

The **Crayfish Classification** is **Animal, Arthropod** (jointed legs), **Crustacean, & Decapod** (10 legs).

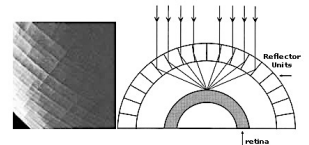
The CRAYFISH is an omnivore and scavenger that eats both pl\_\_\_\_\_ & an\_\_\_\_\_, both d\_\_\_\_\_ and alive. It is eaten by larger animals, but gains much protection with its exoskeleton as it grows. It's ni\_\_\_\_\_, or its special place in the food w\_\_\_\_\_, includes where and what it does to live. Most crayfish live in shallow oxygen rich water where there are hiding places. Earthworms and crayfish are both excellent recyclers.



- NOTES:** \_\_\_\_\_
1. Have all drawings checked while you have the Crayfish and/or Crayfish part(s).
  2. The storage is the same: Burrito Wrap + Name + Water.
  3. Find more help on the Science Page→Life→Animals and Science→Life→ARKIVE (plyter.com/science)
  4. Find & ☒ check all of the underlined parts

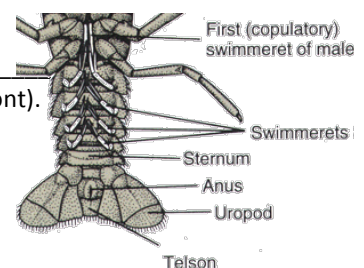
## I. External Parts: If it is underlined, find it and ☒ check it. Other important terms are bold.

1. Watch the ☐Crayfish Molting Video. Science→Life→Animals→
2. All **ARTHROPODS** have an outer ☐exoskeleton covering. A new exoskeleton is soft and flexible so the animal can grow. The exoskeleton then hardens and pro\_\_\_\_\_ the animal and gives it a special shape. Eventually the animal must **MOLT** so it can grow. To **molt** means to sh\_\_\_\_ its exoskeleton. **Muscles** attached to the exo\_\_\_\_\_ allow for movement.
3. **CRUSTACEANS** and **ARACHNIDS** (spiders), including crayfish, have bodies with 2 main BODY PARTS.
  - 3.1 The ☐cephalothorax which is the combination of the h\_\_\_\_ and chest area. (Cephalo- means head.)
  - 3.2 The crayfish ☐abdomen is a series of \_\_\_\_\_ (how many?) ☐segments.
  - 3.3 **INSECTS** have 3 main body parts, the head, thorax & abdomen. **Insects** are also called **HEXOPODS** (\_\_\_\_ legs).
4. **JOINTED** feet (legs) are the classifying characteristic of **ARTHRO-PODS** (joint-feet). **CRUSTACEANS** have 10 or more legs. **ARACHNIDS** have \_\_\_\_\_ legs. **INSECTS (Hexapods)** have \_\_\_\_\_ legs.
5. The **ANTERIOR END** has a center point called a ☐rostrum. On each side is ☐compound eye on a stalk.
  - 5.1 Move the eye. The stalk moves to let the crayfish see in all d\_\_\_\_\_.
  - 5.2 Compound eyes have mul\_\_\_\_\_ lenses. Crayfish have many square lenses that all focus light on the retina ↓.
6. Continue between the **eyes** at the ☐anterior end and find the following.
  - 6.1 The short ☐antennules are more for balance. How many are there? \_\_\_\_\_
  - 6.2 How many long ☐antennae are there? \_\_\_\_\_. Their function? \_\_\_\_\_
  - 6.3 The large pincer(pincher) claws are named ☐chelipeds. Notice the "thumb" joint.
  - 6.4 The \_\_\_\_ pair of regular ☐walking legs are smaller and all about the same size. Describe each tip using "claw" or "pincer". First\_\_\_\_\_ second\_\_\_\_\_ third\_\_\_\_\_ fourth\_\_\_\_\_
  - 6.5 Under the ☐abdomen are \_\_\_\_ pair of small appendages called swimmerets.
  - 6.6 ☐Tail: The **tail** is the last of the paired appendages. Find the ☐uropod, which is the outer 2 pair of "flippers". The center is the ☐telson. A **tail** is the part past the functioning body and anus. Did the earthworm have a tail? \_\_\_\_\_



