

1st Grade Lesson Plan

Get to know the Babies of the Deep Sea: Matching Activity

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1.	Title & Grade Level	pg. 1
2.	Lesson Summary	pg. 1
3.	Objectives	pg. 1
4.	Estimated Time	pg. 1
5.	Next Generation Science Standards	pg. 1
6.	Ocean Literacy Principles	pg. 1
7.	Focus Question	pg. 1
8.	Materials	pg. 1
9.	Preparation	pg. 2
10.	Lesson Steps	pg. 2
11.	Extensions	pg. 3
12.	References	pg. 3
13.	Background information	pg. 3
14.	Butterfly Life Cycle Diagram	pg. 4
15.	Meet the Larvae and Adults Information Sheets	pg. 5-6
16.	Answer keys to Matching the Larvae Activities	pg. 7-8
17.	4 Matching the Larvae Sheets	pg. 9-12
	a. 2 Simple Matching the Larvae Sheets	pg. 9-10
	b. 2 Challenge Matching the Larvae Sheets	pg. 11-12

1. Title & Grade Level

Get to know the Babies of the Deep Sea: Matching Activity (1st Grade)

2. Lesson Summary

Many deep-sea animals have life cycles similar to those of butterflies. As students may have learned before, butterflies spend the first part of their lives as caterpillars. During this stage, they are known as larvae. A larva's main job is to eat and find a safe place. The baby will go through a big change called a metamorphosis to turn into their adult form.

Students will make observations of larvae (babies) and adults of marine animals found in the deep sea. Students will recognize similarities and differences between young and parents, and learn which larvae belong to which adults by completing matching sheets.

3. Objectives

- a. Students examine the shapes of different marine animals
- b. Students explore how the adults and babies of marine animals are both similar and different from each other
- c. Students match marine larvae (babies) to their parents (adults)
- d. Students are introduced to marine animal life cycles

4. Estimated Time

45-60 minutes

5. Alignment with Next Generation Science Standards**1-LS1-2 From Molecules to Organisms: Structures and Processes**

Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive. Performance Expectation Grade: K-2, 1

6. Alignment with Ocean Literacy Principles

OLP 5: The ocean supports a great diversity of life and ecosystems.

OLFC 5A: Ocean life ranges in size from the smallest living things, microbes, to the largest animal on Earth, blue whales.

7. Focus Question: What do the babies of marine animals look like? Are they the same or different from adult marine animals?**8. Materials**Included:

- Matching sheets to print
- Answer keys to matching sheets
- Butterfly Life Cycle diagram
- "Meet the larvae and adults" information sheets

Not included:

- Writing and coloring supplies

9. Preparation

- a. Review the [Larval Biology Basics page](#) on the Born in the Abyss Website
- b. Review the background information and lesson steps below
- c. Print matching sheets
- d. Gather coloring supplies

10. Lesson Steps

Step one: Begin by introducing the butterfly life cycle using the diagram on page 4. Point out or ask students to point out the differences between the caterpillar and butterfly body shapes.

Step two: Discuss how the differences in body shapes allow different behaviors (Example: caterpillars inch around and eat leaves with their teeth; butterflies can fly and drink nectar from flowers with a straw-like appendage called a proboscis)

Step three: Explain that, similar to how caterpillars metamorphose or change into butterflies, many ocean animals have babies that go through a metamorphosis to become recognizable adults such as sea stars and sea urchins. Similar to caterpillars, but unlike humans, marine larvae don't have parents to feed or protect them. Both insects and marine animals have behaviors and features that help them survive before and after metamorphosis.

Step four: Share that the babies that we are learning about today are microscopic, which means that they are smaller than the period at the end of this sentence. Humans can't see these babies without special tools called microscopes.

Step five: Introduce the students to the marine larvae they will learn about during the lesson by sharing the "meet the larvae and adults information sheets" (pages 5-6). You will reveal to students which adult each baby will grow into so that they can apply that knowledge independently on the matching sheets, or use recall when working to complete the matching sheet as a class. Ask students to share observations of the different body forms and features of marine larvae.

Step six: Discuss with students the similarities and differences between adults and babies of marine animals found in the deep sea.

Step seven: Answer keys to the matching activity are on pages 7-8. Provide students with the matching activity sheets and allow time for independent work while helping/answering questions. Note: there are two formats of matching sheets. One format has babies and adults already separated for an easier version (pages 9-10), and the other format has babies and adults mixed together for a challenge (pages 11-12). Alternatively, the matching activity can be completed as a class by asking about each larva and having students offer educated guesses about which adult it is. This exercise encourages students to use recall from the introductory information to match babies to adults.

Step eight: After the matching activity is complete, reflect with students on any difficulties they experienced when matching marine larvae to adults. As a class, discuss the question: How are the babies of marine animals similar or different to their adult forms? To conclude the lesson, share that scientists who study these microscopic babies are larval biologists, and they face the challenge of trying to match tiny babies to their adults.

11. Extensions

- Visit the Born in the Abyss website (linked below) to view life cycle diagrams and videos for each of the marine babies on the matching sheets.
- Consider raising caterpillars into butterflies as a class.
- A more marine-themed alternative classroom pet would be to hatch sea monkeys (brine shrimp). The behaviors and size of the brine shrimp are similar to that of marine larvae.

12. References

[Next Generation Science Standards](#)

[Ocean Literacy Principles Handbook by NMEA/NOAA](#)

[Born in the Abyss Film Website](#): Larval Biology Basics from Marine Larvae Exhibit at the University of Oregon's [Charleston Marine Life Center](#)
 Butterfly Background Information from butterfly-conservation.org

13. Background Information:

Butterfly Life Cycle [Click this link to learn more](#)

Egg – Adult butterfly mothers look for specific plants to lay their tiny eggs on. They use a special glue to stick their eggs to plants that their babies can eat when they are ready to hatch.

Larva (Caterpillar) – The soft and delicate larvae that hatch from butterfly eggs are known as caterpillars. They are usually multi-colored or camouflaged, and many caterpillars are hairy, since the hairs can protect them from other insects and some birds that might want to eat them. Caterpillars spend almost all of their time eating, and they also can shed their skins, just like snakes, many times during this stage, which can last for a few weeks or months.

