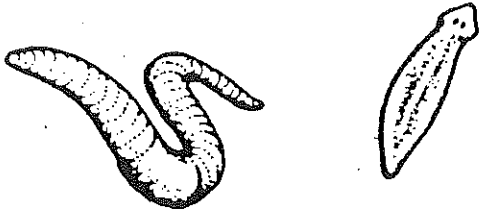


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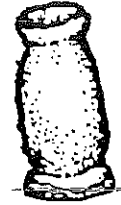
Period:



THE



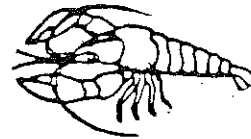
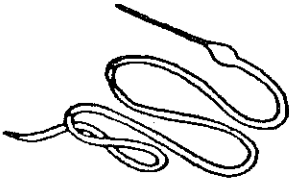
ANIMAL



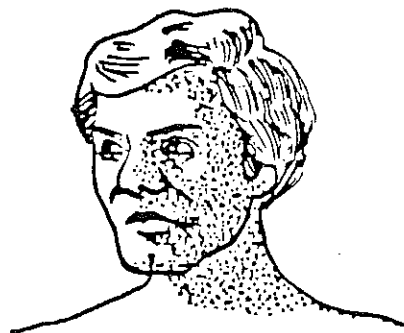
KINGDOM



INVERTEBRATE PHYLA



*This packet represents information you need to study to prepare for the test on Animals. You are responsible for completing the worksheets and color plates enclosed. Anything within this packet is a possible test question. The test will be on*



*NOTE: A deduction of 10 points will be given for any replacement packet.*

# The Animal Kingdom

## Major Animal Phyla

1. PORIFERA – sponges
2. CNIDARIA – hydras, jellyfish, sea anemones, and corals
3. PLATYHELMINTHES – free-living flatworms, flukes, and tapeworms
4. NEMATODA – roundworms
5. ANNELIDA – bristle worms, earthworms and their relatives, leeches
6. MOLLUSCA – chitons, clams, snails, and octopuses
7. ARTHROPODA – insects, crustaceans, centipedes, millipedes, and arachnids
8. ECHINODERMATA – starfish, sea urchins, sea cucumber, brittle star, and sea lily
9. CHORDATA – vertebrates such as fish, amphibians, reptiles, birds, and mammals

Generally, we think of an animal as something with four legs, eyes, ears, a nose and a mouth. However, the Animal Kingdom includes all the organisms (living things) which: a) have more than one cell; b) do not make their own food; and c) produce embryos (young forms) from an egg and a sperm.

Some of these organisms may look like plants to us. Sea anemones and some worms that live in tubes in the bottom of the ocean have colorful tentacles (arms) that make them look like pretty flowers. But they are animals nonetheless because they fit the qualifications listed above.

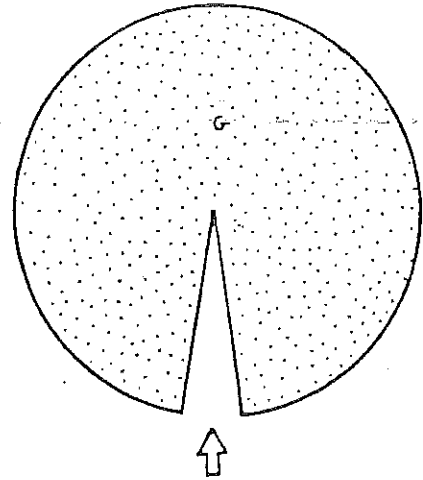
The list above gives nine of the major phyla (groups) in the Animal Kingdom. The sponges are the simplest animals and the chordates, including man, are the most complex. Scientists have put animals with similar structures into the same phylum. Animals in the first five phyla have increasingly complex structures. The animals in phyla 5, 6, and 7 have similar embryos. The animals in phyla 8 and 9 also have embryos which are similar. These are some reasons why scientists have placed the phyla in this order.

Read the above paragraphs carefully. Then write the answers to the following questions:

1. What are three characteristics of an animal? \_\_\_\_\_  
\_\_\_\_\_
2. Which are the simplest animals? \_\_\_\_\_ the most complex? \_\_\_\_\_
3. Arrange the following phyla in order from simplest to most complex:  
flatworms      segmented worms      sponges      cnidarians      roundworms  
1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_  
4. \_\_\_\_\_ 5. \_\_\_\_\_
4. Which three phyla have similar embryos? \_\_\_\_\_
5. Why do you think that having similar embryos tells scientists that two phyla should be listed near each other? \_\_\_\_\_
6. Give the name of the phylum to which each of the following belongs:  
insects \_\_\_\_\_ man \_\_\_\_\_ flukes \_\_\_\_\_  
starfish \_\_\_\_\_ snail \_\_\_\_\_ sponge \_\_\_\_\_  
coral \_\_\_\_\_ earthworm \_\_\_\_\_ roundworm \_\_\_\_\_

# MAJOR PHYLA.

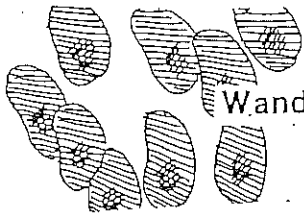
- PROTOZOA<sub>A</sub>
- PORIFERA<sub>B</sub>
- CNIDARIA<sub>C</sub>
- PLATYHELMINTHES<sub>D</sub>
- NEMATODA<sub>E</sub>
- ANNELIDA<sub>F</sub>
- ARTHROPODA<sub>G</sub>
- MOLLUSCA<sub>H</sub>
- ECHINODERMATA<sub>I</sub>
- CHORDATA<sub>J</sub>



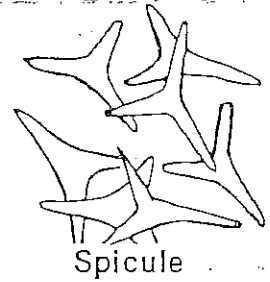
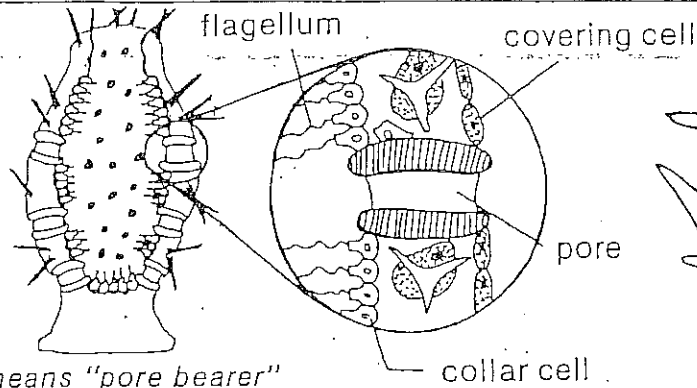
# PORIFERA

## Members, Habitats & Characteristics

### Sponges



Wandering Cell



Spicule

Kingdom: Animal

Phylum: Porifera (por•IF•er•uh) means "pore bearer"

The phylum Porifera is made up of the sponges. Most live attached to the bottom in warm sea water (are marine), but some live in fresh water.

Sponges are the simplest of all the animals. Their body is a thick empty sack with a large opening at the top. There are many tiny holes or "pores" along the sides of the sack.

From the drawing above, you can see that the body of the sponge is made up of two layers of cells. The outer cells are covering cells and the inner cells are collar cells. In between is a jelly-like layer. It contains wandering cells which carry food to all parts of the sponge. It also contains spicules which provide support.

If you were to drop red dye next to the sponge, you would see it go in the sides of the sponge and come out the top. This is because the flagella, or little whips on the collar cells, pump water in through the pores and then out through the opening at the top of the sponge. This brings in food which is trapped and digested by the collar cells and picked up by the wandering cells.

The cells in a sponge are not organized into tissues. We know this is true because scientists can squeeze a sponge through a piece of silk and separate it into individual cells. After three weeks, the cells will reorganize themselves into a working sponge all by themselves! No other adult animal can do this.