## II. Reproduction:

1. Abdominal ☐swimmerets are also called pleopods. They help move water over the inner **gills** for oxygen and carbon dioxide exchange (part of **respiration**). The female's swimmerets carry the eggs and newly hatched baby crayfish, which look like miniature adults. The front 2 swimmerets of the male are enlarged for sperm transfer.
2. Watch the ☐Crayfish Baby Video. Science→Life→Animals→
3. Find and observe both a ☐male and ☐female crayfish. Is your crayfish a male or female? \_\_\_\_\_
  - 3.1 Measure, in centimeters, the length of the 4<sup>th</sup> **swimmeret** (count from anterior or front). The male crayfish. \_\_\_\_\_ cm The female crayfish. \_\_\_\_\_ cm
  - 3.3 Most of the female's swimmerets are (longer or shorter?). \_\_\_\_\_ than the males. The females are useful for \_\_\_\_\_.



**III. MOUTHPARTS:** Identify the crayfish MOUTHPARTS

1. Watch the ☐Crayfish Feeding Video. Science→Life→Animals→

2. Turn your crayfish **ventral** side up (upside down). It has 3 types of mouthparts, **maxillipeds, maxillae and mandibles**.

3. Look where the big **CHELIPEDS** or pincers are attached. Hold the chelipeds apart. Find a pair of smaller leg-like appendages. They are ☐maxilli-peds or jaw- \_\_\_\_\_. The first pair look like legs, the others like fingernails.

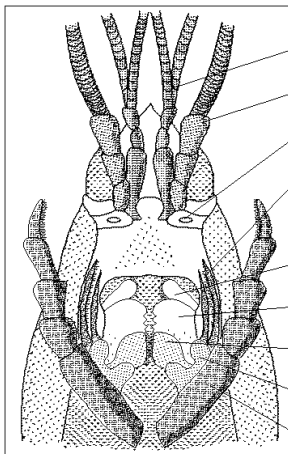
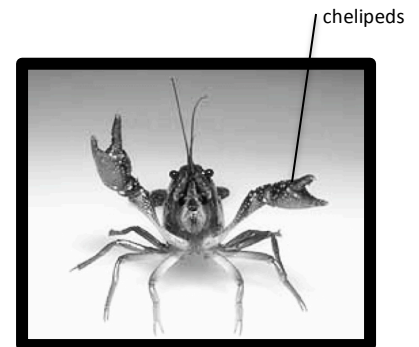
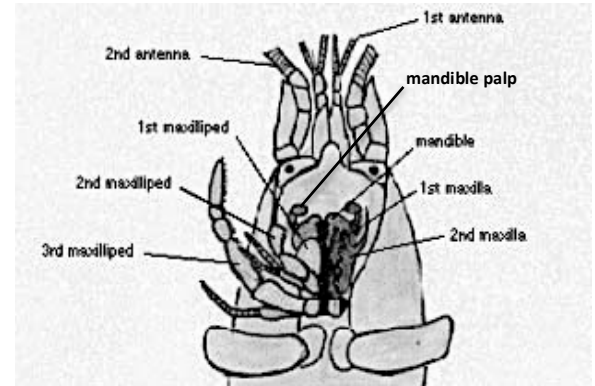
4. Under them are ☐maxillae, or “little jaws”, thin plastic-like layers with hairs that filter food.

5. Use one tip of your tweezers to tap on the 2 center hard tooth-like ☐mandibles. They have saw-tooth edges and are between the other mouthparts, next to the mouth. They move from side to side. Do they chew or slice? \_\_\_\_\_

6. Use one point of your tweezers and see if you can find and move a tiny “helping hand” that works like our tongue to hold food for the ☐mandibles to slice. It is the ☐mandible palp.

7. Show your teacher the mandibles and mandible palp.

8. Extend the line and label any **mouthparts** that you can identify.



**IV. Crayfish EXTERNAL Drawing:**

Make a SCIENTIFIC DRAWING of **one half (or one side)** of the ☐DORSAL VIEW of your crayfish.  
The crayfish has bilateral symmetry, meaning it can be divided into 2 similar (left and right) sides

READ all of 1-8 BEFORE YOU START TO DRAW. ☒Check as you go.

