



Lesson Plan: Fishes, Amphibians, and Reptiles

Grade Level: 6

Subject: Life Science

Duration: 45–60

NGSS MS-LS4-2: Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.

Learning Objectives

By the end of this lesson, students will be able to:

- **Identify** the key characteristics of fishes, amphibians, and reptiles as vertebrate groups.
- **Compare** the structural adaptations of fishes, amphibians, and reptiles for life in water and



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- **Cartilage:** Connective tissue that is flexible and strong but softer than bone. Some fish skeletons are made entirely of cartilage instead of bone.
- **Amphibian:** A vertebrate that is ectothermic and lives part of its life in water and part on land. Amphibians begin life in water with gills and later develop lungs for breathing air.
- **Metamorphosis:** The process of transformation from one life stage to another. In amphibians, larvae with gills undergo metamorphosis to become adults with lungs.
- **Reptile:** A vertebrate that is ectothermic, has scaly skin, breathes with lungs, and can spend its entire life on land. Reptiles lay eggs with protective shells and membranes.



Materials Needed: (all links are included in this PDF)

- Printed copies of the Study Guide (<https://newpathworksheets.com/api/guide/study-guide-science-grade-6-fishes-amphibians-and-reptiles-1.pdf>)
- Activity Lesson handouts (<https://newpathworksheets.com/api/activity-lesson/activity-lesson-science-grade-6-fishes-amphibians-and-reptiles-1-fish-amphibians-reptiles-4.pdf>)
- Worksheet 0 for assessment (<https://newpathworksheets.com/api/worksheet/worksheet-science-grade-6-fishes-amphibians-and-reptiles-1-0.pdf>)
- Vocabulary matching worksheet (<https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-6-fishes-amphibians-and-reptiles-1-1.pdf>)
- Three clear containers with water
- Small fish specimen or goldfish in a bowl
- Frog life cycle model or diagram
- Reptile skin sample or shed snake skin



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[amphibians-and-reptiles-1.pdf](#))

- Discuss the three major groups of fish: jawless, cartilaginous, and bony fish. Show diagrams from the Activity Lesson and explain their skeletal differences. (<https://newpathworksheets.com/api/activity-lesson/activity-lesson-science-grade-6-fishes-amphibians-and-reptiles-1-fish-amphibians-reptiles-4.pdf>)
- Demonstrate ectothermic temperature regulation by placing a thermometer in room-temperature water and explaining how a fish's body temperature would match the water.
- Explain amphibian metamorphosis using the frog life cycle diagram, highlighting the transition from gills to lungs and from water to land.



(<https://newpathworksheets.com/api/activity-lesson/activity-lesson-science-grade-6-fishes-amphibians-and-reptiles-1-fish-amphibians-reptiles-4.pdf>)

Step 3: Guided Practice (15 minutes)

- Distribute the Activity Lesson handouts and work through the Venn diagram comparing fish, amphibians, and reptiles as a class. (<https://newpathworksheets.com/api/activity-lesson/activity-lesson-science-grade-6-fishes-amphibians-and-reptiles-1-fish-amphibians-reptiles-4.pdf>)
- Guide students through labeling the frog life cycle diagram, discussing each stage from egg to tadpole to froglet to adult frog. (<https://newpathworksheets.com/api/activity-lesson/activity-lesson-science-grade-6-fishes-amphibians-and-reptiles-1-fish-amphibians-reptiles-4.pdf>)
- Review the vocabulary matching worksheet together, reinforcing terms like cartilage, endoskeleton, atria, and ventricle. (<https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-6-fishes-amphibians-and-reptiles-1-1.pdf>)



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([amphibians-and-reptiles-1-0.pdf](https://newpathworksheets.com/api/activity-lesson/activity-lesson-science-grade-6-fishes-amphibians-and-reptiles-1-0.pdf))

- Review answers as a class, addressing any misconceptions about ectotherms, metamorphosis, or skeletal systems.
- Have students classify the following as fish, amphibian, or reptile: salmon, salamander, turtle, shark, toad, and snake, explaining one key feature for each.

Step 6: Closure (5 minutes)

- Ask students to share one new fact they learned about fishes, amphibians, or reptiles.



- Preview the next lesson on birds and mammals, asking students to think about how endotherms differ from ectotherms.

Differentiation Strategies

For advanced learners:

- Challenge students to research and present on a specific vertebrate adaptation, such as the swim bladder in bony fish or the amniotic egg in reptiles.
- Have students compare the circulatory systems of fish, amphibians, and reptiles, explaining how the number of heart chambers relates to oxygen delivery.

For learners needing support:

- Provide a pre-labeled diagram of fish anatomy with only key terms for students to match to definitions.