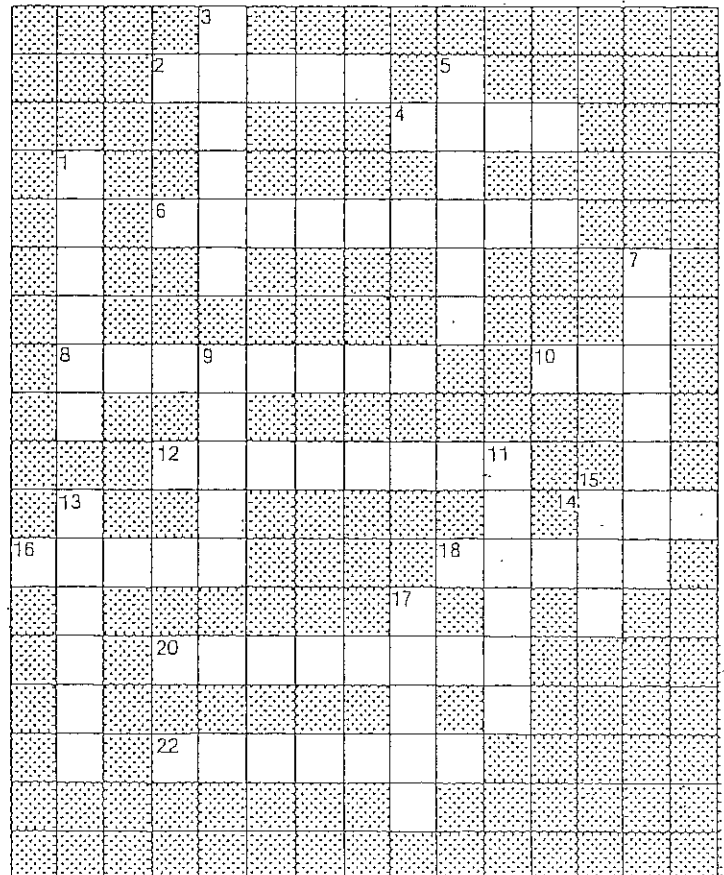
These animals are sessile because they cannot move around.

#### DOWN

1. break down
3. cell with a flagellum
5. ocean living
7. animals in phylum Porifera
9. Tissues are made from \_\_\_\_\_.
11. kingdom we are learning about
13. group
15. Most sponges live in the \_\_\_\_\_.
17. middle "\_\_\_\_\_ like" layer of cells

#### ACROSS

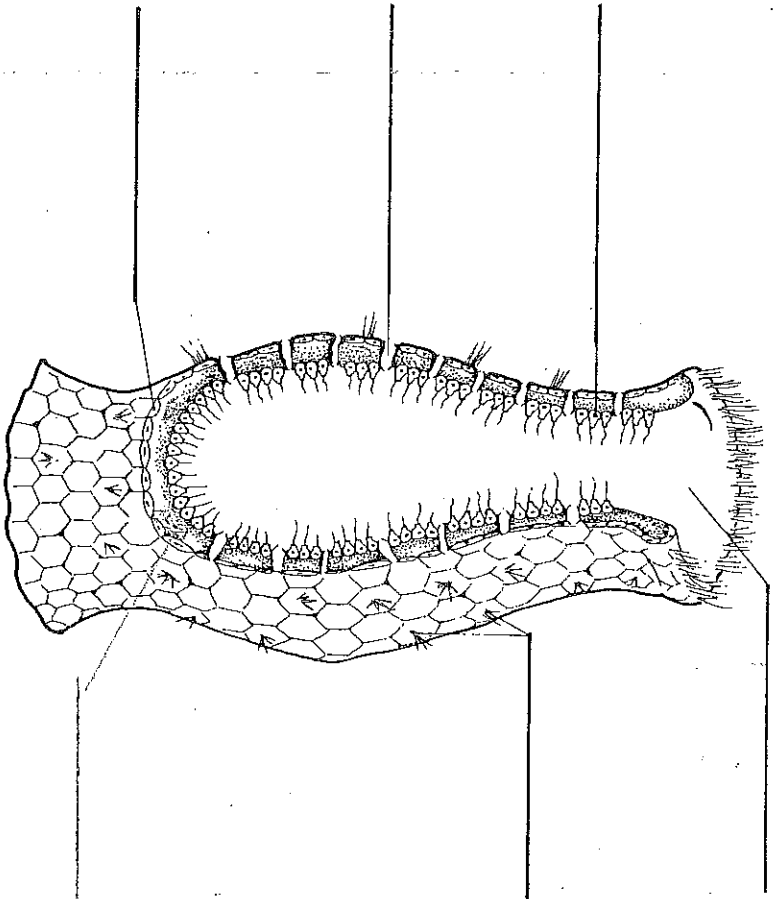
2. holes
4. A sponge is like a \_\_\_\_\_.
6. \_\_\_\_\_ cells carry food around.
8. support structures
10. Sponges have \_\_\_\_\_ cell layers.
12. \_\_\_\_\_ pump water through the pores.
14. ocean
16. flagella
18. Water comes in here.
20. phylum of sponges
22. Sponges are \_\_\_\_\_.



### The Sponge

Name \_\_\_\_\_

Label the parts of the sponge.



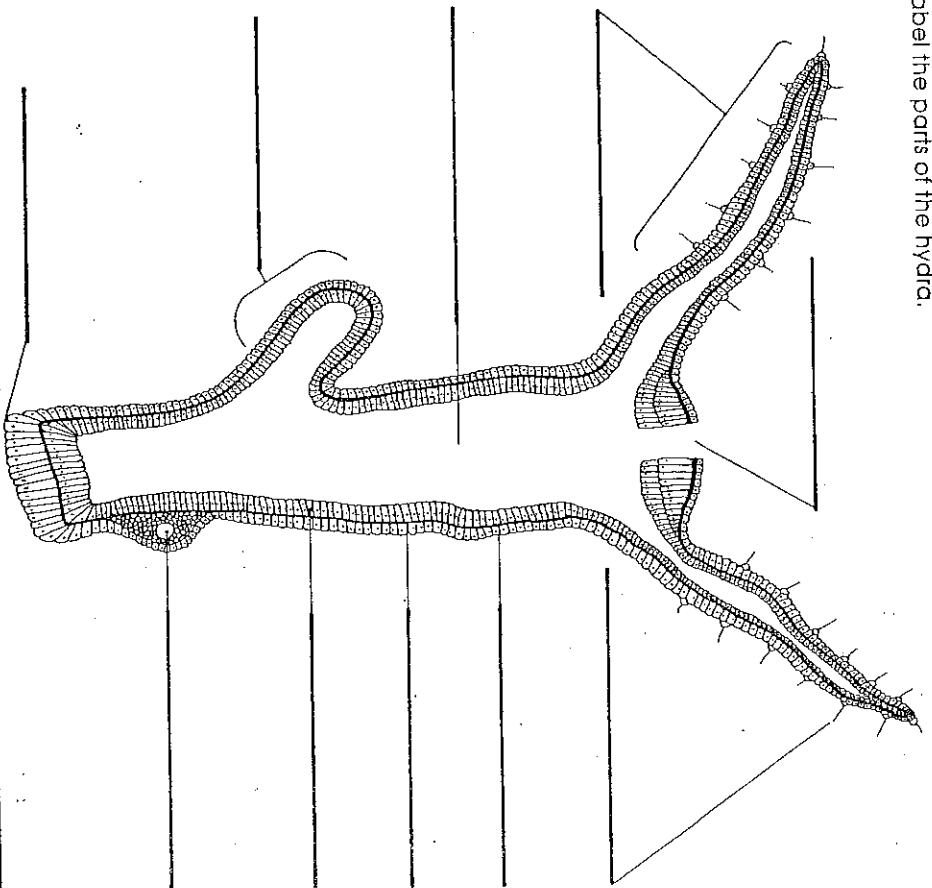
#### WORD BANK

- ostium
- choanocyte (collar cell)
- epidermal cell
- spicule
- pore
- amoebocyte

### The Hydra

Name \_\_\_\_\_

Label the parts of the hydra.



