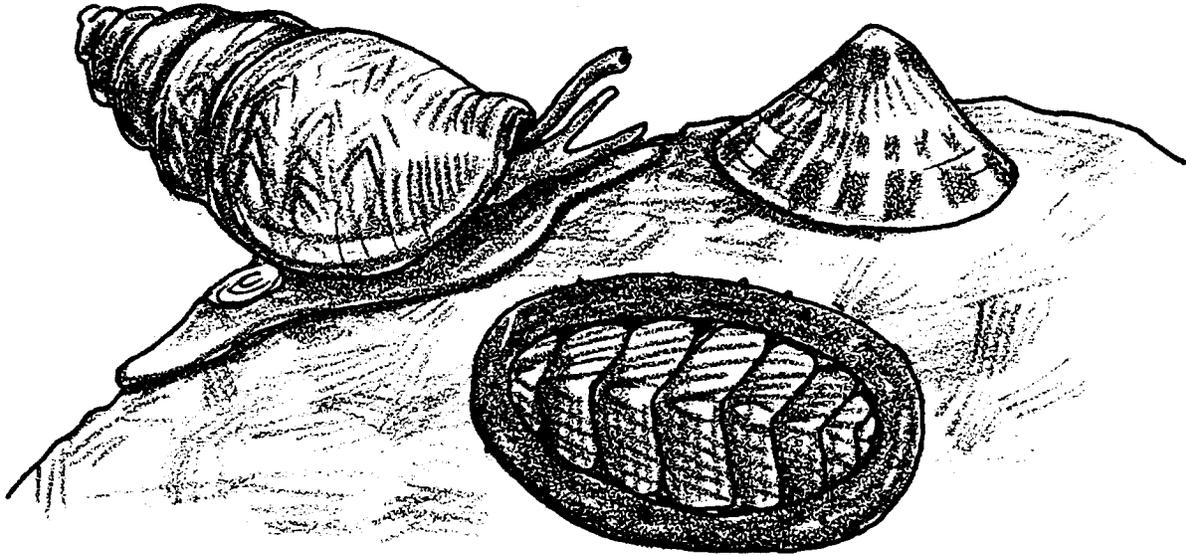


Snails, Limpets and Chitons: Moving On



While barnacles sit, attached to rocks, their neighbors on the rocky shore, the snails, limpets and chitons, are mobile. These three animals all have shells and a strong, muscular foot. They can move to find food and move to find more favorable conditions. Most intertidal snails, limpets and chitons also use their muscular foot to clamp down tightly on a rock if they need to wait for the tide to return or need to discourage a predator.

“Moving On” takes a look at the structures and behaviors of these mobile intertidal animals.

Materials

- snail, limpet or chiton
- glass jar with a lid
- sea water
- washable felt marker, such as overhead transparency pens
- string
- millimeter rule

Procedure:

1. Obtain a glass jar, fill it with sea water and place your animal in the jar. What kind of animal do you have? _____

Use the washable marker pen to outline the animal's foot on the outside of the jar to show the animal's location.

2. When the animal begins to crawl, record the time: _____

3. Watch the animal. As it moves, mark its path on the jar with the marker pen.

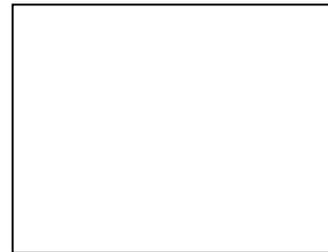
4. In the space below sketch top, bottom and side views of the animal. Label the foot and any cilia you may be able to see on the surface of the foot. Label the shell(s) and any sensory organs you see.

As you draw, remember to mark your animal's location in the jar from time to time.

Top view

Bottom view

Side view



The ability to move gives these intertidal animals many advantages, but can they move fast enough to avoid predators? How fast are they?

- 5 a. Make a final mark showing your animal's location in the jar. Record the time: _____

How much time elapsed since you first marked the animal's position?

- b. Place the string along the path the animal took. How many centimeters did it travel? _____ cm

- c. So, how fast was your animal in cm/hour?

$$\frac{\text{_____ cm}}{\text{(distance traveled)}} \times 60 \text{ min/hour} = \text{_____ cm/hr}$$

$$\text{_____ min}$$

(total time)

- d. Record your rate (in centimeters per hour) on the blackboard. Use the pooled results to calculate the class average. Record the average.

