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ABSTRACT

This programed text, designed for upper elementary and middle school students, is intended to give students a basic knowledge of invertebrates. Students are expected to be able to identify, name, describe, classify to phylum, and draw animals studied in the text when the unit is completed. A pretest, a series of quizzes and are provided. The teacher's guide lists the behavioral objectives of the unit, and suggests methods of supplementing the text with illustrations and specimens. This work was prepared under an ESEA Title III contract. (AT)

INVERTEBRATES

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RATIONALE:

The invertebrates are animals that have no backbone or spine. They include about 800,000 known species of simple microscopic one cell animals, medium complex multicellular softbodied animals and the more complex animals with a hard outer shell. These animals are divided into major groups called phyla. In order that the animals may be better described and studied, the phyla are arranged in a definite order, from the simplest one-celled animals to the most complicated invertebrates.

This unit is designed to give students a basic knowledge of the animals called invertebrates. Through a study of several of its most important groups of animals, the students will be able to identify, name, describe, order in correct phylum class, and construct drawings of some of the animals studied.

UNIT OBJECTIVES:

1. Shown slides, pictures or specimens containing 10 examples of animals found in the invertebrates and 10 examples of non-invertebrates, 90% of the students will identify at least eight invertebrates.

2. Shown slides, pictures or specimens containing four examples of animals found in each of the phylums of invertebrates, 90% of the students will name at least two animals from each phylum.

3. Given the names or pictures of several animals in each phylum, 90% of the students will describe the characteristics of each animal. The following characteristics should be included:

   A. Reproduction
   B. Movement
   C. Intake of food and digestion
   D. Living environment

4. Given drawing paper, color pencils, oil crayons, etc. 90% of the students will construct drawings or color illustrations of at least 6 of the animals studied in this unit.

5. Given a list of names, containing twenty animals classified as invertebrates, 90% of the students will place, in the correct order according to phylums, at least 18 of these animals.

SUB-OBJECTIVES:

Part I - Invertebrates

1. Shown pictures containing 10 examples of animals found in the invertebrates and 10 non-invertebrates, 90% of the class will identify at least 16 out of the 20 correctly.

Part II - Protozoa

1. Shown pictures or drawings of animals containing four examples of protozoan, 90% of the students will correctly name in writing at least 3 of these animals.

2. Given the names or pictures of four protozoan, 90% of the students will describe the characteristic of each animal.

A. Movement

B. Reproduction (dividing)

C. Intake of food and digestion

D. Living environment

3. Given drawing paper, oil crayons, etc. the students will construct drawings or color illustrations of at least one of the animals studied in the phylum protozoa.

Part III - Porifera

1. Shown pictures or drawings of animals containing examples of sponges and non-sponges, 90% of the students will be able to identify the sponges correctly.

2. Given the names or pictures of four sponges, 90% of the students will describe the characteristics of each animal.

A. Reproduction

B. Intake of food and digestion

C. Living environment

3. Given drawing paper, oil crayons, etc. the students will construct drawings or color illustrations of at least one of the animals studied in phylum porifera.

Part IV - Coelenterate

1. Shown pictures or drawings of animals containing four examples of coelenterates, 90% of the students will name correctly in writing at least three of these animals.

2. Given the names or pictures of four coelenterates, 90% of the students will describe the characteristics of each animal.

A. Movement

B. Reproduction

C. Intake of food and digestion

D. Living environment

3. Given drawing paper, oil crayons, etc. the students will construct drawings or color illustrations of at least one of the animals studied.

Part V - Platyhelminthes

1. Shown slides or pictures of animals containing four examples of platyhelminthes, 90% of the students will name correctly in writing at least 3 of these animals.

2. Given the names or pictures of four platyhelminthes, 90% of the students will describe the characteristics of the animal.

A. Movement

B. Reproduction

C. Intake of food and digestion

D. Environment

3. Given drawing paper, oil crayons, etc. the students will construct drawings or color illustrations of at least one of the animals studied.

Part VI - Nemathelminthes

1. Shown slides or pictures of animals containing four examples of nèmathelminthes, 90% of the students will name correctly in writing at least 3 of these animals.

2. Given the names or pictures of four nemathelminthes, 90% of the students will describe the characteristics of the animal.

A. Movement

B. Reproduction

C. Intake of food and digestion

D. Living environment

3. Given drawing paper, oil crayons, etc. the students will construct drawings or color illustrations of at least one of the animals studied.

Part VII - Annelida

1. Shown slides or pictures of animals containing four examples of an annelida, 90% of the students will name correctly in writing at least 3 of these animals.

2. Given the names or pictures of four annelidas, 90% of the students will describe the characteristics of the animal.

A. Movement

B. Reproduction

C. Intake of food and digestion

D. Living environment

3. Given drawing paper, oil crayons, etc. the students will construct drawings or color illustrations of at least one of the animals studied.

PRE-TEST INSTRUCTIONS

I. Place a circle around A, B, C or D, depending on which answer you think is correct.

EXAMPLE:

1. Which of the following parasites may we get if we eat rare pork:
   - A. Malaria parasite
   - B. Trichina worm
   - C. Hookworm
   - D. Ascanis

II. If the instructions are not understood, consult your instructor.

III. If instructions are understood, proceed with the test on the following page.

PRE-TEST

1. What feature or characteristic do all invertebrates have in common:

   A. A vertebral column or backbone

   B. Live in water

   C. Have no backbones or spine

   D. Have hard outer shells

2. Which of the following animals are called invertebrates: (1) Ameba; (2) Sponge; (3) Centipedes; (4) Squid.

   A. 1 and 3

   B. 1 and 4

   C. None of them

   D. All of them

3. Which of the following is not an invertebrate: (1) sponge; (2) Tapeworm; (3) Squid; (4) Fish

   A. 1 and 2

   B. 3 and 4

   C. All of these

   D. 3

4. Which of the following is invertebrate? (1) Earthworm; (2) Octopus; (3) Sting ray; (4) Eel

A. 3 and 4

B. All of these

C. None of these

D. 1 and 2

5. Are any of the following animals invertebrates: (1) Frog; (2) Salamander; (3) Lizard; (4) Eel

A. Yes

B. 1 and 2

C. No

D. 3 and 4

6. A paramecium moves by:

A. Flowing across a solid surface

B. Lashing the water with a flagellum

C. Changing its shape

D. Using its cilia

7. One group of Ameba like animals have shells which:

A. Form oil

B Harden into chalk or limestone

C. Look like the shells of clams

D. Form pearls

8. Which of the following is not true of the Ameba?

A. It is able to move about

B. It has cilia

C. It cannot make its own food

D. It is a type of protozoa.

9. The large vacuoles at opposite ends of the paramecium are used to:

A. Digest food particles

B. Discharge extra water

C. Take in food particles

D. Discharge solid wastes

10. The phylum name for sponge is:

A. Coelenterates

B. Annelida

C. Porifera

D. Protozoa

11. Sponges reproduce by:

A. Eggs

B. Sperms

C. Tentacles, cila, seeds, buds

12. The Jellyfish and Anemones obtain their food by:

A. Allowing water to enter through pores

B. Uses tentacles to catch food

C. Uses cilia to wash food into their mouth opening.

D. Allowing its body to flow around food, pulling it into its body.

13. The simplest animals having bilaterial symmetry, a true head with eyes and brain, and a food tube are:

A. Flatworms

B. Roundworms

C. Tape worms

D. Earthworms

14. The trichia and hookworm is:

A. Harmful to plants

B. Helpful to man

C. More harmful to man than any other roundworm

D. Helpful to plants

15. The following characteristics, a closed blood system, a body cavity and a solid nerve cord, may be found in the:

A. Planaria

B. Paramecium

C. Earthworm

D. Tapeworm

16. The starfish, sand dollar and urchin have a spiney skin, and they make up the phylum called:

A. Arthropoda

B. Echinodormata

C. Mollusca

D. Annelida

17. The starfish's ability to grow new parts to replace one lost is called:

A. Budding

B. Regeneration

C. Fission

D. Parthenogenesis

18. What body feature do most mollusks have, which make the term softbodied animals seem wrong:

A. A stony shell

B. Tentacles

C. Spines

D. Muscular foot

19. Animals with joint feet make up phylum:

A. Arthropoda

B. Mollusca

C. Echinoderms

D. Annelida

20. All mollusk have a muscular foot except two, which are:

A. Oyster and clam

B. Snails and clam

C. Chitons and squid

D. Octopus and squid

21. Ticks are dangerous because many of them:

A. Sting

B. Carry diseases

C. Bite

22. The arthropods used for food in many parts of the world are:

A. Crayfish, lobsters, crabs and shrimp

B. Spiders, Scorpion, Tick and Chiggers

C. Grasshopper, moth's, mosquitoes and bees

23. Insects are different from spiders in the following ways:

A. 8 walking legs

B. 6 walking legs

24. In the following group the only Crustacean is a:

A. Shrimp

B. Blackwidow

C. Millepede

D. Tick

25. An Arthropod that can give a dangerous bite is a:

A. Housefly

B. Water flea

C. Blackwidow Spider

D. Millepede

If test results are 90% correct, proceed to the next unit.

If test results are less than 90% correct, continue with this unit.

INSTRUCTION:

This unit is divided into ten sections. Each section consists of: (1) Information and (2) Exercise. Please read carefully the information part before going on to the exercises.

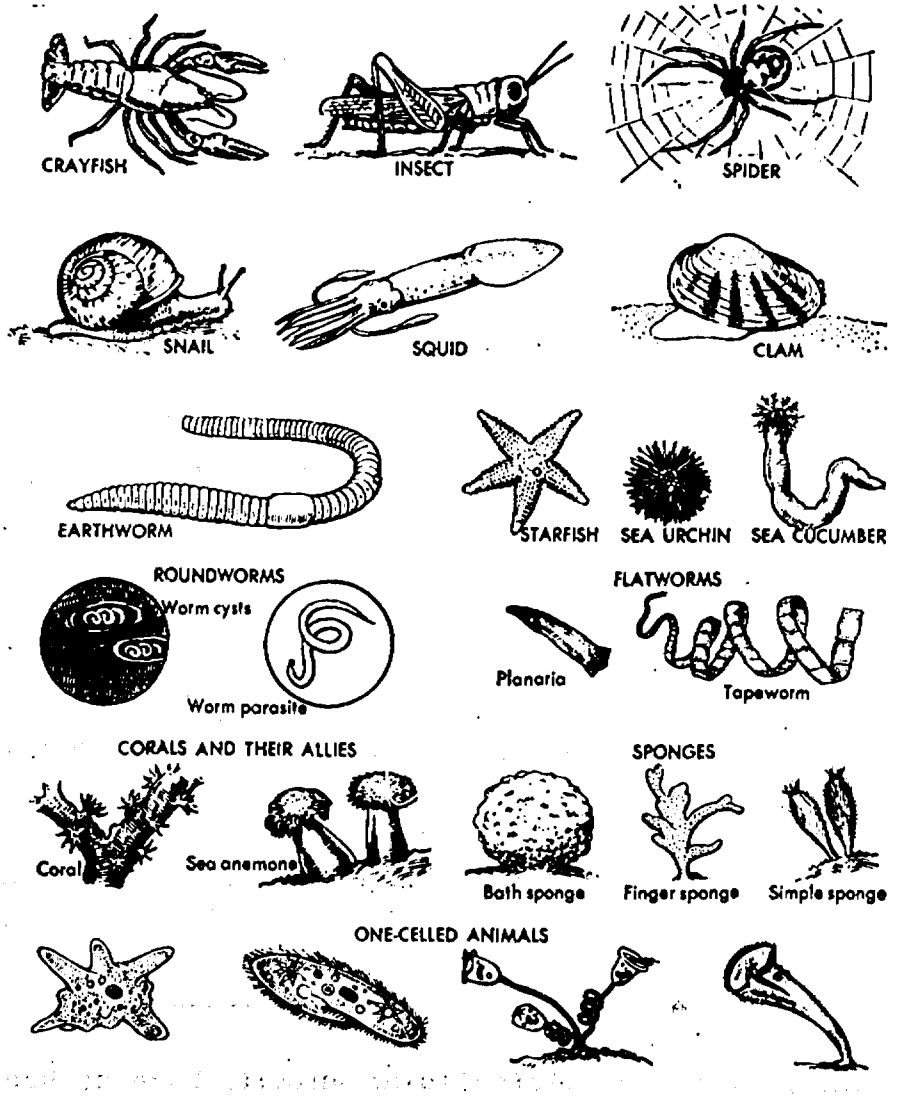
The following exercises are self-correcting. In order to use them effectively, provide yourself with a 5 x 7 card. Slide this card down the page until you see a segmented line.

