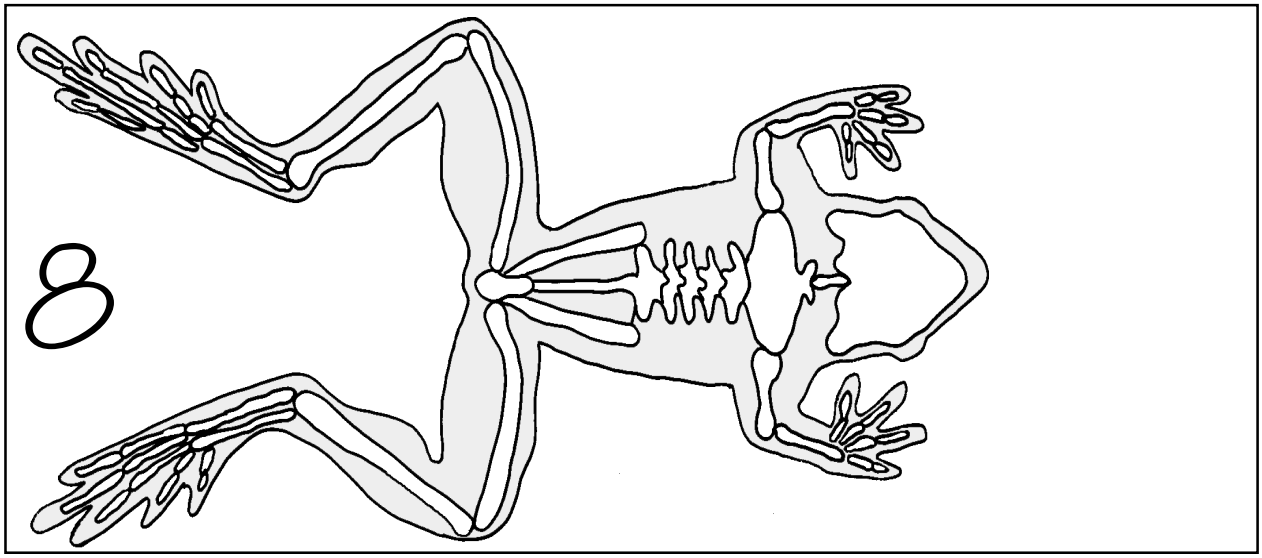
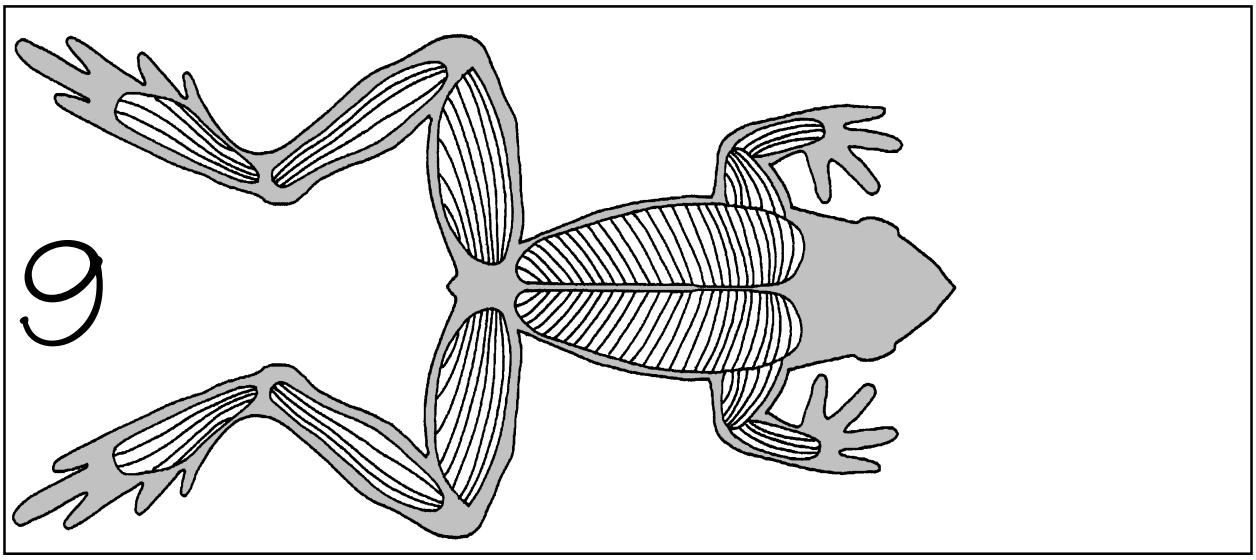


The nervous system is what a frog uses to understand its world.





Color page 10 just like page 1!

Teacher Background: Frogs

Frogs are cold blooded animals that spend part of their lives in the water and part on land. The unique features of a frog that could be emphasized during this activity is a frog's skin and a frog's strong muscles.

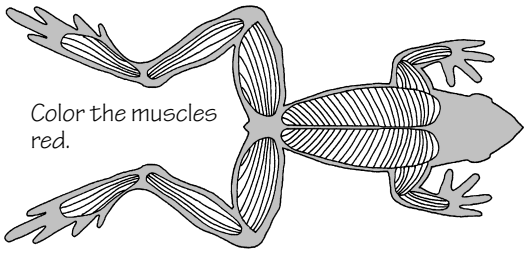
Teacher Background: Skin

The frog is covered by a soft, thin, moist skin that protects the frogs and helps in breathing.

* Blood vessels run throughout the skin. Oxygen passes through the skin and goes directly into the blood. When a frog is under water, all its respiration takes place through the skin. Oxygen is taken directly from the water.

Teacher Background: Muscles

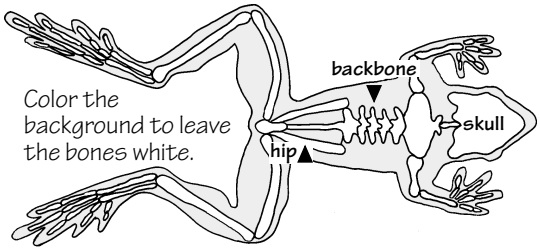
Frogs have long muscular hind legs that are very good for jumping or hopping long distances.



* Frogs, like humans, have three kinds of muscles. Striated (striped) muscles are skeletal muscles. They help a frog move. Smooth muscles line the digestive system, the blood vessels and some internal organs. They are involuntary muscles. Cardiac or heart muscles look like striated muscles but act like smooth muscles.

Teacher Background: Bones

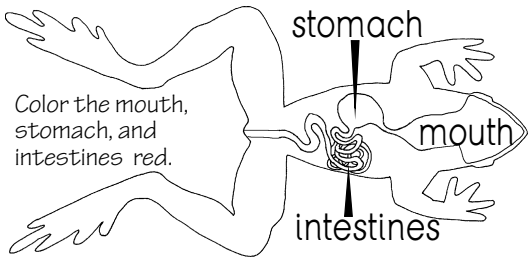
The skeleton supports and protects the frog.



* Its backbone has only nine vertebrae (compared to twenty-four in a human). The frog has no ribs. The shoulders and front legs are similar to a human's arms and shoulders. The frog has only one forearm bone and one lower leg bone. Humans have two forearm bones (radius and ulna) and two lower leg bones (tibia and fibula).

Teacher Background: Digestive System

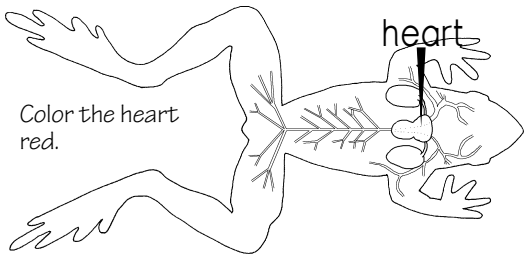
The frog's mouth has feeble, nearly useless teeth present only in the upper jaw. The frog can flick out its sticky tongue quickly to grasp prey.



* Food passes through the frog's mouth, its esophagus, and into the stomach. Digestion occurs in the small intestine. A frog has a liver, gall bladder, and pancreas just like humans. Liquid wastes from the kidneys travel by way of the ureters to the urinary bladder. Solid wastes from the large intestine pass into the cloaca. Both liquid and solid waste material leave the body by way of the cloaca and the cloacal vent.

Teacher Background: Circulatory System

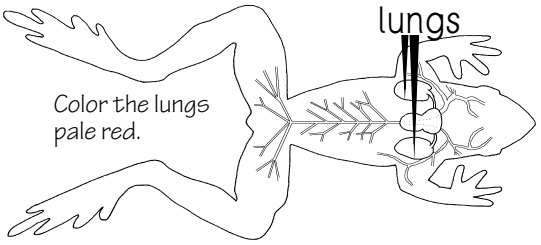
The heart moves oxygen rich blood through the body returning to the lungs.



