Name:_____ **Date:**_____

ADVENTURE ENGINEERING – "Lost in the Amazon"
LESSON 5 – Where's the Water?

ACTIVITY 1: Is it Safe to Drink?

Even though hunting has been slow, you have been able to survive the pangs of hunger during your adventure in the Amazon Rainforest on the few plants and insects you and your colleagues have found. But time is an important factor since the pilot needs medical help that can only be found in a large city. You continue on your quest to finding Manaus with the hope that each day will bring you a little closer.

"Hey guys we are almost out of water," you hear Julie say, "and there are several pools of water nearby according to the map. Maybe some of the water is good enough to drink." You realize that testing the water will be hard with the tools you have, but you also worry about how to filter the water in case it isn't safe to drink. Or perhaps Julie, a Chemical Engineer, can come up with an idea for a filter design. What will you use? Will it work?

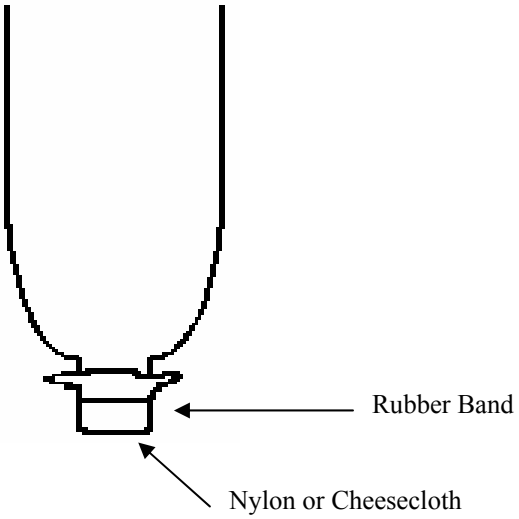
Procedures:

You must use your engineering knowledge to find a way to filter the dirty water that you've been given. Build and test a water filter of your design using the 2-liter plastic bottle along with the layering supplies given to you. Below are some procedures to help you. Remember that you will want your filter to work correctly and fast!

<u>Prepare your bottle prior to adding the layering materials</u>

1. Place the piece of nylon stocking or cheesecloth on the mouth of the bottle (the smaller hole).
2. Use the rubber band to secure it to the mouth of the bottle.
3. See picture on the right.

Picture of bottle after steps 1 and 2.



<u>Design your layering system</u>

4. Here is a list of items from the plane and the Amazon:
   - Sand
   - Gravel
   - Paper Towels
   - Coffee Filters
5. Discuss among your group different ways of layering the materials to make a filter.

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6. Choose the method you think will filter the best. Fill in the correct area below with the items your team chose to use and draw a picture of your filter design.

Write down the materials used.

_____

_____

_____

_____

_____

Draw a picture of **your** filter idea:

Draw a picture of your **team's final** filter. Label the parts.

7. Carefully place the items in the upside down 2-liter bottle in the order your group agreed upon.
8. Hold the mouth of the bottle over the bowl.
9. Have another student in your group keep track of the time.
10. When the timekeeper says **start,** pour the cup of dirty water into the bottom of the filter you designed.
11. **Stop** the time when the water has gone completely through the filter.
12. Use the line below to record the time your filter took.

Record the time for water to go through filter:

_____ *Min* _____ *Seconds*

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13. Rate how clean your filtered water is using a scale of 1 to 5, with 1 meaning the water came out clear and 5 meaning that the water remained dirty.

Questions:

1. Describe the water before you filtered it.

2. Describe how the water changed after you filtered it.

3. Describe what you saw as the water went through filter.

4. After discusssing all the filters as a class, record which filter worked best and why.

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5. Are there other ways to purify the water besides filtering?

6. Do you think there is a limit to the number of times you could use your filter. Why or why not?