Then stop. Read and do whatever the text tells you. When you have finished, slide the card down until you reach a solid line.

- -

Then stop. Read the materials just uncovered; it is the suggested response. Then repeat the procedure; slide the card down until you see a segmented line, etc.

PART I - INVERTEBRATA:



Invertebrates are animals that have no backbone or spine. Some, like the amoeba, are soft. Others, like the lobster or insects, have hard outer shells. These animals are separated into nine different phyla, which are: protozoa, porifera,

coelenterata, platyhelminthes, nemathelminthes, echinodermata, annelida, mollusca and arthropoda.

In the diagrams on the previous page, there are several examples of the animals found in each of the invertebrates' phyla.

EXERCISE:

1. Invertebrates are animals that have no backbone or spine. The animals in the first nine phyla of the animal kingdom have no backbone, they are classified as _____.

- -

1. Invertebrates

---

2. The microscopic one cell animals are Invertebrates, they have no _____.

- -

2. backbone

---

3. The softbodied multicellular animals have no backbone, they are called _____.

- -

3. Invertebrates

---

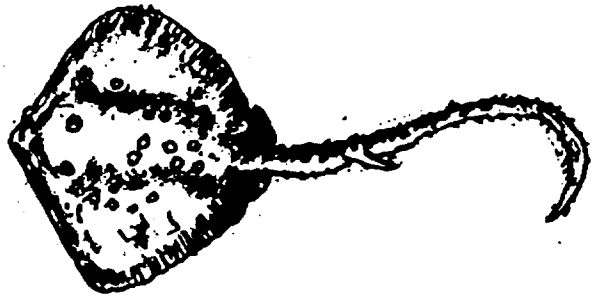
4. The animals with a hard outer shell, which have no backbone, are called _____.

- -

4. Invertebrates

---

5. This animal has a backbone. It is / is not an invertebrate.



- -

5. Is not

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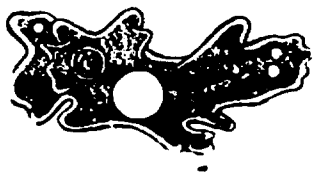
6. 

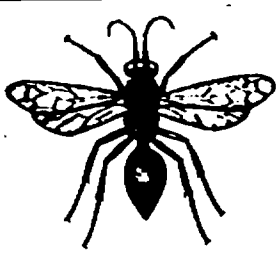
AMOEBA

This animal is a one celled animal without a backbone. It is / is not an invertebrate.

---

6. It is

---

7. 

wasp

Because this animal has no _____ it is classified as an _____.

---

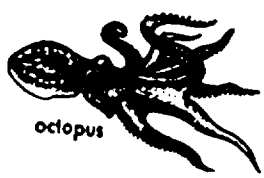
7. backbone

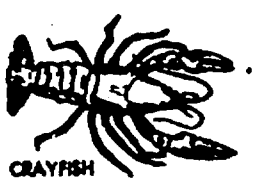
Invertebrate

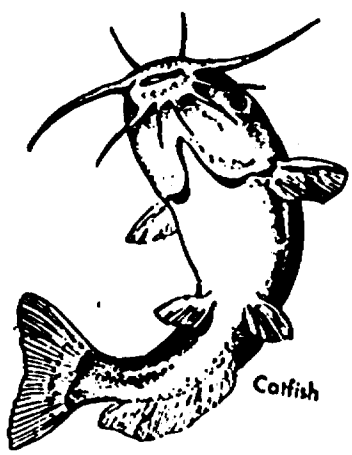
---

8. Place a check (✓) before those animals that are invertebrates.

A. 

D. 

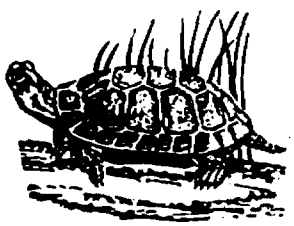
B. 

E. 

C. 

F. 

G.



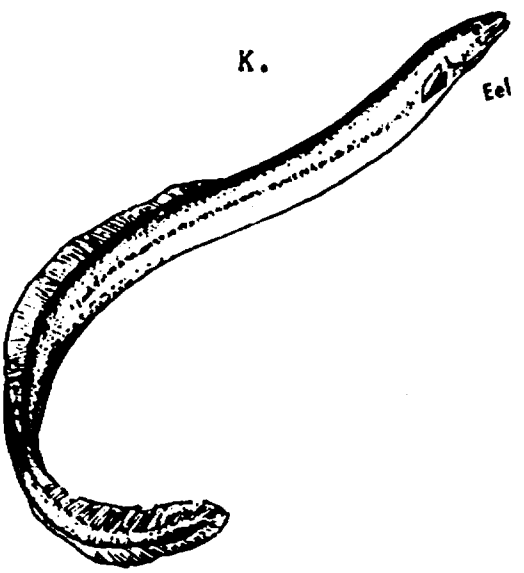
turtle

I.

H.

crab

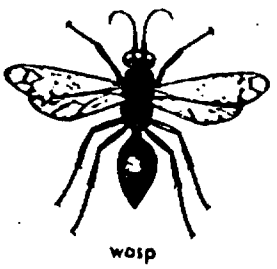
K.



8. A, B, Γ, F, H

9. Place a check (✓) before those animals that are invertebrates.

A. 

D. 

B. 

E. 

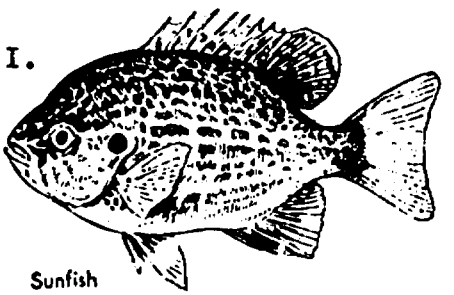
C. 

F. 

G.

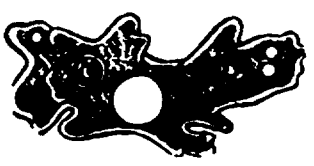
Simple sponge

I.



Sunfish

H.



AMOEBA

J.

blue jay

---

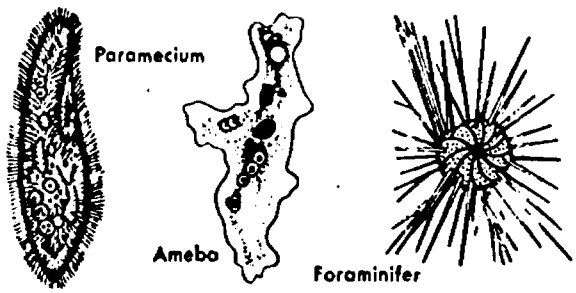
9. A, C, D, F, G, H

10. What is an Invertebrate:

- -

10. Invertebrates are animals that have no backbone or spine.

PART II - PROTOZOA



The first large group in the animal kingdom consists of all the one-celled animals, which together make up the phylum Protozoa (protozoa means "first animals"). The most familiar group of protozoa are the amoebas, which live in backyard ponds and other places where there is water containing green plants.

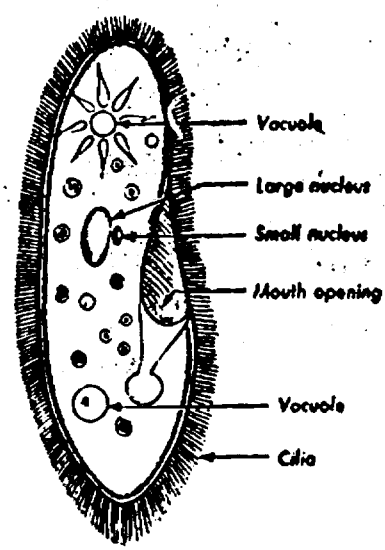
The whole amoeba is a single cell, most of which is cytoplasm. It looks like a blob of clear gelatin. Floating in the cytoplasm are a small nucleus, bits of food enclosed in a food vacuole (or "bubble"), and one or more clear "bubbles" called contracting vacuoles. The food vacuoles digest food and the contracting vacuoles give off liquid wastes.

The amoeba moves by sending out projections of its body. The cell bulges out on one side and the rest of the protoplasm flows into the bulge.

The amoeba takes in food by wrapping its body around it. Here you see an amoeba eating another protozoan.

There are many other kinds of protozoa, some of which are more complicated than the amoeba. Two of these are the paramecium and the vorticella. The hairlike projections on them are called cilia (singular, cilium). They use the cilia for moving around and taking in food. The cilia washes water and food into the mouth and gullet. Food vacuoles fill, one at a time, from the mouth and gullet, then move off to carry food around the cell. At each end of the cell are contractile vacuoles which excrete waste products that are brought to them by means of canals.

The paramecium is often called the slipper animal, because of its shape. You can see the canals of the contractile vacuole at the toe end of the slipper - the rear end of the animal. Notice the large nucleus in the center.



The vorticella looks like a microscopic tulip. The stem coils and uncoils continuously, like a spring. As the cell rises from the coiled position, food is swept into its mouth, helped by the action of the cilia.

EXERCISE:

1. The protoza are one cell animals. Since the amoeba is a one cell animal it is a _____.

- -

1. Protozoa

---

2. The paramecium is a one cell animal. It is / is not a protozoa.

- -

2. It is

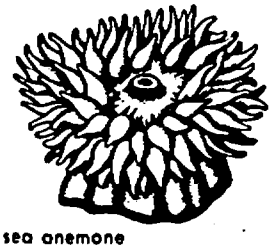
---

3.  This animal is a protozoa. It has only _____ cell.

- -

3. One

---

4. 

sea anemone

This animal is multi-cellular.

It is / <u>is not</u> a protozoa.

- -

4. Is not

---

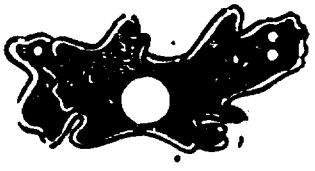
5. The protozoa are one cell animals without a backbone. They <u>are / are not</u> invertebrates.