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Complete List of Available Resources:

- NewPathWorksheets: Fishes, Amphibians, and Reptiles (<https://newpathworksheets.com/science/grade-6/fishes-amphibians-and-reptiles-1>)
- Study Guide PDF (<https://newpathworksheets.com/api/guide/study-guide-science-grade-6-fishes-amphibians-and-reptiles-1.pdf>)
- Activity Lesson PDF (<https://newpathworksheets.com/api/activity-lesson/activity-lesson-science-grade-6-fishes-amphibians-and-reptiles-1-fish-amphibians-reptiles-4.pdf>)



- Worksheet 0 PDF (<https://newpathworksheets.com/api/worksheet/worksheet-science-grade-6-fishes-amphibians-and-reptiles-1-0.pdf>)
- Worksheet 1 PDF (<https://newpathworksheets.com/api/worksheet/worksheet-science-grade-6-fishes-amphibians-and-reptiles-1-1.pdf>)
- Worksheet 2 PDF (<https://newpathworksheets.com/api/worksheet/worksheet-science-grade-6-fishes-amphibians-and-reptiles-1-2.pdf>)
- Worksheet 3 PDF (<https://newpathworksheets.com/api/worksheet/worksheet-science-grade-6-fishes-amphibians-and-reptiles-1-3.pdf>)
- Vocabulary 1 PDF (<https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-6-fishes-amphibians-and-reptiles-1-1.pdf>)
- Vocabulary 2 PDF (<https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-6-fishes-amphibians-and-reptiles-1-2.pdf>)
- Vocabulary 3 PDF (<https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-6-fishes-amphibians-and-reptiles-1-3.pdf>)
- Vocabulary 4 PDF (<https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-6-fishes-amphibians-and-reptiles-1-4.pdf>)



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FISHES, AMPHIBIANS, AND REPTILES

Characteristics of Chordates and Vertebrates

Fish, amphibians, and reptiles are part of a group of animals called vertebrates. All vertebrates are part of the phylum Chordata and the subphylum Vertebrata.



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part of the nervous system. Humans have a nerve cord called the spinal cord that runs through the backbone. In humans, information travels along the nerve cord from the body to the brain and back.

Chordates also have **pharyngeal slits** at some point in their lives. The pharynx is part of the throat, just behind the mouth. In fish, the pharyngeal slits turn into gills, but in humans the pharyngeal slits disappear before birth.

Lesson Checkpoint:
What is a notochord? What are pharyngeal slits?

Vertebrates

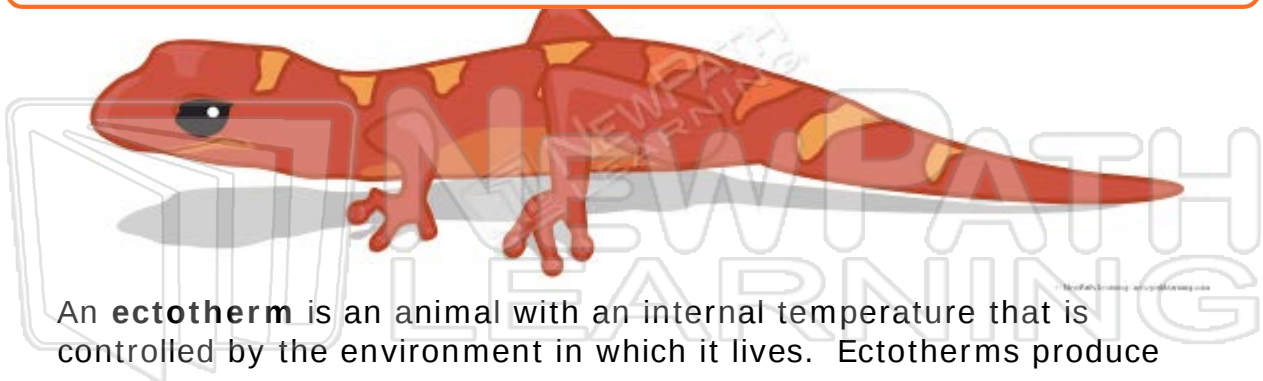
Vertebrates are chordates that develop backbones. Mammals, birds, amphibians, reptiles, fish, sharks, and rays are all groups, called classes, of vertebrates.

Backbone Development: In all vertebrate species, the notochord develops into a backbone made of vertebrae. Vertebrae are many small bones that are lined up in a row that come together to form the backbone. The vertebrae are flexible because there are joints in between the vertebrae. Each of the vertebrae has a hole in the center where the spinal cord runs through. The backbone protects the spinal cord.