#### WORD BANK

- tentacle
- ovary
- ectoderm
- mesoglea
- mouth
- nematocyst
- endoderm
- bud
- base
- gastrovascular cavity

# CNIDARIANS

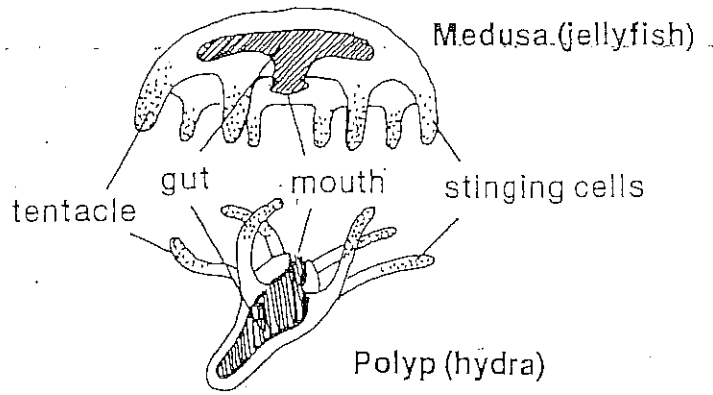
Kingdom: Animal

\*\*\* Phylum: Coelenterata (suh•LEN•ter•AH•tuh)  
means "hollow insides"

The phylum Coelenterata is made up of hydras, jellyfishes, sea anemones and corals. These animals are called coelenterates which means "hollow insides." Most coelenterates are marine but a few live in fresh water.

Coelenterates are more complex animals than sponges because they have three cell layers instead of two. They also have tissues. The outer cell layer is a tough skin and the inner layer is also a tissue. It gives off juices to digest food inside the gut (central cavity).

The coelenterate body is a sack with one opening, and the opening is surrounded by many tentacles or arms. These arms may contain special stinging cells called nematocysts which only coelenterates have. These cells contain a poisoned arrow connected to a thread. When a small fish touches a tentacle, the arrow shoots out to paralyze and tie up the victim. Then the tentacles bring the victim



or prey to the mouth. After the prey is digested inside the sack, the food passes into the cells, and the waste must go back out through the mouth. They have a two-way (one opening) digestive system.

The coelenterates can have two forms as shown above. In the medusa form, the tentacles hang down. Adult jellyfish have this appearance and dangle their tentacles in the water waiting for their prey. Some swimmers have been killed by the sting of large jellyfish. Adult hydras, corals and sea anemones have the polyp form. They are attached at the bottom so they can spread their tentacles up into the water. In fact, anemones resemble colorful flowers.

Most Cnidarians exhibit radial symmetry.

- Which animals are coelenterates? \_\_\_\_\_
- What does coelenterate mean? \_\_\_\_\_
- How would a jellyfish catch a mackerel? \_\_\_\_\_
- What is inside a nematocyst? \_\_\_\_\_
- How is a jellyfish more complex than a sponge?
  - \_\_\_\_\_
  - \_\_\_\_\_
- Tell whether the following have the medusa or polyp form as adults:
 

coral	hydra	jellyfish	sea anemone
MEDUSA _____			
POLYP _____			

II. Match the following:

- |                      |   |
|----------------------|---|
| 1. tentacles _____   | A. Animal that looks like a flower            |
| 2. nematocysts _____ | B. Victim                                     |
| 3. prey _____        | C. "Arms" containing stinging cells           |
| 4. sea anemone _____ | D. Stinging cells containing a poisoned arrow |

\*\*\*Another term for Cnidarian is coelenterate.

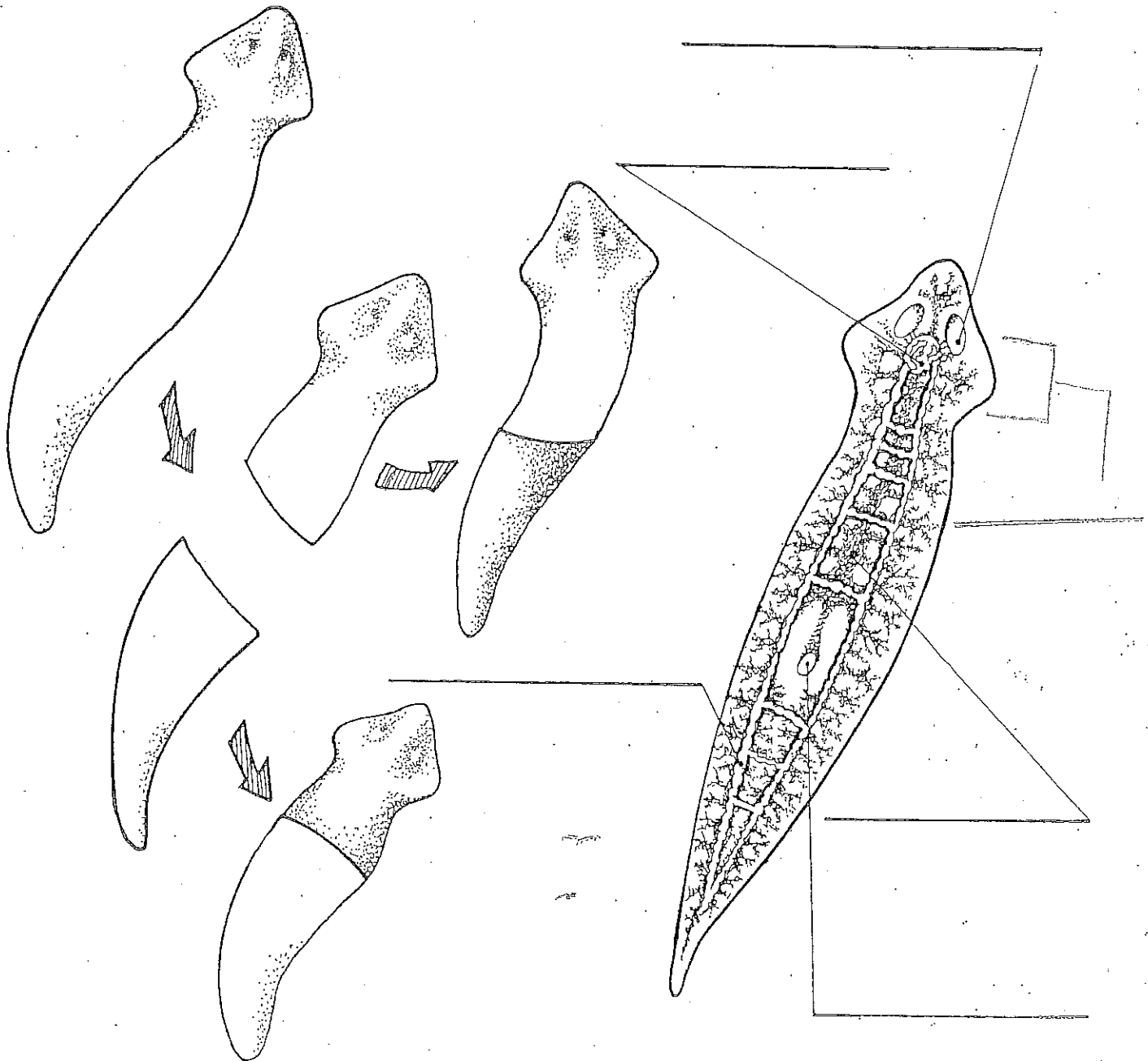


# The Planarian

Name \_\_\_\_\_

A planarian is a small flatworm that can regenerate missing body parts when portions are cut off.

Label the parts of the regenerated planarian.