- ☐1. Use Pencil. NO SKETCHING OR SHADING.
- ☐2. Draw PART FOR PART. Count! If too many to draw (hair or bumps)? Don't draw.
- ☐3. Start at the bottom or the paper by drawing the telson.
- ☐4. FINISH THE TELSON, BEFORE your start the uropod.
- ☐5. As you draw, move your crayfish so you can draw all the parts of the tail (the telson & uropod)
- ☐6. Each leg is 4 or 5 drawings. DO NOT DRAW a whole leg and add lines (No striped socks!).
- ☐7. Have your drawing checked BEFORE YOU LABEL.
- ☐8. **LABEL**, on one side (unless you have a plan). Use a straight edge for your lines.

Yes→



No→



Start here:

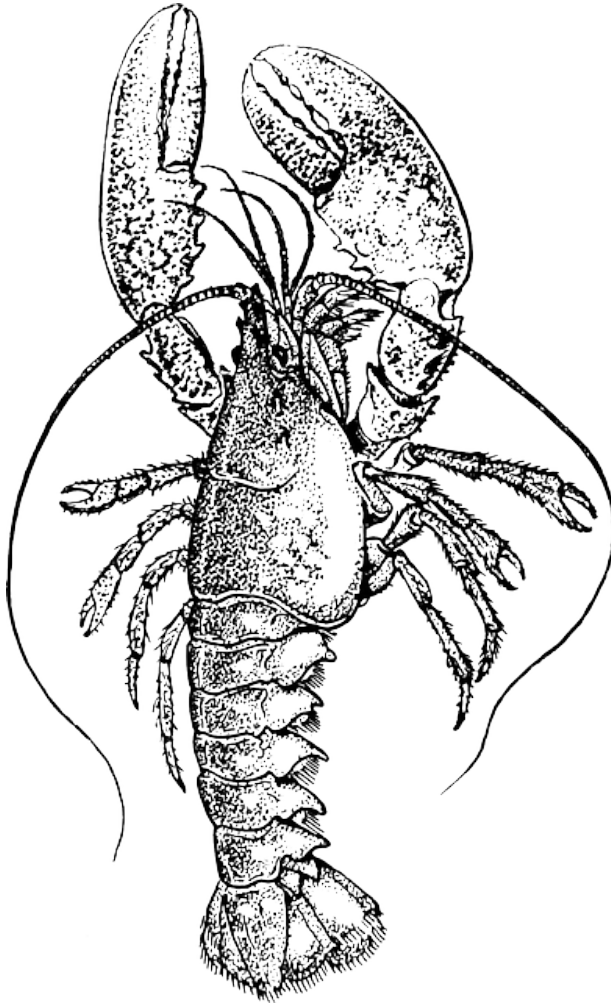
Draw the Telson here.