* Humans have two atria and two ventricles. A frog's heart has two ventricles, but only one atria. Because blood with oxygen and blood without oxygen have a different density, they do not mix, even though both kinds of blood are in the same atria.

Teacher Background: Respiratory System

The frog's respiratory system brings air into the frog's body and takes away waste gases like carbon dioxide.

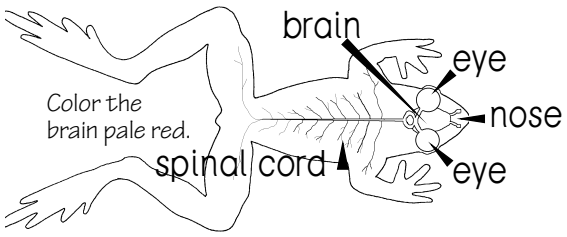


Blood vessels runs throughout the frog's skin. This allows oxygen to pass through the skin directly into the blood. Frogs can breathe through its skin when submerged under water.

* Adult frogs have a pair of simple lungs. Air enters the body through nostrils, the windpipe, to the lungs. In humans, breathing occurs when the diaphragm and chest muscles move. In a frog, the animal opens its mouth and the air flows into its windpipe. A frog can also breathe with its mouth closed. The frog's throat "puffs out" when the floor of the mouth is lowered and air moves into the nostrils.

Teacher Background: Nervous System

A frog's nervous system is made up of a brain, a spinal cord, and nerves. It helps the frog to move and feel. It also helps the frog with seeing, smelling, hearing, tasting, and feeling.



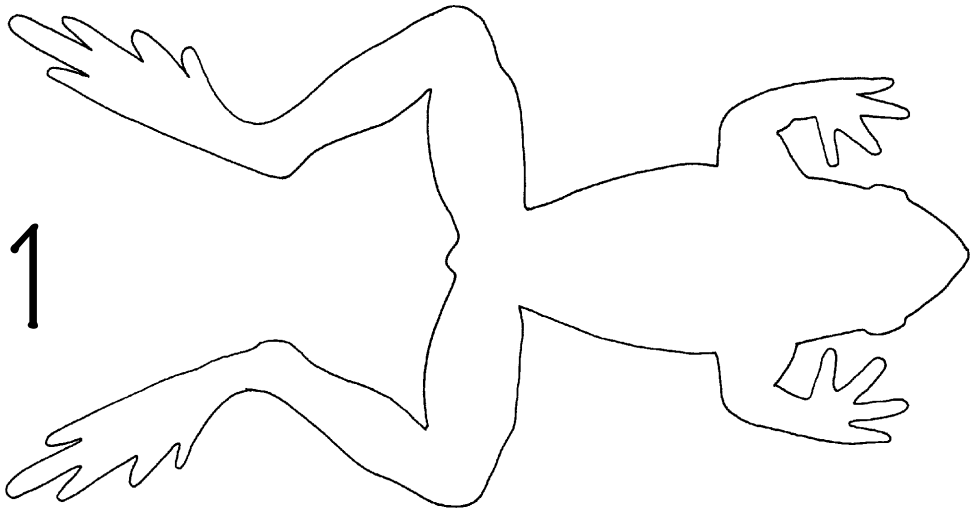
* A frog's nose registers smells on the olfactory lobes which are the front part of the brain.

* A frog's eyes have a fixed lens that cannot change focus. Its eyelids do not move. To close its eye, a frog has to move the eye back into its socket. It does have membrane that covers the eye once it is pulled into its socket.

* A frog's eardrums are exposed. Its middle ear has only one bone, not three like humans. The semicircular canals in the ear help a frog to balance, just like humans.

Vocabulary for this lesson: blood, bones, brain, diaphragm, eardrums, esophagus, eyes, heart, intestine, lungs, mouth, muscles, nerves, nose, nostrils, respiration, ribs, skeleton, skin, spinal cord, stomach, teeth, tongue, vertebrae, windpipe.

* Additional information for the teacher or very capable students.



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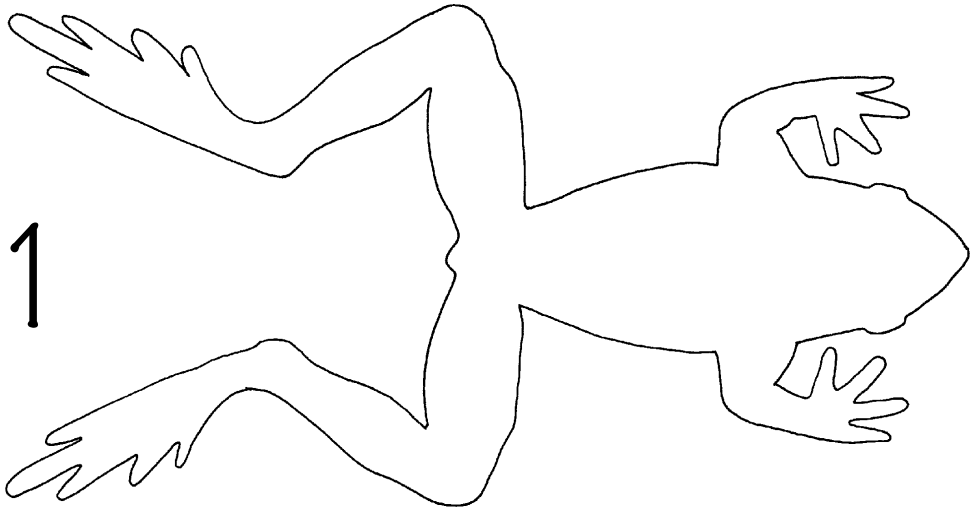
A frog's covering protects it from its environment.



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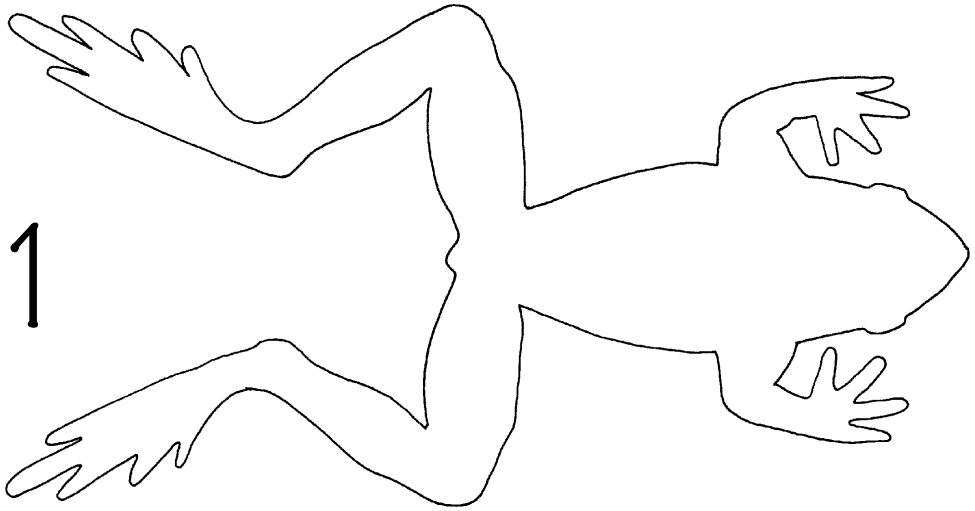