## WORD BANK

brain  
nerves

eyespot  
mouth

intestine  
auricle



# NEMATODA

## Members, Habitats and Characteristics

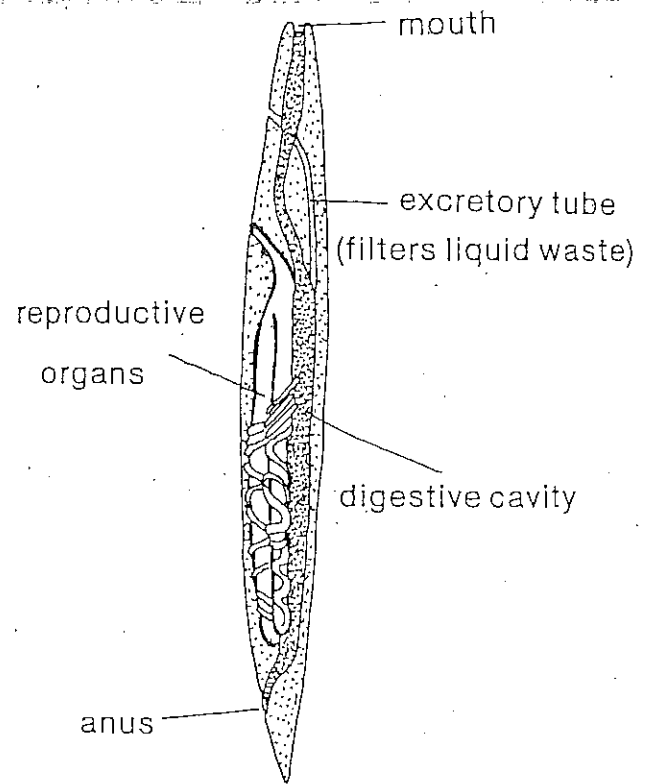
### Roundworms

Kingdom: Animal

Phylum: Nematoda (nem•a•TODE•uh)  
means "thread"

The phylum Nematoda includes the roundworms. Some are free-living in the soil and in marine and fresh-water mud. However, many types or species are parasites of plants and animals.

The diagram above shows that nematodes are more complex than the flatworms. They have both a mouth for bringing in food and an anus or opening at the other end of their digestive cavity for getting rid of wastes. Like the flatworms, they have muscles, nerves, excretory organs and reproductive organs organized into simple systems. They also have a tough cuticle or waxy outer covering.



**Ascaris**

About 50 species of roundworms can be parasites of humans. The hookworm is a harmful one which lives in the soil and can bore through the feet. Trichina worms cause trichinosis which may result in death. The disease comes from improperly cooked pork contain-

ing young trichina. The filaria worm causes a disease called elephantiasis. Its young are transmitted to humans by a mosquito bite and make the feet and legs swell.

I. List the key words under the appropriate roundworm parasite (one key word may be used twice):

hookworm	filaria worm	trichina worm	KEY WORDS
_____	_____	_____	rare soil
_____	_____	_____	mosquito feet
_____	_____	_____	legs elephantiasis
_____	_____	_____	swelling pork

II. Use the paragraphs above to answer the following:

- Name four organs the roundworms have:  
\_\_\_\_\_
- How are the roundworms more advanced than the flatworms? \_\_\_\_\_  
Why is this important? \_\_\_\_\_
- Where do roundworms live? \_\_\_\_\_
- Why is it important to cook pork thoroughly? \_\_\_\_\_

# ANNELIDA

## Members, Habitats & Characteristics

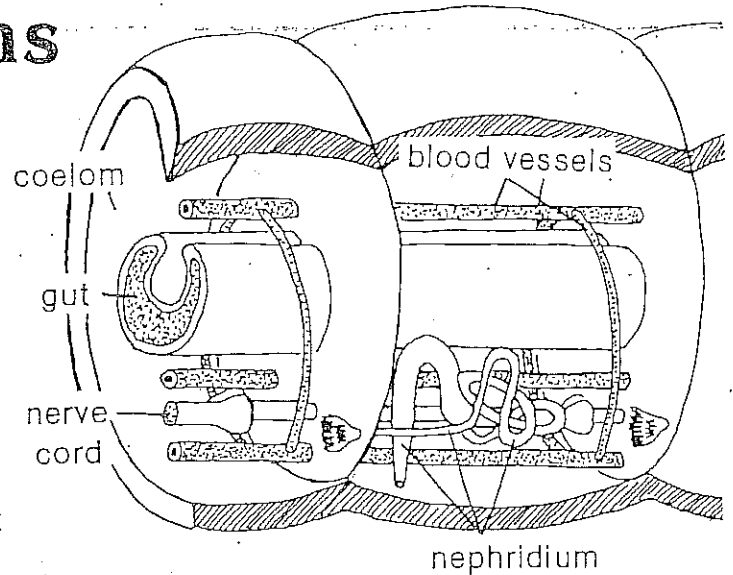
### Segmented Worms

Kingdom: Animal

Phylum: Annelida (an•NEL•id•uh)  
means "ringed"

The phylum Annelida includes the bristle worms, earthworms and their relatives, and the leeches. Most bristle worms are marine. Some live in tubes they build by sticking sand and pieces of shell together. The earthworms and their relatives burrow in soil or live around water weeds. Most leeches live in fresh water. Many are parasites which suck blood from their hosts. Once, leeches were used to suck "bad blood" from sick people.

The most important way that all segmented worms or annelids are more advanced than the roundworms and all the phyla below them is that segmented worms have a coelom (SEE•lom). The coelom is a space filled with fluid between the gut and the skin. All animal phyla higher than and including the annelids have a coelom. The coelom allows room for all the organs in between the gut and the skin. These organs are more complex than the organs in animals in the lower phyla and are organized into more complex systems. For ex-



Inside of an Earthworm

ample, the segmented worms have blood vessels which carry food to all the cells. Roundworms and the lower phyla do not have blood vessels. Another organ in the coelom is the nephridium. It is an excretory organ that gets rid of liquid wastes. Notice that there is a nephridium in each segment (little compartment) of the earthworm. Some of the organs in each segment are different. But most are the same.

I. Use the paragraphs above to define the following terms:

- segment \_\_\_\_\_  
parasites \_\_\_\_\_  
annelids \_\_\_\_\_  
coelom \_\_\_\_\_

II. Choose the correct answer to complete the following. Use each answer at most one time.

coelom      bristle worms      respiratory      space      reproductive organs  
sand      excretory      flatworms      leeches      blood vessels

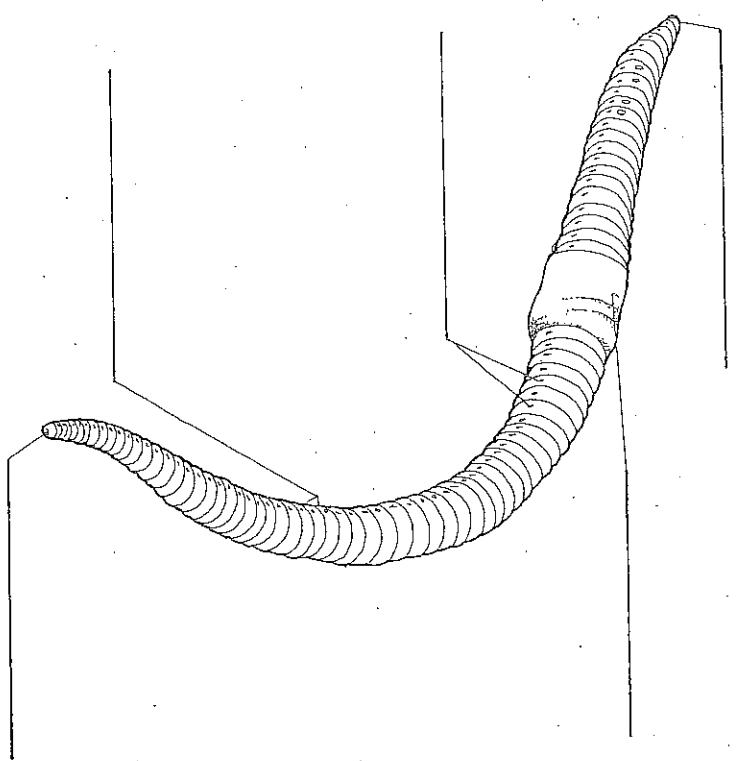
- The phylum Annelida includes the \_\_\_\_\_, earthworms and leeches.
- At one time, doctors used \_\_\_\_\_ to suck "bad blood" out of patients.
- Some bristle worms live in tubes made by sticking \_\_\_\_\_ and pieces of shell together.
- The most important advance of the segmented worms is the \_\_\_\_\_.
- A coelom is a \_\_\_\_\_ between the gut and the skin.
- The nephridium is an \_\_\_\_\_ organ that gets rid of liquid wastes.
- Annelids have \_\_\_\_\_, but the lower phyla do not have these organs.