**IV. Crayfish External:**

1. Use a pencil and straight edge to label to the right side. Labels must touch what they label.

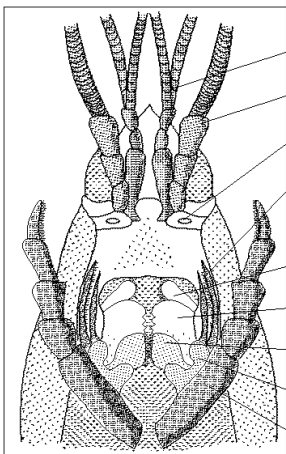
Lateral (side) View: ↓

Labels: ↓



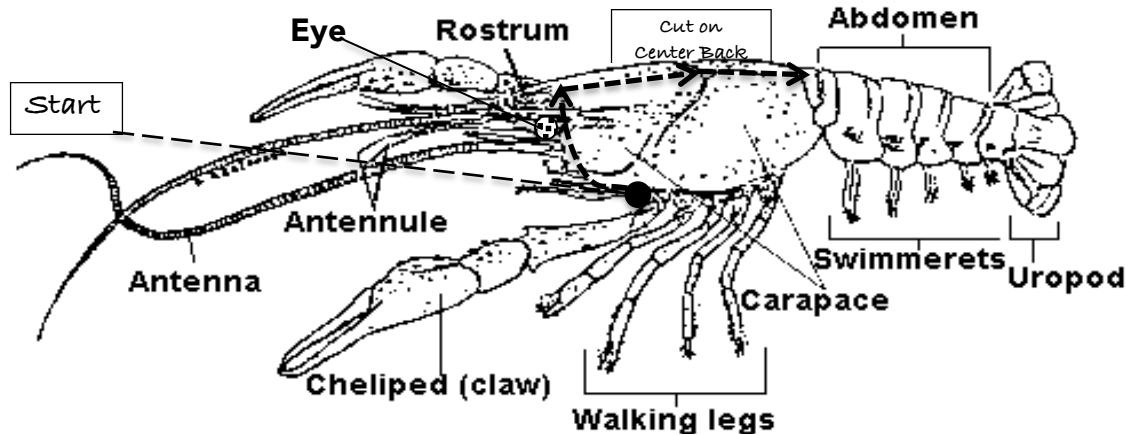
2. Ventral Side of Head Region: ↓

Labels: ↓ (Extend lines of those you identify with a straight edge.)



**V. The Crayfish Internal: The First Cut.**

1. Observe **MOLLUSCA** (soft bodied) shells. Snail and clam shells are secreted (like a fingernail) and are attached one place.
2. Observe your crayfish exoskeleton. The muscles of the crayfish are attached to the exoskeleton throughout the body.
3. Which one is required for life? \_\_\_\_\_
4. **Start** next to the **Cheliped**. **Cut the exoskeleton near the eye, according to the arrows, ending at the abdomen.**
5. Carefully remove the **exoskeleton** from the side you cut. You may have to loosen it from the body.
6. Repeat the cut on the other side. Carefully remove the second **exoskeleton** section.

**VI. Respiratory System:**

1. The gray feathery parts that you can now see are gills to pick up oxygen and give off carbon dioxide. Each tiny "hair" of a gill has a tiny blood vessel in it. The **blood** absorbs \_\_\_\_\_ and gives off carbon dioxide. **Respiration** includes **cellular respiration** which is the combination or "burning" of \_\_\_\_\_ and \_\_\_\_\_ to release \_\_\_\_\_.
2. The earthworm absorbs oxygen through its skin. We have \_\_\_\_\_ where our blood picks up  $O_2$  and gives off  $CO_2$
3. Notice the plastic like liner behind the gills. This helps hold \_\_\_\_\_ so the crayfish can be on land for a short time.

**VII. Circulatory System:**

1. The circulatory (blood) system of the **earthworm** is a **closed blood system**. In a closed system, blood is in blood vessels all the time as it is pumped to all parts of the body. The microscopic blood vessels that go by the cells are **capillaries**. The **crayfish** has an **open blood system** which means blood is in vessels part of the time and is pumped out to the organs and cells and the let loose to flow back to the heart to be pumped out again. The heart has holes to let the blood back in.

2. Fill in the summary:

Animal	Blood system type	What happens to blood.
Earthworm	_____	_____
Crayfish	_____	_____
Human	_____	_____

3. **READ BEFORE YOU TOUCH.** Find the crayfish **heart** is in the center back of the crayfish. It is usually light pink or colorless. The heart has vessels that go out to the body and holes called **ostia** that let the blood back in to be pumped out again. Use **only ONE POINT OF YOUR TWEEZERS** to LIFT THE **heart** up and out. Move it to a small container of water.

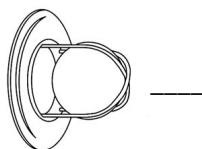
4. Ask for directions to demonstrate the heart moving the blood one direction.

5. Draw the heart here. → Label at least one of the ostia. (Ostium is singular.)

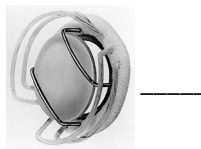
6. A valve at each ostium (hole) closes that ostium, so when the heart pumps, the blood has to go out the other way and to the body. A **valve** is a one-way gate.