Chrysalis – When a caterpillar is ready, it finds a hidden place, usually on the underside of a leaf, to stick itself to and cover itself with a hard shell. Inside, it begins to grow and change. During this stage, it is called a chrysalis. The chrysalis begins to develop the parts we recognize in butterflies, such as wings, legs, and a long mouthpart. This stage may last a few weeks or months.

Adult Butterfly – Finally, the adult butterfly emerges from its hard casing and starts to fly. In this stage, the adult has a long mouthpart called a proboscis used to suck up food such as flower nectar. It also has light, fragile wings that allow it to move around and mate, so the cycle can begin again.

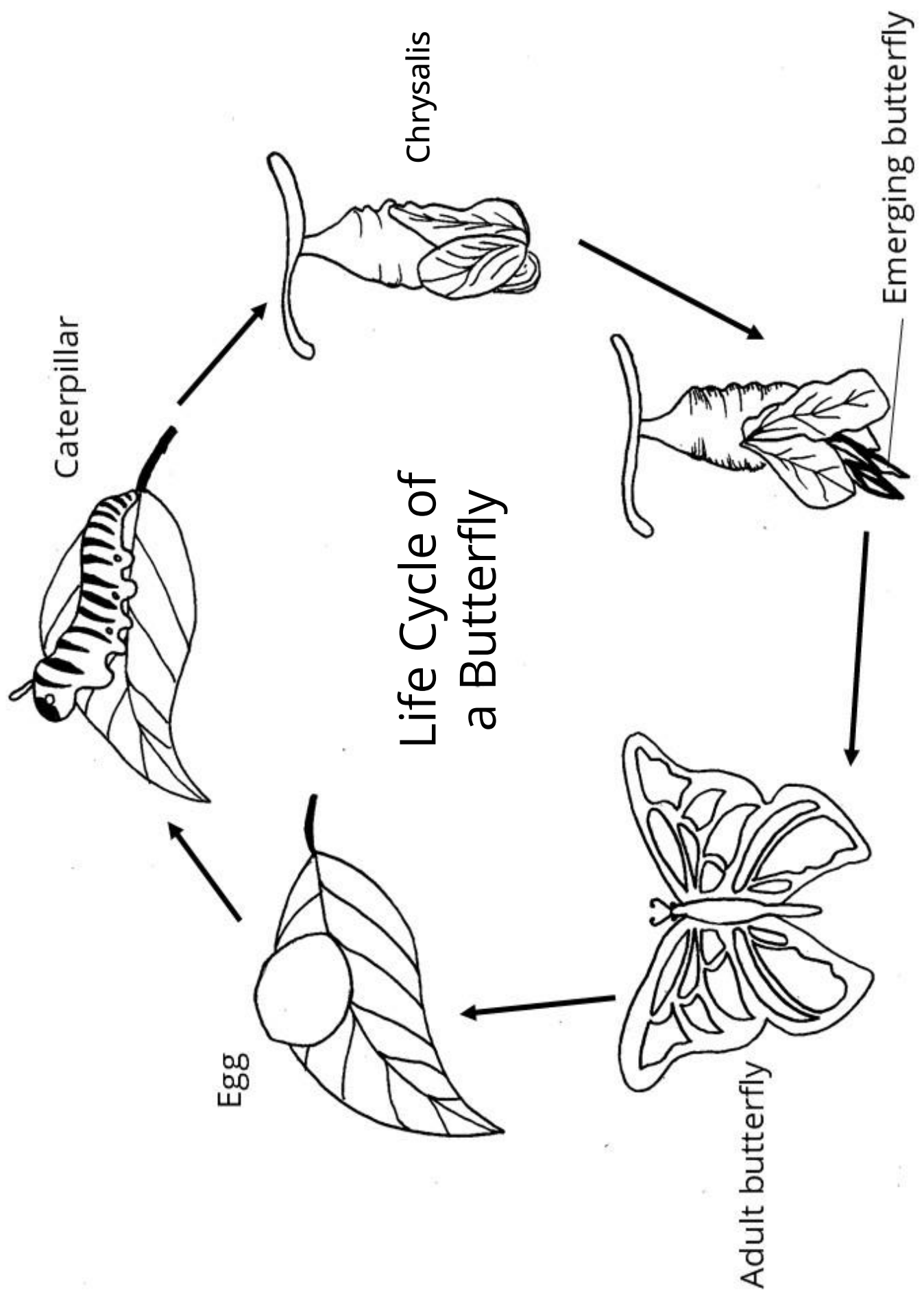
Marine Larvae [Click this link to learn more](#)

Question: What is a larva?

Answer: The beginning stage, or baby, of many animals that does not look like the adult

Human babies have the same basic features as adults (such as fingers, toes, nose, eyes), but butterflies do not look much like their caterpillar babies. Neither do frogs look much like tadpoles. These animals have indirect development, in which a larval form (baby) undergoes a dramatic change called metamorphosis to take on the adult form. Metamorphosis is Greek for “transformation” and often involves a change in both behavior and anatomy.

Marine larvae are tiny and diverse. Like butterflies and other insects, many marine animals lack backbones and are called invertebrates. The larvae (plural of larva) of marine invertebrates are microscopic, and many are smaller than the period at the end of this sentence.



Meet the Larvae and Adults Information Sheet

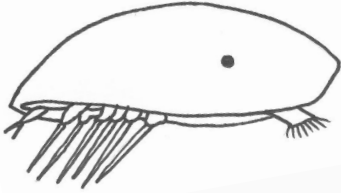
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Page 1

During the larval stage, some marine babies do not look like their parents at all. Other larvae already have the beginnings of body parts they will always have even after their metamorphosis when they become adults. Would you know that a caterpillar would one day look like a butterfly just from seeing a caterpillar? Would you be able to match these larvae to their adults just by looking?