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An **ectotherm** is an animal with an internal temperature that is controlled by the environment in which it lives. Ectotherms produce

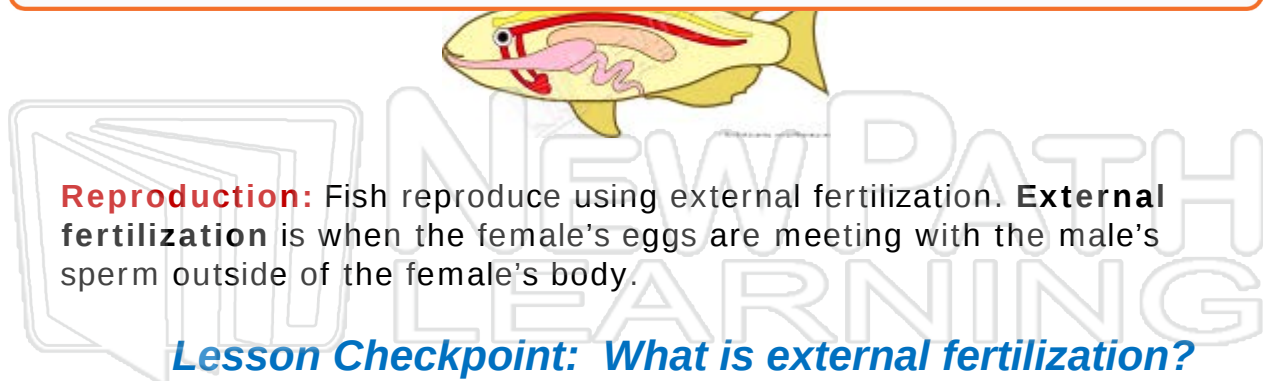
very little heat within their bodies. A lizard will sun bathe on a cool desert morning in order to raise its body temperature.

The opposite of an ectotherm is an **endotherm**. An endotherm controls the internal temperature by producing heat, making it nearly the same temperature inside its body at all times. Humans are endotherms.



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Classification: Scientists classify fish into three major groups. They are the jawless fish, cartilaginous fish, and bony fish. The oldest of all vertebrates are the jawless fish.

- **Jawless Fishes:** Jawless fish are the only fish that do not have scales. Their fins are not paired and their skeletons are made of cartilage. Most importantly, jawless fish are not able to bite because, as their name states, they are jawless. Instead, they feed by sucking, stabbing, and scraping their food. There are two types of jawless fish: hagfish and lampreys.
- **Cartilaginous Fishes:** Cartilaginous fishes include rays, sharks, and skates. Just like the skeletons of the jawless fishes, the cartilaginous fish skeletons are made of cartilage. The major difference between the two groups is that the cartilaginous fish have jaws that they can use to bite. They also have fins that are paired.



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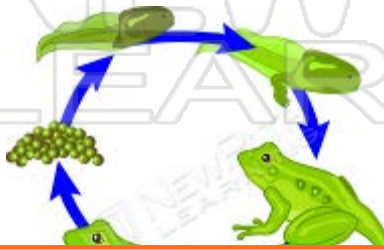
The majority of species of bony fish have an organ called a swim bladder. The **swim bladder** is a gas-filled sac that stabilizes the fish's body at different depths in the water. The amount of gas that is in the swim bladder is controlled by the fish and can be adjusted by the fish. Bony fishes are the most abundant of all the fishes and vary drastically in their physical characteristics.

Lesson Checkpoint:
What are the three major groups of fish?

Amphibians

An **amphibian** is a vertebrate that is ectothermic. Most amphibians live the beginning of their lives in the water. Once they reach adulthood, they live on land, only to return to the water to reproduce.

Life Cycle: Amphibians lay eggs in the water, where the eggs hatch into larvae. The larvae have gills and undergo metamorphosis when entering the adult phase.



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What is the role of the atria and the ventricle in an amphibian's heart?

Types of Amphibians: Examples of amphibians include frogs, toads, and salamanders. The adult skeletons of most amphibians are strong with muscular limbs, which they adapted for better movement on land.

Lesson Checkpoint:
What are some examples of amphibians?

