



Lesson Plan: Mollusks, Arthropods and Echinoderms

Grade Level: 6

Subject: Life Science

Duration: 45–60

NGSS MS-LS1-1: Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.

Learning Objectives

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

- **Identify** the key characteristics that define mollusks, arthropods, and echinoderms.
- **Recognize** examples of each group and explain their ecological importance.
- **Describe** the unique adaptations and structures that allow these organisms to thrive in their



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- **Mantle:** A thin layer of tissue in mollusks that covers the internal organs and usually secretes the shell.
- **Radial symmetry:** A body plan in which body parts are arranged around a central axis, usually in multiples of five, as seen in adult echinoderms.
- **Water vascular system:** A system of fluid-filled tubes in echinoderms that helps with movement, feeding, and gas exchange.
- **Appendage:** A structure that is jointed and attached to the body, such as legs, antennae, or claws in arthropods.



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-mollusks-arthropods-and-echinoderms-1.pdf>)
- Activity Lesson handouts (<https://newpathworksheets.com/api/activity-lesson/activity-lesson-science-grade-6-mollusks-arthropods-and-echinoderms-1-mollusks-arthropods-echinoderms-4.pdf>)
- Worksheet Set 1 (<https://newpathworksheets.com/api/worksheet/worksheet-science-grade-6-mollusks-arthropods-and-echinoderms-1-0.pdf>)
- Vocabulary matching worksheet (<https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-6-mollusks-arthropods-and-echinoderms-1-1.pdf>)
- Physical specimens or high-quality images of mollusks (snail shell, clam shell), arthropods (preserved insects, crab shell), and echinoderms (starfish, sea urchin)
- Chart paper or whiteboard
- Markers



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[guide-science-grade-6-mollusks-arthropods-and-echinoderms-1.pdf](https://newpathworksheets.com/api/guide/study-guide-science-grade-6-mollusks-arthropods-and-echinoderms-1.pdf)

- Discuss arthropods: jointed appendages, segmented body, exoskeleton made of chitin, and their incredible diversity as the largest animal phylum.
(<https://newpathworksheets.com/api/guide/study-guide-science-grade-6-mollusks-arthropods-and-echinoderms-1.pdf>)
- Explain echinoderms: radial symmetry, water vascular system, spiny skin, and regeneration ability. Emphasize that all echinoderms are marine.
(<https://newpathworksheets.com/api/guide/study-guide-science-grade-6-mollusks-arthropods-and-echinoderms-1.pdf>)



- Use the Activity Lesson handout to show labeled diagrams of representative organisms from each group. (<https://newpathworksheets.com/api/activity-lesson/activity-lesson-science-grade-6-mollusks-arthropods-and-echinoderms-1-mollusks-arthropods-echinoderms-4.pdf>)

Step 3: Guided Practice (15 minutes)

- Work through the vocabulary matching worksheet as a class, reinforcing key terms such as mantle, exoskeleton, radial symmetry, and water vascular system. (<https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-6-mollusks-arthropods-and-echinoderms-1-1.pdf>)
- Have students examine the Activity Lesson diagrams and identify the major body parts of a mollusk (shell, mantle, foot, gills), an arthropod (segments, appendages, exoskeleton), and an echinoderm (tube feet, radial arms). (<https://newpathworksheets.com/api/activity-lesson/activity-lesson-science-grade-6-mollusks-arthropods-and-echinoderms-1-mollusks-arthropods-echinoderms-4.pdf>)
- Create a class comparison chart on the board listing characteristics, examples, and ecological importance for each group.



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[mollusks-arthropods-and-echinoderms-1-0.pdf](#)

- Conduct a quick oral assessment by asking students to classify organisms shown in images: 'Is this a mollusk, arthropod, or echinoderm? What characteristics helped you decide?'
- Have students write a brief exit ticket comparing two of the three groups, identifying at least two similarities and two differences, then summarize the key characteristics of mollusks, arthropods, and echinoderms as closure.

Differentiation Strategies



For advanced learners:

- Challenge advanced learners to research a specific species from each group and create a detailed fact sheet including habitat, diet, life cycle, and conservation status.
- Have students investigate the evolutionary relationships between the three groups and create a simple phylogenetic tree showing their connections.

For learners needing support:

- Provide pre-labeled diagrams and a simplified vocabulary list with visual aids for students who struggle with independent labeling and terminology.
- Pair struggling students with peer buddies during guided practice to provide additional support and scaffolding.

Extension Activities



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- Activity Lesson PDF (<https://newpathworksheets.com/api/activity-lesson/activity-lesson-science-grade-6-mollusks-arthropods-and-echinoderms-1-mollusks-arthropods-echinoderms-4.pdf>)
- Worksheet Set 1 PDF (<https://newpathworksheets.com/api/worksheet/worksheet-science-grade-6-mollusks-arthropods-and-echinoderms-1-0.pdf>)
- Worksheet Set 2 PDF (<https://newpathworksheets.com/api/worksheet/worksheet-science-grade-6-mollusks-arthropods-and-echinoderms-1-1.pdf>)
- Worksheet Set 3 PDF (<https://newpathworksheets.com/api/worksheet/worksheet-science-grade-6-mollusks-arthropods-and-echinoderms-1-2.pdf>)