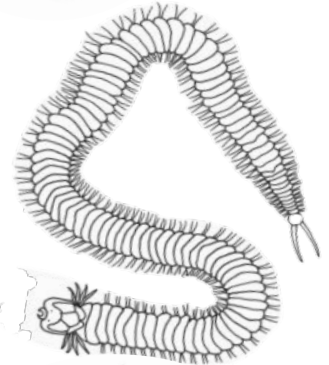
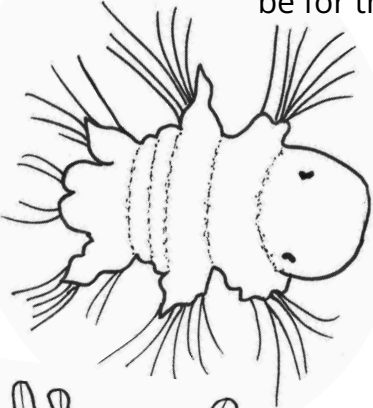
Cyprid = baby barnacle

This larva is called a cyprid and it will grow into a barnacle. They have one eye that can see light and dark. Cyprids have special legs that help them swim. During metamorphosis, the cyprid settles in one spot where the adult barnacle will be for the rest of its life.



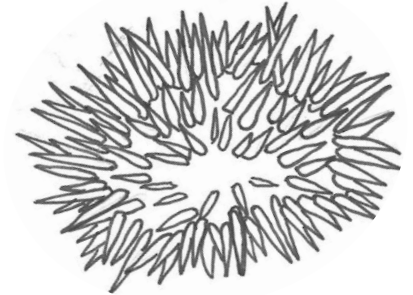
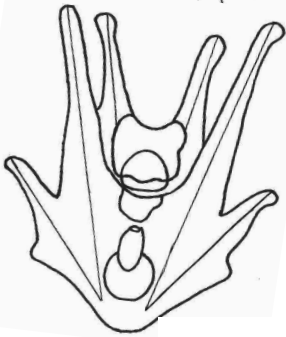
Nectochaete = baby bristle worm

This larva is called a nectochaete and it will grow into a bristle worm. As babies, nectochaetes have the same bristles or spines they have as adults. These bristles can help these worms move and protect themselves from predators. As the nectochaete grows, it will grow more and more bristles.



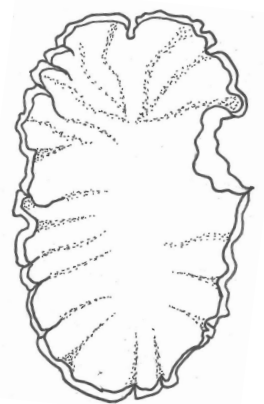
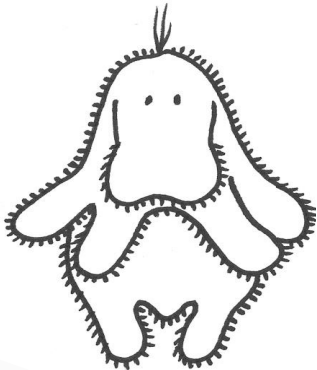
Pluteus = baby sea urchin

This larva is called a pluteus and it will grow into a sea urchin. The straight lines you see inside the baby are the start of the adult sea urchin skeleton which is called a "test".



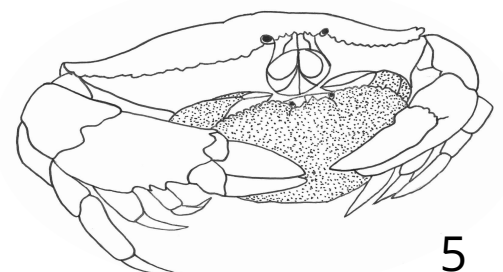
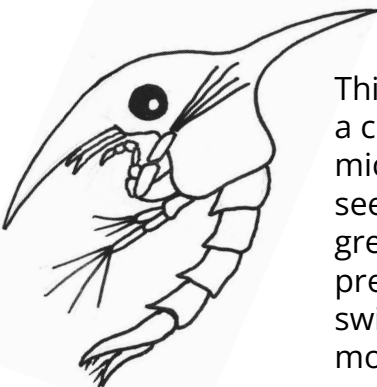
Müller's larva = baby flatworm

This larva is called a Müller's larva and it will grow into a flatworm. The "hairs" you see all over this larva are called cilia. Cilia allow many of the microscopic babies in the ocean to feel their environment, move around, and find food. The long cilia on the top are important for sensing their environment.



Zoea = baby crab

This larva is called a zoea and it will grow into a crab. Unlike the eyes of most other microscopic babies, the eyes of a zoea can see images, not just light and dark. Their great eyesight makes them successful predators of other tiny animals. Zoea can swim very well, but after metamorphosis, most crabs spend their lives crawling on the ocean floor.



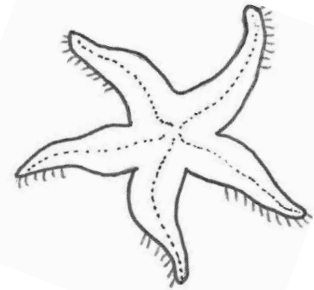
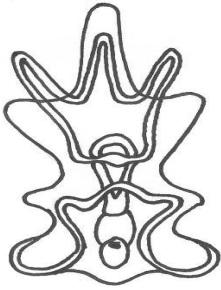
Meet the Larvae and Adults Information Sheet

1st Grade
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Page 2

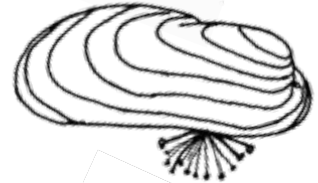
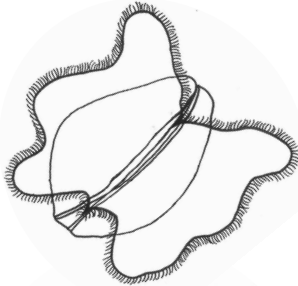
Bipinnaria = baby sea star

This larva is called a bipinnaria and it will grow into a sea star. Similar to a caterpillar and a butterfly, the bipinnaria baby does not look like the adult sea star at all, and they will even grow a new mouth, stomach, and digestive system during metamorphosis.



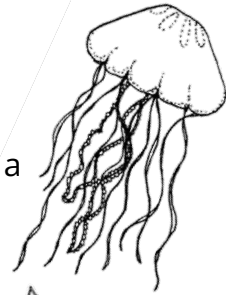
Bivalve veliger = baby mussel

This larva is called a bivalve veliger and it will grow into a mussel. The word "bivalve" means two doors. Both the baby and adult mussel have two shells that close together. Bivalve veligers have a velum that sticks out of their shell and allows them to move. Adult mussels have byssal threads that allow them to hold tightly to rocks.



