Respiratory System

- Tadpoles respire, or exchange carbon dioxide and oxygen, through gills

Respiratory System

- Adult frogs lose the gills but can respire in three ways: through the lungs, through the skin, and through the mouth.
- Respiration through the lungs is called pulmonary respiration.
- A frog breathes by changing the volume and pressure of air in its mouth while either opening or closing its nostrils

- The frog's thick, moist skin serves two important functions—respiration and protection
- Glands secrete mucus to keep it from drying up

Some glands secrete foul-tasting or poisonous substances that protect the frog from enemies

Some frogs, such as *Hyla versicolor*, can change color in order to blend with the environment.

Count the number of frogs in the picture?

Respiratory System

- Air moves from the throat to the lungs through a slit-like passage called the glottis.
- Because the frog's lungs are small, cutaneous respiration, or respiration through the skin in both air and water, is very important, especially during estivation or hibernation.
- Oxygen can diffuse across the lining of the mouth and into the blood.
- Frogs use mouth breathing for only a relatively small amount of their respiration.

Gas Exchange

- Because the skin of amphibians is moist and richly supplied with capillary beds, the skin can act as a respiratory organ.
  - Gas exchange across the skin is called cutaneous respiration and can occur in water and on land.
  - In salamanders, 30 to 90% of gas exchange occurs across the skin.
- Gas exchange also occurs across the moist surfaces of the mouth or pharynx which is called buccopharyngeal respiration.

- **This accounts for 1 to 70% of total gas exchange.**
- **Most amphibians, except plethedontid salamanders, posses lungs.**

- **The lunges of salamanders are simple sacs and the lungs of anurans are subdivided which increases surface area for gas exchange.**

  - **The buccal pump mechanism allows pulmonary ventilation by creating positive pressure to force air into the lungs with the use of the muscles in the mouth and pharynx.**

Temperature Regulation

- Amphibians are ectothermic
  - They depend on external heat sources to maintain body temperature.
- They are ectothermic because they are poorly insulated aquatic animals; so, regardless of how much metabolic heat it produces, it will lose heat as quickly as it is produced because of powerful heat-absorbing properties of the water.