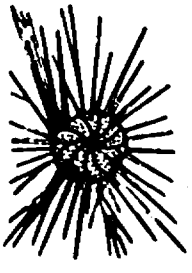
- -

5. Are

---

6. Place the correct name in the blank before each of the following animals.





_____

_____

_____ _____

6. Amoeba Vorticella
Foraminifer Paramecium

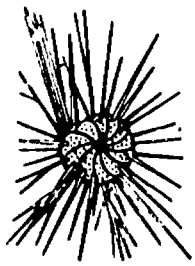
7. 

This is a one cell protozoan.
It is / is not a paramecium.

7. It is

8. The foraminifer is a proto: :h a _____ covering its body.

8. Shell

9.  This animal has a hard shell covering its body. It is / is not a foraminifer.

---

9. It is

---

10. Place a check ( ) before the best answer for this item. Which of the following is not true of the amoeba?

_____ A. It is able to move about.

_____ B. It has cilia

_____ C. It cannot make its own food

_____ D. It is a type of protozoa

---

10. B

---

11. Which of the following is something that amoebas cannot do?

A. Respire

B. Change shape

C. Make food

D. Digest food

---

11. C

---

12. 

This animal gets it food by wrapping its body around it. The name of this animal is _____.

---

12. Amoeba

---

13. The amoeba gets rid of its undigested material by forcing it out through the cell membrane. This process is called _____.

---

13. Excretion

---

14. 

This animal is a protozoan. Its name is _____.

---

14. Amoeba

---

15. A paramecium moves by?

____ A. Flowing across a solid surface

____ B. Lashing the water with a flagellum

____ C. Changing its shape

____ D. Using its cilia

---

15. D

---

16. 

The large vacuoles at opposite ends of a paramecium are used to

____ A. Digest food particles

____ B. Discharge extra water

____ C. Take in food

____ D. Discharge solid wastes

---

16. B

DIRECTIONS:

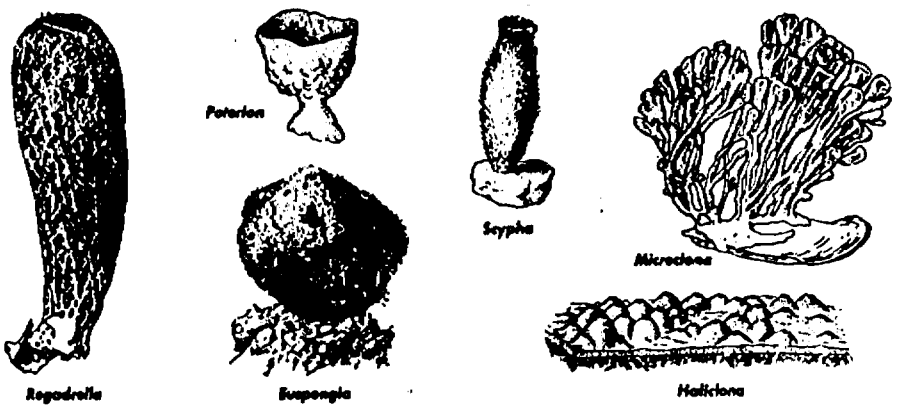
At this point, obtain check quiz number one from your teacher. Finish the quiz and return it to your teacher. Then proceed with the unit.

Experiment #I:

A. Bring in a jar of pond water. Examine the water at intervals of one week, looking for one-cell protozoa. Describe the kinds of life and the condition of water that you observe each time. Make drawings of what you observe.

B. Write a summary of what has happened in your pond water. Explain what main factor caused changes after each examination.

PART III - PORIFERA



Sponges are "pore-bearing animals". They are the most primitive animals of the many-celled animals. The sponges have a saclike wall, riddled with pores and canals, which surround a central cavity. This cavity has structures which circulate water around and into their bodies through the pores. The cells lining the inside of the sponge engulf food particles as they flow past. The large opening at the top, the osculum, is where the water comes out.

The Porifera are a step ahead of the protozoa. They are made of many cells. Some cells are specialized because they have different jobs to do and this is a primitive tissue.

There are about 5,000 species of sponges. Some sponges are used commercially as bath sponges. These are not to be confused with the synthetic man-made sponges. The sponge you use is only the skeleton of the animal and when it is living, it is filled with cells. Sponges reproduce by budding or by the production of egg and sperm.

Sponges have great powers of regeneration. That is, they can regrow parts that are lost. If you cut up a sponge into many pieces each piece will grow into a whole sponge!!

The sponge skeleton is made up of either silicate or calcareous spicules, or horny spongin.

The large sponge live in the warm parts of the ocean. Many smaller ones live in the cool water of the ocean and even a few live in fresh water. The fresh water sponge looks like a rough coating attached to the bottom of rocks or on sticks or lily pads, in most streams, ponds and lakes. Looking for them is the most enjoyable field trip you can take.

EXERCISE:

1. The porifera are pore-bearing animals. The sponge has pores on its body. It is / is not a porifera.

- -

1. It is

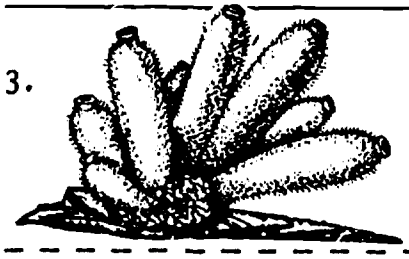
---

2. The porifera are multi-cellular animals. The sponge is a porifera. It is / is not multi-cellular.

- -

2. It is

---

3.  This animal is a porifera. It is / is not a sponge.

- -

3. It is

---

4. The sponges do not have backbones. They are _____.

4. Invertebrates

5. The sponges have structures called collar cells, which keep a current of _____ _____ flowing through their tissues.

5. Water

6. The sponge's ability to regrow parts that are lost is called _____.

6. Regeneration

7. The method by which the sponge reproduces is _____ or by the production of egg and _____.

7. Budding Sperm

8. The porifera are a step ahead of the protozoa, because they are made of _____ cells.

- -

8. Many

---

9. The sponges live in the warm parts of the _____.

- -

9. Ocean

---

10. What is a porifera?

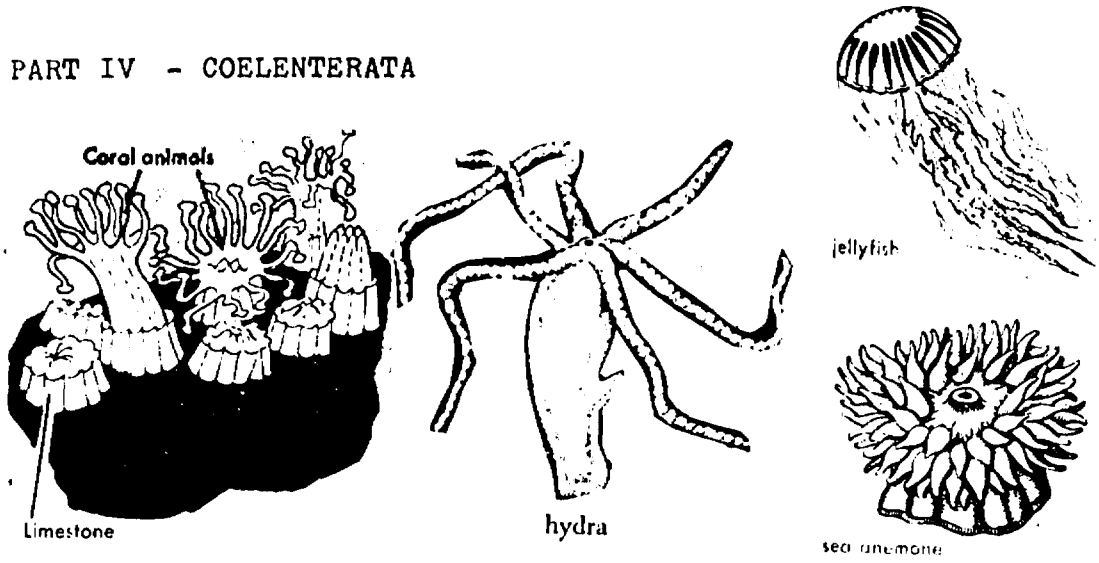
- -

10. Porifera are animals containing pore cells.

DIRECTIONS:

At this point, obtain check Quiz Number Two from your teacher. Finish the quiz and return it to your teacher. Then proceed with the unit.

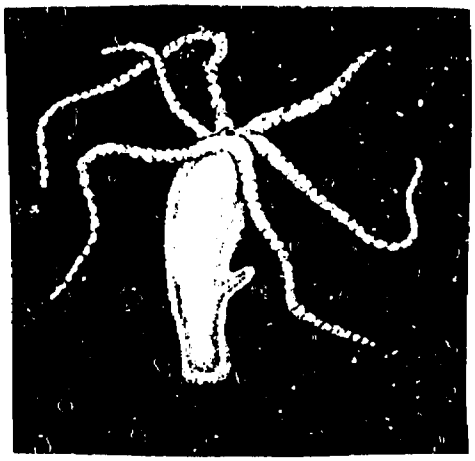
PART IV - COELENTERATA



The Coelenterates include the Hydra, Jellyfish, Sea Anemones and Corals. Most of these animals live in the sea. They have delicate, filmy bodies, shaped like a cylinder or cup, open at one end and closed at the other. Coelenterata means having a hollow cavity (stomach). These animals' bodies are made up of a firm jellylike substance that is 98% water. There are two body types: The Sessile (attached to a base like a plant) and the free swimming, like the jellyfish.

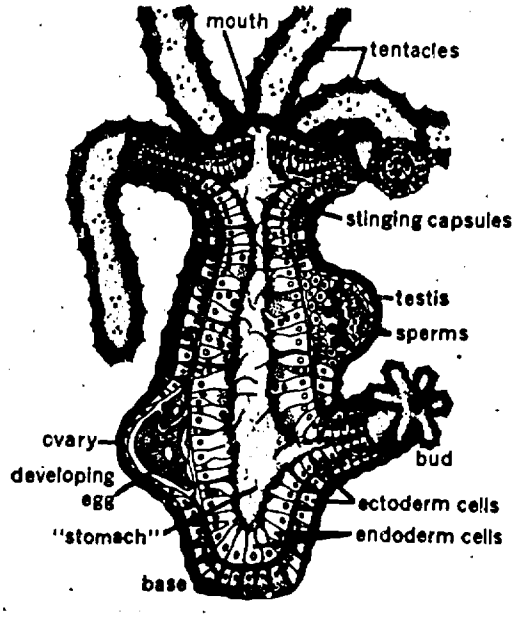
Around the mouths of colenterates are tentacles equipped with stinging cells called Nematocysts. These are for securing food and protection.

Hydras, jellyfish, and their relatives are the first animals with true tissues. They are also the first animals with true organs - their tentacles.



The Hydra is the only member of this phylum that can be found in fresh water. It also has the simplest structure.

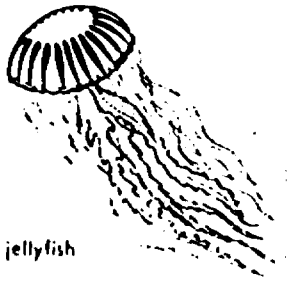
The Hydra is about an eighth of an inch long. It has a tube like body with a mouth at the top end.