- Worksheet Set 4 PDF (<https://newpathworksheets.com/api/worksheet/worksheet-science-grade-6-mollusks-arthropods-and-echinoderms-1-3.pdf>)
- Vocabulary Set 1 PDF (<https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-6-mollusks-arthropods-and-echinoderms-1-1.pdf>)
- Vocabulary Set 2 PDF (<https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-6-mollusks-arthropods-and-echinoderms-1-2.pdf>)
- Vocabulary Set 3 PDF (<https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-6-mollusks-arthropods-and-echinoderms-1-3.pdf>)
- Vocabulary Set 4 PDF (<https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-6-mollusks-arthropods-and-echinoderms-1-4.pdf>)
- Vocabulary Set 5 PDF (<https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-6-mollusks-arthropods-and-echinoderms-1-5.pdf>)
- Vocabulary Set 6 PDF (<https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-6-mollusks-arthropods-and-echinoderms-1-6.pdf>)
- Vocabulary Set 7 PDF (<https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-6-mollusks-arthropods-and-echinoderms-1-7.pdf>)



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MOLLUSKS, ARTHROPODS AND ECHINODERMS

Characteristics of Mollusks

A mollusk is an invertebrate that has an un-segmented, soft body that is almost always protected by outer shells.



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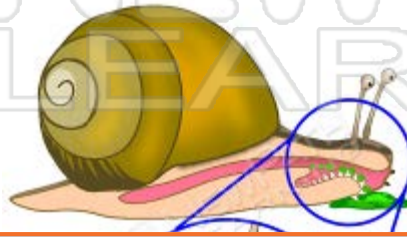
Foot

Structure

Mollusks have bilateral symmetry and internal organs that are located in one area. Some of the internal organs include a stomach, heart, reproductive organs, and a pair of kidneys.

The **kidneys** are organs that eliminate wastes produced by the cells. Most mollusks that live in a water environment have gills. **Gills** are organs that take oxygen out of water. The gills have a large supply of blood vessels that allow oxygen to diffuse across their membrane and carbon dioxide to diffuse out of the mollusk.

Mollusks also have an organ called a radula. The **radula** is a structure that is bendable and is covered in small teeth. Mollusks use the radula to draw in food and to tear it into pieces they can digest.



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Gastropods

The **gastropods** are the most abundant of the mollusks, which include snails and slugs. These mollusks have no shell or a single shell.

Snails have a single shell and slugs do not have a shell at all. A gastropod has sense organs located in the head and a muscular foot that helps it to move around. The stomach of a gastropod is on the same side of the body as the foot, which is how gastropods got their name.

How Gastropods Avoid Predators

When the conditions are dry or there is a predator nearby, gastropods with shells will retreat into their shells. Some gastropods have a structure called a **trapdoor** that will close once the gastropod retreats into its shell. This seals the gastropod inside the shell until the threat is gone. Gastropods feed in many different ways. They are herbivores, omnivores and carnivores.

The Bivalve

The second major group of mollusks is the **bivalve**, which are **mollusks with two shells** that are held together by a hinge and secured by very strong muscles.

Species of bivalves include oysters, clams, and mussels. Bivalves are a unique mollusk because they are filter feeders and they do not have a radula.



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having an external shell.

They catch food with their tentacles, which have suckers on them that are sensitive to smell and touch. Cephalopods have the largest brain of the invertebrates which allows them to have excellent vision and the ability to learn from their environment.

Lesson Checkpoint:
What type of mollusk is a nautilus shell?

Arthropods

Arthropods are invertebrates with external skeletons, segmented bodies, and appendages. **Appendages** are structures that are jointed and attached to the body.

Most arthropods reproduce sexually and are either male or female, have an open circulatory system, and have internal fertilization. An **open circulatory system** is when the blood leaves the blood vessels and bathes the internal organs within the body. **Internal fertilization** is when the sperm and egg meet inside the body. Arthropods have a waterproof outer covering called an **exoskeleton**. The exoskeleton prevents water from evaporating and protects them from predators. The exoskeleton is made up of a material known as **chitin**. The exoskeleton of an arthropod is unable to grow as the organism grows larger.



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Lesson Checkpoint: What does an arthropod do if it outgrows its exoskeleton?



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Five Major Groups of Arthropods

There are five major groups of arthropods: arachnids, centipedes, millipedes, crustaceans, and insects.

Arachnids: An arachnid is an arthropod that has two body segments, the first being the head and chest and the second being the abdomen.

The **abdomen** contains the part of the digestive tract and the reproductive organs. Arachnids do not have antenna, have eight legs, and breathe through lungs that are attached to openings on the exoskeleton. Mites, scorpions, spiders, and ticks are all arachnids.