Planula = baby jellyfish

This larva is called a planula and it will grow into a jellyfish. Although they do not look like jellyfish when they are larvae, these babies can have stinging cells just like their parents.



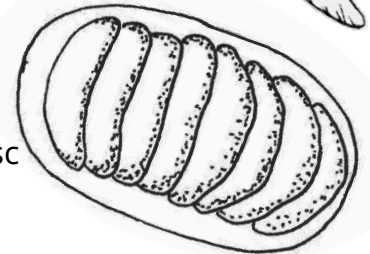
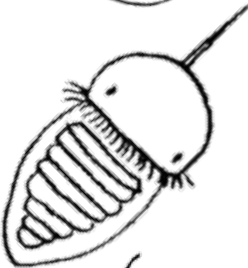
Gastropod veliger = baby sea slug

This larva is called a gastropod veliger and it will grow into a sea slug. You can see that as larvae, gastropod veligers have shells like snails, but drop their shells during metamorphosis into a sea slug.



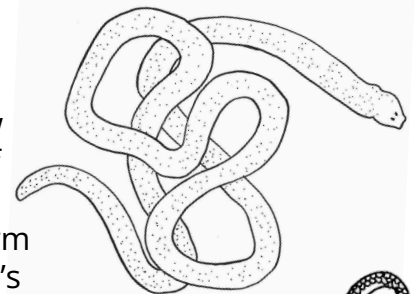
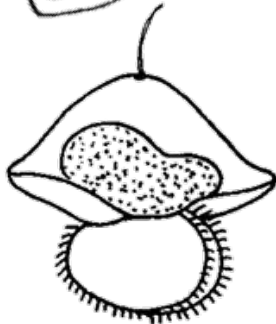
Trochophore = baby chiton

This larva is called a trochophore and it will grow into a chiton. A chiton is a type of mollusc like sea snails and slugs. Chitons have eight plates of armor that start growing when they are larvae and keep growing after metamorphosis.



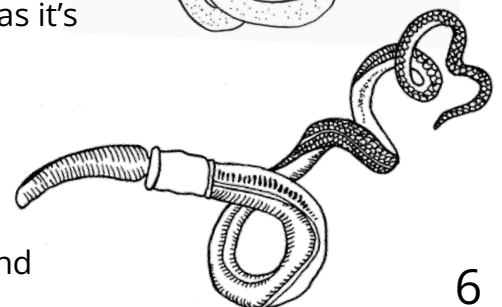
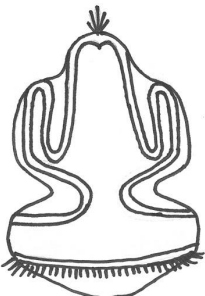
Pilidium = baby chiton

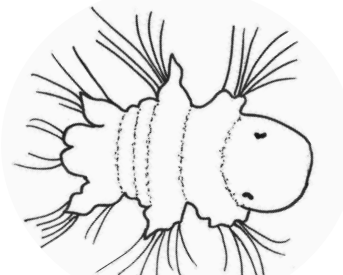
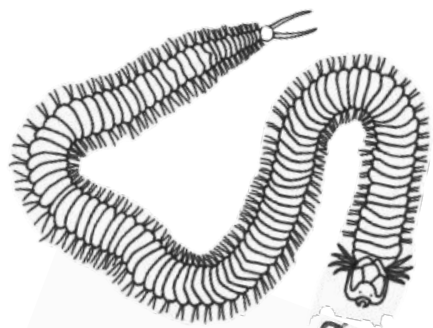
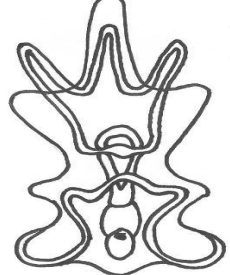
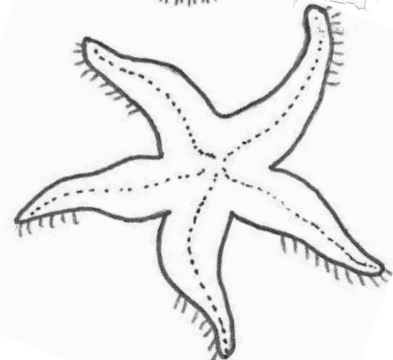
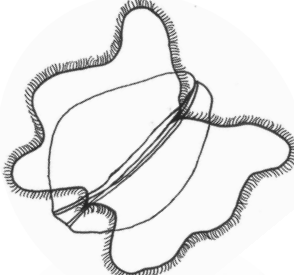
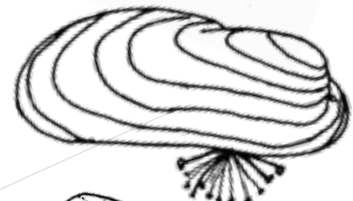
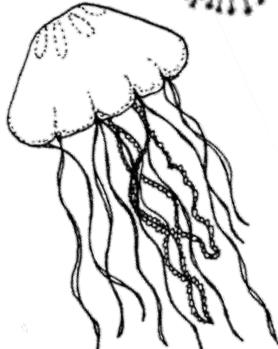
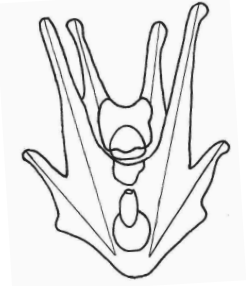
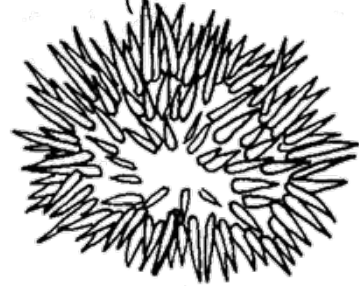
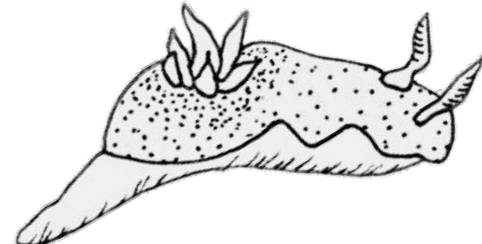
This larva is called a pilidium and it will grow into a ribbon worm. You can see the start of the adult worm growing inside the pilidium body. During metamorphosis, the small worm will burst out and eat the pilidium body as it's first meal as a growing ribbon worm.

