

Date: \_\_\_\_\_

Limpets shell type Name \_\_\_\_\_

**Professor Dave Lindberg has been kind enough to lend us these shells from the U.C. Museum of Paleontology. Please treat them with care. They are delicate.**

1. We have already discussed some of the possible biotic and abiotic influences on a limpet's life. They include:

Biotic (living):

\_\_\_\_\_ predators \_\_\_\_\_

\_\_\_\_\_ prey (algae) \_\_\_\_\_

\_\_\_\_\_ fouling organisms \_\_\_\_\_

Abiotic (non-living):

\_\_\_\_\_ waves \_\_\_\_\_

\_\_\_\_\_ drying out \_\_\_\_\_

\_\_\_\_\_ heat \_\_\_\_\_

2. Limpet shells come in a variety of thicknesses and shapes. Some are tall and pointy, others are short and wide. Their shape may be the result of **selection** for a certain shell type during **evolution**.

Selection: come up with a class definition- ours was "Because organisms vary, or are different, some are better able to survive and reproduce than others in their habitat"

Evolution: change over time

3. What do we need for evolution by selection (we'd already gone over this)?

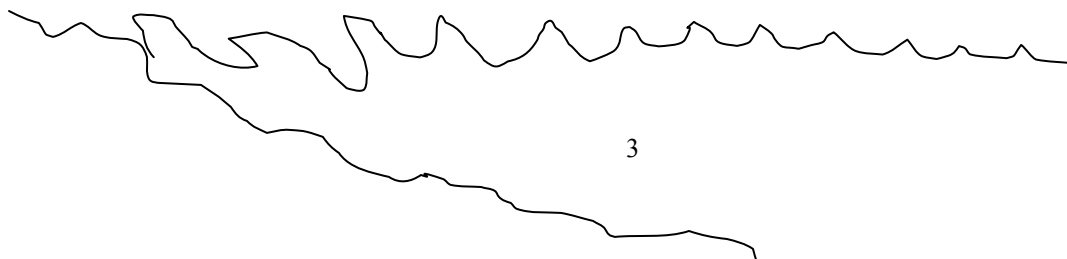
V ariation  
I nheritance  
S election  
T ime

4. Ok- back to the limpets. We might make hypotheses about what type of shell a limpet has

based on its environment because \_\_\_\_\_ selection for that shell type (or against other shell

types) might have influenced the the evolution of those limpets along the shore/in that habitat \_\_\_\_\_

Seashore environments:



HIGH



5. Environments along the shore:

SUB-

High tide zone: hot, dry, long periods between getting wet

Low tide zone: wave action, some predators, sometimes dries out

Sub (below) tide zone: never dries out, lots of predators, surge underwater

6. State hypotheses and **use complete sentences**. For example: *“I hypothesize that because the limpet needs to protect itself from predators, it has lightweight big spines on its shell.”*

Make a hypotheses about shell types you might see in the: **Stress that there are many combinations of traits that could be advantageous in these environments, so as long as they have a good reason for their hypotheses, it is acceptable, i.e. there’s not a “perfect shell” for each zone. These are some examples we came up with**

High tide zone:

Examples they came up with- tall shell to dissipate heat, a way for the shell to hold water or clamp down to keep from losing it, light shell. An example that came up- if you’re in a hot place, you want to wear loose-fitting, lightweight clothes.

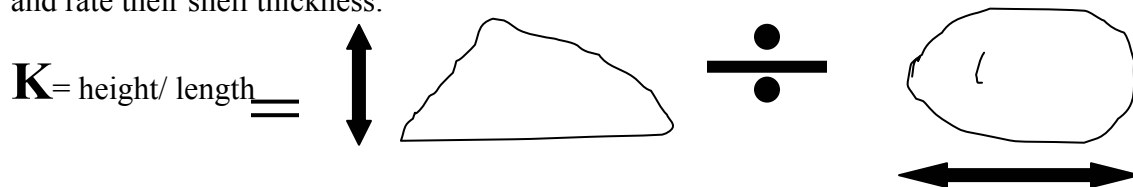
Low tide zone:

Thick, sturdy shell, spikes, low profile

Sub(below) tidal zone:

Not as sure. Maybe also thick and spiny (but keep in mind fouling organisms would love your spines)

7. Now we will examine limpet shells collected from high tide, low tide, and sub tidal habitats and hypothesize what environment they live in. We will measure the ratio of length and height, and rate their shell thickness.



Could a limpet ever have a K value of zero? What would such a limpet look like in cross-section?

Could a limpet ever have a K value of 1.0? What would such a limpet look like in cross-section?

**8. Now- measure those limpets!**

**A.** Write the length, height, and K-value on each card.

**B.** Then, rank each shell as thick, moderate, or thin.

**C.** Make any other notes about the shells that might help you figure out where they were from.

**9.** Based on your data, write a hypothesis, in a complete sentence, about where each limpet is from (high tide, low tide, or sub-tidal).

SHELL #:      HYPOTHESIS

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

11.

**10.** Take a minute to explain your predictions from question 6. **Describe the shells you predict are from the high-tide line? Why did you place these animals in that group?** Answer these questions for the low and sub-tidal shells also.

Shells from the high tide zone:

Shells from the low tide zone:

Shells from the sub-tidal zone:

**11. Thank you for putting the shells and cards back in the bag.**