Around the mouth is a ring of tentacles. In the diagram of a Hydra, you can see its' body wall has two layers of cells. The tentacles are hollow and have two layers also. The hollow space inside the Hydra is its digestive cavity. We might say that the Hydra is all stomach! The mouth is the only opening into this digestive cavity. Food must enter and

undigested materials leave through it. Cells lining the cavity produce digestive juice which dissolves the food. The food is then absorbed by the cells.

The Hydra can move around, but most of the time it stays in one place with its base attached to some support. It can slide along on its base, turn or bend over.



jellyfish

The Jellyfish has a hollow body with ectoderm and endoderm, and tentacles that have stinging cells. It is adapted to drifting in the open sea. There is often jellylike material between their two cell layers. This gives them their name. The mouth opens downward, with tentacles hanging around it. Jellyfish sting and eat small fish and other sea animals which swim into their tentacles. Many Jellyfish are only a few inches across, some are giants with bodies six feet across and tentacles as much as 40 feet long. They are often transparent and their stinging cells are capable of stinging the human skin.

The Sea anemones (a-nem-oh-neez) are something like oversized Hydras. They may be several inches high with hundreds of short tentacles around the mouth. Many are brightly colored and look like beautiful big flowers. That is why they are named after the flower called the anemone. But they are animals.

You can find sea anemones along some seacoasts at low tide. A few people have kept live sea anemones in large tanks of sea water because they are so pretty to look at. Together, they look like a flower garden, but this garden must be fed a bucket of live minnows every so often!

The Corals are important to man because they build coral reefs. A reef is a shallow, rocky ridge under water. The individual coral animal is similar to a Hydra, but usually larger. Each one forms a lime-stone crater around its body.

The animals can duck into this crater for protection or reach their tentacles out from it for food. These little animals live in large groups, with their limestone craters all connected in one big mass. Corals multiply by budding and build the reef higher and wider. Some reefs even stick out above water at low tide. Sponges and algae also help to build up these reefs.

EXERCISE:

1. The coelenterates are animals having a hollow cavity for their stomach. Since the hydra has a hollow cavity for its stomach it is a _____.

- -

1. Coelenterate

---

2. The Jellyfish has a hollow cavity for a stomach. <u>It is/is not</u> a coelenterate.

- -

2. It is

---

3. The Sea Anemone is a Coelenterate. It has a _____ _____ for a stomach.

- -

3. Hollow cavity

---

4. The Coral is a Coelenterate. It has a _____ _____ for a stomach.

- -

4. Hollow cavity

---

5. The Coelenterates are the first animals to have true tissue. These tissue are _____ and _____.

- -

5. Ectoderm cells and endoderm cells

---

6. The Hydra is a Coelenterate. It has _____ cell layers.

- -

6. Two

---

7. The Coelenterates are the first animals to have true organs. These organs are _____.

- -

7. Tentacles

---

8. The tentacles of the coelenterates are equipped with stinging cells called _____.

- -

8. Nematocyst

---

9. The Hydras, Jellyfish, Sea Anemones, and Corals are classified under phylum _____.

- -

9. Coelenterata.

---

10. Define Coelenterata

- -

10. Coelenterata means animals having a hollow cavity.

---

11. A Coelentrate does not have a backbone. It is/is not an invertebrate.

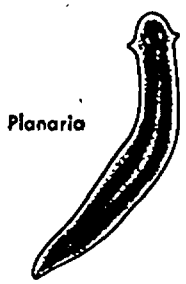
- -

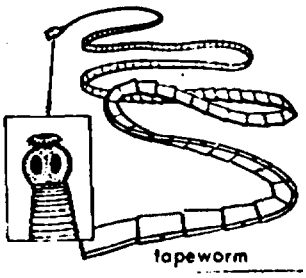
11. It is

DIRECTIONS:

At this point, obtain check Quiz Number Three from your teacher. Finish the quiz and return it to your teacher. Then proceed with the unit.

PART V - PLATYHELMINTHES:



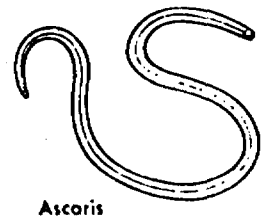


This phylum consists of flatworms. This group is important in showing how animals have gradually developed more and more complex bodies. This group has organs and organ systems familiar to us such as a head, eyes, nervous, digestive, and muscular systems. A good many live inside the bodies of other animals as parasites. For example tapeworms, liver flukes, and blood flukes may cause diseases in man. The body they live in is called the host. Still others are free-living such as the planaria.

Another feature of this group is that the members have a left and right side. This is called bilateral symmetry. Man has a body type of bilateral symmetry. These animals also have an anterior end (a head) and a posterior end (a tail). They have a dorsal (top) side and a ventral (lower) side.

To be sure that you never get a tapeworm make sure that all meat that you eat is well cooked.

PART VI - NEMATHELMINTHES:



This is one of the least-known phyla, but most widely spread. Do not confuse roundworms with earthworms which we will study next. The roundworms have a rounded body with pointed ends. It is hard to tell which is the head and which is the tail. Some are helpful by enriching the soil with nutrient substances but the majority are harmful infecting both plants and animals (including man).

The worms that belong to the genus Ascaris are the most typical of this group. An infection of ascaris is not serious and is easily cured. Other more serious roundworms are the trichina which causes weakening and inflammation in the muscles of the host. Hookworms are common parasites. They enter the body through the feet and work their way up in the blood vessels and eventually work their way to the digestive tract. These two disease causing parasites can be extremely dangerous.

EXERCISE:

1. The animals found in phylum platyhelminthes are the flatworms. Since the planaria, liver fluke, tapeworms and blood flukes are flat worms, they are/are not classified as platyhelminthes.

- -

1. are

---

2. Some flatworms are parasites. The planaria lives in fresh water. It is / is not a parasite.

- -

2. Is not

---

3. Parasites get their food from a host (other animals). The tapeworm and the flukes live inside larger animals. They are / are not parasites.

- -

3. They are

---

4. The nemathelminthes are roundworms. Ascaris, hookworms, and the trichina are roundworms. They are classified as _____.

- -

4. Nemathelminthes

---

5. The ascaris, hookworm and the trichina live in the bodies of animals and man. Since they get their food from a host, they are called _____.

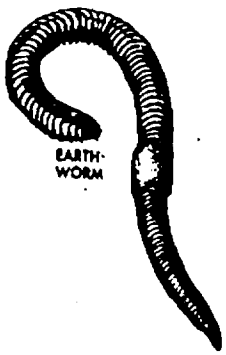
- -

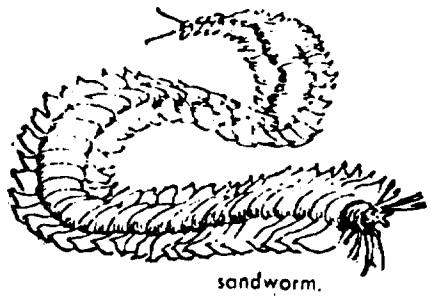
5. Parasites

DIRECTIONS:

At this point, obtain check Quiz Number Four from your teacher. Finish the quiz and return it to your teacher. Then proceed with the unit.

PART VII - ANNELIDA:





This phylum consists of worms with segmented bodies. The Earthworm is the most common example. It is found in moist soil all over the world. They work their way through the soil and keep it loose; and their wastes are a good fertilizer for plants so they are beneficial.

The annelida has a tube running through the body for digestion. Food enters at the anterior end where the lip is and exits at the posterior end, where the anus is. The earthworm has blood, hearts, nerves, and muscles. These are all advanced features showing a more complex system developing.

There are marine (salt water) forms in the annelida phylum. One is the clamworm. The leech is the only parasitic annelida. It is still used in some places to remove discolored blood from black eyes. It was believed having leeches suck blood from sick people would cure them.

EXERCISE:

1. The annelida includes all the worms which have their bodies divided into segments, except the tapeworm. Since the earthworm is a segmented worm, it is classified as a _____.

---

1. Annelida

---

2. The annelida have well developed organs and systems. The earthworm is an annelida, it does/ does not have well developed organs and systems.

---

2. It does

---

3. Place a check in the blank before the system or organ the earthworm has.

____ (a) crop	____ (e) hearts
____ (b) gizzard	____ (f) muscles
____ (c) nerve cord	____ (g) sex organs
____ (d) blood vessels	____ (h) all of these
	____ (i) none of these

---

3. (h) all of these

---

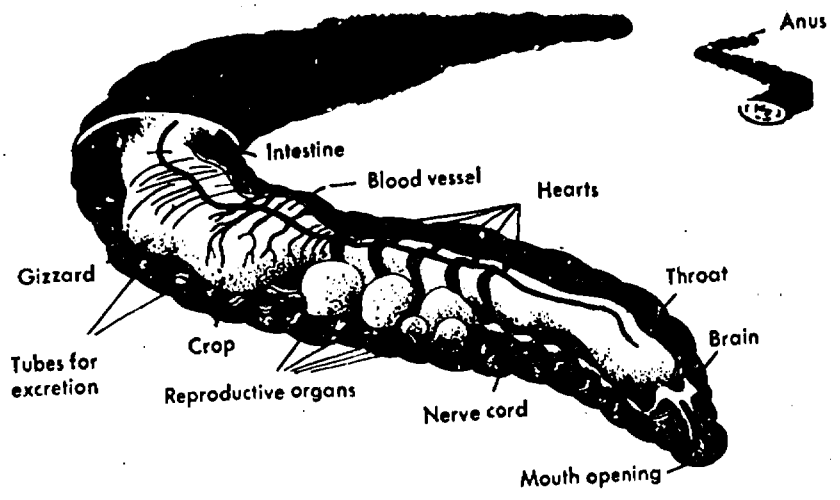
8. The leeches are the only parasitic annelida. They get their food from a _____.

- -

8. host

EXPERIMENT #II.

Collect several earthworms, or get preserved ones from a supply house. Cut one of specimen along the upper mid-line. Compare your specimen with the diagram shown below.



See if you can find the following structures, organs or systems shown in it.

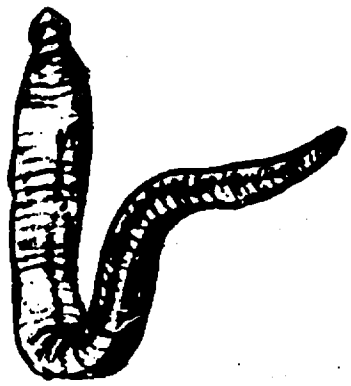
(a) Brain
(b) Nerve cord
(c) Heart
(d) Blood vessel
(e) Muscles
(f) intestine
(g) gizzard
(h) mouth opening
(i) crop
(j) reproductive organs
(k) anus
(l) throat

ACTIVITY:

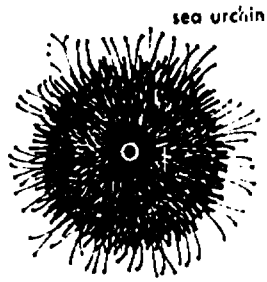
A class poster. On a large piece of cardboard make a chart of the seven animal phyla studied so far. First, either cut pictures of animals from papers or magazines or draw animals, so that you have at least one illustration of each of the seven phyla. Arrange your pictures on the cardboard in the order in which you studied them. Under each illustration, print neatly the name of the animal and its phylum. Name also its sub-phylum and class, if you can. Use the classification summaries in this chapter to help you. Display your poster in class.

