

Name:  
Section:  
Date:

### Global Kelp Location Student **Answer Sheet**

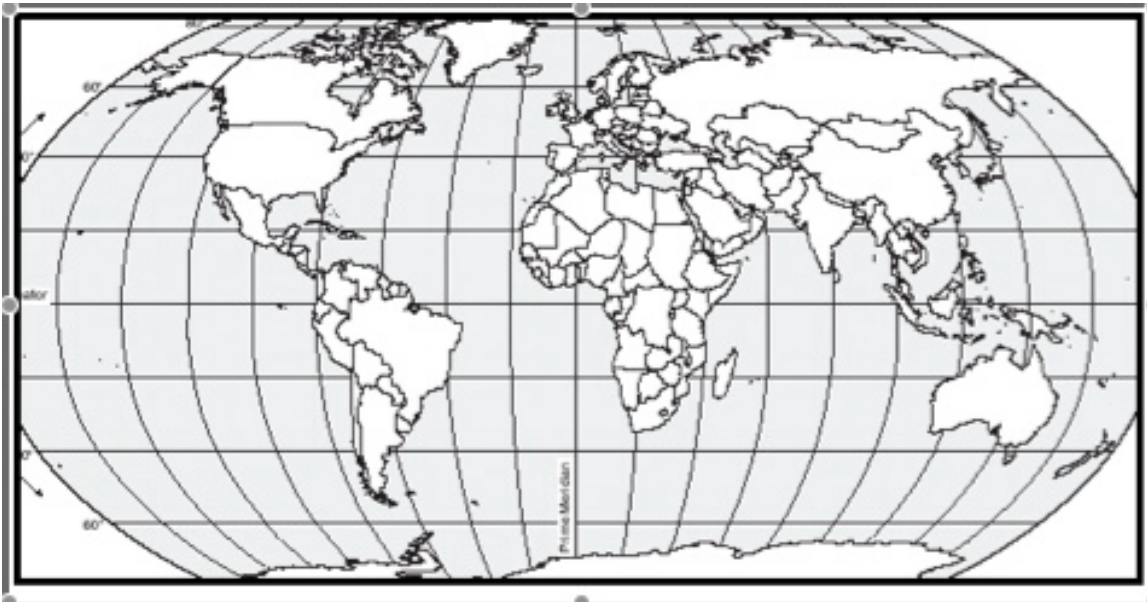
**Preview:**

Answer questions 1 a. and b. before beginning the exercise.

1. a.) List the regions on Earth you think would be ideal for kelp forest locations in the table below. You will return to your predictions at several points in the exercise to check off if you were correct, so leave that section blank for now.

General Location	Reason Kelp Would Grow in this Region.	Correct?
Near coasts	Shallow	
Arctic	Cold	

b.) Shade on the **world map** the same areas listed above showing where you believe the kelp forest would grow.



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## Bathymetry and Kelp Forests

Answer these questions while looking at the map of **Bathymetry**. **These answers can be arrived at in several ways including using the table of the data or simply clicking around.**

2.
  - a. What is the highest elevation on your map? **5750**
  - b. What is the lowest elevation on your map? **-5750**
  - c. What units are being used? (Hint: Look at the legend.) **meters**
  - d. What do the negative numbers mean? **Below sea level**
3. Compare the locations of the shallow areas to your predictions in the chart above, put a check mark where you were correct.

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## Temperature and Kelp Forests

Answer these questions while looking at the map of **Sea Surface Temperatures**.

4. What ocean temperature is the most common? **23.5**
5. You have studied histograms in math. What type of information do histograms give you about data? **The distribution, or spread, of the data. What data is most common.**
6. Describe the areas of warm and cold water.  
Are they where you would expect? **Students' opinions**  
  
Are there any areas that surprise you? **Should notice patterns around South America where it is colder than the rest of the ocean nearby.**
7.
  - a. What color represents a temperature between 14° and 16° C? **yellow**
  - b. What part of the ocean is the warmest? **Near equator**

- c. What temperature is this? 28 -30 °C
- d. What regions of the ocean are ideal temperatures for kelp? Does this fit your predictions? The cool regions are ideal

Look at the relationship between the location of the **kelp forest** and **temperature**.

8. Respond to the following questions.

- a. Are there areas of the kelp forest that are in warmer/colder water than you would expect? Describe these areas. Areas near South America and Africa are warmer than expected.