7. Below are drawings of artificial heart valves for humans. Add an arrow to each line to show direction of blood flow.

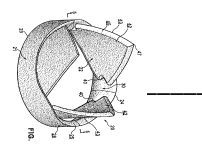
7.1



7.2



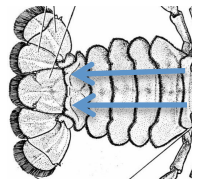
7.3



Crayfish Heart showing Ostium

**VIII. Digestive System**

- The **digestive system** begins with the mouthparts and the opening for food, the \_\_\_\_\_.
- There are 3 main kinds of mouthparts. See page 2. Find them and then write the names here.
  - Jaw feet \_\_\_\_\_
  - Little jaws \_\_\_\_\_
  - Tooth like jaws \_\_\_\_\_
- The crayfish does not have a muscular **pharynx** like the earthworm. The **mouthparts** help move the food to a short **esophagus** which leads to the **stomach**, a large pouch with a hard ridge on top. Locate the large **stomach** in what seems like the head. Loosen it from the exoskeleton and move it aside. It may come out when you move it. If not, use a scissors to cut the lower **esophagus** by the mouthparts. Move the **stomach** to your paper towel.
- Turn the **stomach** so the hard ridge is down. Cut the soft part of the **stomach** off or open.
- (If possible, dump some of the food in the wastebasket.) Use your tweezers to take the part of the stomach that has the hard ridges to the cleanup sink faucet and rinse until it is clean.
- Look inside for the **teeth**. How many sets are there? \_\_\_\_ What is their function? \_\_\_\_\_  
What earthworm organ had the same function? \_\_\_\_\_ In humans? \_\_\_\_\_
- Look closely at the center set. Draw all of the **teeth** here. Try to count and draw each of the points.
- Watch the **Lobster Stomach Teeth Video**. Science→Life→Animals→  
This was taken with a small camera on a tube that a doctor might use to look at your esophagus.  
Together the teeth are called a **gastric mill** (stomach grinder).
- Just look! The crumbly organ around the heart and above the intestine is the **digestive gland** somewhat like our liver. It makes digestive juice, which dissolves food. (You may also find eggs here in a female.) The **digestive gland** can be messy, so leave it alone. The **intestine** runs from the **stomach** under the **digestive gland** to the **abdomen** and **anus**.
- The rest of the intestine is in the abdomen.
  - Carefully cut two parallel cuts down the center of the **abdomen exoskeleton**. →
  - Remove the center section of **exoskeleton**. A thin layer of tissue should go with it.
  - The **intestine** and a **blood vessel** should be in the center of a large muscle.  
The blood and the **blood vessel** are clear. The **blood vessel** is very fragile and may break.  
The **intestine** takes the undigested food to the anus for removal.  
The large **muscle** is what you would eat for "Lobster Tail". The actual tail is mostly exoskeleton.
- Show the **blood vessel** and **intestine** to your teacher. Have Checked for points.

Gastric Mill  
(Teeth)**IX. Nervous System**

- The crayfish **brain** is a group of white mounds inside the head. Don't try to remove it. You should be able to see white **nerve cord branches**. Some lead forward to the **sense organs**. Some lead backward to the lower crayfish.
- The **sense organs** **anterior** to the brain are a \_\_\_\_\_, a \_\_\_\_\_ and e\_\_\_\_\_.
- Nerve branches** from the **brain** meet to form the **nerve cord**. To see the **nerve cord** turn your crayfish ventral side up (upside down). Make 2 parallel cuts like you did on top. It is ok if you cut **swimmerets**. Remove the center.
- You should see the white **nerve cord**. It fits down in the center of the **muscle**. There is a **ganglion** for each **segment**.
  - Use your scissors to make 2 cuts, as far apart as possible, in the **nerve cord**.
  - Move the nerve cord to a puddle of water. Like the earthworm, each **ganglion** directs messages to its segment.
- Draw enough of the **nerve cord** to show at least one **ganglion** and its **nerve branches** (count the branches). **Label**.

Nerve Cord with Ganglion  
and Nerve Branches