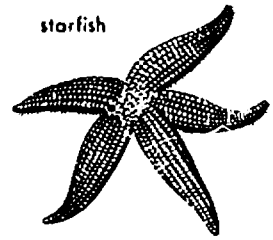
EXPERIMENT #III:

Obtain a pond culture. Get a quart jar, go to the edge of a pond or stream, if one is near by. Fill the jar about one-half full of water. Add plenty of the decaying plant material that lies on the bottom near the shore. Put some of the decaying plant material and pond water on a slide. Examine it with the low power of a microscope. See if you can find a segmented worm. Compare it with the following diagram and name it.



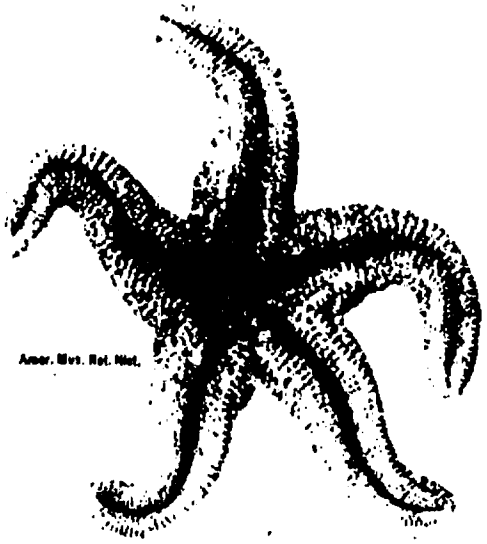
PART VIII - ECHINODERMATA:

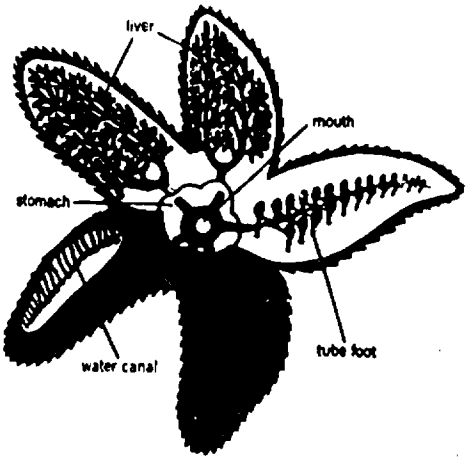




Sand dollar

The name of the phylum comes from the fact that "echino" means spiny and "dermata" means skin. The spiny-skinned marine (saltwater) animals are the starfish, sea urchin, sand dollar, sea cucumber, and brittle star. They are found in all seas at all depths from the tidal zones to the great depths. These animals have radial symmetry. That is, it has parts which radiate from the center. Most all have movable spines and tube feet. Their mouths are on the ventral side. The echinoderms are the only creatures in the world that have tube feet that are run by a water vascular system. They have no relatives on land or in fresh water.





The starfish is one of the most voracious of predators on the ocean floor. If a starfish wishes to eat a fair sized snail it does the snail no good to slam its trap door shut --- the starfish will let its stomach out through its mouth and wrap it around the snail to smother it!! If the prey is a clam with two valves (bivalve) it will pull the valves apart with its tube feet. In goes its stomach and the starfish eats when it wants. NO OTHER ANIMAL can extrude (send out its stomach) like the starfish.

Most starfish have five points. There is an eyespot sensitive to light at the tip of each arm. On the top of the central disc is a round spot marked differently. This is the sieve or madrepore. It is a plate to remove the water that passes into the water system that works the tube feet.

Starfish have the ability to regenerate lost parts. Sponges also have this ability.

Sea urchins are globe-shaped and covered with spines. They reach out with a five-pointed set of jaws to pull in bits of food. Sand dollars are similar, but not so spiny, and very flat. They look a little like silver dollars. Sea cucumbers are long and soft and actually look something like cucumbers. In some countries they are gathered to use in soups and other dishes. The fleshy body wall is eaten.

The spiny-skinned animals are different from all other animals. They are well-organized cell communities, with muscles and nerves and stomachs and livers and many other special tissues and organs. In these features they resemble the vertebrates and other more complex animals. But they differ from vertebrates in that most of them have spiny skins and water-vessel systems of locomotion, and are built around a central point as a wheel is.

EXERCISE:

1. The spiny-skinned animals are classified in phylum echinodermata. The starfish and its relatives have spiny-skins, they are called _____.

- -

1. Echinoderms

---

2. The starfish moves on tube feet. They are found on the underside of each _____.

- -

2. arm

---

3. The starfish eats in an unusual way. It does so by turning its _____ inside _____.

- -

3. stomach, out

---

4. The starfish uses its _____ _____ to hold fast to solid objects.

- -

4. Tube feet

---

5. Some of the other members of the starfish phylum are _____, _____, and the _____.

- -

5. Sea Urchin, Sand dollars and Sea Cucumber

---

6. The fleshy body wall of the sea cucumber is used in _____ and other dishes.

- -

6. Soup

---

7. The starfish is a nuisance to oystermen because they _____.

- -

7. Destroy as many as twelve oysters a day.

---

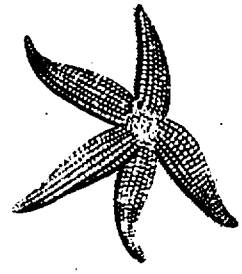
8. The fluid contained in the body cavity of the starfish is _____.

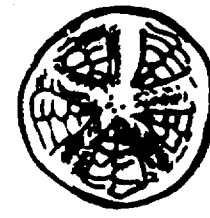
- -

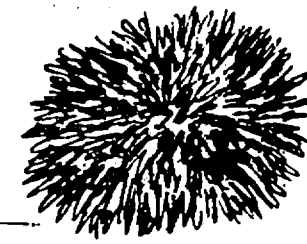
8. Sea water

---

9. Place the correct names by the following animals.



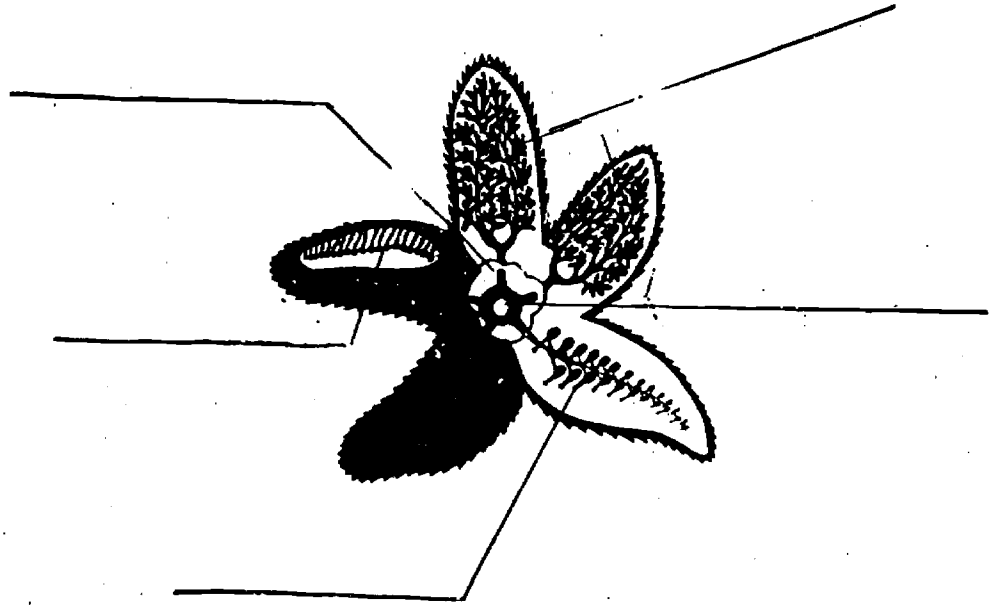




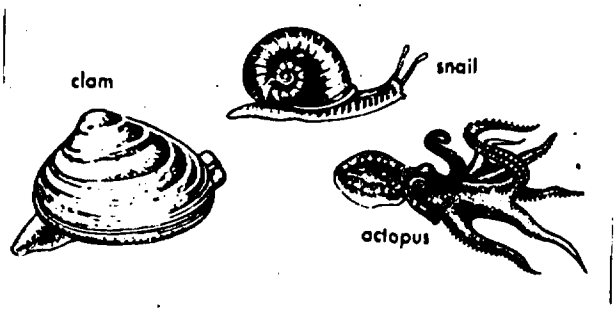
EXPERIMENT #IV;

(A) Examine a preserved starfish. On the lower surface locate the mouth and the grooves running from the mouth to the tips of the arms. Find the tube feet in rows along the sides of the grooves. On the upper surface locate the plates and the spines. See if you can find the thin bulges in the body wall through which oxygen and carbon dioxide can pass. Cut through an arm with a scalpel, and examine the body cavity. You will find large digestive glands in this cavity. The digestive glands connect with the pouch-like stomach. The glands produce a fluid which digests food.

(B) Label the following diagram:



PART IX - MOLLUSCA:



Mollusks get their name from the Latin word "mollis" which means soft. There are many kinds of mollusks, animals with stony shells. There are about 70,000 known species some of which are: oysters, clams, chitons, slugs, squid, snails, and octopuses. They are found on land and in fresh water. They may or may not have shells, a muscular foot, or tentacles. All of them have a soft tissue called a mantle which usually secretes a shell. If you ever gathered shells on the beach you were probably gathering the shells of mollusks.

All mollusks have a mouth, a food tube, and an anus. All mollusks have practically all the organs that you have including the following systems: digestive, respiratory, circulatory, nervous, excretory, muscular, skeletal, and reproductive.

The mantle lines the inside of the shell and in certain mollusks makes real pearls!! It secretes mother-of-pearl around some sand or parasite in the shell.

Most mollusks have a muscular foot. The octopus and squid are exceptions because they have tentacles. They are mollusks even if they have no outside shell because when they were embryos (young) they started to grow a shell, but stopped.

Mollusks play an important part in human life. Some examples are:

(a) American indians used shells for money (wampum).

(b) buttons out of mother-of-pearl.

(c) food source-snails, oysters, clams, [illegible]s.

(d) shells are used in jewelery.

(e) "ink" from squids for photographic pa[illegible]

(f) gems such as pearls.

EXERCISE:

1. Mollusks are a group of animals called softbodied animals. The clam is a softbodied animal. It is / is not classified as a Mollusk.

- -

1. It is

2. A body feature of most mollusks, that make the term soft-bodied animal not seem right, is _____.

- -

2. outside shell

---

3. The mollusks that are not one-footed are _____ and _____.

- -

3. Squid and Octopus

---

4. The body feature that all mollusks have in common is _____.

- -

4. Mantle

---

5. Some of the mollusks used for food are _____, _____, _____, _____, _____, and _____.

- -

5. Clams, oysters, scallops, snails, octopuses and squids.

---

6. The part of the mollusks that would make a good collection is _____.

---

6. Hard outer shell

---

7. Some economic value of mollusks are:

A.