Reptiles

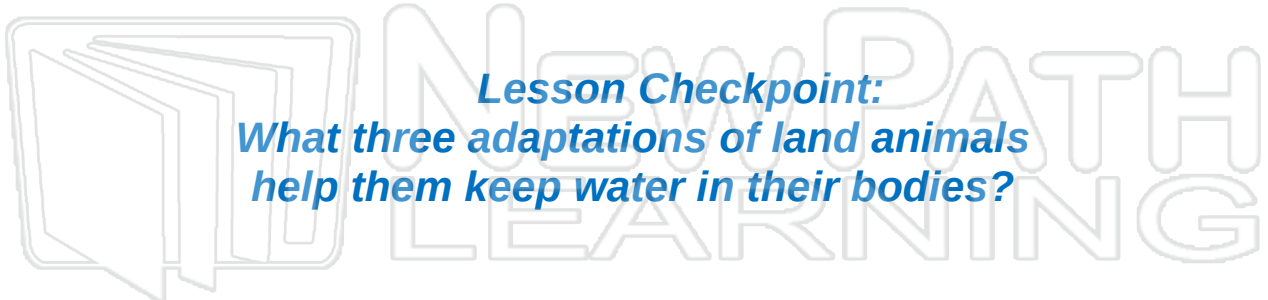
A **reptile** is a vertebrate that is ectothermic and has scaly skin and a pair of lungs. Lizards, snakes, turtles, tortoises, and crocodiles are all examples of reptiles.



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excreted by the body in watery liquid called **urine**. The kidneys keep the majority of water inside of the body while filtering the wastes.



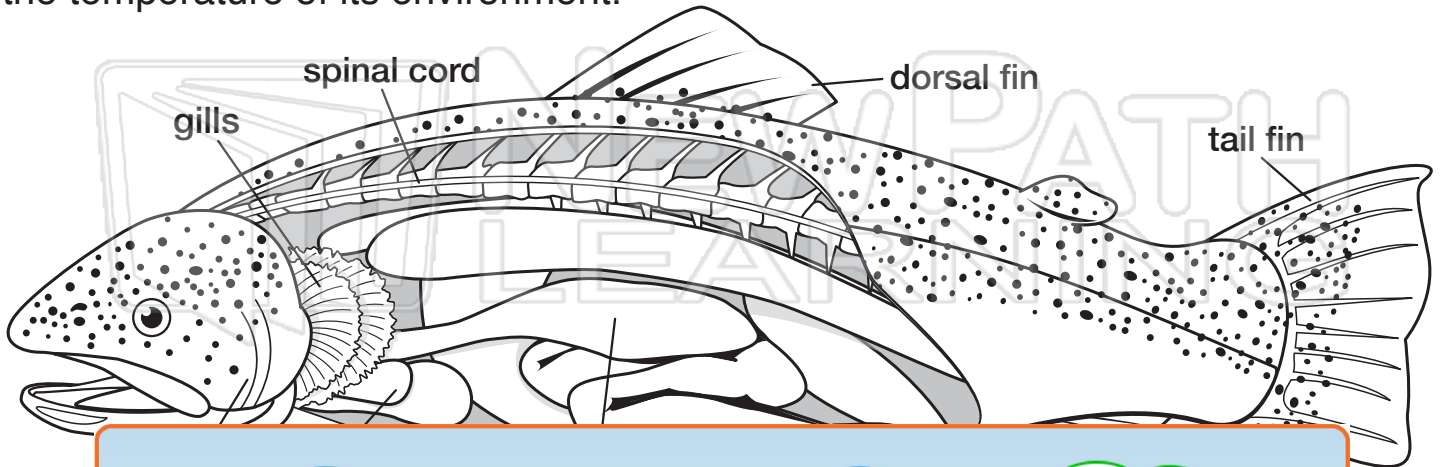


Fish, Amphibians & Reptiles

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F

Name _____ Class _____ Date _____

A **fish** is a **vertebrate animal** that lives in **water**. It uses **gills** to obtain oxygen from the water, and uses its **fins** for movement. Most fishes have **scales** and are **ectotherms**. The **body temperature** of an **ectotherm** changes depending on the temperature of its environment.