- b. What is the warmest temperature that you find kelp in? 18°C

- c. The coldest? 0°C

9. In what depth of water does kelp appear most often? Less than 50 m deep. The kelp forest layer was drawn by the teacher and so may extend into deeper water than the “real” kelp forest.

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## Upwelling and Kelp Forests

Answer these questions while looking at the map of **Upwelling and Kelp Forests**

10. Fill in the data table below. **The point of this question is to look for patterns.**

Continent name	Hemisphere	Ocean Basin	Coast kelp is found on. (N,S,E,W)
North America	N	Atlantic	E
North America	N	Pacific	W
South America	S	Pacific (mostly)	W
Africa	S	Atlantic	W
Australia	S	Pacific	E
Asia	N	Pacific	E
Europe	N	Arctic	E / N

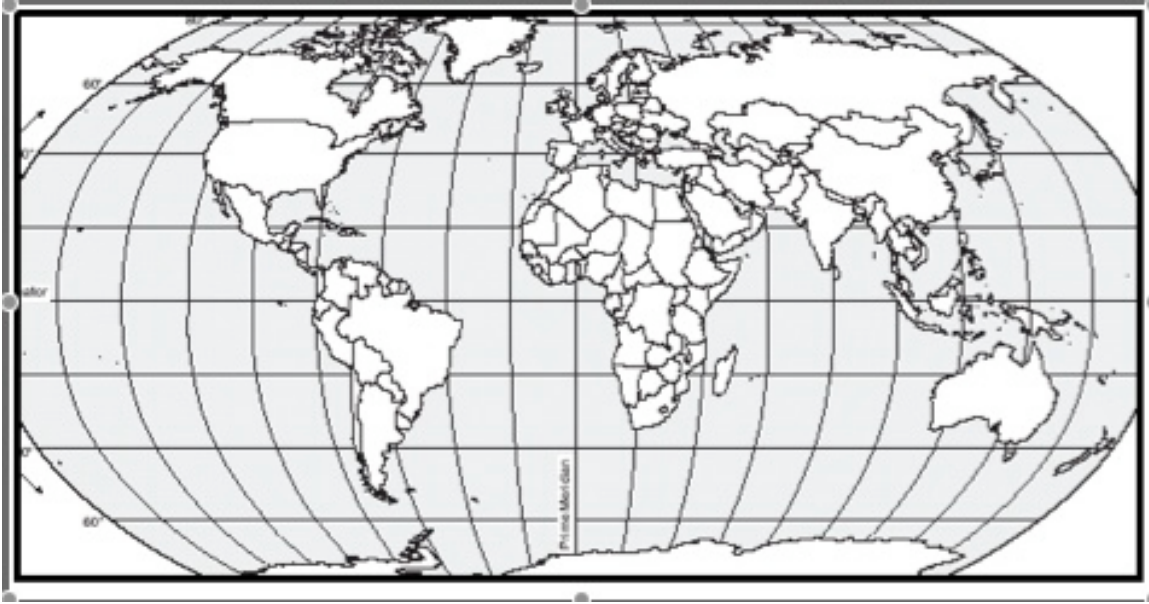
11. What creates upwelling? **Wind patterns that blow parallel to coasts. The water that is cool is pulled up by the force of the wind. The upwelling is perpendicular to the wind direction. Explained in the movie.**

12. Wind currents that are over upwelling areas are blowing in which direction relative to the coastline? **Parallel, explained in the schematic.**

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### Conclude:

13. Color the World Map below *green* where kelp forests appear.  
Put **xx**'s in black over where kelp forests are in upwelling areas.



14. What might upwelling bring to the kelp forest? **Cool water is obvious answer, can include nutrients.**

15. Label the Venn diagram below with the three factors that create ideal conditions for kelp forest survival.

**Kelp in the center**

**Upwelling**

**Shallow water where light can penetrate**

**Cool water <18°C**

16. Do you suspect other factors may also be important to kelp forest growth and survival? What do you think they might be and why?

**Nutrients in the water.**

**Light and lack of turbidity.**

**Wave action**

17. Review your “preview” table. Were there any patterns that you discovered in the kelp forest distribution that you hadn’t predicted?

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### **Extend:**

1. Use the web to look at several web sites to learn more about *kelp forests* and how they are monitored. **See teacher notes for ideas.**
2. Learn more about *how upwelling works*. Read online at the links included here or try the upwelling lab set up by your teacher. **Lab can be found in the teacher notes.**