B.

C.

D.

E.

---

7. A. American indians used shells for money
B. buttons out of mother-of-pearl
C. food source - snails, oysters, clams, octopus, etc.
D. shells are used in jewelery
E. gems such as pearls.

---

8. The living layer of a clam or oyster that secretes the pearls is the _____.

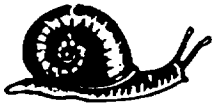
- -

8. Mantle

---

9. Place the correct name by the following animals.

_____



_____

_____

_____

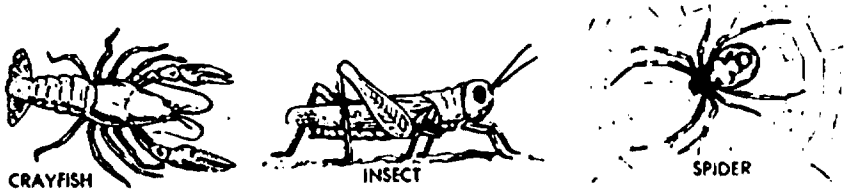
EXPERIMENT #V:

Examine shells of clams, oysters, and snails. Locate the mother-of-pearl layer, and study its relation to the rest of the shell. If possible, examine products from mollusks, such as cracked shell (bird food), pearl buttons, and pearl inlay work (mostly on furniture or ornamental boxes).

ACTIVITY:

Field trip: Visit the sea shore where specimens of this phylum may be collected.

PART X - ARTHROPODA:



The largest phylum of all invertebrates is the Arthropods. The name comes from the Greek words - arthron meaning "joint" and podos meaning "foot". These animals have jointed feet. They outnumber all other animals. There are 750,000 known species. All arthropods have similarities in structure. There are three main body regions - a head with sense organs, a middle region or thorax and a posterior body region, the abdomen. They have exterior skeletons called exoskeleton made of chitin, a secretion of the cells. The arthropods have three or more pairs of jointed legs. This is one method used to distinguish arthropods. All arthropods lay eggs. Those that start life as larvae undergo metamorphosis. They include such types as insects, spiders and centipedes. Crayfish, crabs, shrimp and lobsters also belong to this group. These animals are divided into four main classes, which are: Crustacea, Arachnids, Insects and Myriapods.

CRUSTACEA:

This class includes the crayfish and their relatives: the lobsters, crabs and shrimp. All these animals have hard external skeletons, or coverings. Most of these animals have the head and the thorax fused together. They breathe by gills. The name crustacea refers to the hard exoskeleton of chitin. The crustacea have five pairs of legs and two pair of antennae or "feelers". Most have compound eyes and pinchers. Most of these characteristics can be seen in the diagram below.

Note its jointed legs, and the large claws, on the first pair of legs. They are used for capturing and holding prey.

The crustacean eat about any plant or animal material they find in the water. They even eat dead or decaying materials.

MYRIAPODS:

This group is the "many legged" animals such as the centipede and the millipedes. They have a very light exoskeleton and one or two pairs of legs for each segment of the body. Some have poison claws. These animals are located on both land and water.

Most centipedes have 40 legs and most millepedes have over 100. Both centipedes and millipedes are commonly found in the ground or in almost any dark, damp place. Millepedes eat decaying plant materials. Even with all their legs, they generally move slowly. Centipedes are usually fast moving hunters. They use their pincer-like jaws to catch and eat insects or other animals. The jaws of centipedes inject poison into its victims.

ARACHNID:

tarantula

This class is the spiders and their relatives: the mites, ticks, scorpions, and the daddy long legs. The head and thorax are also fused together in this group. The arachnids have four pairs of legs. A spider's body is covered with sensitive hairs that are used as sense organs. They have two

pairs of special jaws which serve as poison fangs or for spinning a web of silk.

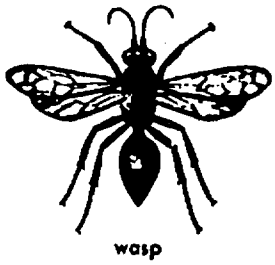
Ticks are small spiderlike animals which suck the blood of larger animals. They sometimes carry serious diseases. Texas fever in cattle and Rocky Mountain spotted fever in man are carried by ticks.

The scorpions are the most deadly because they can inject a paralyzing poison from a spike on its tail.

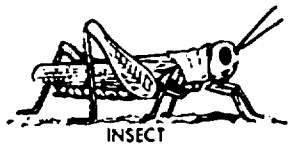
INSECTS:

This is the most diverse and widespread group of animals. There are over 650,000 species of insects alone!! There are more insects than all other species of animals put together. The insects have three pairs of legs, a body in three parts - head, thorax, and abdomen.

There are one or two pairs of wings attached to the body. The insects breathe through air tubes called trachea with openings on the body called spiracles (breathing pores). They have one pair of antennae. Insects undergo a change in body form during stages of their life. This change in form is called metamorphosis.



wasp



INSECT

FLY

Some examples of insects are bees, grasshoppers, wasps flies, mosquitoes, ants, beetles, termites, praying mantis, and butterflies. The list is just too long to write down here.

We spend billions of dollars a year to control the insects that destroy crops, spread disease, or have a painful sting. One method of control is biological control. This is when other animals (birds, mammals, other insects) destroy a good number of insects. Chemical control is used.

Many insects are beneficial because they spread pollen and thus continuing the species of plants.

EXERCISE:

1. Arthropods have jointed appendages.

These animals have jointed legs. They are _____

- -

1. Arthropods

---

2. Place a check mark before the animals having jointed appendages:

(a) round worms

(b) flatworms

(c) segmented worms

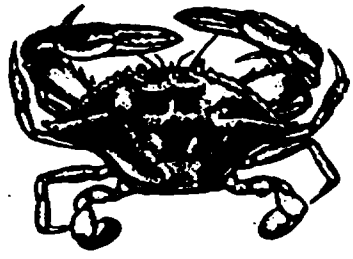
(d) arthropods

---

2. (d)

---

3. The characteristics of Crustaceans seen in the diagram below are:



crab

---

3. Eyes on stalks; Clawlike pinchers; jointed legs; hard body coverings or shells

---

4. The Crustaceans are like insects in the following ways:

(a)

(b)

(c)

(d)

---

4. (a) Shell; (b) antennae; (c) compound eyes; (d) jointed legs

---

5. In the following group, the only crustacean is a:

(a) shrimp

(b) blackwidow

(c) millepede

(d) tick

---

5. (a) shrimp

---

6. Texas fever is a disease that is carried from one animal to another by:

(a) housefly

(b) ticks

(c) scorpions

(d) fleas

---

6. (b) ticks

---

7. An arthropod that can give a dangerous bite is a

(a) housefly

(b) water flea

(c) blackwidow spider

(d) millepede

- -

7. (c)

---

8. Insects are different from spiders in the following ways:

INSECTS	SPIDERS

- -

8. 6 walking legs	8 walking legs

---

9. Some insects are useful to us because they:

---

9. (a) produce honey
   (b) pollenate plants
   (c) destroy other insects that are pests.

---

10. The insects that produce honey and pollenate plants are _____.

---

10. Bees

DIRECTIONS:

At this point, obtain check Quiz Number Five from your teacher. Finish the quiz and return it to your teacher. Then proceed with the unit.

ACTIVITY:

Reporting on harmful insects: Choose any harmful insect that interests you. A list of suggestions below may help you, but choose one of your local insect pests, if possible. Look up the insect in a government bulletin or in Insects: The Yearbook of Agriculture, 1952, U. S. Department of Agriculture, or in any other available reference book.

Include in your report the life history of the insect, how to recognize the adult, and especially the ways in which it is harmful and the methods of control.

Cotton boll weevil	potato beetle	housefly
codling moth	termites	bean weevil
gypsy moth	corn borer	silverfish
Hessian fly	"army worm"	ants

INVERTEBRATES

TEACHER'S GUIDE

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TITLE III, OEG-3-7-703659-5091

ACKNOWLEDGEMENTS

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A Title III Project under
Public Law 89-10
OEG-3-7-703659-5091

RATIONALE:

The invertebrates are animals that have no backbone or spine. They include about 800,000 known species of simple microscopic one cell animals, medium complex multicellular softbodied animals and the more complex animals with a hard outer shell. These animals are divided into major groups called phyla. In order that the animals may be better described and studied, the phyla are arranged in a definite order, from the simplest one-celled animals to the most complicated invertebrates.

This unit is designed to give students a basic knowledge of the animals called invertebrates. Through a study of several of its most important groups of animals, the students will be able to identify, name, describe, order in correct phylum class, and construct drawings of some of the animals studied.

UNIT OBJECTIVES:

1. Shown slides, pictures or specimens containing 10 examples of animals found in the invertebrates and 10 examples of non-invertebrates, 90% of the students will identify at least eight invertebrates.

2. Shown slides, pictures or specimens containing four examples of animals found in each of the phylums of invertebrates, 90% of the students will name at least two animals from each phylum.

3. Given the names or pictures of several animals in each phylum, 90% of the students will describe the characteristics of each animal. The following characteristics should be included:

   A. Reproduction
   B. Movement
   C. Intake of food and digestion
   D. Living environment

4. Given drawing paper, color pencils, oil crayons, etc. 90% of the students will construct drawings or color illustrations of at least 6 of the animals studied in this unit.

5. Given a list of names, containing twenty animals classified as invertebrates, 90% of the students will place, in the correct order according to phylums, at least 18 of these animals.

SUB-OBJECTIVES:

Part I - Invertebrates

1. Shown pictures containing 10 examples of animals found in the invertebrates and 10 non-invertebrates, 90% of the class will identify at least 16 out of the 20 correctly.

Part II - Protozoa

1. Shown pictures or drawings of animals containing four examples of protozoan, 90% of the students will correctly name in writing at least 3 of these animals.

2. Given the names or pictures of four protozoan, 90% of the students will describe the characteristic of each animal.

A. Movement

B. Reproduction (dividing)

C. Intake of food and digestion

D. Living environment

3. Given drawing paper, oil crayons, etc. the students will construct drawings or color illustrations of at least one of the animals studied in the phylum protozoa.

Part III - Porifera

1. Shown pictures or drawings of animals containing examples of sponges and non-sponges, 90% of the students will be able to identify the sponges correctly.

2. Given the names or pictures of four sponges, 90% of the students will describe the characteristics of each animal.

A. Reproduction

B. Intake of food and digestion

C. Living environment

3. Given drawing paper, oil crayons, etc. the students will construct drawings or color illustrations of at least one of the animals studied in phylum porifera.

Part IV - Coelenterate

1. Shown pictures or drawings of animals containing four examples of coelenterates, 90% of the students will name correctly in writing at least three of these animals.

2. Given the names or pictures of four coelenterates, 90% of the students will describe the characteristics of each animal.

A. Movement

B. Reproduction

C. Intake of food and digestion

D. Living environment

3. Given drawing paper, oil crayons, etc. the students will construct drawings or color illustrations of at least one of the animals studied.

Part V - Platyhelminthes

1. Shown slides or pictures of animals containing four examples of platyhelminthes, 90% of the students will name correctly in writing at least 3 of these animals.

2. Given the names or pictures of four platyhelminthes, 90% of the students will describe the characteristics of the animal.