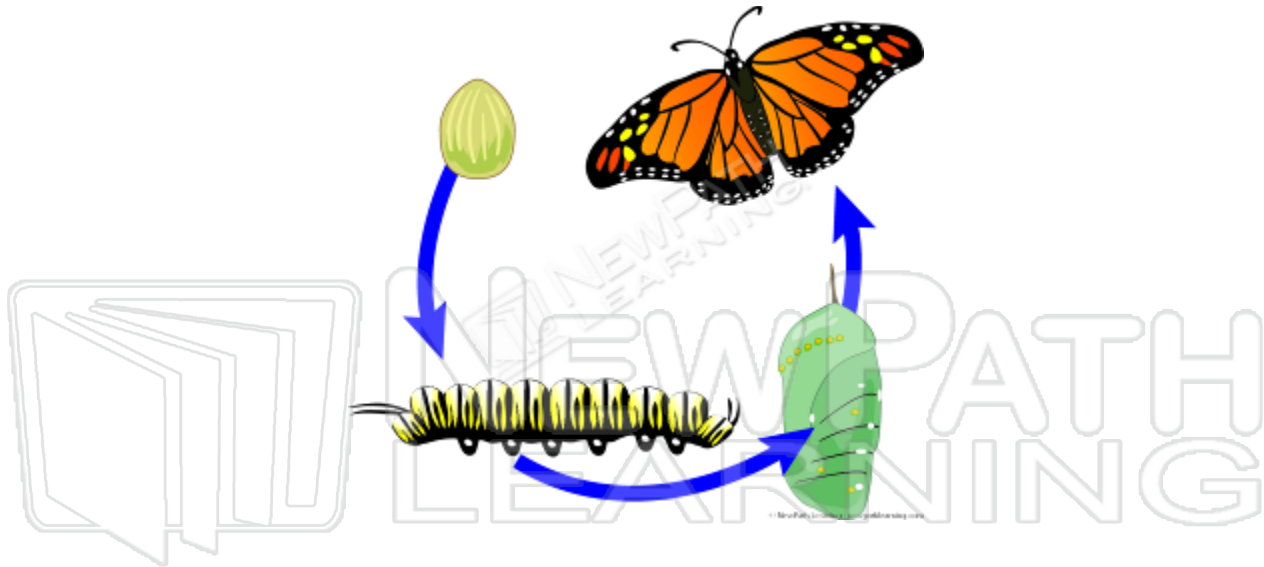
Centipedes and Millipedes: The bodies of centipedes and millipedes have a high number of segments. One pair of legs attaches to each segment of a **centipede** and two pairs of legs are attached to each segment of a **millipede**.



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Complete metamorphosis consists of four stages: egg, larva, pupa, and adult. The insect will begin life in a fertilized egg, which will hatch and an insect larva will emerge. After growing dramatically, the larva will enter the third stage called the pupa. During the **pupa** stage, the larva will be encased in a protective covering where it will develop into the adult form of the insect.



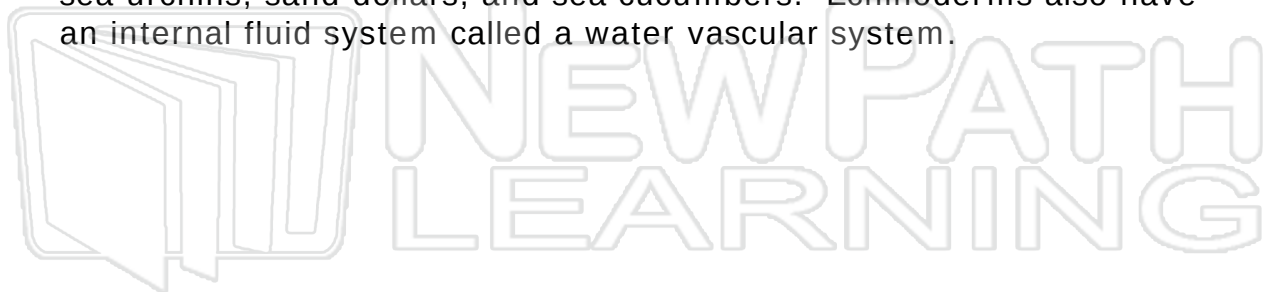
Gradual metamorphosis is when the larva appears similar to the



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Endoskeleton. Adult echinoderms have radial symmetry that is usually in multiples of five. Examples of echinoderms are sea stars, sea urchins, sand dollars, and sea cucumbers. Echinoderms also have an internal fluid system called a water vascular system.





Water Vascular System

The **water vascular system** is a system of tubes within the body where fluids flow to help the animal survive.