III. THINK! Why do you think the earthworm has been called the "farmer's plow"?

**The Earthworm**

Name \_\_\_\_\_

Label the exterior parts of the earthworm.



**WORD BANK**

mouth  
segment

clitellum  
anus

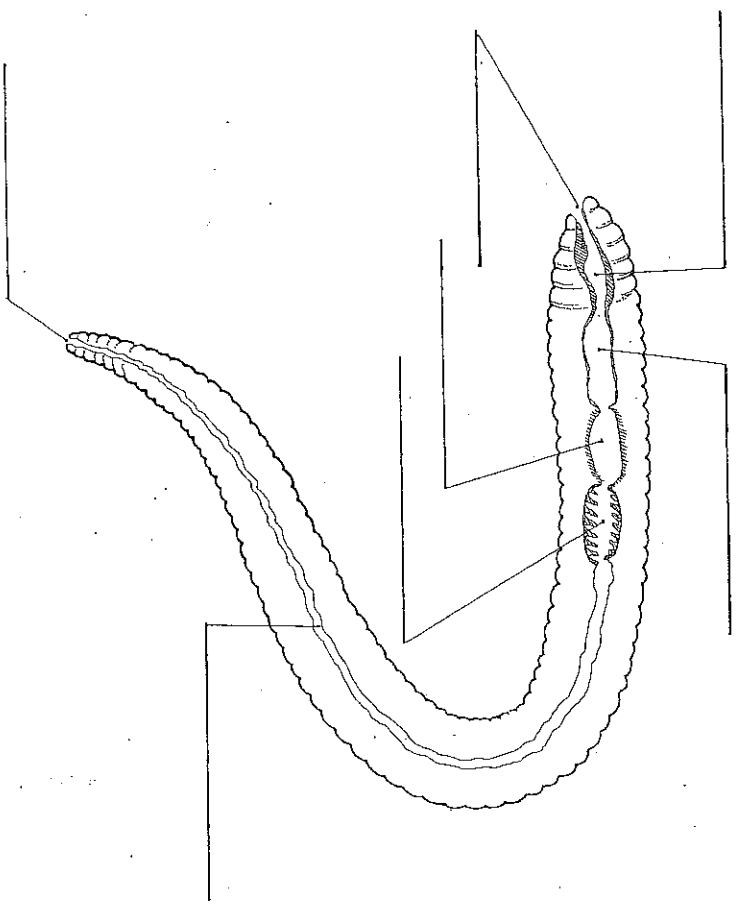
setae

**The Earthworm -  
Digestive System**

Name \_\_\_\_\_

For the earthworm, as with most animals, digestion takes place in a long tube with openings at both ends. This tube is divided into organs that do different jobs.

Label the parts of the earthworm's digestive system.



**WORD BANK**

crop  
mouth  
pharynx

intestine  
gizzard

esophagus  
anus

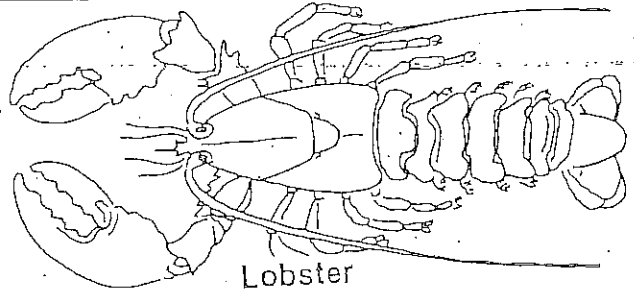
Name \_\_\_\_\_

## Characteristics, Members & Habitats

# Arthropods

Kingdom: Animal

Phylum: Arthropoda (ar•THROP•o•duh)  
means "jointed foot"



Lobster

The phylum Arthropoda is made up of animals having jointed legs, an exoskeleton (outside skeleton), and simple and/or compound eyes. There are four classes (subgroups) of Arthropods. They are the myriapods (centipedes and millipedes), the insects (beetles, flies, etc.), the arachnids (spiders, ticks, etc.), and the crustaceans (lobsters, crabs, pillbugs, etc.). Most land animal species are insects. And most marine animal species are crustaceans. One kind of crustacean, the tiny copepod, is an important member of most food chains in the ocean. Arthropods live in just about every habitat in the world. This is one reason they are so numerous.

Since arthropods don't have any bones, they need the tough armor of the exoskeleton to protect them. It also keeps them from drying out. However, this armor must be shed by molting each time the arthropod grows too fat for its exoskeleton. The exoskeleton is made of chitin.

One way to tell the class of an arthropod is by the number of its legs. Myriapods can have over 100 legs: Insects always have 3 pairs of legs, arachnids always have 4 pairs, and crustaceans have several pairs. Some of the crustaceans' legs may be adapted for swimming.

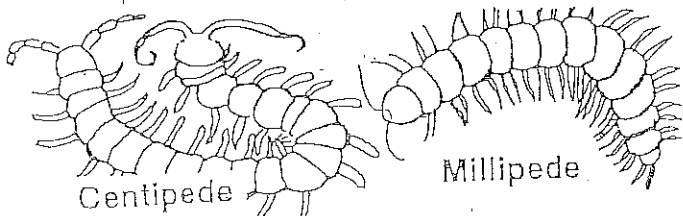
Read the above paragraphs carefully. Then answer the following:

1. What are three characteristics of all arthropods? \_\_\_\_\_
2. Name an arthropod that represents each arthropod class. \_\_\_\_\_
3. When must an arthropod molt? \_\_\_\_\_
4. How many legs do insects have? \_\_\_\_\_ How many legs do arachnids have? \_\_\_\_\_
5. Which arthropods have legs modified for swimming? \_\_\_\_\_
6. Which crustacean is an important member of oceanic food chains? \_\_\_\_\_
7. Most land animal species are \_\_\_\_\_. Most sea animal species are \_\_\_\_\_.

Find the following words and circle them:

- |             |            |             |
|-------------|------------|-------------|
| beetle      | food chain | lobster     |
| armor       | ant        | bee         |
| land        | molt       | adapted     |
| crustacean  | marine     | jointed leg |
| arachnid    | insect     | class       |
| tick        | millipede  | exoskeleton |
| grasshopper | fly        | myriapod    |
| bug         | habitat    | pillbug     |
| arthropod   | centipede  |             |

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

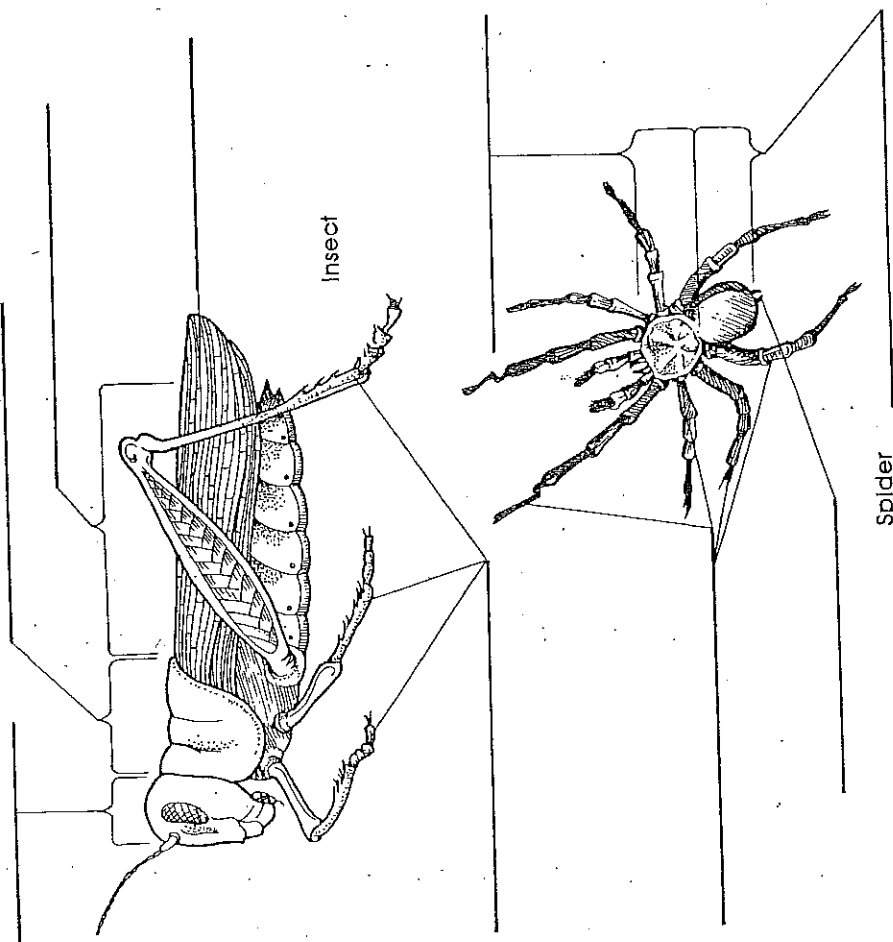


Centipede

Millipede

### Spiders and Insects

Spiders are not insects. Label the parts of the spider and insect.