A. Movement

B. Reproduction

C. Intake of food and digestion

D. Environment

3. Given drawing paper, oil crayons, etc. the students will construct drawings or color illustrations of at least one of the animals studied.

Part VI - Nemathelminthes

1. Shown slides or pictures of animals containing four examples of nemathelminthes, 90% of the students will name correctly in writing at least 3 of these animals.

2. Given the names or pictures of four nemathelminthes, 90% of the students will describe the characteristics of the animal.

A. Movement

B. Reproduction

C. Intake of food and digestion

D. Living environment

3. Given drawing paper, oil crayons, etc. the students will construct drawings or color illustrations of at least one of the animals studied.

Part VII - Annelida

1. Shown slides or pictures of animals containing four examples of an annelida, 90% of the students will name correctly in writing at least 3 of these animals.

2. Given the names or pictures of four annelidas, 90% of the students will describe the characteristics of the animal.

A. Movement

B. Reproduction

C. Intake of food and digestion

D. Living environment

3. Given drawing paper, oil crayons, etc. the students will construct drawings or color illustrations of at least one of the animals studied.

Part VIII - Echinodermata

1. Shown slides or pictures of animals containing four examples of echinoderms, 90% of the students will name correctly in writing at least three of these animals.

2. Given the names or pictures of four echinoderms, 90% of the students will describe the characteristics of the animal.

A. Movement

B. Reproduction

C. Intake of food and digestion

D. Living environment

3. Given drawing paper, oil crayons, etc. the students will construct drawings or color illustrations of at least one of the animals studied.

Part IX - Mollusca

1. Shown slides or pictures of animals containing four examples of mollusca, 90% of the students will name correctly in writing at least 3 of these animals.

2. Given the names or pictures of four mollusca, 90% of the students will describe the characteristics of the animal.

A. Movement

B. Reproduction

C. Intake of food and digestion

D. Living environment

3. Given drawing paper, oil crayons, etc. the students will construct drawings or color illustrations of at least one of the animals studied.

Part X - Arthropods

1. Shown slides or pictures of animals containing four examples of arthropods, 90% of the students will name correctly in writing at least three of these animals.

2. Given the names or pictures of four arthropods, 90% of the students will describe the characteristics of the animal.

A. Movement

B. Reproduction

C. Intake of food and digestion

D. Living environment

3. Given drawing paper, oil crayons, etc. the students will construct drawings or color illustrations of at least one of the animals studied.

Suggested levels - Upper Elementary
and Middle Schools.

TEACHER'S GUIDE:

This unit is primarily designed as a Science Unit, with information covering animals classified as Invertebrates being presented. In order that these animals may be better studied, this unit is divided into ten sections and are presented in a definite order: beginning with their general classification "Invertebrates" followed by a study of the simplest one-celled animals through the most complicated invertebrates. The information presented in each section lends itself to enlargement, elaboration or alteration by the individual teacher, since each section is complete in itself.

At the end of each section is a short Quiz, and a group of Experiments, to check and enhance the learner's memory.

PROCEDURE:

1. Give the pre-test
2. Show the slide-tape presentation.
3. Proceed with the Unit
4. Do not hesitate to show slides, filmstrips or films at any time during the presentation of the Unit, particularly any slide, group of slides, filmstrip, films or specimens, that will help facilitate learning in any of the sections of the Unit.
5. Give the post-test to evaluate:

(a) Your student

(b) The effectiveness of the unit

(c) The effectiveness of your presentation

SUGGESTIONS:

1. Following the pre-test and prior to the showing of the slides, we would suggest the introduction of the following vocabulary:

Invertebrate	Protozoa
Porifera	Coelenterata
Platyhelminthes	Nemathelminthes
Echinodermata	Mullusca
Annelida	Arthropoda
Parasite	

2. Bulletin boards may contain pictures of the Invertebrates.

3. Make use of any 16mm films on Invertebrates listed below: (Any of these films may be ordered from the Film Library, Broward County Public Schools.)

(a) Life in a Drop of Water; 11 Min. B & W

(b) Origin of Life; 28 Min. B & W

(c) Life in the Sea; 11 Min. B & W

(d) Plankton and the Open Sea; 19 Min. Color

(e) Seashore Life; 11 Min. Color

(f) Beach and Sea Animals; 10 Min. B & W

(g) Microscopic Life; 14 Min. B & W

(h) Protozoa: One Cell Animals; 11 Min. B & W

(i) Single Celled Animals - Protozoan; 17 Min. Color

(j) The First Many-celled Animals -
Sponges; 17 Min. Color

(k) Stinging-celled Animals-Coelenterates;
17 Min. Color

(l) Adaptive Radiation - The Mollusks;
20 Min. Color

(m) Mollusks: Snails, Mussels, Oysters and
their relatives; 14 Min. B & W

(n) Flatworms (Platyhelminthes); 16 Min. Color

(o) Parasitism (Platyhelminthes); 17 Min. Color

(p) Segmentation - The Annelids ; 17 Min. Color

(q) Worms - The Annelida; 13 Min B & W

(r) Enchindoerms - Sea Stars and their relatives;
17 Min. Color

(s) The Joint legged Animals: Anthropods; 18 Min.
Color

(t) Crustaceans; 14 Min. B & W

(u) Spiders; 11 Min. B & W

(v) Insects; 11 Min. Color

(w) Insect Zoo; 11 Min. Color

USE OF THE PRE-TEST:

The Pre-test <u>is not</u> an evaluation unit. Before administering the Pre-test, the learner or learners should be reassured that its purpose is diagnostic, employed only to find out what you as the teacher must stress in order to accomplish the Behavioral Objectives of this unit.

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QUIZ NO. 1:

1. One group of protozoan have shells which harden into chalk or lime stone. It is _____.

---

2. Three characteristics the amoeba has that are not common to other protozoan are:

(a)

(b)

(c)

---

3. Three characteristics the paramecium have that is not common to other protozoan are:

(a)

(b)

(c)

---

4. The characteristics that all protozoa have in common are:

(a)

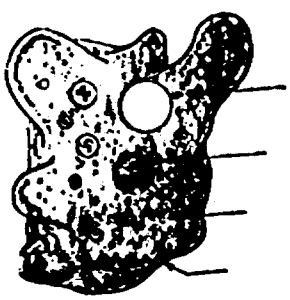
(b)

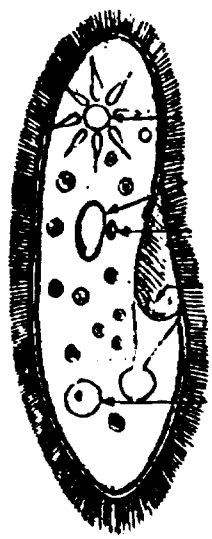
(c)

(d)

---

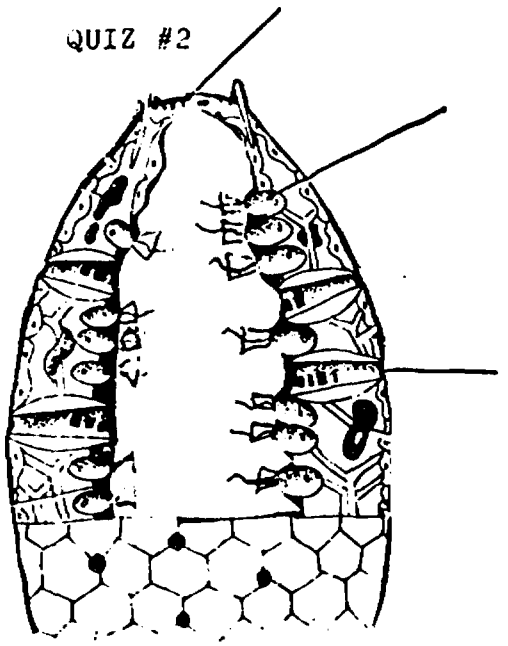
5. Label the following diagrams:





NAME: _____

QUIZ #2



This is a

_____

A. In the space below the diagram name the organism.

B. To what phylum does it belong?

_____

C. Label the diagram.

D. By means of arrows on the diagram, show how the water flows in and out of the organism.

E. A common household article obtained from this animal is the _____

F. This article is actually the animal's _____

G. If a living specimen is cut into pieces, what happens to the pieces? _____

_____

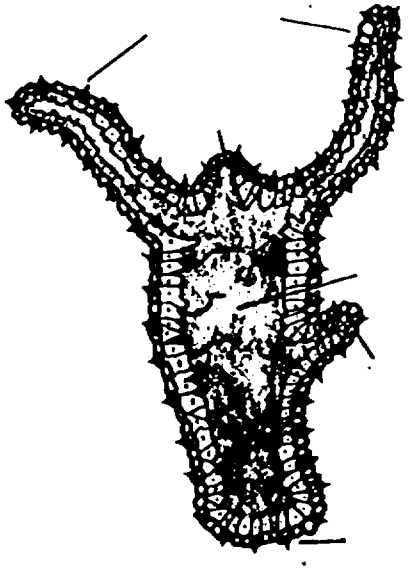
H. This process is called

_____

_____

QUIZ #3:

1.



This is a

_____

A. Name the organism. _____

B. To what phylum does it belong?

_____

C. Name two other members to this phylum. _____

_____

D. Describe the body structure of animals in this phylum. _____

_____

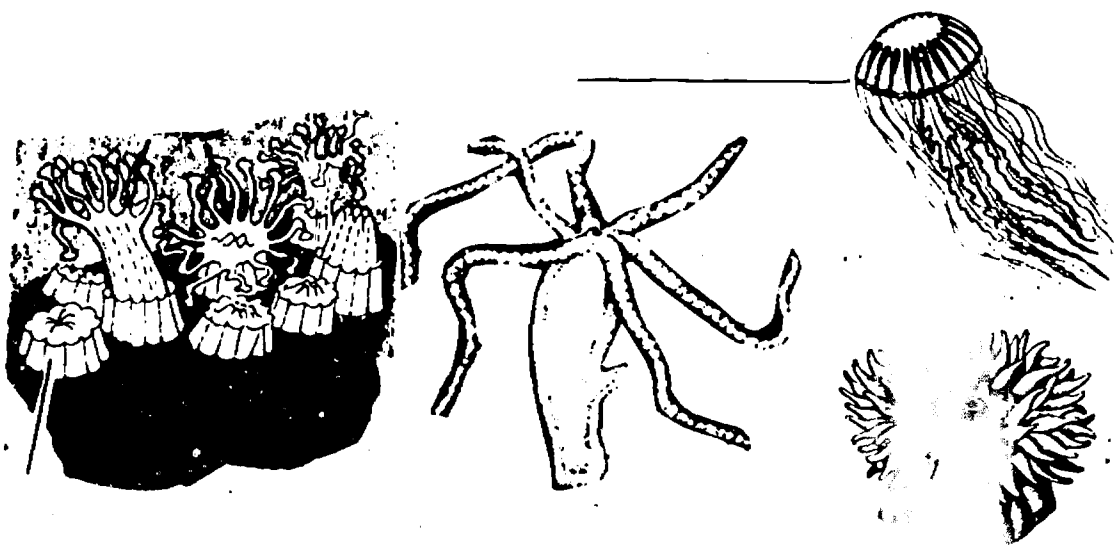
E. Label the diagram, using words from Column I.