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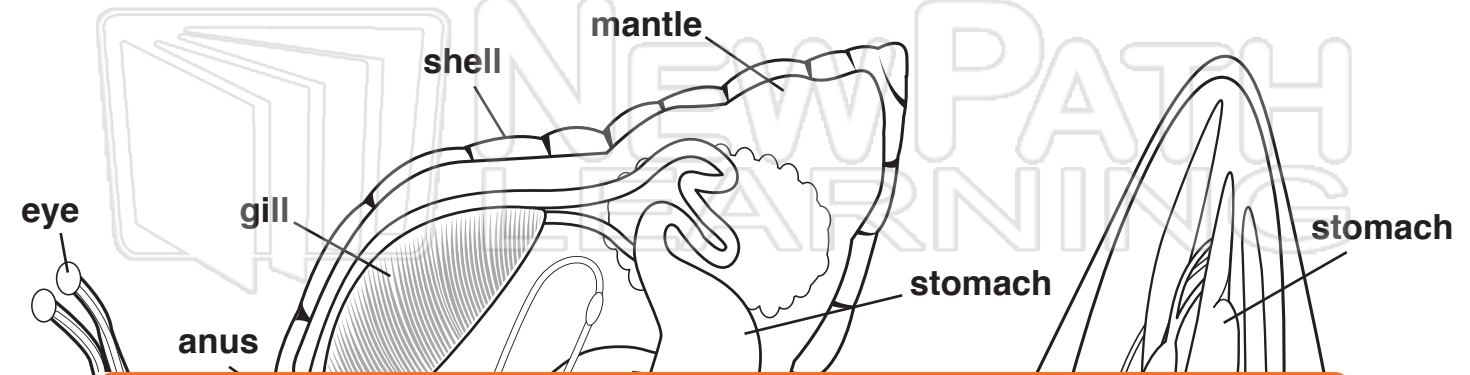
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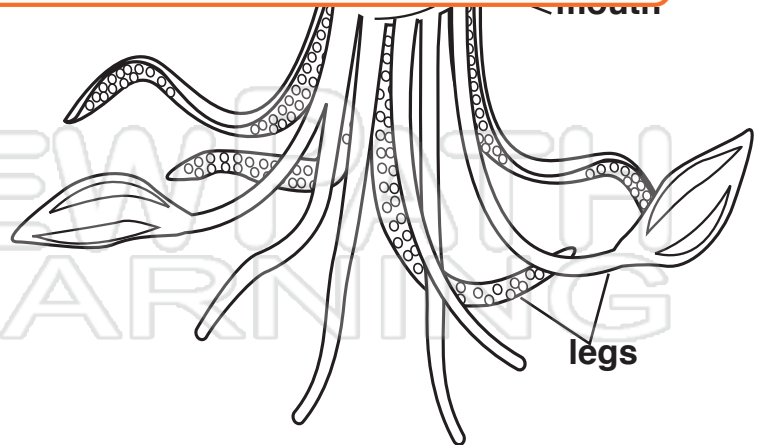
Name _____ Class _____ Date _____

Mollusks are **invertebrate** animals with soft bodies. Most are protected by an **outer hard shell**. Mollusks have a **mantle**, a thin layer of tissue covering their internal organs. They move using a thick muscular organ called a **foot**. Snails, octopuses, squids and clams are examples of mollusks.



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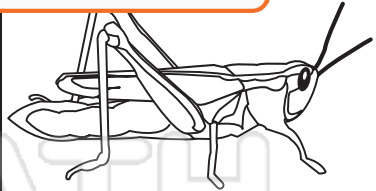


Mollusks, Arthropods & Echinoderms

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Name _____ Class _____ Date _____

Arthropods are the **most advanced invertebrates**. They have **external skeletons**, **segmented bodies**, and **jointed appendages**. Most arthropods have **bilateral symmetry**, an open circulatory system, a digestive system with two openings, and reproduce sexually. Spiders, grasshoppers, crayfish and centipedes are examples of arthropods.

Crustaceans	Arachnids	Millipedes & Centipedes	Insects
			
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2 or 3 body sections	2 body sections	2 body sections	3 body sections
5 or more pairs of legs	4 pairs of legs	many pairs of legs	3 pairs of legs
2 pairs of antennae	none	1 pair of antennae	1 pair of antennae

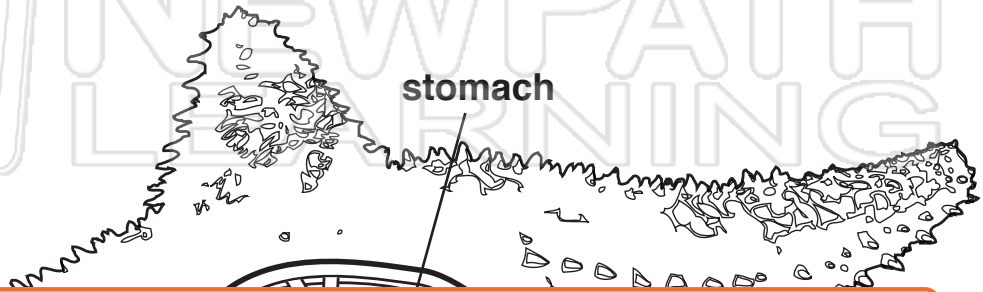


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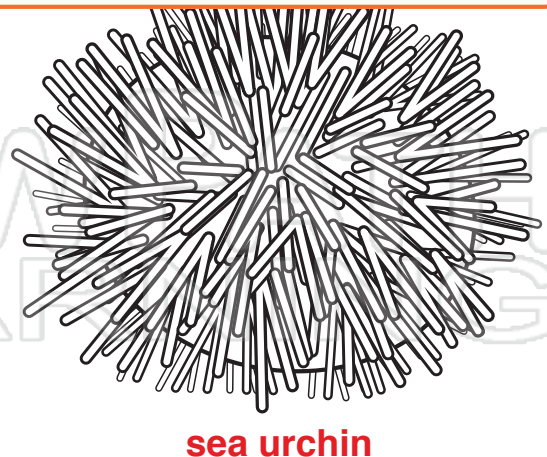
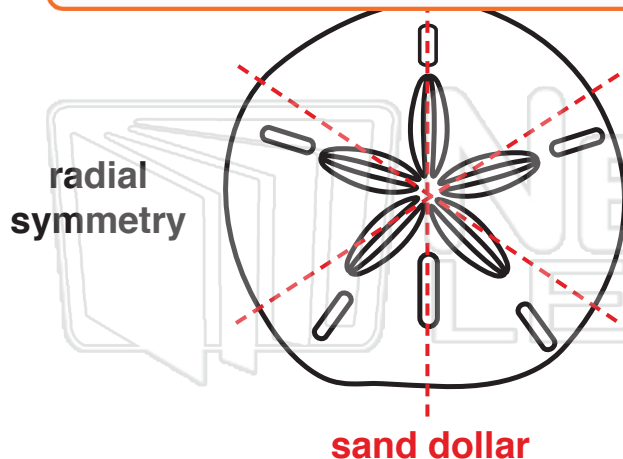
Name _____ Class _____ Date _____