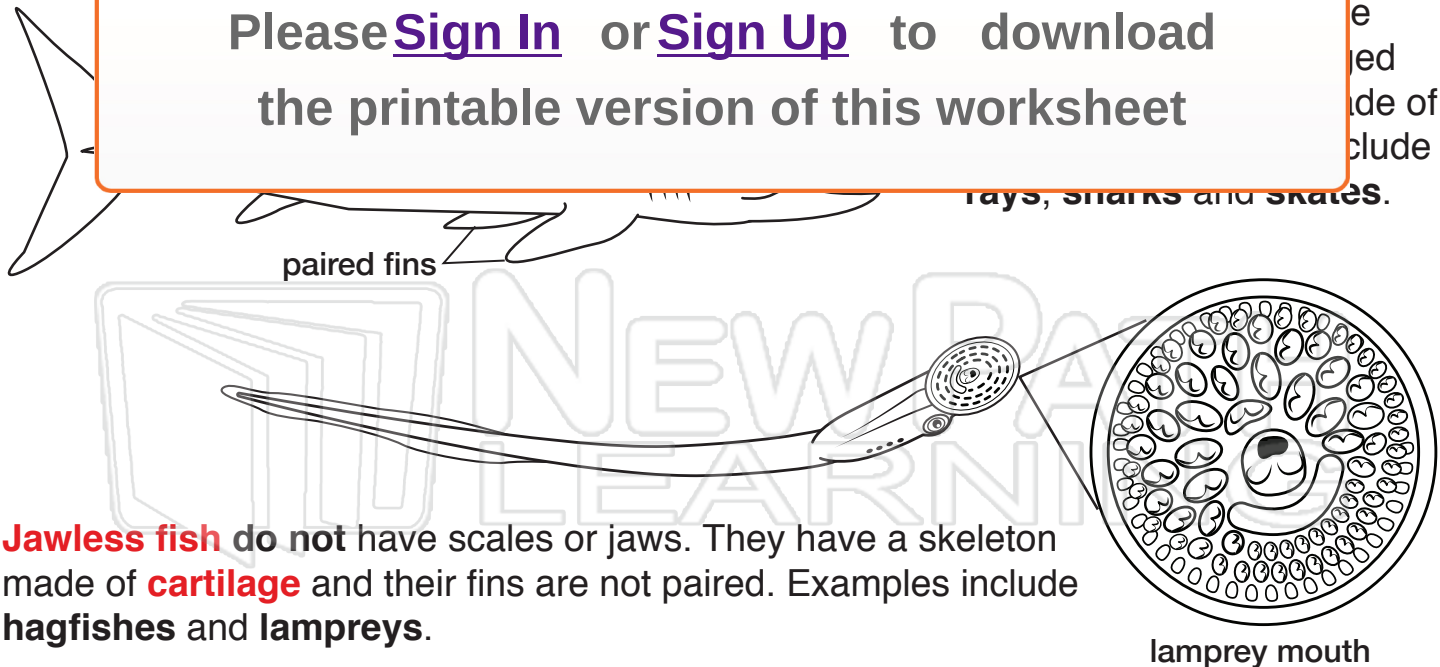
Bony
speci
of bo



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rays, sharks and skates.



Jawless fish do not have scales or jaws. They have a skeleton made of **cartilage** and their fins are not paired. Examples include **hagfishes** and **lampreys**.

lamprey mouth

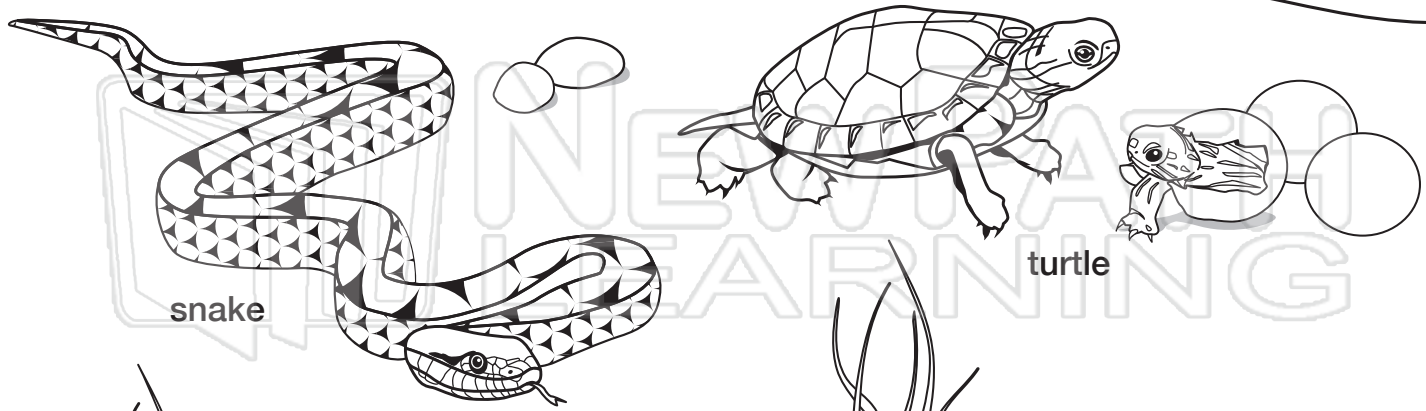


Fish, Amphibians & Reptiles

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Name _____ Class _____ Date _____

Reptiles are **ectotherms**, breathe by **lungs**, and have a **dry scaly skin**. Lizards, snakes, turtles, tortoises, alligators and crocodiles are all examples of reptiles.

