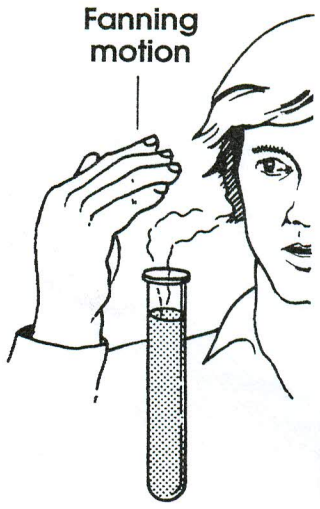
Using a Scientific Method

Name_____ Period_____

If scientists hypothesized that there are organisms in the air, how could they test their hypotheses? Do you believe that there are organisms in the air? What makes you think so? You can experiment to test your hypotheses.

Goal: You will use the scientific method to determine if organisms are found in the air. You will use tubes containing beef broth that may or may not allow for the growth of organisms. You will observe and test for the presence of organisms.



Materials:

beaker 250ml	Test tube holder
beef broth	Test tube rack
cotton balls	2 test tubes
graduated cylinder	Water
heat source, burner stand	goggles

Procedure:

1. Add 10ml of beef broth into one test tube
2. Add 10 ml of water into one test tube.
3. Place both test tubes into a water bath on the burner stand.
4. Allow the water to boil for 5 min.
5. Remove all test tubes form the water and place in a test tube rack.
6. Place a cotton ball in the top of the beef broth test tube.
7. Label each test tube with a china marker.(your name will be just fine)
8. Examine each test tube after a few days. Compare the two test tubes. Do they appear cloudy or clear? Is there a odor coming from the beef broth?
9. Make a mount of both liquids with a slide and let's look at the liquids under magnification.

Data and observations:

test tube	Appearance	Odor	Magnification
beef broth			
water			

questions and conclusions:

1. Bacteria growing in a liquid will cause the liquid to become cloudy. Which tube had bacteria growing in them?_____.

2. Bacteria growing in a liquid often results in a spoiled odor. Which tube or tubes had a spoiled odor?_____

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3. What evidence do you have that bacteria came into the tubes only from the air? _____

_____

4. What evidence do you have that bacteria need food in order to live, grow, and increase in number? _____

_____

5. Why were all tubes first boiled in hot water? **HINT:** Boiling destroys bacteria. _____

_____

6. What conclusion can you make if the sealed soup tube became cloudy and had a foul odor?

_____

7. What evidence do you have that you breathe organisms as part of the air? _____

_____

_____

8. Predict what experimental results might be expected if both tubes of soup and water were boiled and sealed. _____

Why? _____

9. Predict what experimental results might be expected if both tubes of soup were boiled but were left open. _____

_____

10. Predict what experimental results might be expected if both tubes were not boiled and were not sealed. _____

Strategy Check

_____ Did you use the scientific method to test the hypotheses that there are organisms in the air?

_____ Can you determine which tubes do or do not have organisms growing in them?