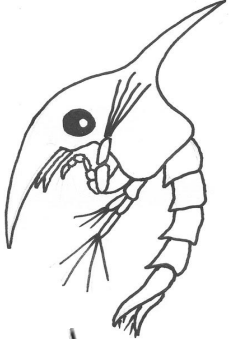
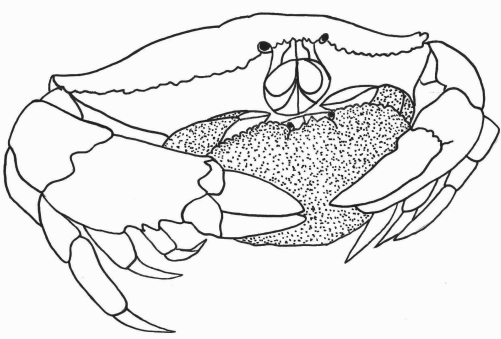
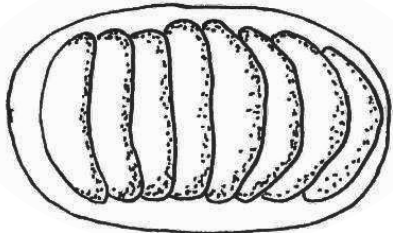
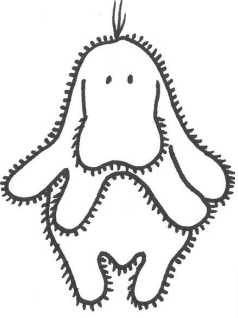
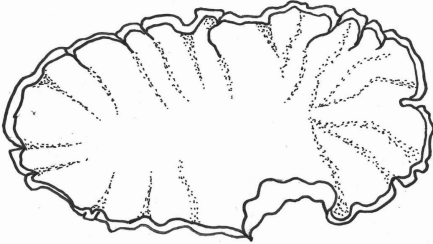
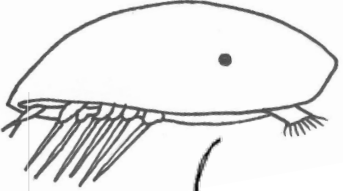
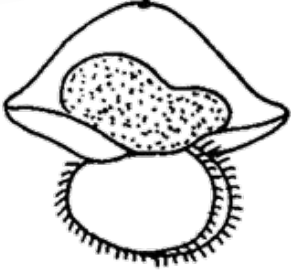
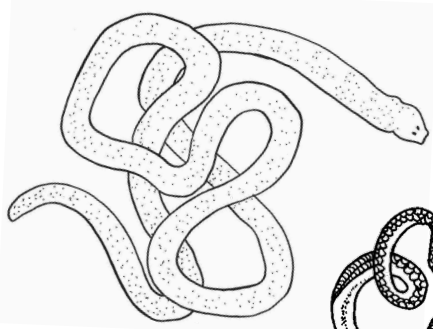
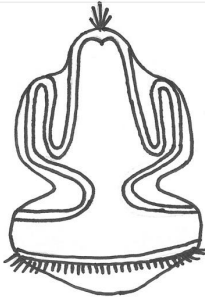
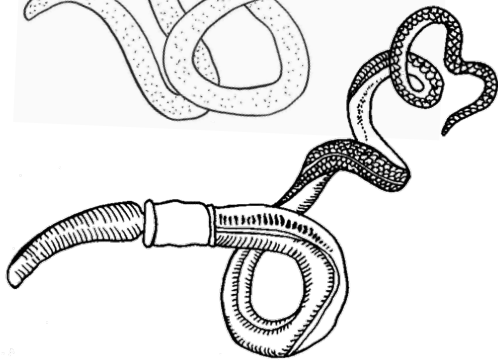


Tornaria = baby acorn worm

This larva is called a tornaria and it will grow into an acorn worm. Unlike the bipinnaria larvae of sea stars, tornaria keep the same esophagus, stomach, and intestine they have as larvae through metamorphosis into adulthood.



Babies (larvae)	Parents (adults)
Name: Nectochaete 	Name: Polychaete worm 
Bipinnaria 	Sea star 
Bivalve veliger 	Mussel 
Planula 	Jellyfish 
Pluteus 	Sea urchin 
Gastropod veliger 	Sea slug 