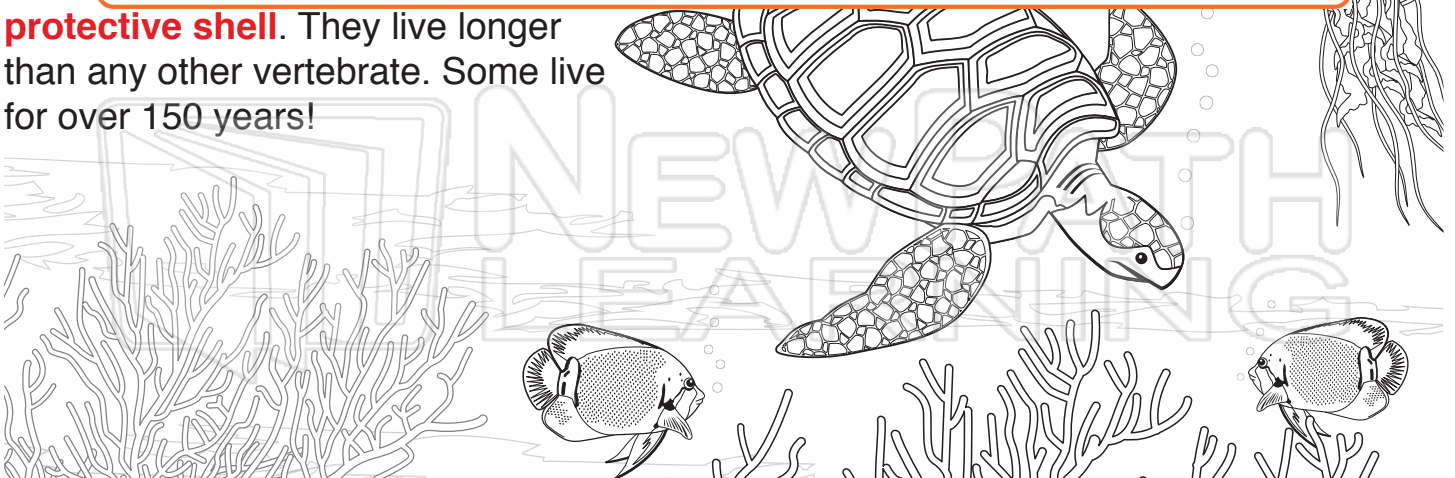


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Lizard
Lizard
Snake

Turtle
the se
protective shell. They live longer
than any other vertebrate. Some live
for over 150 years!





Name _____ Class _____ Date _____

An **amphibian** is a **vertebrate** that is **ectothermic** and lives its early life in water. Once an amphibian reaches adulthood, it then lives on land, only to return to the water to reproduce. Examples include frogs, toads, newts and salamanders.



Amphibians lay **eggs** in the water where they hatch into larvae. The **larvae** have **gills** and undergo **metamorphosis** when entering the adult phase.



Name _____ Class _____ Date _____

Use the Venn diagram to **compare & contrast** fish, reptiles and amphibians.

Fish



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Reptiles

Amphibians



Fish, Amphibians & Reptiles

Sci
F

Name _____ Class _____ Date _____

Complete the **Frog Life Cycle**. Number the stages of metamorphosis.



A frog starts its life as
an _____.