Echinoderms are invertebrates with an internal skeleton, called the **endoskeleton**. All echinoderms live in the ocean and most have **spiny skins**. The water-vascular system of fluid-filled tubes helps echinoderms move and catch food. Adult echinoderms have **radial symmetry** in which the body parts, usually in **multiples of five**, are arranged like spokes on a wheel. Examples of echinoderms include **sea stars**, **sea urchins** and **sand dollars**.



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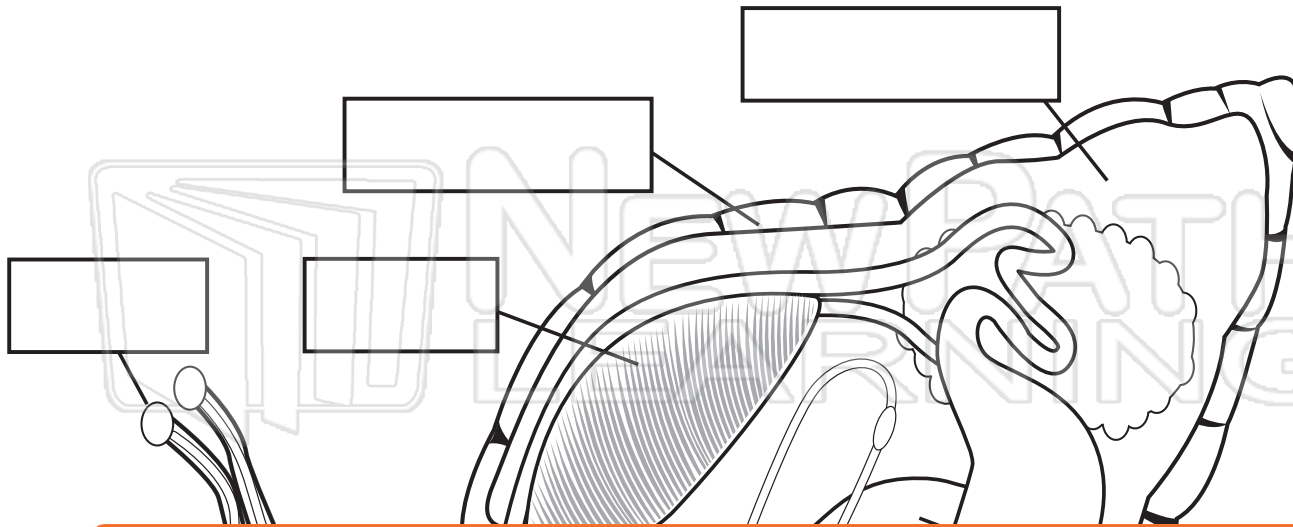


Mollusks, Arthropods & Echinoderms

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Name _____ Class _____ Date _____

Label parts of the mollusk. **Answer** the questions below.



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Mollusks have a _____, a thin layer of tissue covering their

internal organs. They move using a thick muscular organ called a _____.

Mollusks have _____ symmetry. Most have an _____ circulatory system.

Mollusks that live in water use _____ to obtain oxygen from the water.

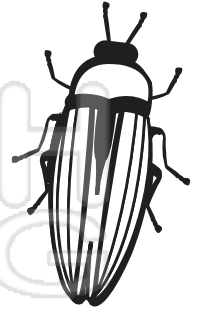
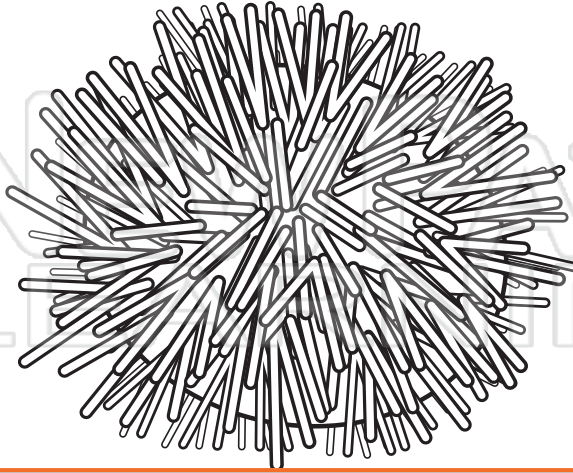
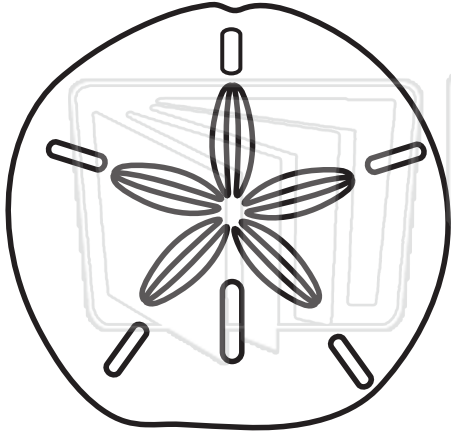