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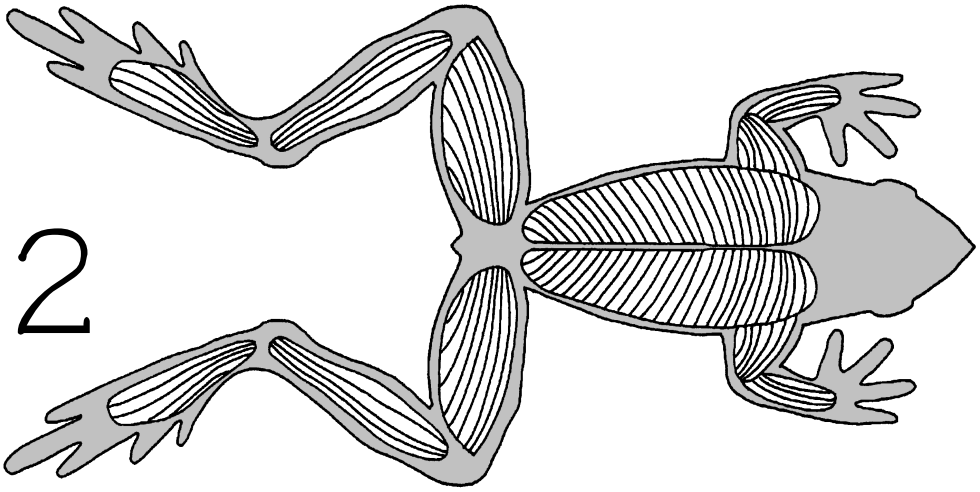
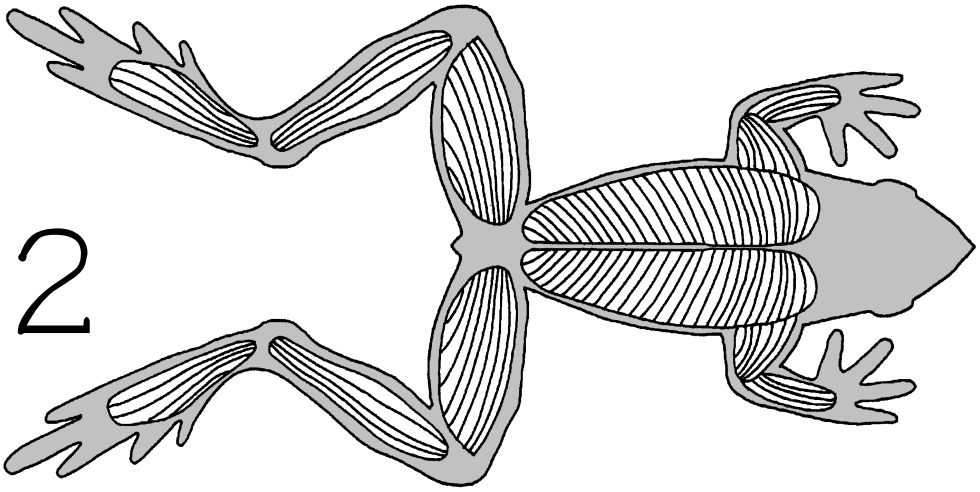


Muscles help a frog move.



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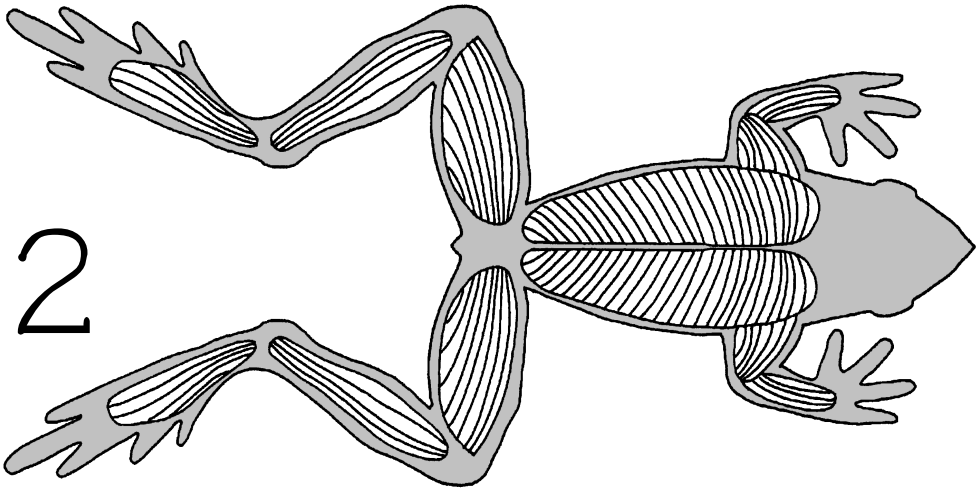

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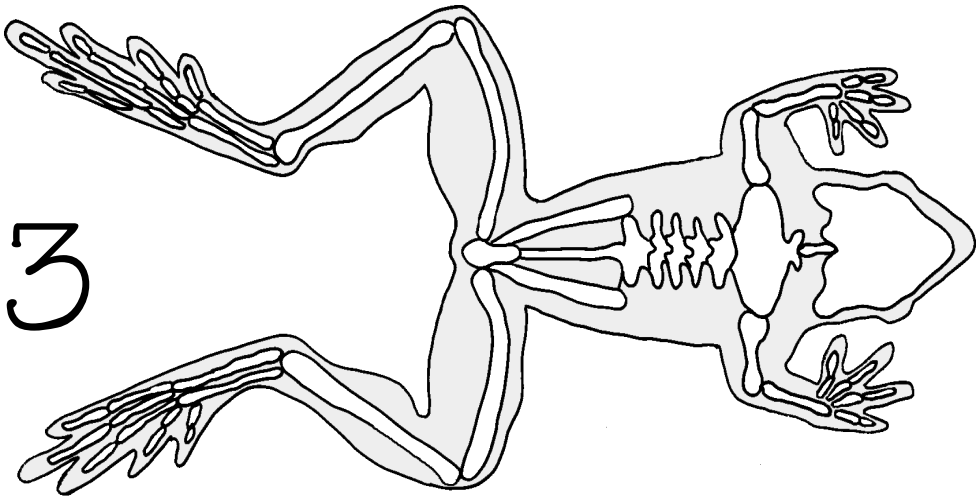

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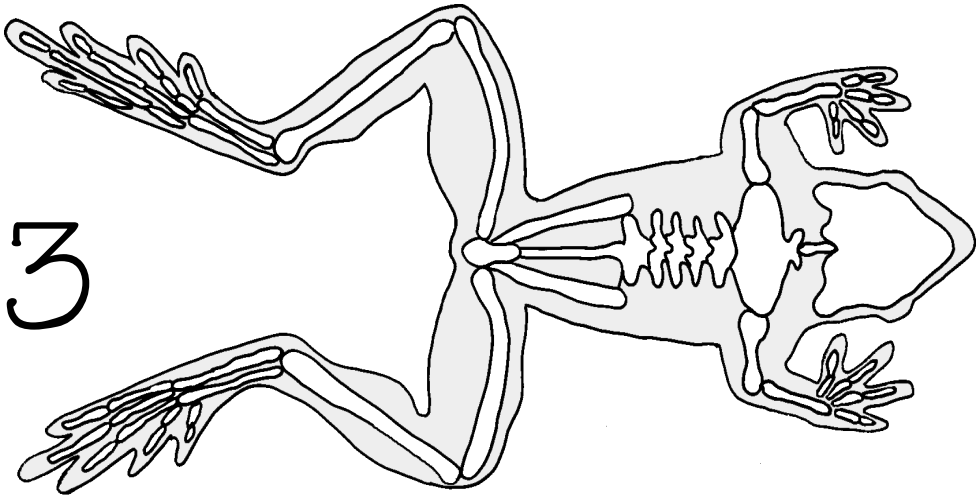
Bones support a frog.



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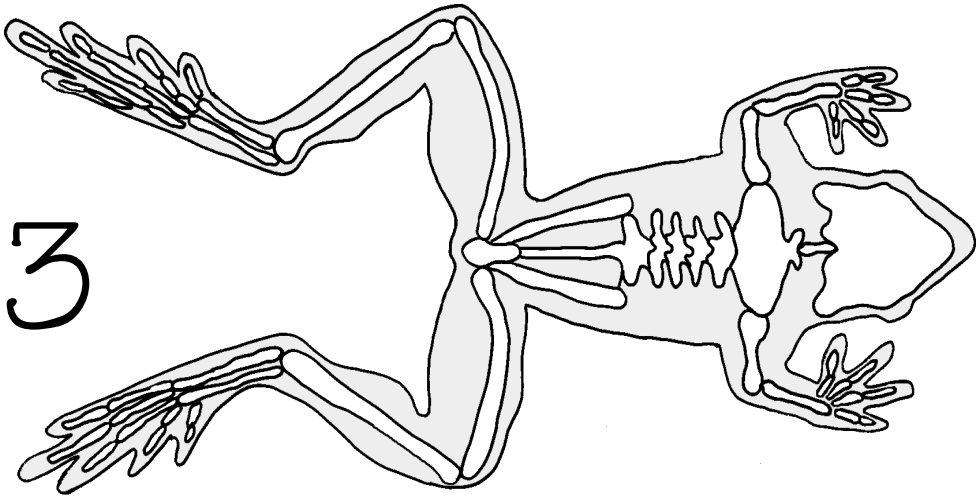