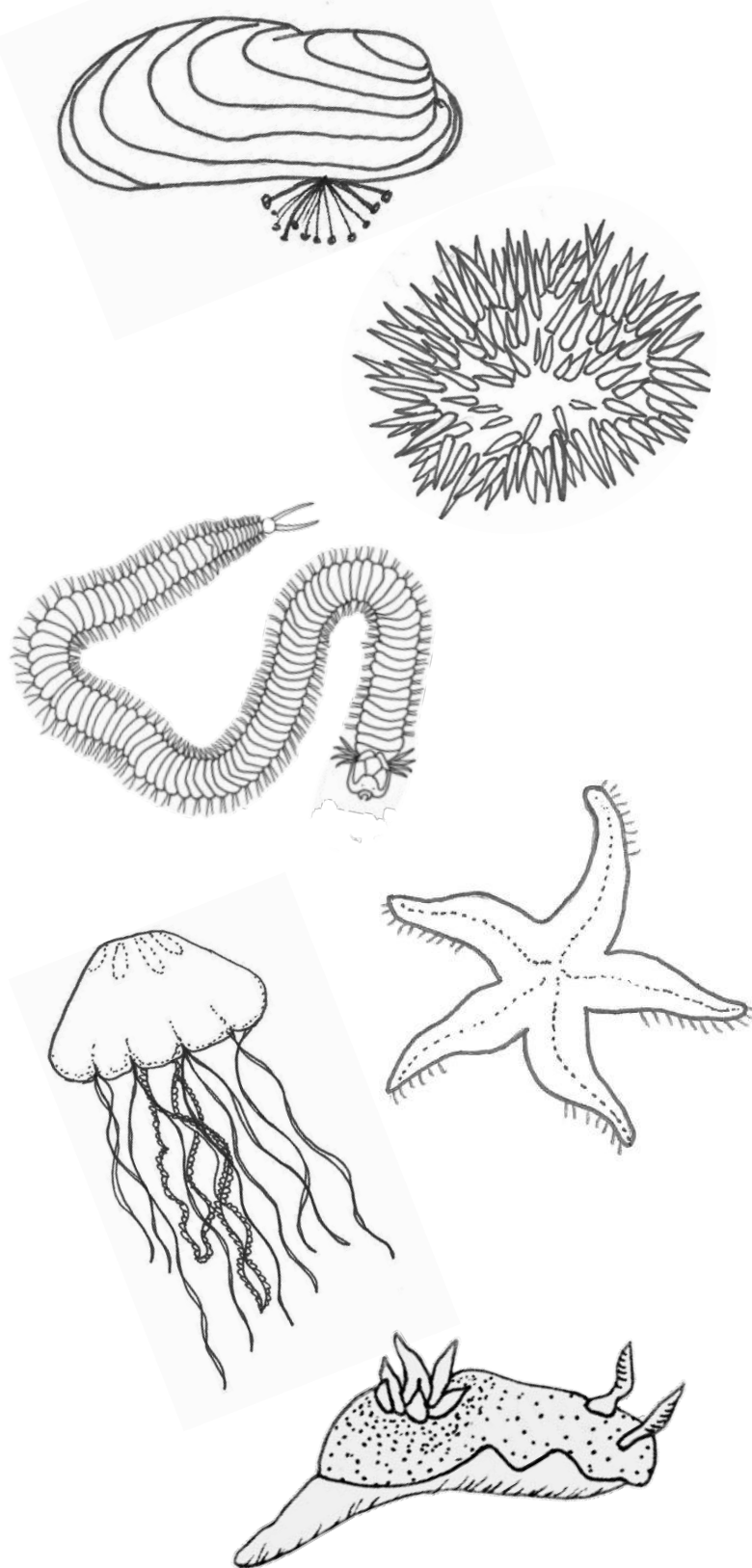
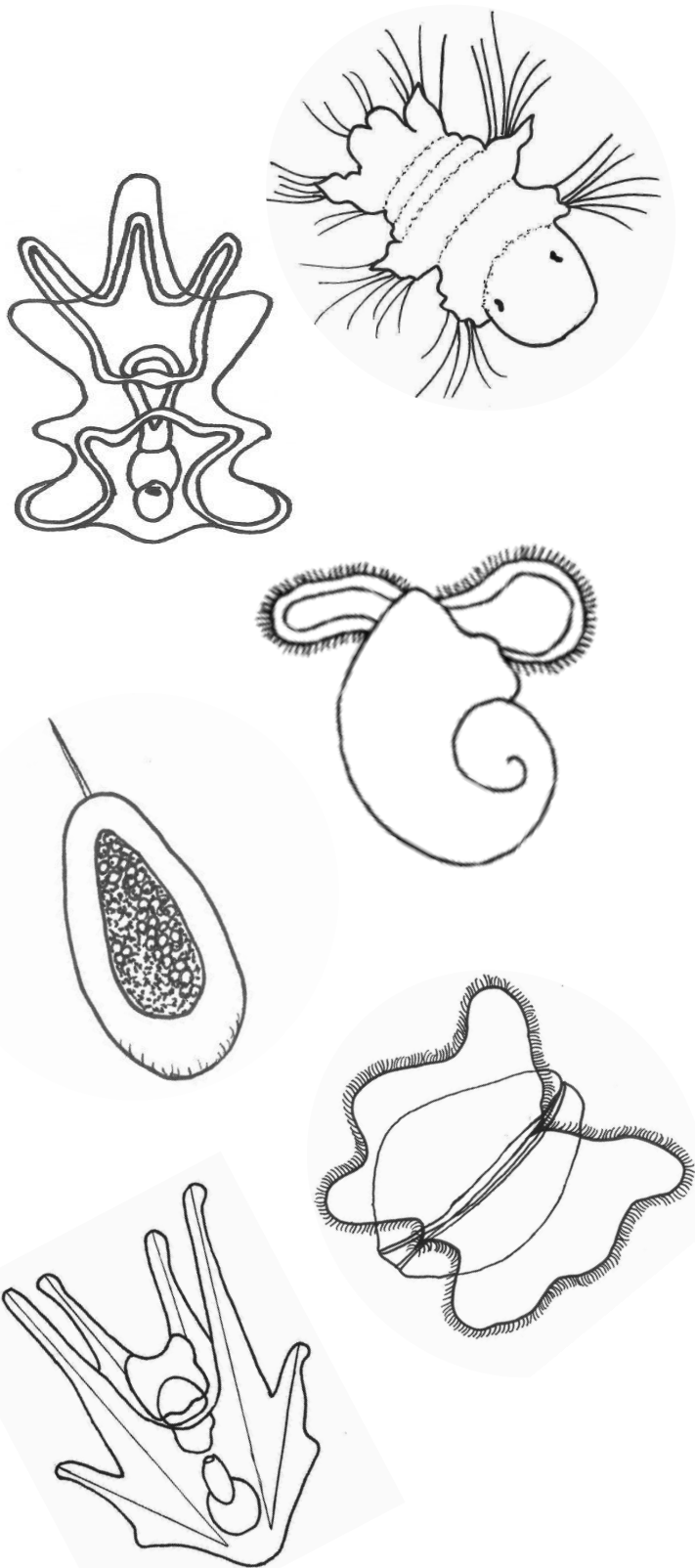
Babies (larvae)	Parents (adults)
Name: Zoea 	Name: Crab 
Trochophore 	Chiton 
Müller's larva 	Flatworm 
Cyprid 	Barnacle 
Pilidium 	Ribbon worm 
Tornaria 	Acorn worm 

Matching the Larvae #1

Color the marine animals and draw lines to match adults to their babies!