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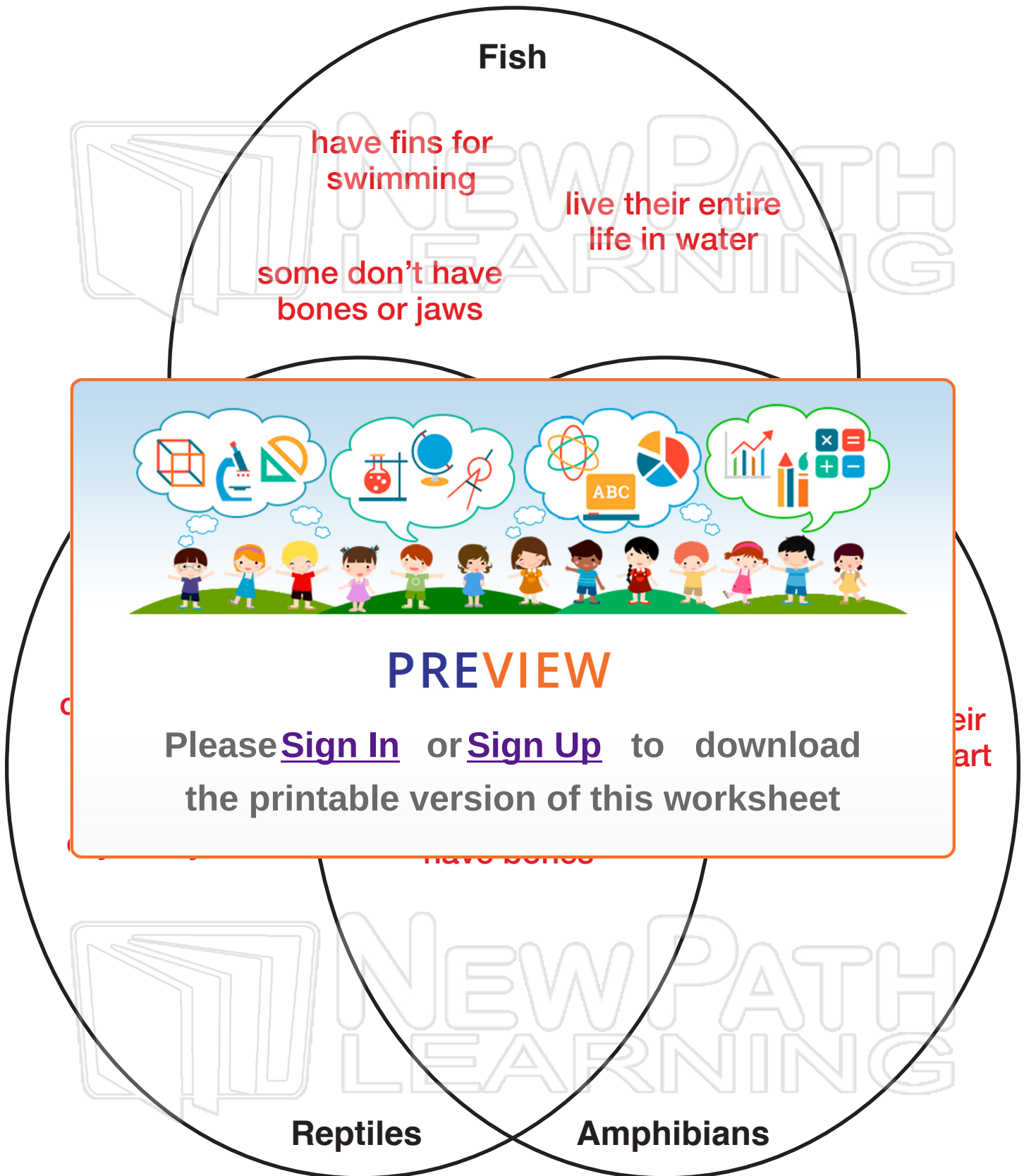
Adult frogs
breathe with
_____.

_____.
grow legs and become
_____.



Answer Key - Example

Use the Venn diagram to **compare & contrast** fish, reptiles and amphibians.





Answer Key - Example

Complete the **Frog Life Cycle**. Number the stages of metamorphosis.



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Adult frogs
breathe with
lungs.

Tadpoles
grow legs and become
froglets.



Name _____ Class _____ Date _____

1

Which species does not belong within the **Phylum Chordata**?

- A** humans
- B** lizard
- C** jellyfish
- D** whales

**2**

A **fish** is an organism that is _____.

- A** an endothermic invertebrate with fins and lives in the water
- B** an endothermic vertebrate with legs and lives on land
- C** an ectothermic vertebrate with fins and lives in the water
- D** an ectothermic invertebrate with legs and lives on land

3

A **notochord** is a rod that is flexible and supports an organism's backbone.

Why is a notochord helpful to **chordates**?

- A** It brings information to the body and brain.
- B** It allows the organism to stand up.

4

In a **reptile**, the **nerve cord** is called the _____.

- A** backbone
- B** notochord
- C** spinal cord
- D** cartilage

**5**

PREVIEW

7

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9

How much **internal heat** does an organism produce if they are considered to be **ectotherms**?

- A** none
- B** a small amount
- C** a large amount
- D** enough to heat the environment outside the body

**10**

Why does a **lizard** lay in the **sun**?

- A** to get a tan
- B** to hide from their prey
- C** to lower its body temperature
- D** to increase its body temperature





Name _____ Class _____ Date _____

1

Which species does not belong within the **Phylum Chordata**?

- A humans
- B lizard
- C jellyfish
- D whales



C

2

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- B an endothermic vertebrate with legs and lives on land
- C an ectothermic vertebrate with fins and lives in the water
- D an ectothermic invertebrate with legs and lives on land

C

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- D cartilage



C

5



C

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7

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C

9

How much **internal heat** does an organism produce if they are considered to be **ectotherms**?

- A none
- B a small amount
- C a large amount
- D enough to heat the environment outside the body



B

10

Why does a **lizard** lay in the **sun**?