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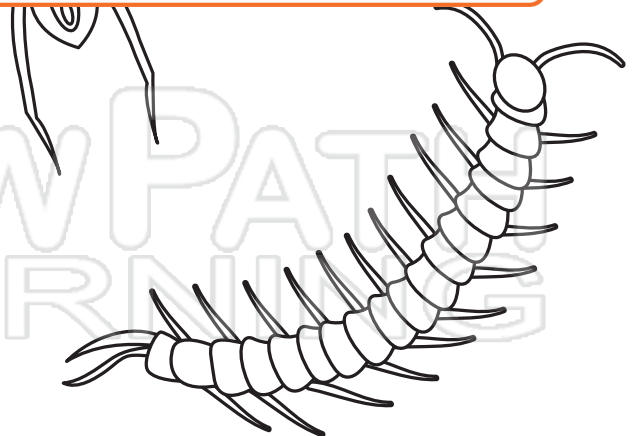
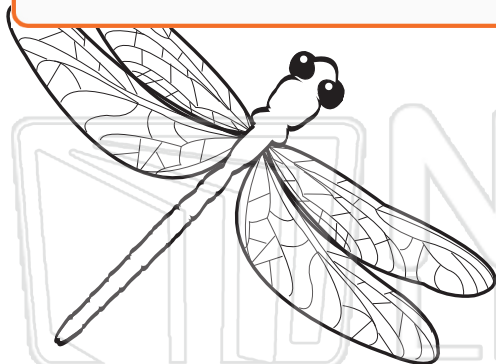
Name _____ Class _____ Date _____

Color and cut out the animals. Make a **chart** to separate them into the correct **phylum**. Find more examples to add.



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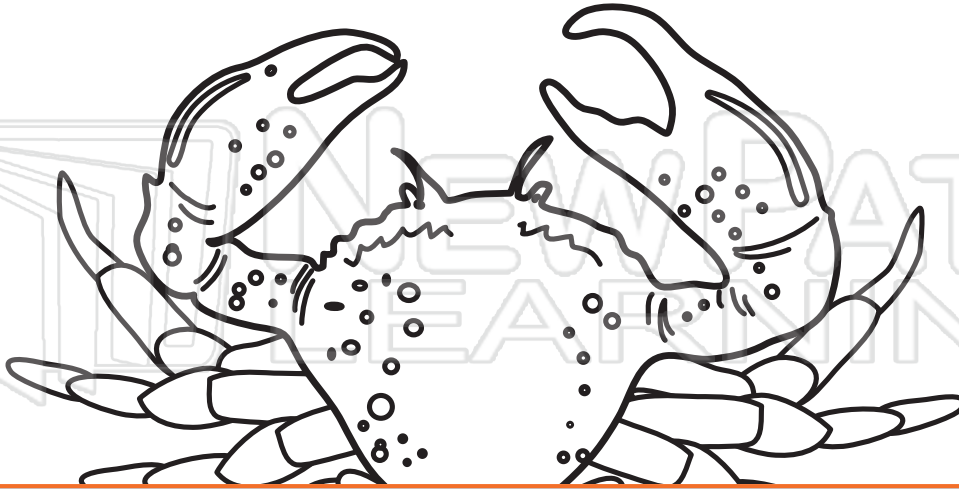


Mollusks, Arthropods & Echinoderms

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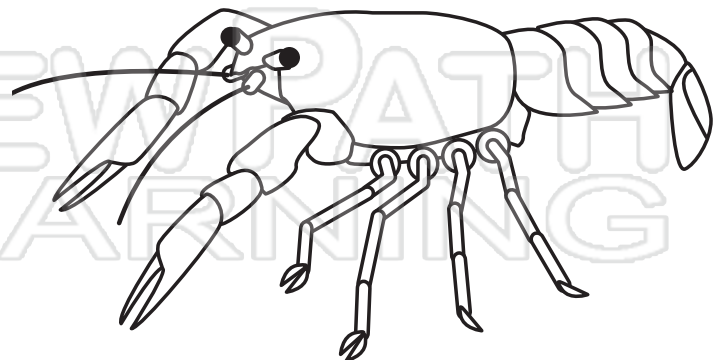
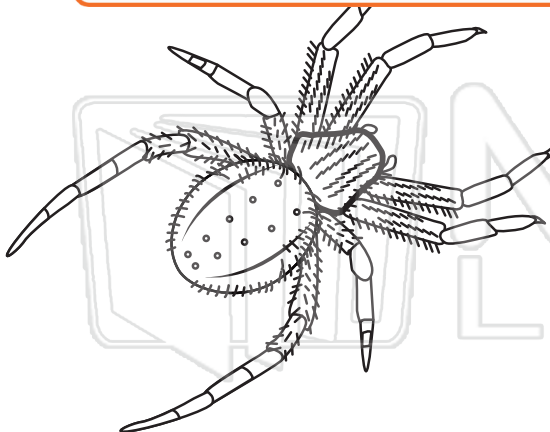
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Color and cut out the animals. Make a **chart** to separate them into the correct **phylum**. Find more examples to add.