Babies (larvae)

Parents (adults)

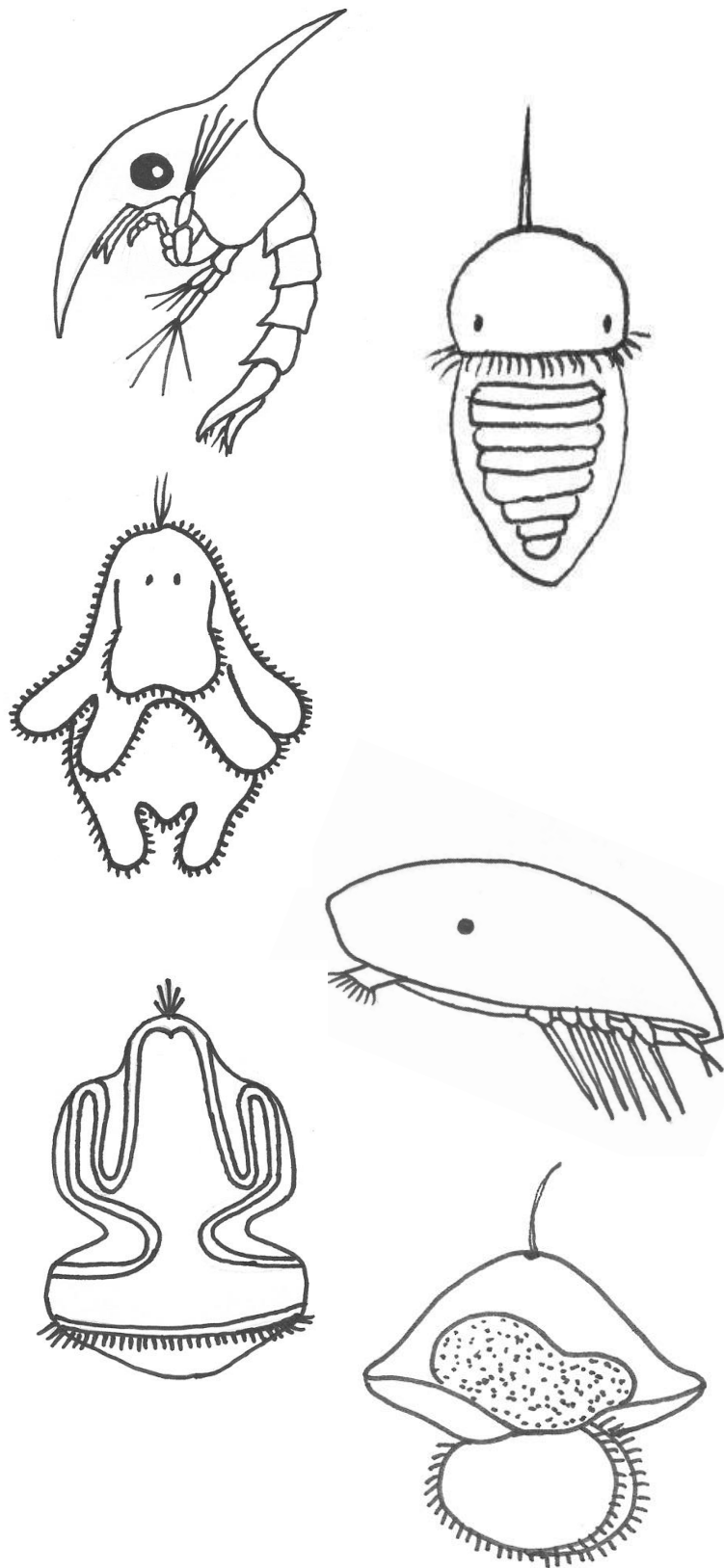


Matching the Larvae #2

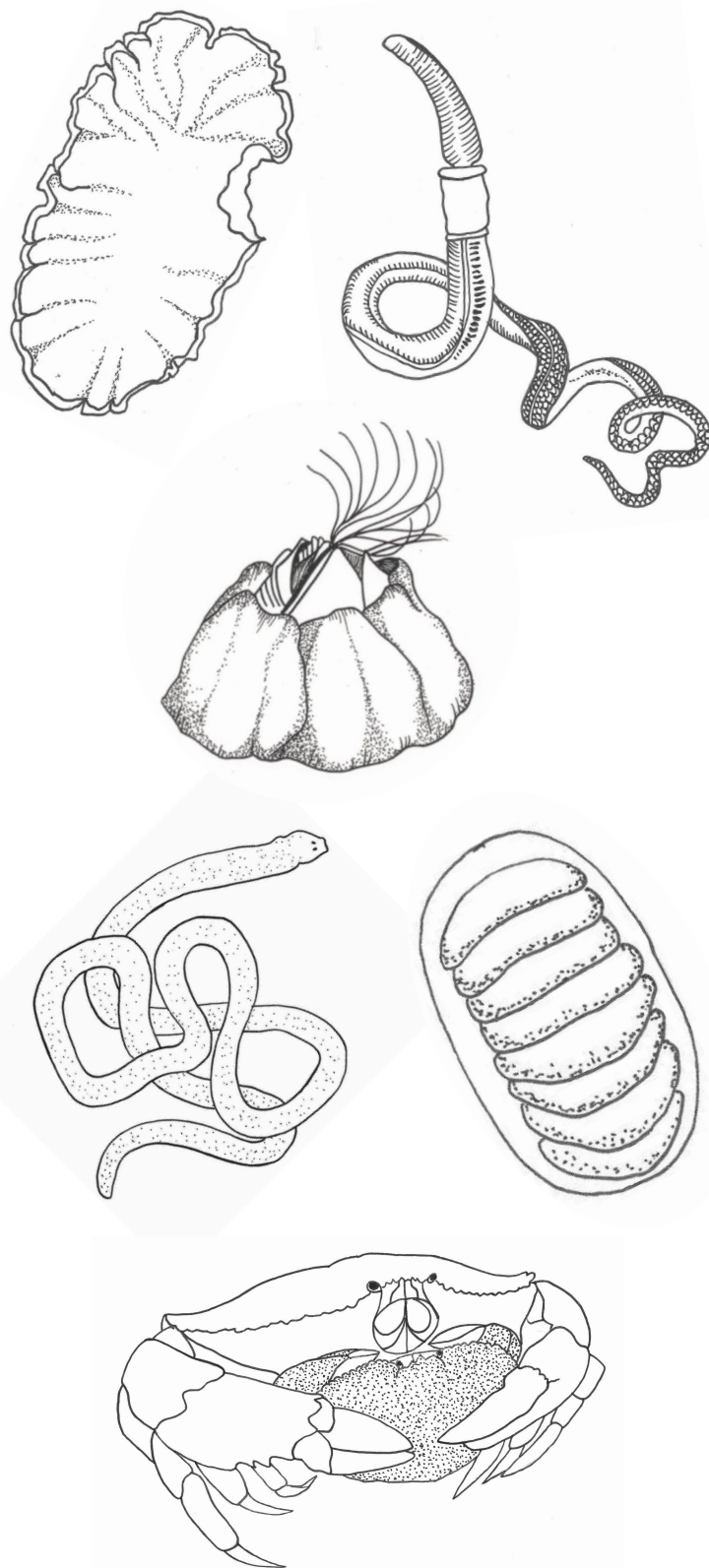
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Color the marine animals and draw lines to match adults to their babies!