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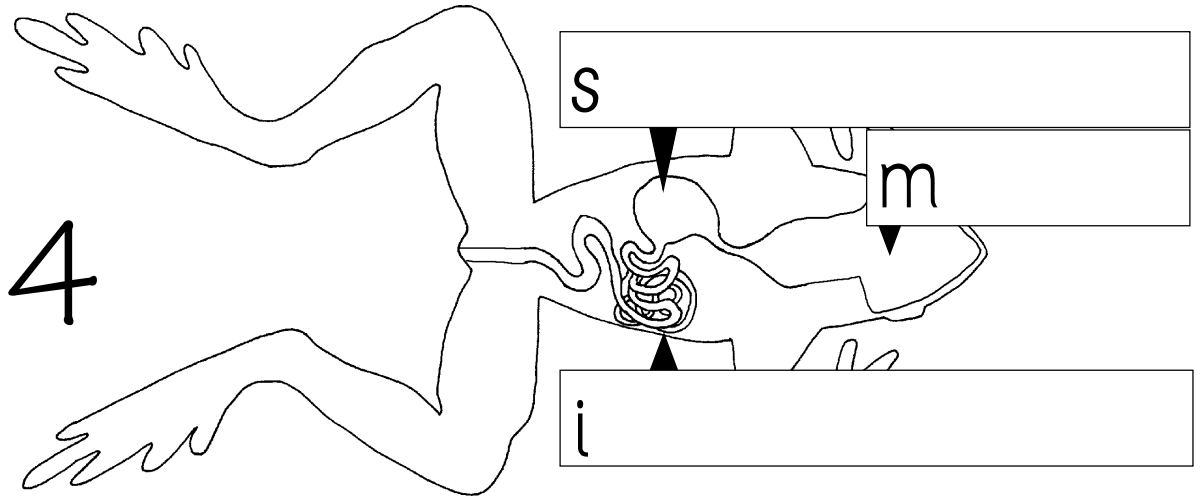
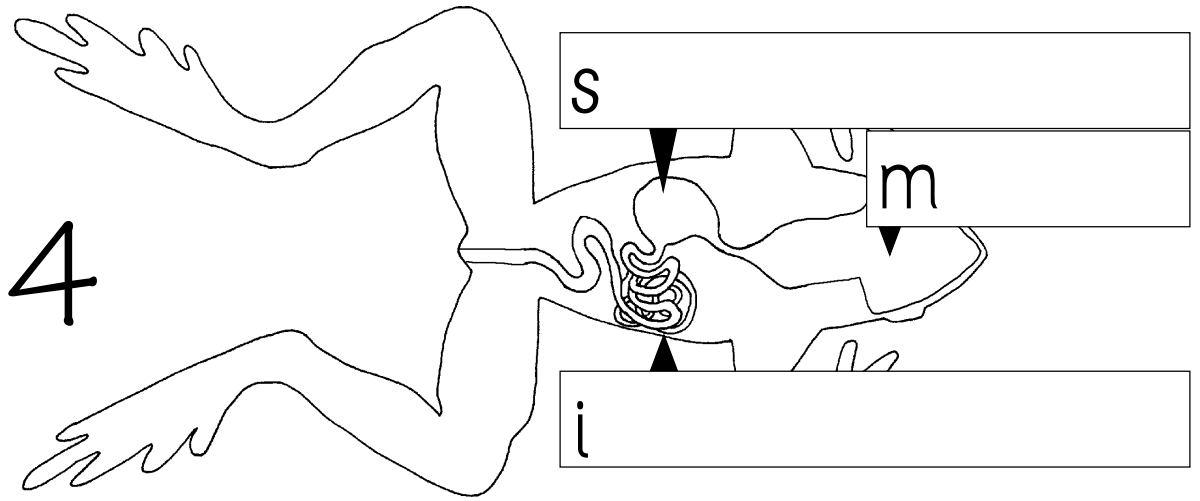


The digestive system provides food to a frog.



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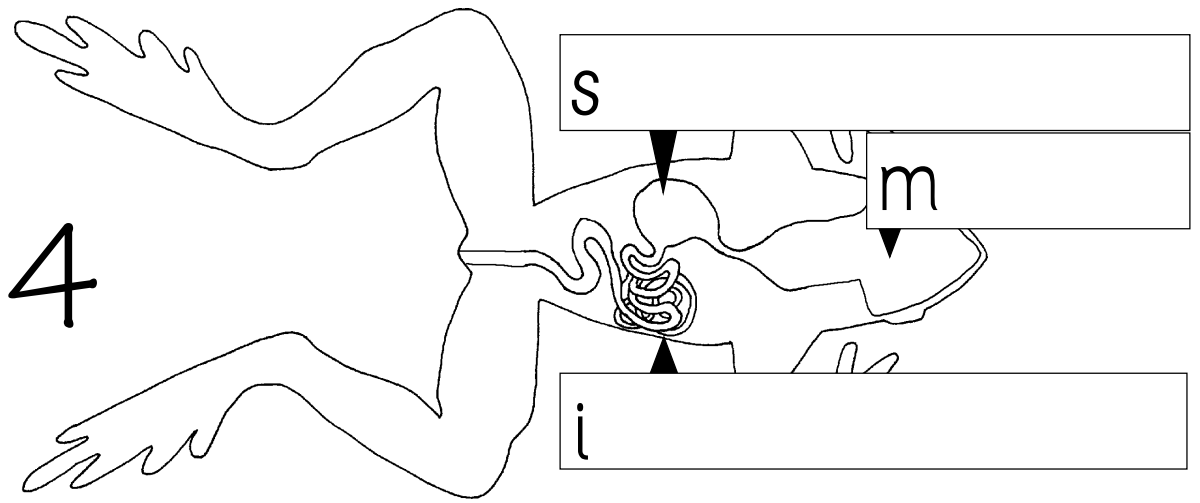

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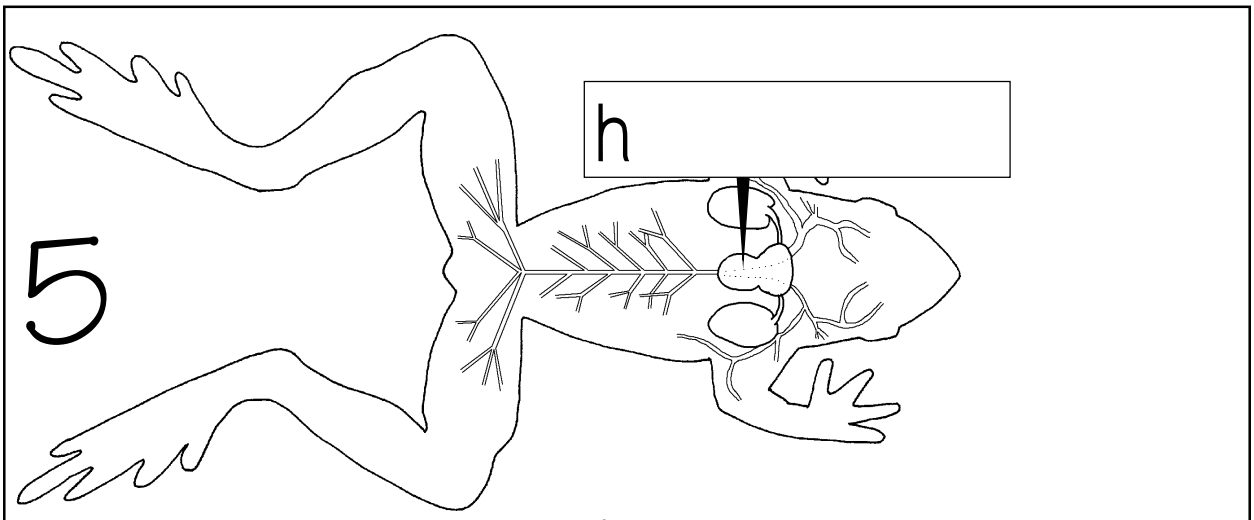
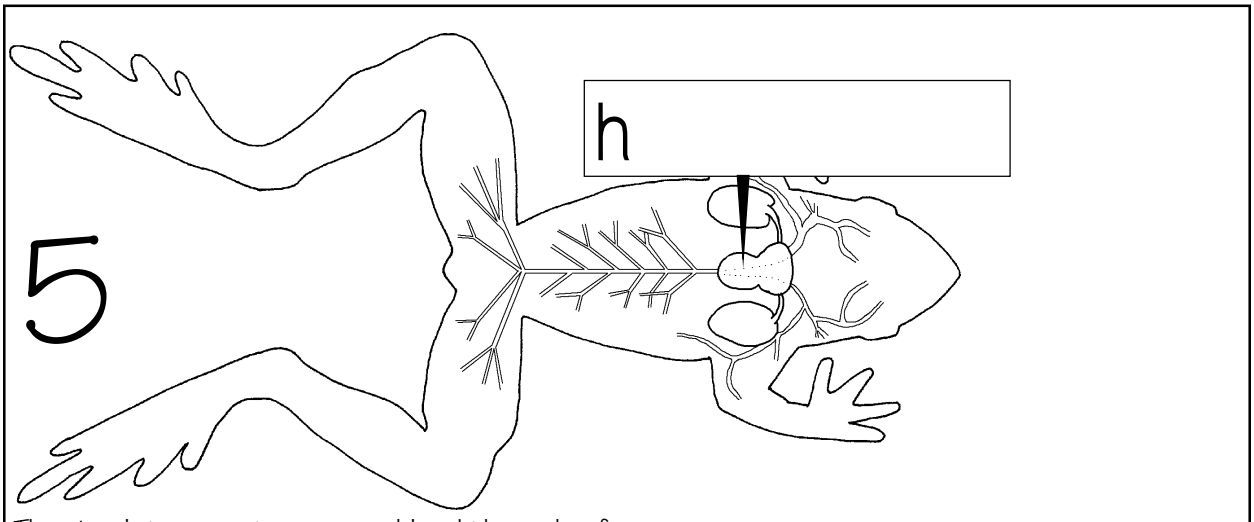


The circulatory system moves blood through a frog.