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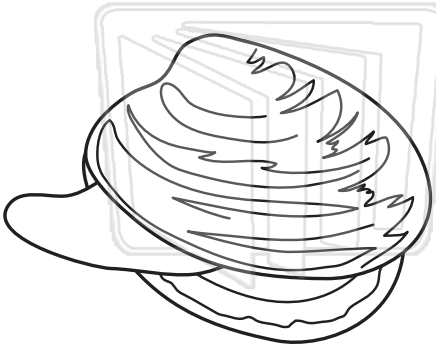
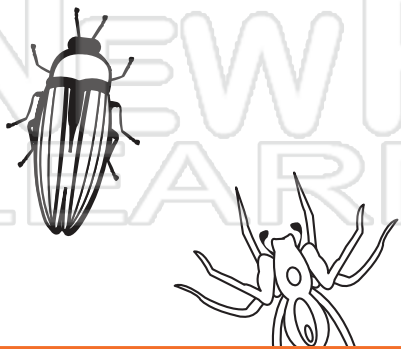
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Answer Key - Sample

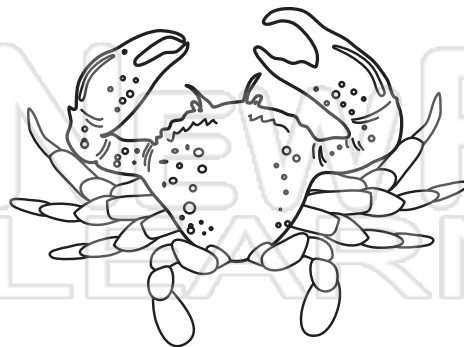
Color and cut out the animals. Make a **chart** to separate them into the correct **phylum**. Find more examples to add.

mollusks	arthropods	echinoderms
		



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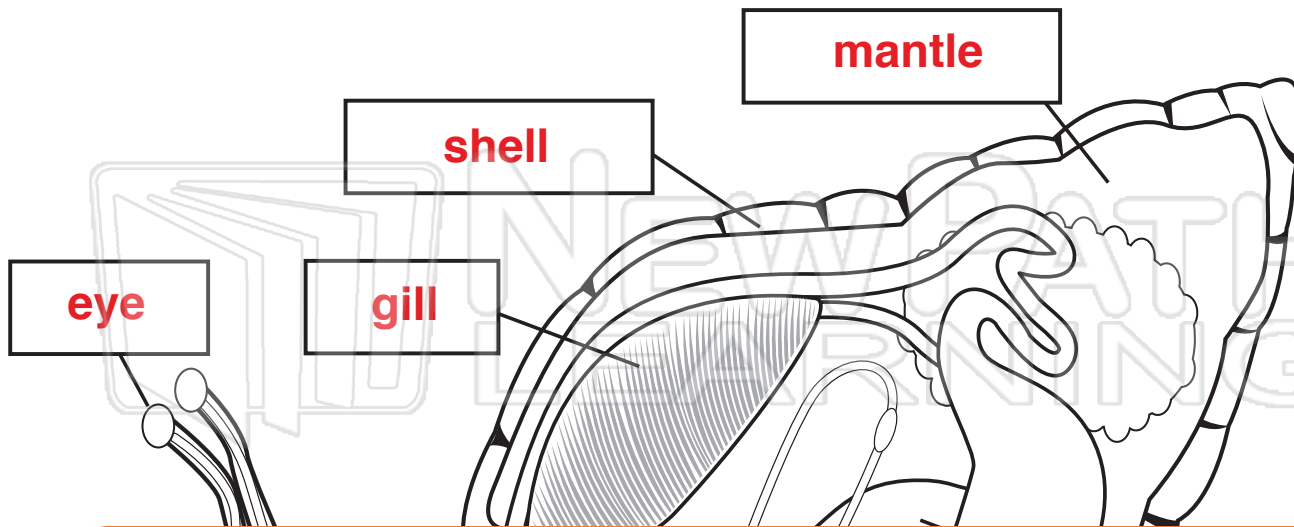
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Answer Key - Sample

Label parts of the mollusk. **Answer** the questions below.



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Mollusks have a mantle, a thin layer of tissue covering their

internal organs. They move using a thick muscular organ called a

foot. Mollusks have bilateral

symmetry. Most have an open circulatory system.

Mollusks that live in water use gills to obtain oxygen
from the water.

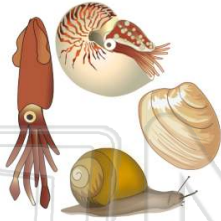


Name _____ Class _____ Date _____

1

Which is a **characteristic** of a **mollusk**?

- A segmented body
- B unsegmented body
- C prokaryote
- D unicellular



2

Which organism is a **mollusk**?

- A octopus
- B worm
- C butterfly
- D centipede



3

The _____ is a thin layer of tissue that **covers** the **internal organs** of mollusks.

- A kidneys
- B foot
- C radula



4

Which structure helps a **mollusk** to **move** around its environment?

- A kidneys
- B foot
- C radula
- D mantle



5



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9

A _____ is a **mollusk** with **two shells** that are held together by a hinge and secured by very strong muscles.

- A bivalve
- B gastropod
- C arthropod
- D cephalopod



10

Why are **bivalves** a unique mollusk?

- A They are carnivores.
- B They are herbivores.
- C They are filter feeders.
- D They are parasites.