F. Before each phrase in Column II fill in the number of the best word from Column I.

COLUMN I	COLUMN II
1) stinging cell	( ) captures food
2) endoderm	( ) outer cell layer
3) coelenterate	( ) where waste is eliminated
4) polyp	( ) paralyzes prey
5) tentacle	( ) means of reproduction
6) ectoderm	( ) internal cavity
7) mouth	( ) maintains water current
8) spicule	( ) inner cell layer
9) bud	
10) flagellum	

---

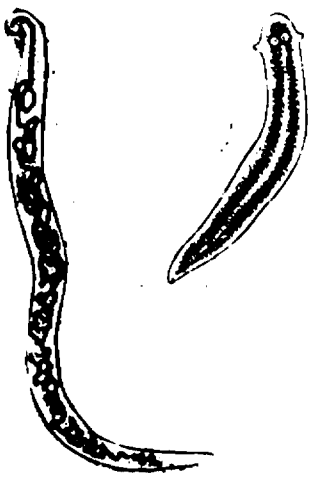
2. Place the correct names by the following animals.

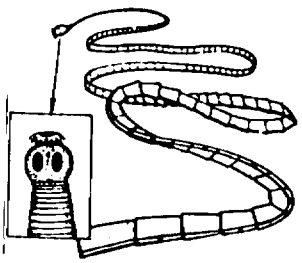


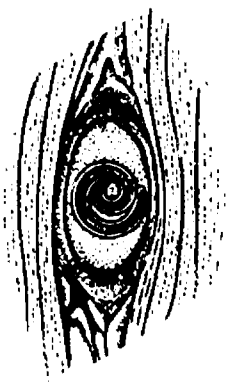
_____ _____ _____

_____ _____

QUIZ #4:







_____ _____ _____ _____

_____ _____ _____ _____

_____ _____ _____ _____

A. The above drawings include hookworm, planaria, tapeworm, and trichina. Name each drawing.

B. Under the name of each organism, write the name of the phylum to which it belongs.

C. State whether it is injurious (harmful) to man.

D. Many worms live in or on other organisms; such dependent organisms are called _____. The organism that they live on is called the _____.

E. Name the organism described:

(1) As an adult it lives in the human intestine, attached to the wall of the intestine. It absorbs digested food, thereby depriving the victim of nourishment. Sections of the worm, containing eggs, are excreted by the host, and may be eaten by pigs or cows. The eggs hatch into young, which bore into the animal's muscles and enclose themselves in cysts. A human may become infected by eating meat from such an animal.

Name of worm _____

(2) The young of this worm also form cysts in the muscles of pigs. If eaten by a human, the young worms will emerge and mature in the human intestine. When these worms reproduce, their young will form cysts in the muscles of the infested person producing weakness and inflammation.

Name of worm _____

F. Both diseases described in Question E can be prevented by _____.

G. A parasitic worm that enters the body through the soles of the feet is the _____. The young of this worm develop in the _____.

QUIZ NO. 5:

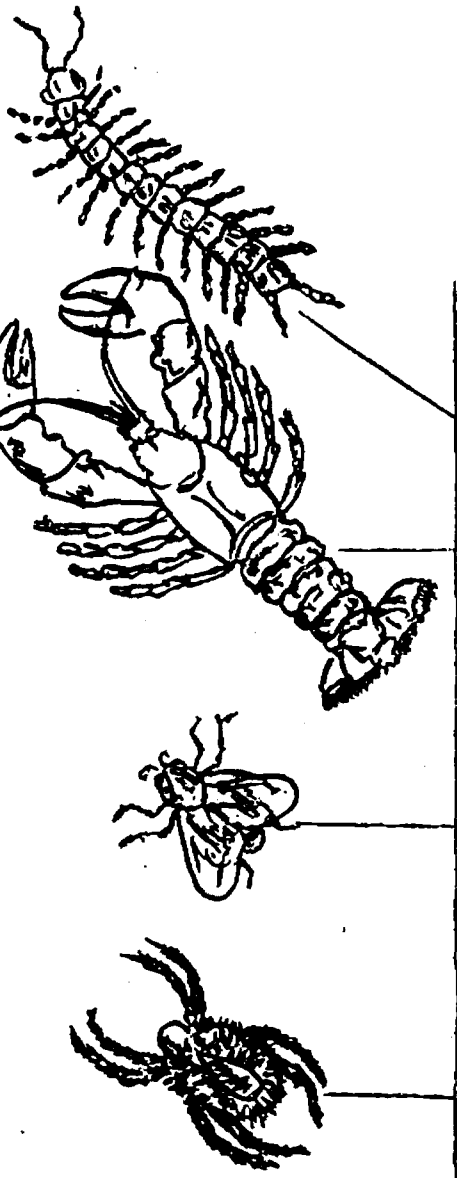
THE NAME OF THIS PHYLUM IS: _____

The general characteristics of this phylum are:

1. 3.

2. 4.

5.



CLASS	DISTINGUISHING CHARACTERISTICS

INSTRUCTIONS: There are 40 insects hidden in this puzzle. Circle 20 names that you can locate, they may be found going sideways, up, down, across or around.

S U C K I N G L I C E A Y E L L O W J A C K E T B C L
T I D W A L K I N G S T I C K E A T S O T A A A C O A
O A L C F Z G H W X T A S S O L D I E R A N T L N O D
N F C K A B D M T E N R O H N O P F L C G V O G M S Y
E M W X W A S P S Y Y Z K L C Y L F E S R O H A H Q B
F C O T T O N B O L L W E E V I L S O F T O E S K U I
L O L F P O R G O O D I L I K E M E P M R T I M A A R
I R U N A T A M Y W A T E R B U G P R N N F A T T S D
E N I T E H T O M A N U L O N G U O E A R A T H Y H R
S E A T A T J O E O N O F F A D W D K E A T T O D B A
B A C K A T T H E F T O O K D H G C V T E O O H I U G
L R U N E E B Y E N O H A U C R A L A T M Y E H D G O
M W I F Y O U L I K E I M N E L I T H A S I S H U N N
B O R I N G B E E T L E I E B S A T T C E S N I G I F
U R A R U N N I N G A T N O T I N M Y H O U S T E A L
T M Z E E K A T S U P G Y P S Y M O T H A T F L I E Y
T K Y F L Y L M P Q R U N D T O M Y L O V E E L I K E
E L X L O T C I C A D A B A A R A Y A T L M C K E A C
R M S Y O I N A T L I K E M G E L L A C K E C A T A R
F N E W K Y W S A B S A T S B D F F A T B A S E L A I
L O T V A X H E B L T B A E E A C E L L S E A U T B C
Y P I U T O S C O K S E N L T N A S K A T E L O O B K
L O M T P U K E L L U E K F T T B U T I C K S B A L E
I R R P O Z E A N A C A T L L E F O T I U Q S O M I T
K S E I X B U M P L O O K Y E G H H I L T H E R E U U M
E R T Y A N T S Q E L T E E B T E P R A C O L F F U B

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POST-TEST INSTRUCTIONS

I. Place a circle around A, B, C or D, depending on which answer you think is correct.

II. If the instructions are not understood, consult your instructor.

III. If instructions are understood, proceed with the test on the following page.

POST-TEST

1. Which of the following is not an invertebrate: (1) sponge; (2) Tapeworm; (3) Squid; (4) Fish

   A. 3 and 4

   B. 3

   C. 1 and 2

   D. All of these

2. Which of the following is invertebrate? (1) Earthworm; (2) Octopus; (3) Stingray; (4) Eel

   A. None of these

   B. 1 and 2

   C. All of these

   D. 3 and 4

3. Which of the following animals are called invertebrates: (1) Amoeba; (2) Sponge; (3) Centipedes; (4) Squid.

   A. 1 and 4

   B. None of them

   C. 1 and 3

   D. All of them

4. Are any of the following animals invertebrates: (1) Frog; (2) Salamander; (3) Lizard; (4) Eel

   A. Yes

   B. 1 and 2

   C. No

   D. 3 and 4

5. What feature or characteristic do all invertebrates have in common:

A. A vertebral column or backbone

B. Live in water

C. Have no backbones or spine

D. Have hard outer shells

6. One group of Amoeba like animals have shells which:

A. Form oil

B. Harden into chalk or limestone

C. Look like the shells of clams

D. Form pearls

7. Which of the following is not true of the Amoeba:

A. It is able to move about

B. It has cilia

C. It cannot make its own food

D. It is a type of protozoa

8. The large vacuoles at opposite ends of the paramecium are used to:

A. Digest food particles

B. Discharge extra water

C. Take in Food particles

D. Discharge solid wastes

9. A paramecium moves by:

   A. Flowing across a solid surface

   B. Lashing the water with a flagellum

   C. Chainging its shape

   D. Using its cilia

10. Sponges reproduce by:

   A. Eggs

   B. Sperms

   C. Tentacles, cila, seeds, buds

11. The Jellyfish and Anemones obtain their food by:

   A. Allowing water to enter through pores

   B. Uses tentacles to catch food

   C. Uses cilia to wash food into their mouth opening.

   D. Allowing its body to flow around food, pulling it into its body.

12. The phylum name for sponge is:

   A. Coelenterates

   B. Annelida

   C. Porifera

   D. Protozoa

13. The starfish, sand dollar and urchin have a spiney skin, and they make up the phylum called:

A. Arthropoda

B. Echinodormata

C. Mollusca

D. Annelida

14. What body feature do most mollusks have, which make the term softbodied animals seem wrong:

A. Stony shell

B. Tentacles

C. Spines

D. Muscular foot

15. The starfish's ability to grow new parts to replace one lost is called:

A. Budding

B. Regeneration

C. Fission

D. Parthenogenesis

16. An Arthropod that can give a dangerous bite is a:

A. Housefly

B. Water flea

C. Blackwidow spider

D. Millepede

17. Animals with joint feet make up phylum:

A. Arthropoda

B. Mollusca

C. Echinoderms

D. Annelida

18. Ticks are dangerous because many of them:

A. Sting

B. Carry diseases

C. Bite

19. All mollusk have a muscular foot except two, which are:

A. Oyster and clam

B. Snails and clam

C. Chitons and squid

D. Octopus and squid

20. The simplest animals having bilaterial symmetry, a true head with eyes and brain, and a food tube, are:

A. Flatworms

B. Roundworms

C. Tape worms

D. Earthworms

21. The following characteristics, a closed blood system, a body cavity and a solid nerve cord,may be found in the:

A. Planaria

B. Paramecium

C. Earthworm

D. Tapeworm

22. The arthropods used for food in many parts of the world are:

A. Crayfish, lobsters, crabs and shrimp

B. Spiders, scorpion, tick and chiggers

C. Grasshopper, moths, mosquitoes and bees

23. The trichia and hookworm is:

A. Harmful to plants

B. Helpful to man

C. More harmful to man than any other roundworm

D. Helpful to plants

24. Insects are different from spiders in the following ways:

A. 8 walking legs

B. 6 walking legs

25. In the following group the only Crustacean is :

A. Shrimp

B. Blackwidow

C. Millepede

D. Tick

If test results are 90% correct, proceed to the next unit.

If test results are less than 90% correct, repeat this unit.