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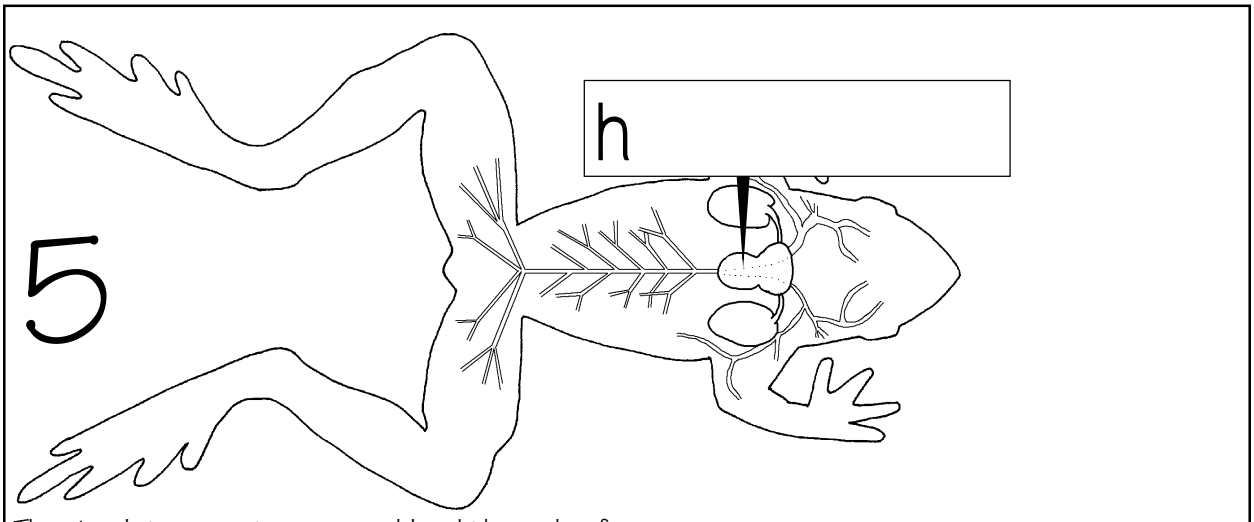

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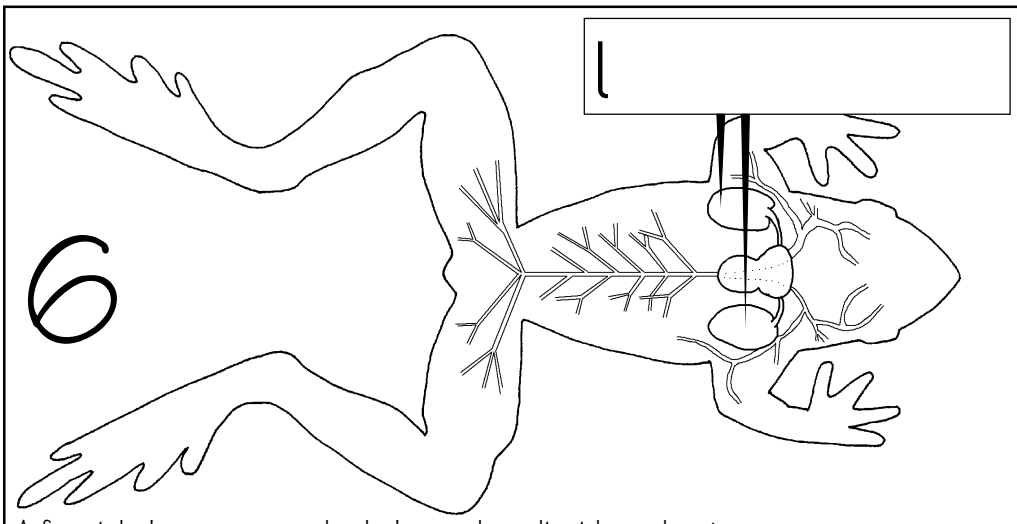
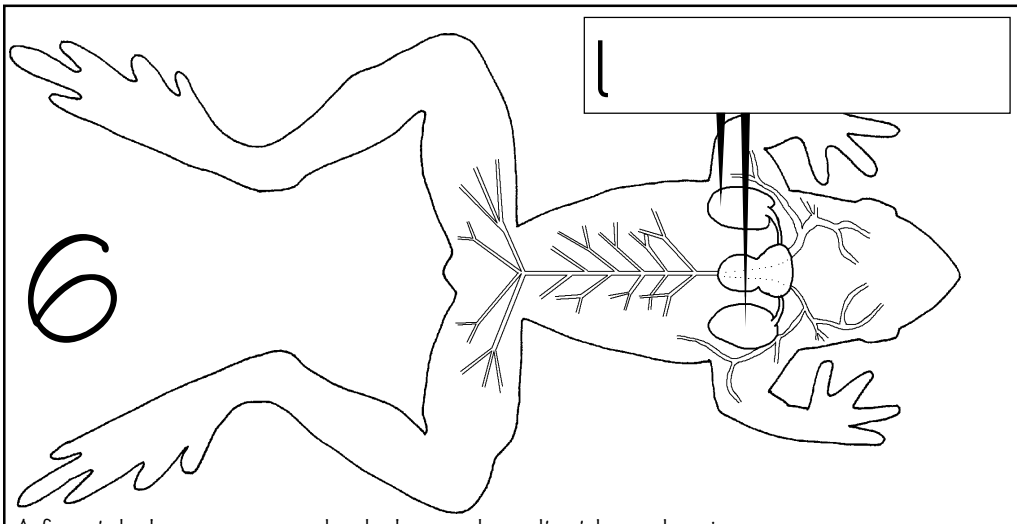


A frog inhales oxygen and exhales carbon dioxide and water.



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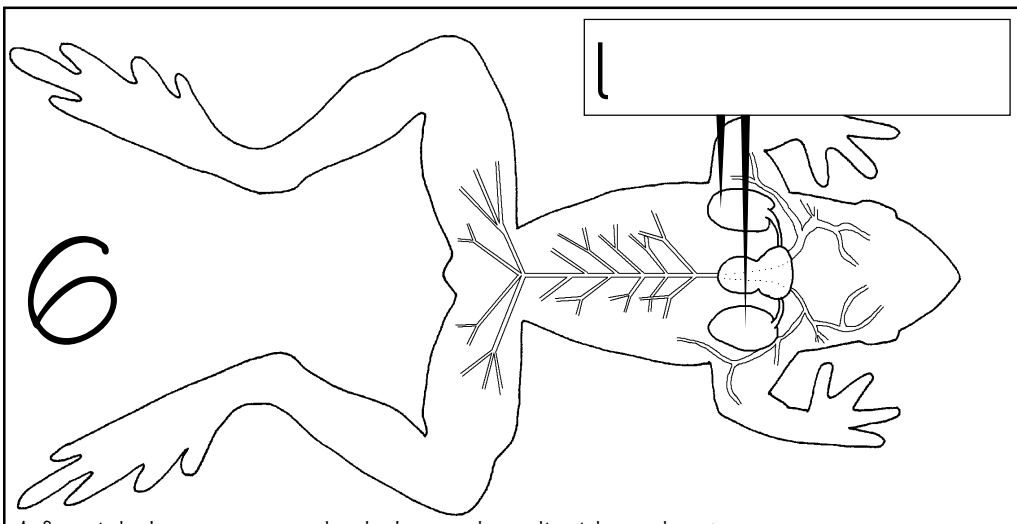