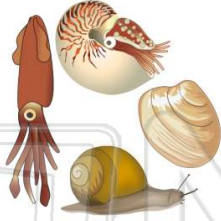


Name _____ Class _____ Date _____

1

Which is a **characteristic** of a **mollusk**?

- A segmented body
- B unsegmented body
- C prokaryote
- D unicellular



B

2

Which organism is a **mollusk**?

- A octopus
- B worm
- C butterfly
- D centipede



A

3

The _____ is a thin layer of tissue that **covers** the **internal organs** of mollusks.

- A kidneys
- B foot
- C radula



D

4

Which structure helps a **mollusk** to **move** around its environment?

- A kidneys
- B foot
- C radula
- D mantle



B

5



C

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D

9

A _____ is a **mollusk** with **two shells** that are held together by a hinge and secured by very strong muscles.

- A bivalve
- B gastropod
- C arthropod
- D cephalopod



A

10

Why are **bivalves** a unique mollusk?

- A They are carnivores.
- B They are herbivores.
- C They are filter feeders.
- D They are parasites.



C

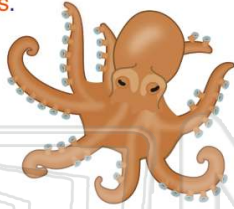


Name _____ Class _____ Date _____

1

A(n) _____ is the **adapted foot** of **cephalopods**.

- A tentacle
- B gill
- C radula
- D antenna



2

The **shells** of **cephalopods** are _____.

- A absent
- B small and internal
- C external
- D varied between species



3

Cephalopods have the most advanced _____ of all invertebrates.

- A appendages
- B tentacles
- C brain
- D radula



4

A(n) _____ is a structure that is **jointed** and attached to the body.

- A appendage
- B tentacle
- C antenna
- D radula



5



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9

Which **group** are **not arthropods**?

- A arachnids
- B insects
- C crustaceans
- D sea stars



10

How many **pairs of legs** do **millipedes** have attached to **each** body segment?

- A 1
- B 2
- C 3
- D 4



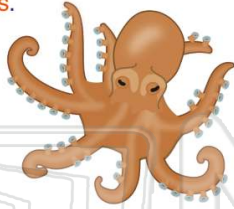


Name _____ Class _____ Date _____

1

A(n) _____ is the **adapted foot** of **cephalopods**.

- A tentacle
- B gill
- C radula
- D antenna



(A)

2

The **shells** of **cephalopods** are _____.

- A absent
- B small and internal
- C external
- D varied between species



(D)

3

Cephalopods have the most advanced _____ of all invertebrates.

- A appendages
- B tentacles
- C brain
- D radula



(C)

4

A(n) _____ is a structure that is **jointed** and attached to the body.

- A appendage
- B tentacle
- C antenna
- D radula



(A)

5



(C)

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(C)

9

Which **group** are **not arthropods**?

- A arachnids
- B insects
- C crustaceans
- D sea stars



(D)

10

How many **pairs of legs** do **millipedes** have attached to **each** body segment?

- A 1
- B 2
- C 3
- D 4



(B)



Name _____ Class _____ Date _____

Match each of the following terms to its definition:

Angiosperm

Appendage

Algae

Gills

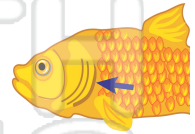
Archaeobacteria

Arachnid

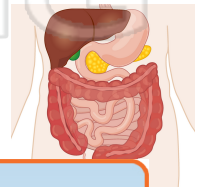
Animal

Abdomen

1. - a body part that certain animals such as fish use to breathe in water; organ that takes oxygen out of the water



2. - the portion of the body that contains part of the digestive tract and the reproductive organs



3. ranging from



4. around

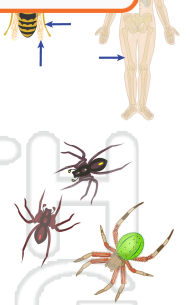
5. organisms

6.

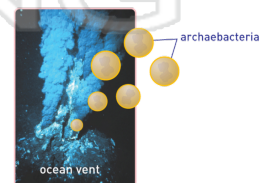
PREVIEW

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7. - an organisms that has an exoskeleton, two-part segmented body, and eight jointed legs (for example - spiders)



8. - known as ancient bacteria; a kingdom of scientific classification which includes organisms that are unicellular, do not have a nucleus, some make their own food and some need to obtain food from other sources; often found in harsh environments





Name _____ Class _____ Date _____

Match each of the following terms to its definition:

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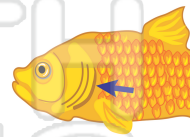
Archaeobacteria

Arachnid

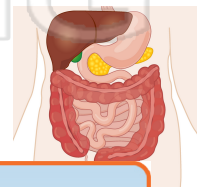
Animal

Abdomen

1. gills - a body part that certain animals such as fish use to breathe in water; organ that takes oxygen out of the water



2. abdomen - the portion of the body that contains part of the digestive tract and the reproductive organs



3. algae
from u
chloro

4. angiosperm
seeds

5. animal
capabl

6. appendage



PREVIEW

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the printable version of this worksheet

7. arachnid - an organisms that has an exoskeleton, two-part segmented body, and eight jointed legs (for example - spiders)



8. archaeobacteria - known as ancient bacteria; a kingdom of scientific classification which includes organisms that are unicellular, do not have a nucleus, some make their own food and some need to obtain food from other sources; often found in harsh environments