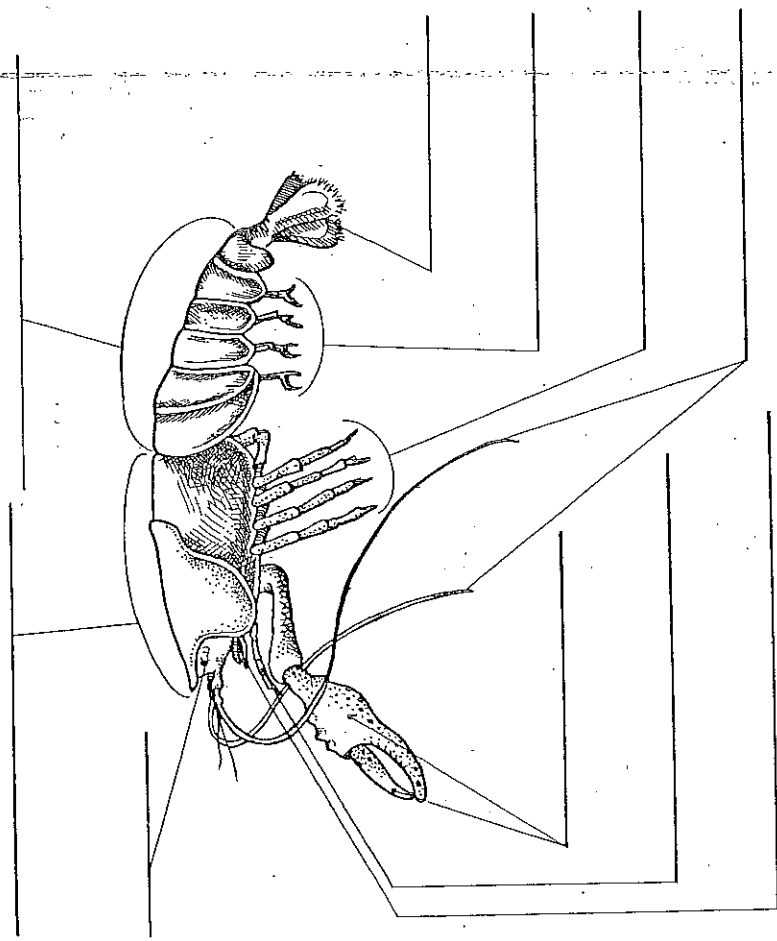


#### WORD BANK

- head
- cephalothorax
- 4 pairs of legs
- thorax
- 3 pairs of legs
- wings
- abdomen
- spinneret

### The Crayfish

Label the parts of the crayfish.



#### WORD BANK

- eye
- swimmerets
- cephalothorax
- mandible
- walking legs
- abdomen
- cheliped
- flipper
- antennae
- maxilliped

Name \_\_\_\_\_

## Members, Habitats & Characteristics

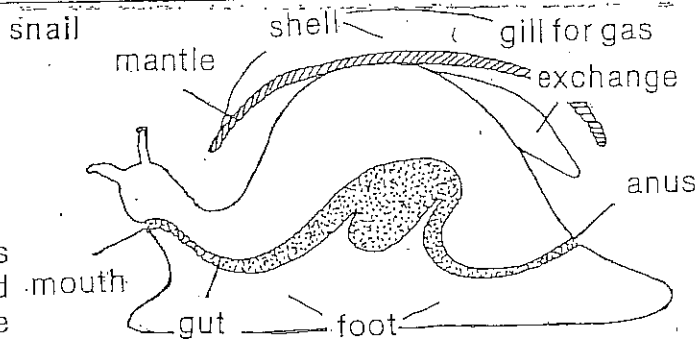
# Mollusks

Kingdom: Animal

Phylum: Mollusca (mo•LUSK•uh)  
means "soft bodied"

The phylum Mollusca is made up of animals such as snails, octopuses, clams, and chitons. Most mollusks are marine but some such as the garden slug can live on land.

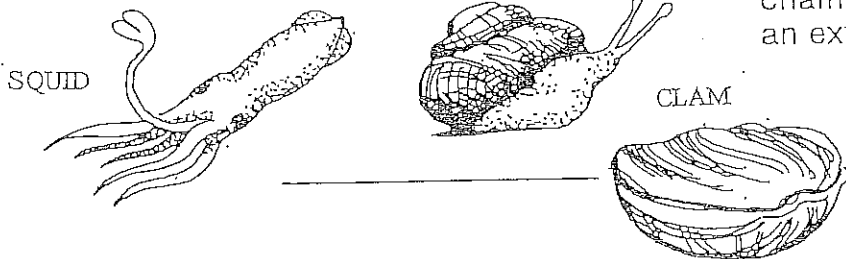
If you have ever eaten snails or clams, you know that most of the body is soft and slimy except for a few tough areas. One tough area is the muscular "foot" which helps clams and snails move along or burrow into the mud. The many arms of the squid and octopus are really their "foot" divided into many sections. Another structure peculiar to mollusks is the mantle. It covers the soft inner organs like a tent. In some mollusks, the mantle secretes (gives off) a shell and sometimes pearls!



Snails have a rough-edged tongue called a radula which they use to scrape green algae off the glass sides of the aquarium.

One can tell which subgroup or class a certain mollusk belongs to by looking at the body shape. Bivalves (means "two-doors") have two shells and include the clam and oyster. Gastropods (means "stomach-foot") usually have one shell and include the snail. Most glide along on the "foot" which is just under the stomach. Cephalopods (means "head-foot") usually have no external (outside) shell and include the squid and the octopus. (The chambered nautilus is the only member with an external shell.) They receive their necessary respiratory gases through gills.

I. Label the mollusk with the correct name:



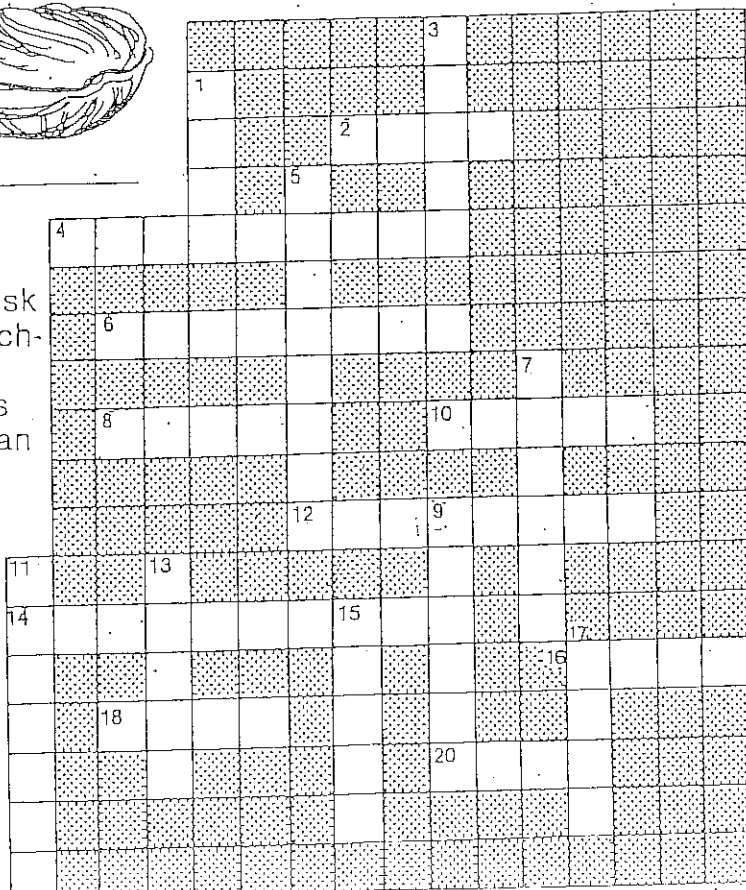
II. Complete the crossword:

Down

1. The mantle forms a \_\_\_\_\_ over the organs.
3. A cephalopod
5. snails, octopus, clam and chiton.
7. \_\_\_\_\_ secretes the shell.
9. rough-edged tongue
11. cephalopod with 8 arms
13. Cephalopods usually don't have an external one.
15. Sometimes the mantle makes a \_\_\_\_\_.
17. Snails are good housekeepers for \_\_\_\_\_.

Across

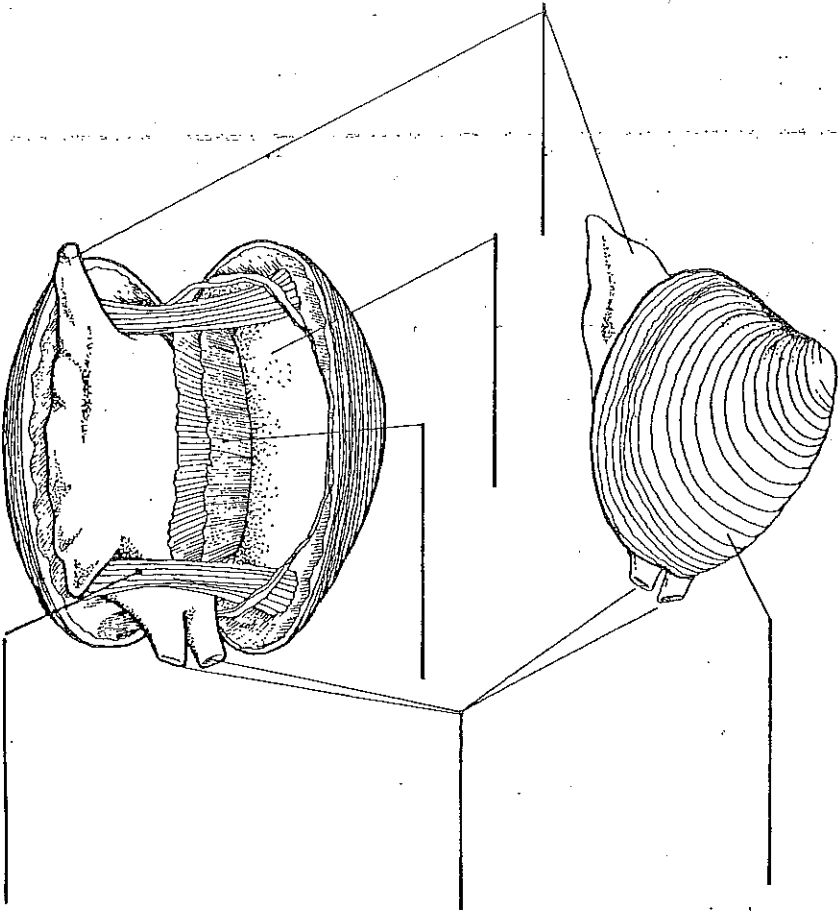
2. a garden mollusk
4. means "stomach-foot"
6. have two shells
8. group lower than a phylum.
10. has a radula
12. gives off
14. chambered nautilus
16. Every mollusk has one.
18. A bivalve
20. "foot" of a squid



### The Clam

Name \_\_\_\_\_

Label the parts of the clam.



shell  
foot

gills  
muscle

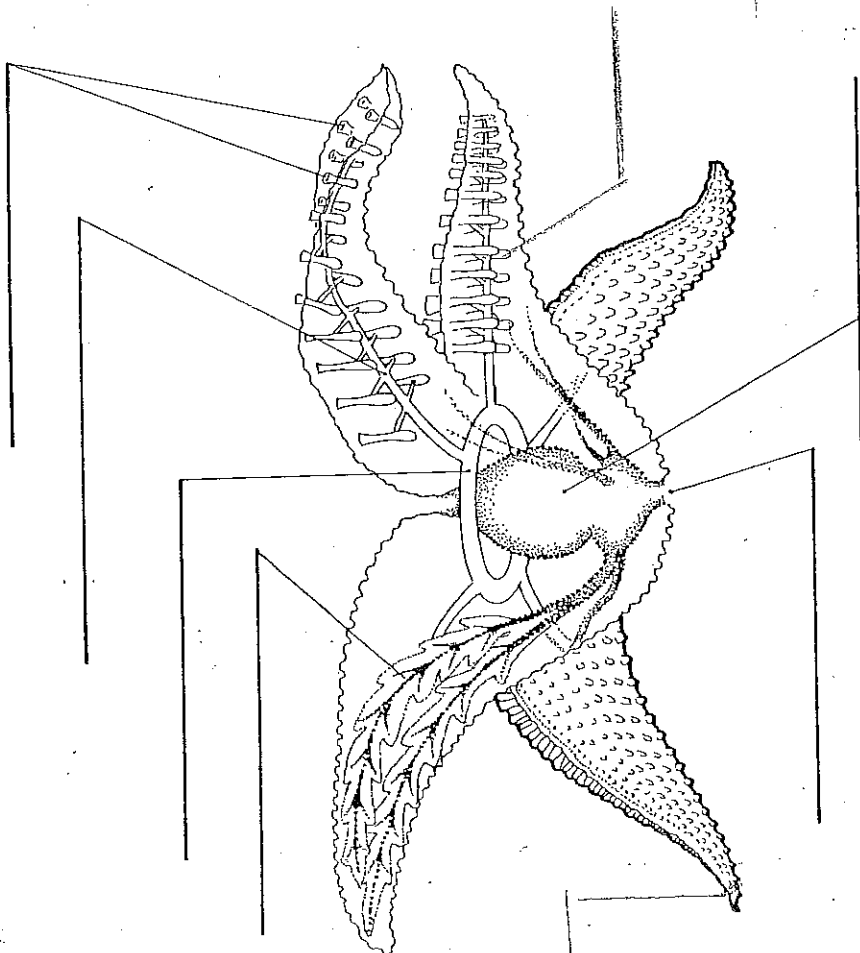
siphons  
mantle

### WORD BANK

### The Starfish

Name \_\_\_\_\_

Label the parts of the starfish.