Babies (larvae)



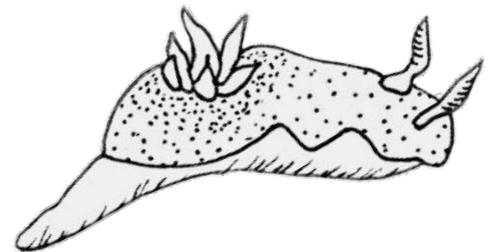
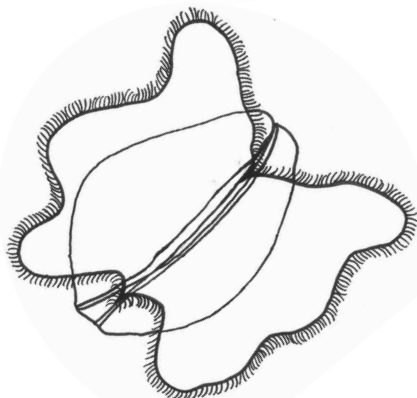
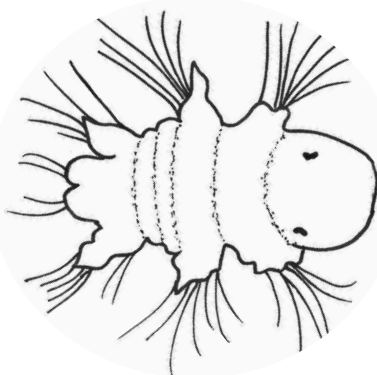
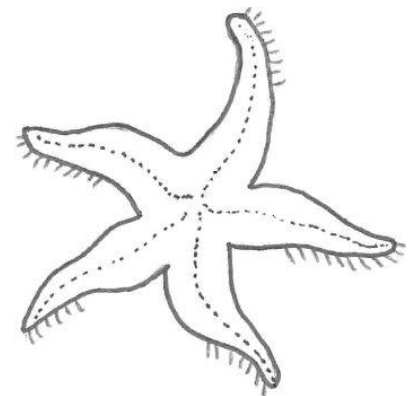
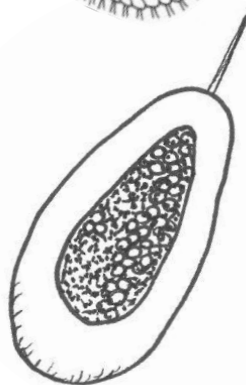
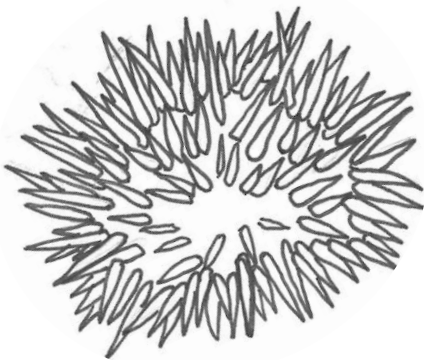
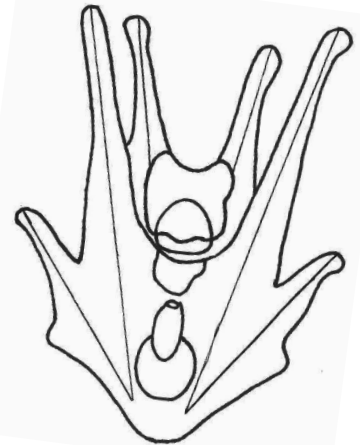
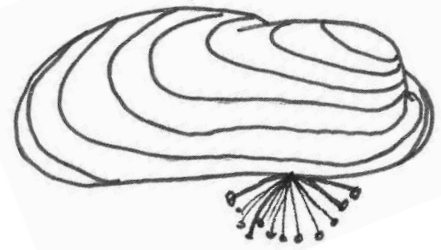
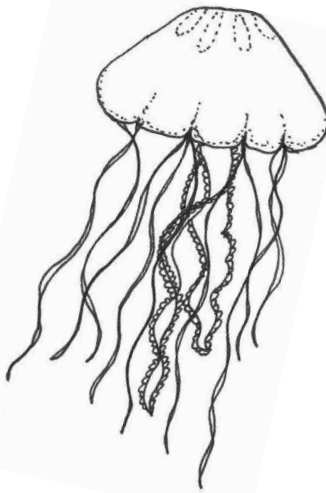
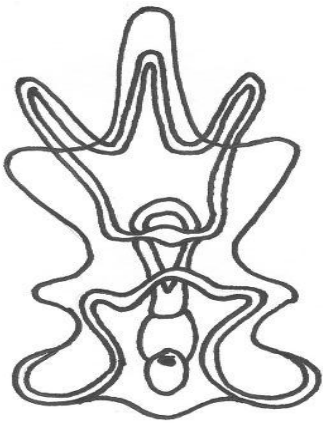
Parents (adults)



Matching the Larvae #3

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Color the marine animals and draw lines to match adults to their babies!



Matching the Larvae #4

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Color the marine animals and draw lines to match adults to their babies!