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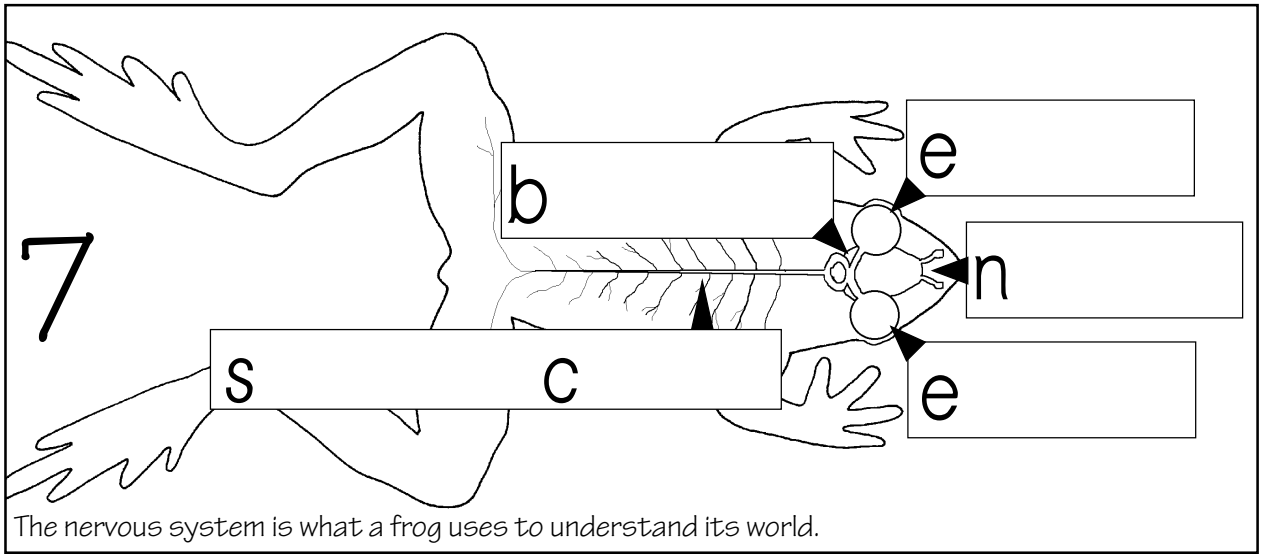
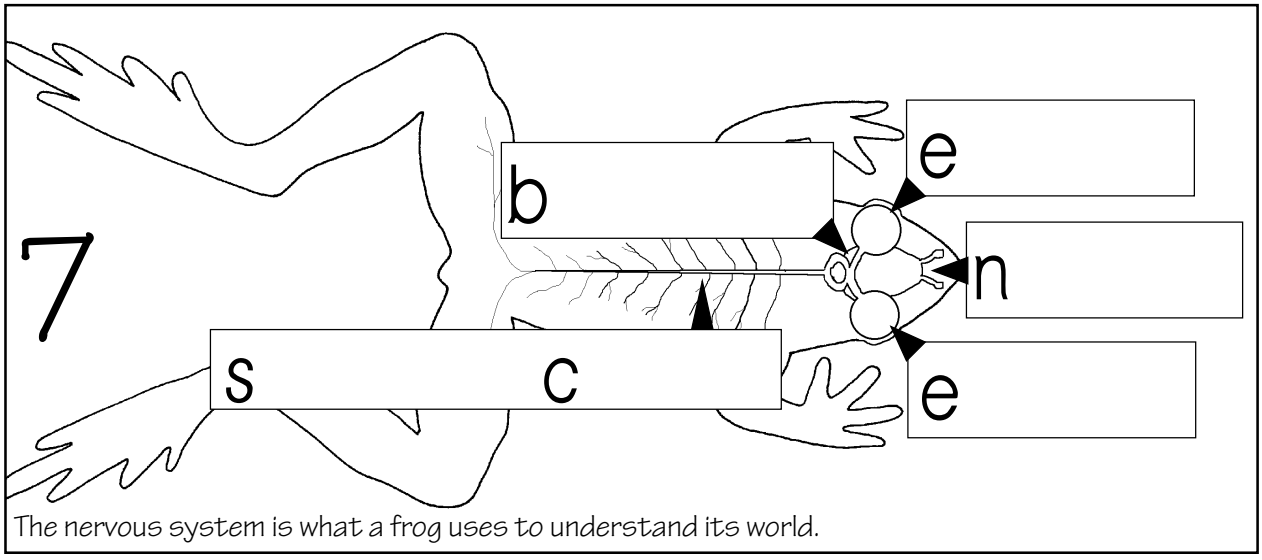


The nervous system is what a frog uses to understand its world.



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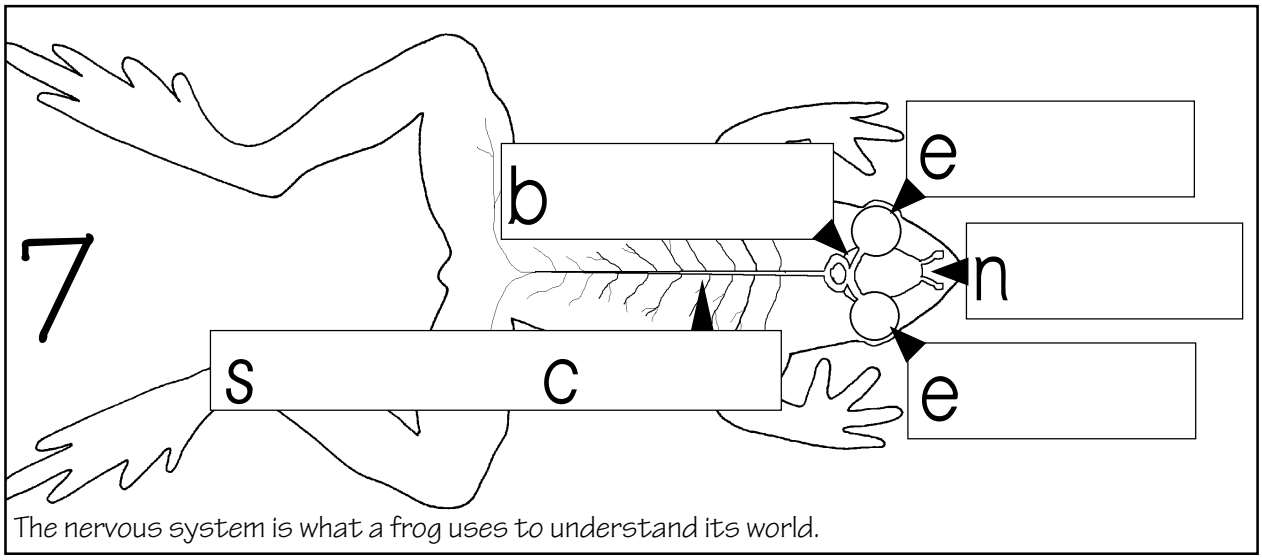