_____ cm/hr.

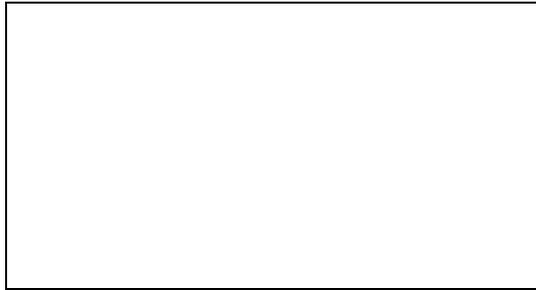
How does the speed of your snail compare with the class average?

- e. Is it reasonable to assume that your snail, limpet or chiton relies heavily upon speed to escape from enemies?

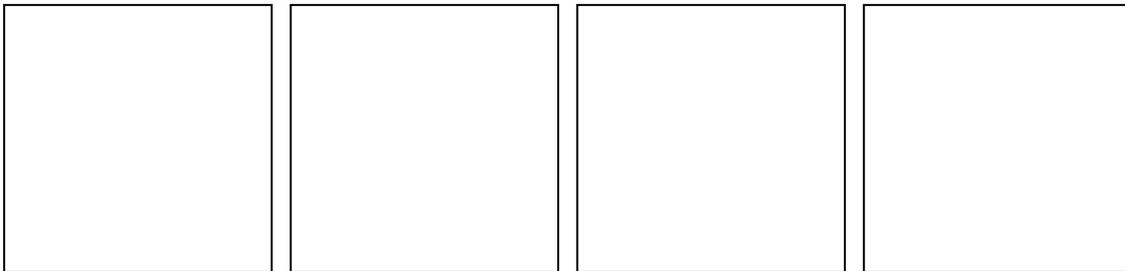
Let's look more closely at snail, limpet and chiton's locomotion. How do these animal accomplish this movement with just one rather amorphous (shapeless) looking foot?

6. Sketch the animal's foot when the animal is still, moving in a straight line, and turning. As you draw, imagine that you are taking snapshots of the animal's foot, capturing how the foot looks at one instant.

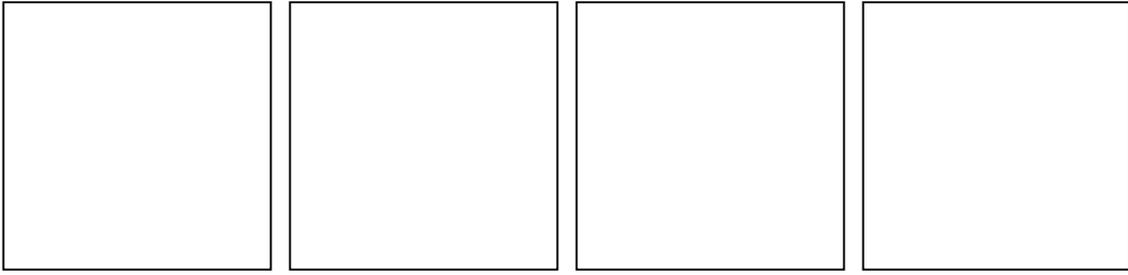
- a. Draw the shape of the foot when the animal is still:



- b. Draw a series of pictures of the animal's foot as it travels straight ahead. Each drawing will show the shape of the foot at an instant in the snail's movement.



- c. Draw a series of pictures of the animal's foot as it turns. Each drawing will show the shape of the foot at an instant in the snail's movement.



7. How does the animal's foot change as it moves?

The animal's foot is a large muscle that can extend and contract, moving the animal forward. Snails, limpets, chitons (slugs, too) also have a special mucus that helps them move. It smooths their path so they can glide easily, yet it also adheres to surfaces so they can stick tightly to rocks.

8. Finally, reach in your jar and remove or try to remove your animal from the glass.
- Were you able to remove your animal?
 - If so, set your animal upside down in the jar. **IF IT STICKS VERY TIGHTLY, STOP PULLING ON IT SO YOU WILL NOT BREAK ITS SHELL.**
 - Watch the animal for a few minutes.
 - Describe what your animal did when it was upside down.

Snails, limpets and chitons defend themselves by clamping tightly to rocks. Limpets are especially strong and not only deter predators with this behavior, but also seal their soft tissues from the air at low tide. If a chiton is loosened from its rock, it typically curls up like a pillbug to hide its soft underside. A snail pulls its soft body inside and seals its shell with a shell plate called an operculum.

9. How does your animal probably protect itself from enemies?

10. Return your animal, wash your jar and return all materials.