- A to get a tan
- B to hide from their prey
- C to lower its body temperature
- D to increase its body temperature



D



Name _____ Class _____ Date _____

1

An **endotherm** controls its **internal temperature** by producing heat, making it nearly the same temperature inside of its body at all times.

- A** true
- B** false

**2**

What substance is **released** by the **gills** of a fish?

- A** carbon dioxide
- B** oxygen
- C** nitrogen
- D** energy

**3**

What happens to the blood in a **closed-circulatory system**?

- A** It bathes the internal organs.
- B** It stays within the blood vessels.
- C** It brings carbon dioxide to the cells.
- D** It brings oxygen out of the cells.

4

In a **closed-circulatory system**, the blood moves _____.

- A** in and out
- B** one-way
- C** two-ways
- D** up and down

**5**

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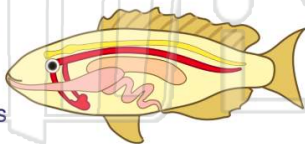
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9

Which organisms have a structure called a **swim bladder**?

- A** goldfish
- B** hagfish
- C** sharks
- D** lampreys

**10**

The **most numerous** group of fishes are the _____.

- A** jawless
- B** cartilaginous
- C** bony
- D** hagfish





Name _____ Class _____ Date _____

1

An **endotherm** controls its **internal temperature** by producing heat, making it nearly the same temperature inside of its body at all times.

- A true
- B false



A

2

What substance is **released** by the **gills** of a fish?

- A carbon dioxide
- B oxygen
- C nitrogen
- D energy



A

3

What happens to the blood in a **closed-circulatory system**?

- A It bathes the internal organs.
- B It stays within the blood vessels.
- C It brings carbon dioxide to the cells.
- D It brings oxygen out of the cells.

B

4

In a **closed-circulatory system**, the blood moves _____.

- A in and out
- B one-way
- C two-ways
- D up and down



B

5



D

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7

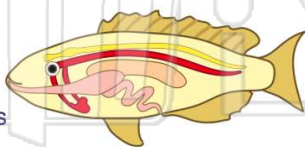
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C

9

Which organisms have a structure called a **swim bladder**?

- A goldfish
- B hagfish
- C sharks
- D lampreys



A

10

The **most numerous** group of fishes are the _____.

- A jawless
- B cartilaginous
- C bony
- D hagfish



C



Name _____ Class _____ Date _____

Match each of the following terms to its definition:

Archaeobacteria

Atria

Cartilage

Autotroph

Angiosperm

Algae

Amphibian

Animal

1. - a vertebrate that is ectothermic (cold-blooded) that spends part of its life in the water and part of its life on land; it begins its life in water having gills, and spends the later part of its life on land breathing with lungs



2. - a large and diverse group of simple, plant-like protists ranging from unicellular to multicellular organisms; plant-like protists that contain chloroplasts and are autotrophic

3. around



4. organi

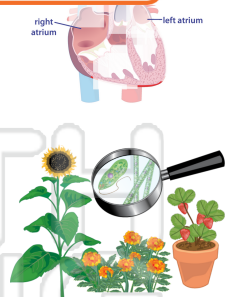
5. classifi
nucleu
source

6.

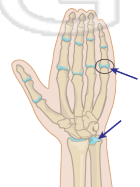
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7. - a living organism, such as algae, that is capable of producing its own food; also called a producer



8. - connective tissue that is flexible and strong, but softer than bone





Name _____ Class _____ Date _____

Match each of the following terms to its definition:

Archaeobacteria

Atria

Cartilage

Autotroph

Angiosperm

Algae

Amphibian

Animal

1. amphibian - a vertebrate that is ectothermic (cold-blooded) that spends part of its life in the water and part of its life on land; it begins its life in water having gills, and spends the later part of its life on land breathing with lungs



2. algae - a large and diverse group of simple, plant-like protists ranging from unicellular to multicellular organisms; plant-like protists that contain chloroplasts and are autotrophic

3. angiosperm - a plant that has seeds

4. animal - a living organism that is capable of movement

5. archaeobacteria - a group of bacteria that are classified as prokaryotes

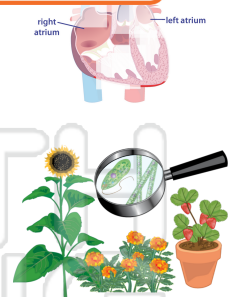
6. atria - the two upper chambers of the heart



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7. autotroph - a living organism, such as algae, that is capable of producing its own food; also called a producer



8. cartilage - connective tissue that is flexible and strong, but softer than bone