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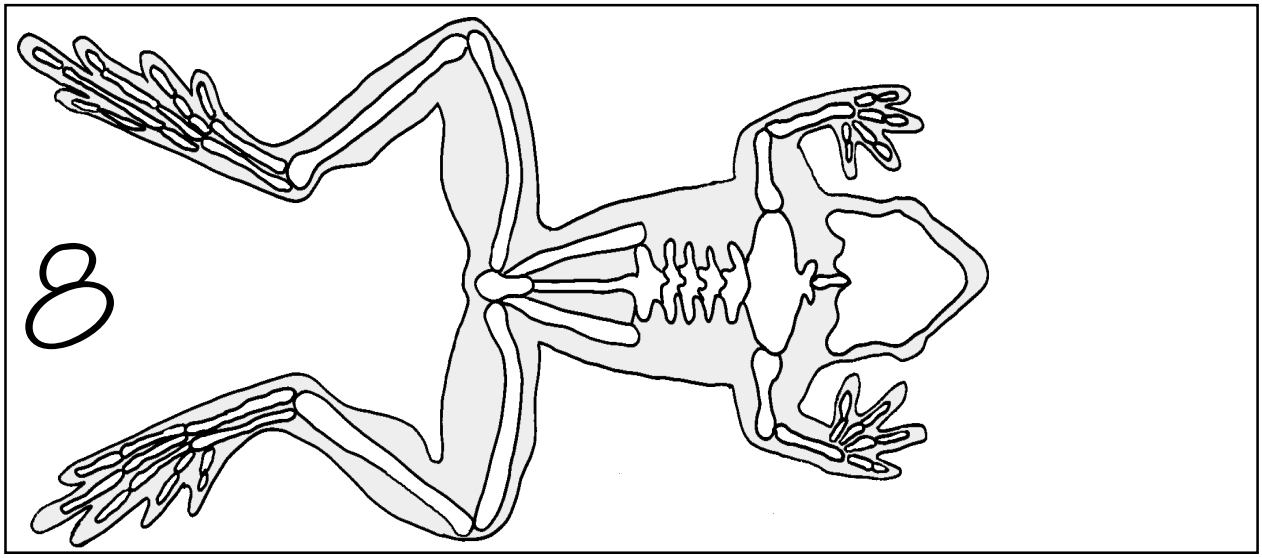
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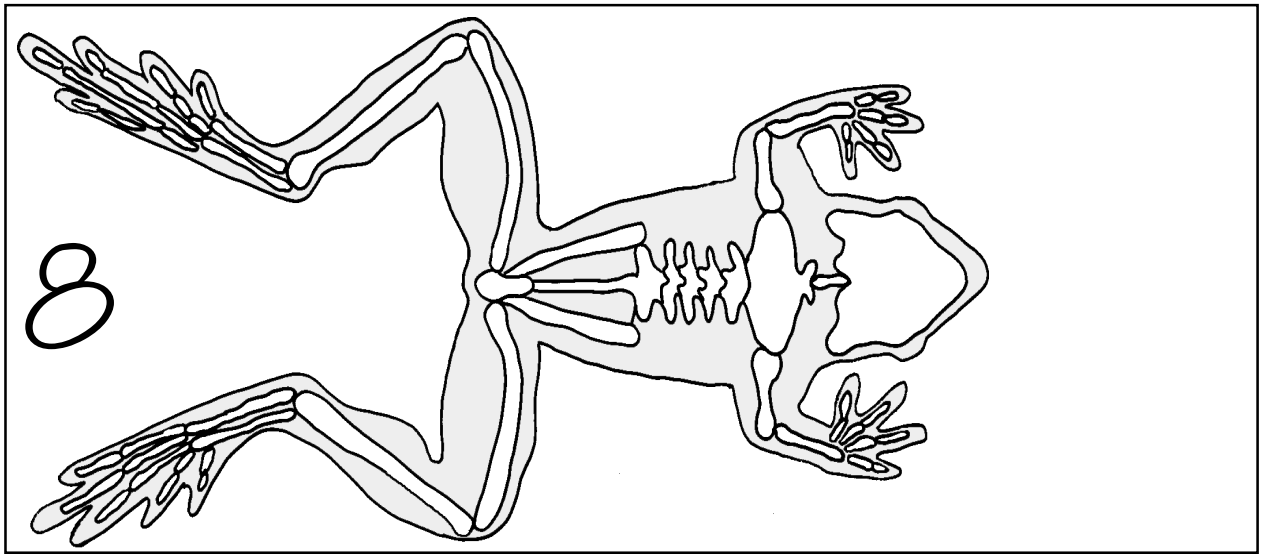
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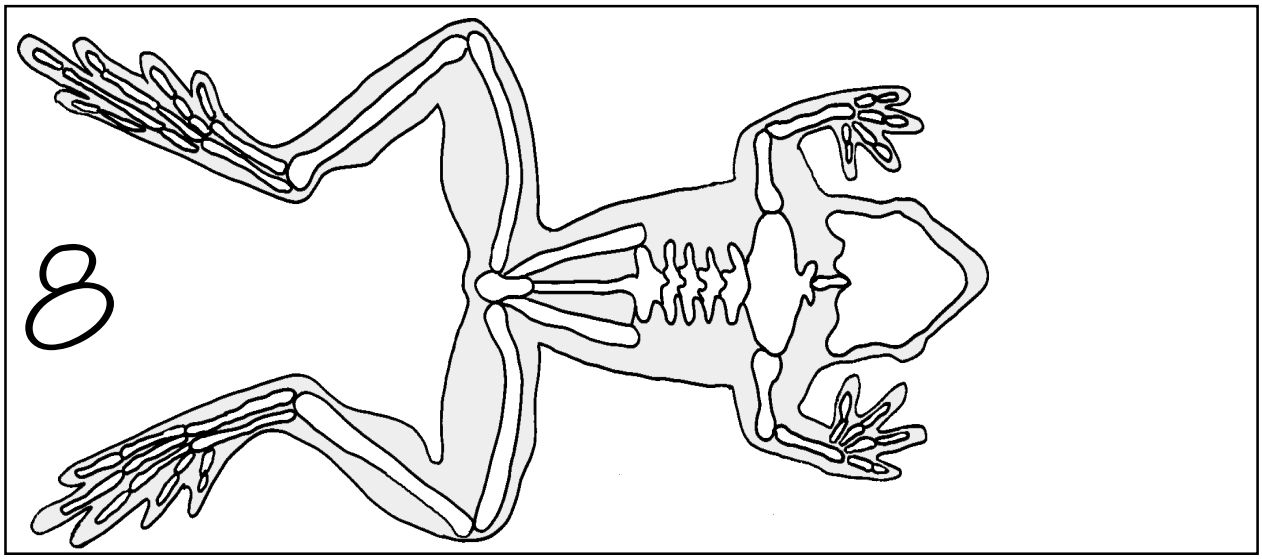
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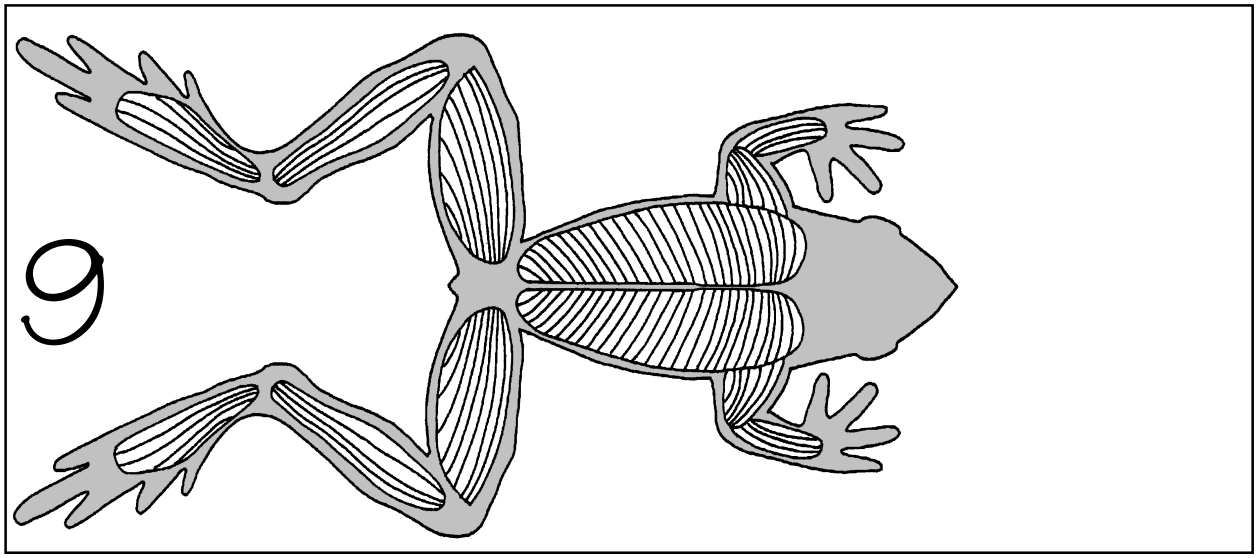
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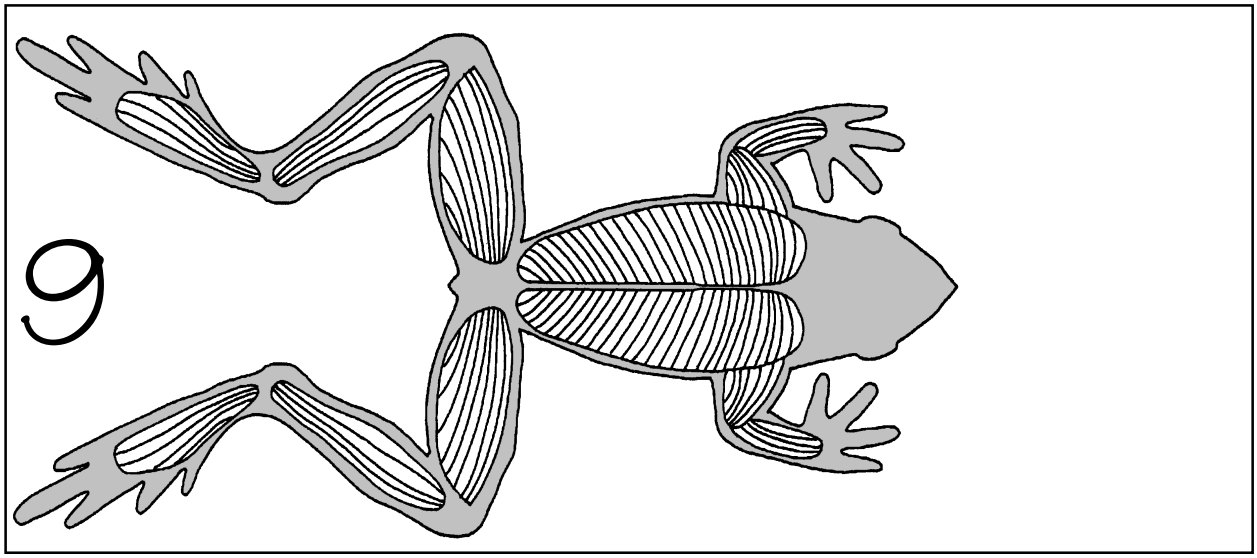