digestive glands  
stomach

ring canal  
anus

tube feet  
radial canal

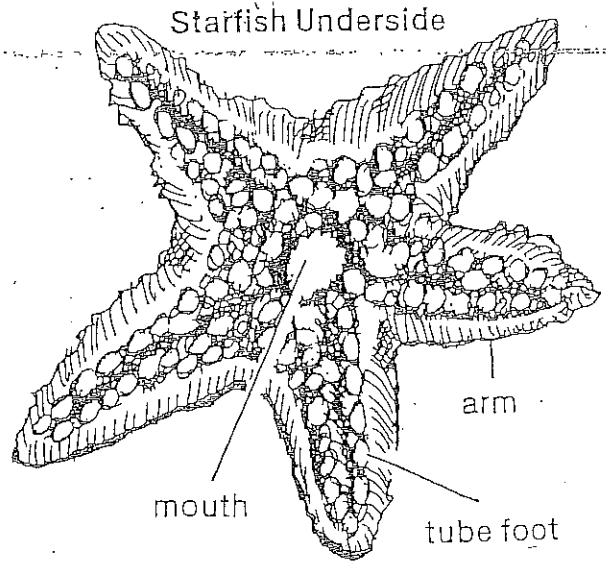
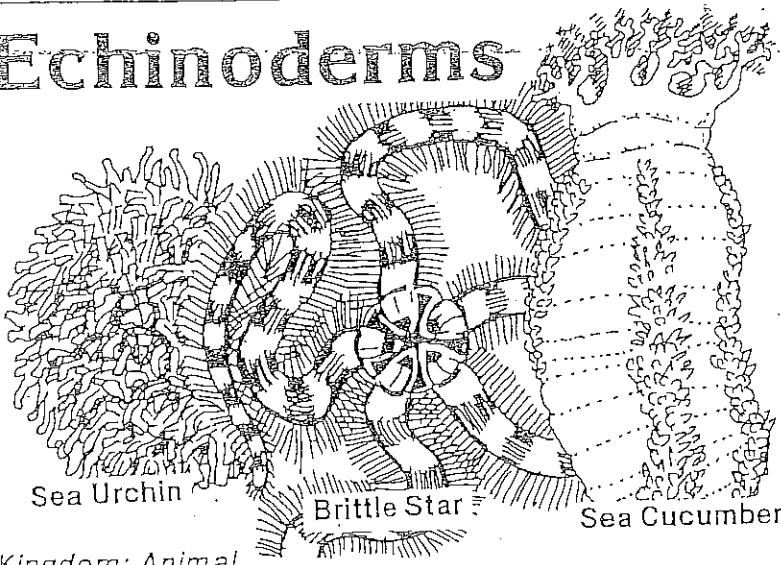
ampulla  
eyespots

### WORD BANK

Name \_\_\_\_\_

## Members, Habitats & Characteristics

# Echinoderms



Kingdom: Animal

Phylum: Echinodermata (Ee•KINE•o•der•MAT•a) means "spiny skinned"

The phylum Echinodermata includes the starfish, sea urchin, sea cucumber, brittle star and sea lily. All of these animals live in the ocean.

Animals which belong to this phylum have two characteristics in common: 1) They have spiny skins. 2) They have a circular shape. (Or you could draw a circle around the outstretched arms.)

Many echinoderms like the starfish, have five arms coming out from the center. In the middle, underneath, is a hole that is the mouth. Most echinoderms also have a very special organ called a tube foot. There are two rows of tube feet under each arm of the starfish. Each tube foot acts like a suction cup which

the starfish can attach or release.

The starfish has a unique water vascular system that includes its tube feet that it uses to move along the bottom of the sea, it also uses them to pull open clams and oysters. Then an amazing thing happens! He can push his stomach out through his mouth and push it into the clam. Inside the clam, the starfish's stomach is inside out! Then the stomach secretes digestive juices into the clam. This breaks down the soft clam so the starfish can eat it like jelly.

Fishermen used to cut up starfish to keep them from eating the oysters they were fishing for. However, this only made more starfish! Starfish are able to grow back or regenerate missing parts.

An Acrostic: use the definitions to fill in the blanks.

C \_\_\_\_

I \_\_\_\_\_

R \_\_\_\_\_

C \_\_\_\_

U \_\_\_\_\_

L \_\_\_\_

A \_\_\_\_

R \_\_\_\_

The tube foot acts like a suction \_\_\_\_\_.

Starfish's stomach in an oyster is \_\_\_\_\_.

To grow back \_\_\_\_\_

Starfish food \_\_\_\_\_

The mouth is \_\_\_\_\_ the starfish.

The tube foot can either hold on or \_\_\_\_\_.

Many echinoderms have five \_\_\_\_\_.

Each arm has two \_\_\_\_\_ of tube feet.

1. Which of these are characteristics of all echinoderms? Circle them.

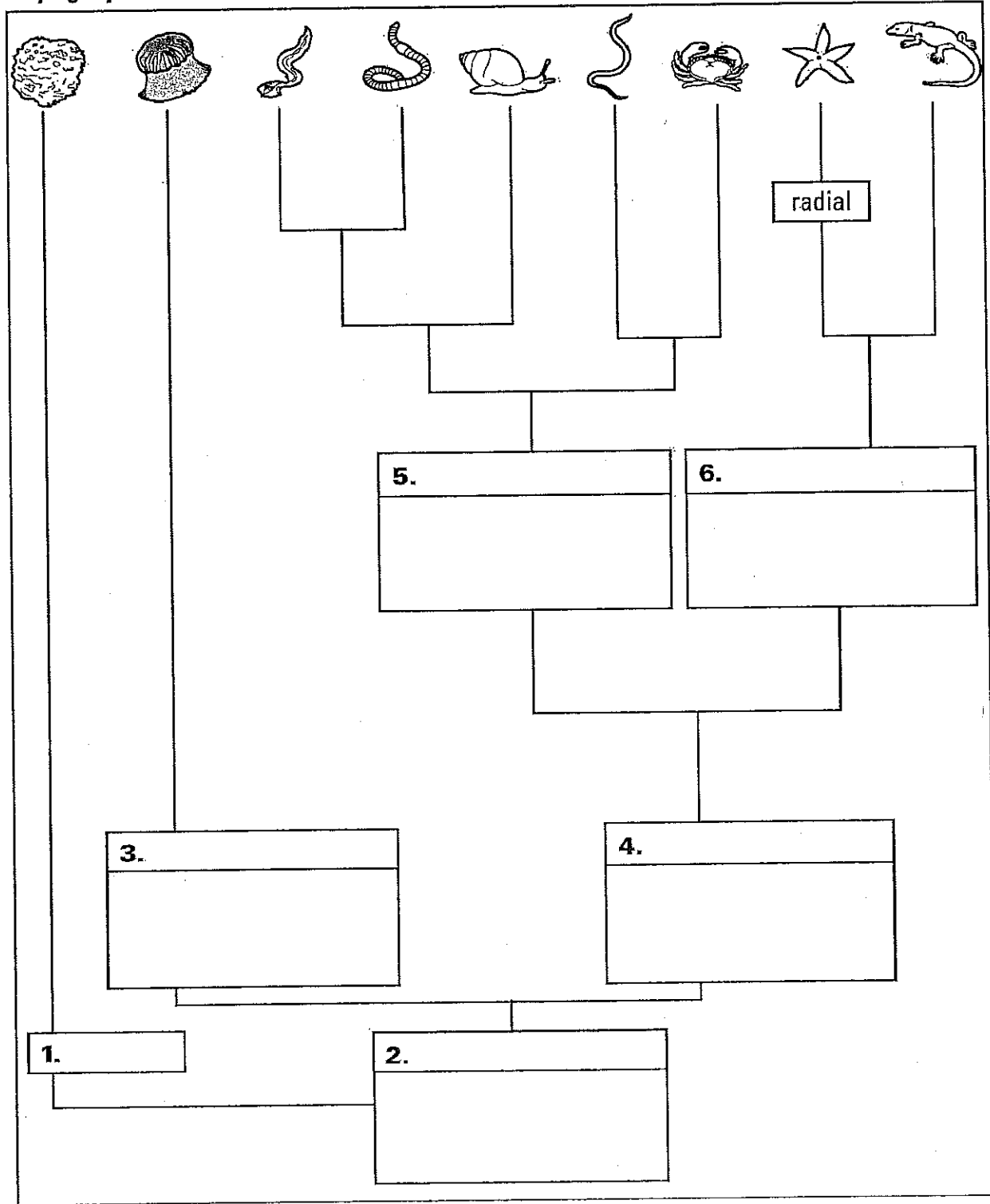
arms      circular shape      tube feet      spiny skin

2. In the space below, describe how a starfish eats an oyster:



# Phylogeny of Animals

See Diagram on page 677 (Be sure to identify on each branch, name of phyla shown.)  
 Phylogeny of Animals



## The Invertebrate Animal Body

GROUP & Examples	No. of germ (cell) layers, Type of Cavity	Body Symmetry	Reproduction (internal or external)	No. of body Openings	Systems Present (simple or complex)
Porifera, ex:					
Cnidarians, ex:					
Platyhelminthes, ex:					
Mollusca, ex:					
Annelids, ex:					
Nematoda, ex:					
Arthropods, ex:					
Echinoderms, ex:					