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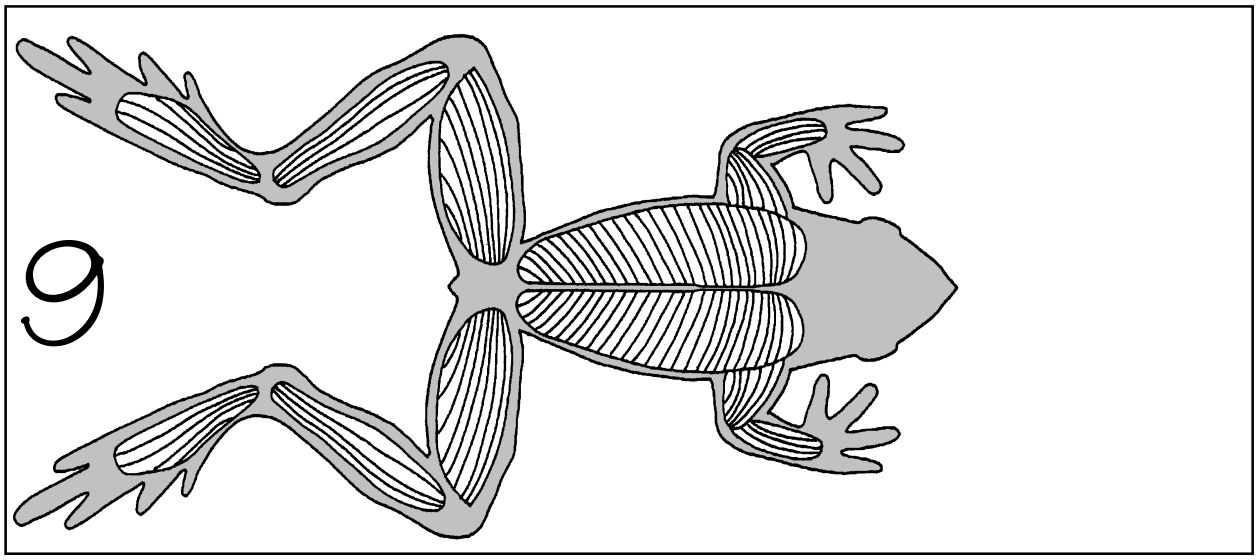
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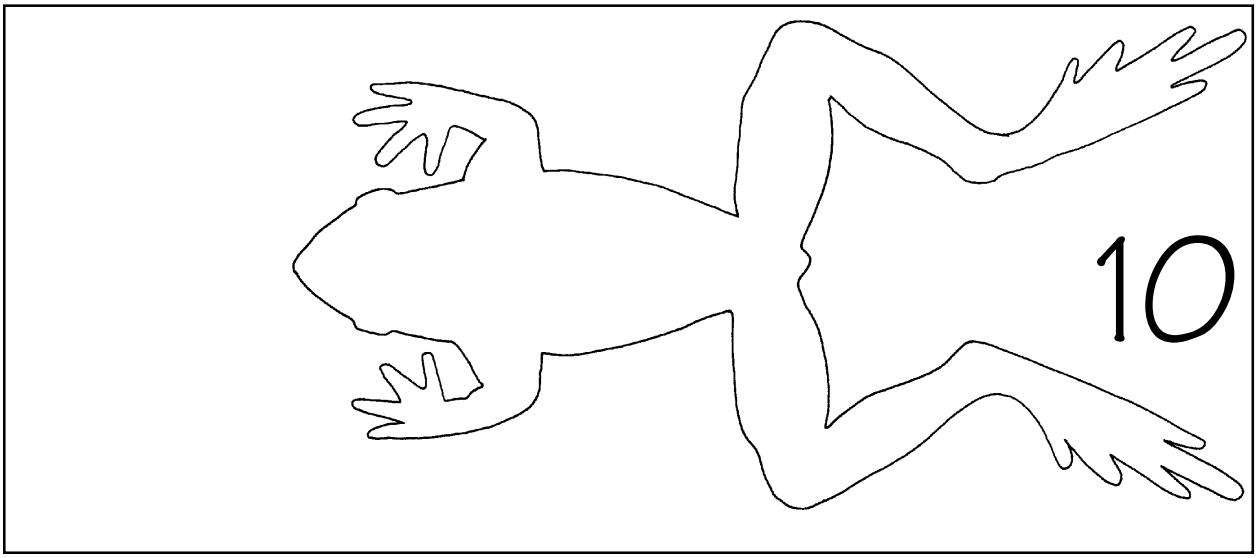
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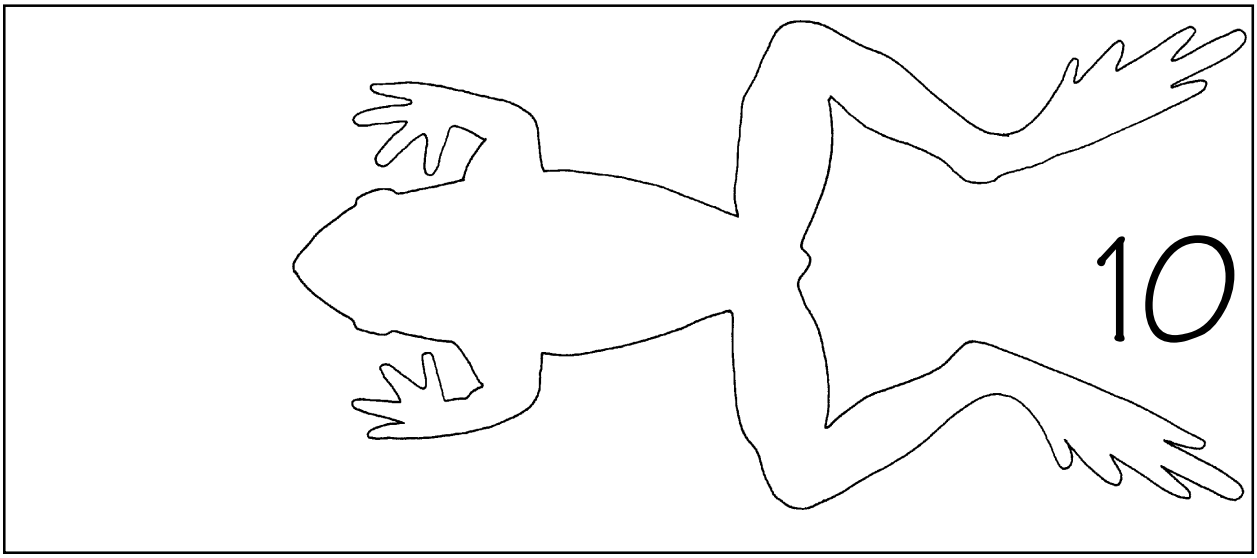
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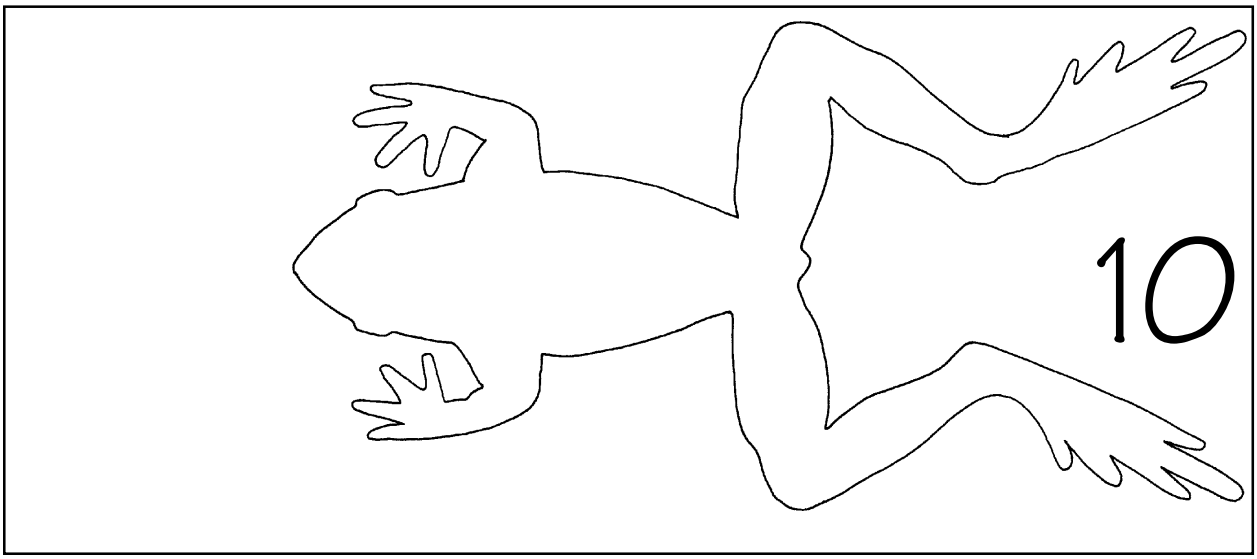
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