WEIRD SCIENCE

EXPERIMENT #1
GROW YOUR OWN PENICILLIN

In the Infectious diseases workbook we talked about the Ancient Egyptians and the records they left behind regarding diseases and treatments. Remember, we said that they did not name their diseases, but merely described the symptoms? Also, they had some puzzling treatments. Remember one cure that called for "moldy bread"? We figured out that the mold cured because it was made up of penicillium fungus, the ingredient in our very first antibiotic, penicillin.

Penicillium has spores that are smaller than dust particles and float freely in the air. Some spores are on our food, but we eat the food before the spores have a chance to grow and affect the quality or safety of the food.

Method One:

1. Place a piece of bread in a self-sealing plastic bag. Put it in your bread drawer or in a dark cabinet.

2. Place a second piece of bread in a self-sealing plastic bag and stick it in the back of your refrigerator.

3. Leave them be for a week or ten days.

4. Check to see if there is green or black mold growing on the slices. If not, leave for another 3 or4 days.

5. Observe that the refrigerated slice takes longer to grown mold than the slice left at room temperature.

That's because most organisms like warmth and dark to grow well. Moisture can speed-up the process.

Method Two:

1. Drop 7 or 8 drops of water from a straw or eyedropper onto the bread.

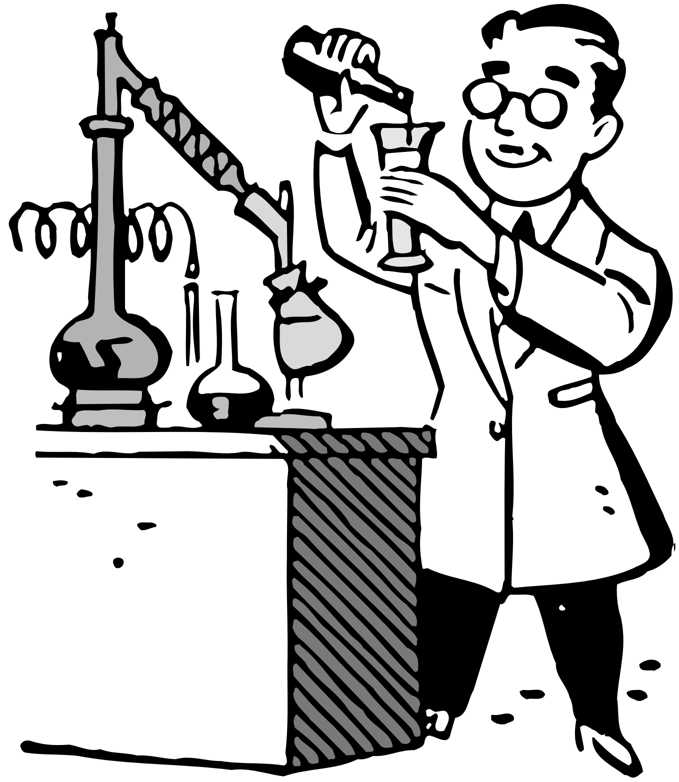
2. Follow steps 1. through 5. as above and compare the amount of time needed for the mold to grow.

3. Discard all plastic bags with the moldy bread inside after you have seen the results.

EXPERIMENT #2
DEMONSTRATE MICROBES' NEED FOR MOISTURE TO FUNCTION AND GROW

With out moisture, most bacteria cannot function. That is why drying was an important way of preserving food before the invention of the icebox and later, the refrigerator.

1.Take a few ripe grapes and place them on a small plate in the back of the refrigerator.
2. Take a few ripe grapes and place them on a small plate in the back of a cabinet or in a spot on your kitchen counter.
3. Place a few raisons on two plates and place them along-side the plates with the grapes. After a week to ten days, the grapes will be mushy and spoiled, but the raisons will not have changed except, perhaps, for being a bit harder due to additional drying out from exposure to the air.



EXPERIMENT #3
HOW WE PUT MICROBES TO WORK FOR US

If you have ever helped your mother bake bread, you know that a vital ingredient is yeast. Without the yeast, the bread won't rise. How does this work? Simple yeast is a form of fungus. It changes the sugar in recipe to alcohol, carbon dioxide gas, and energy. The gases escaping during the baking leave tiny holes in the bread where it pushed upward, causing the bread to rise, and outward, leaving little vent holes behind. You can observe this phenomenon by placing yeast, sugar, and warm water in a jar and covering the jar with a balloon.

1. Mix one package of powdered yeast and I spoon of sugar in one cup of warm water. Use warm, not hot water.
2. Pour the mixture in a bottle with a narrow neck.
3. Add another cup of warm water to the bottle.
4. Cover the top of the bottle tightly with a balloon.
5. Find a warm, dark place to leave the bottle for 4 or 5 days.
6. Observe the bottle from time to time. As the yeast turns the sugar to alcohol, carbon dioxide gas, and energy, the bubbles will gradually inflate the balloon as they form and push upward.

EXPERIMENT #4
HOW EVOLUTION WORKS

BISTON BETULARIA &
THE INDUSTRIAL REVOLUTION

Materials needed:

- scissors
- glue stick
- light gray construction paper
- green construction paper
- black crayon

Procedure:

1. Cut out the trunk, the leaf pattern, and the moth patterns.
2. Cut out one trunk and two moths from light grey construction paper.
3. Cut several circles from green construction paper and overlap them to complete the tree.
4. Lightly color one moth black.
5. Hold the two moths against the tree trunk.
6. See how the grey moth gets lost against the grey tree. Birds cannot see it. See how the black moth is not camouflaged against the tree. Birds can see it and eat it before it can reproduce. This population has genes for both light grey and dark grey, but the dark grey are eaten before they can reproduce. The moth population remains primarily light grey with an occasional dark grey moth.

7. Now color one side of the tree trunk lightly with black so that it matches the moth you colored. (Leave the flip side of the trunk as before so that you can demonstrate the dark grey moth against the light grey tree again if you want.) This is how the trees looked after the Industrial Revolution caused many factories to be built to mass-produce things people used to make by hand. The factory machines were powered by coal. Factory chimneys belched out soot and debris-filled smoke that settled over the tree trunks.

8. Hold the two moths against the tree. Now it is the light grey moths that the birds can see and eat. Now it is the light grey moths that do not have the opportunity to reproduce. After a while, this moth population becomes primarily dark grey with a few light grey moths.

The dark grey gene became the dominant color of the Biston betularia moth when the tree trunks were changed from light grey to dark grey by the soot.This color change was possible because the gene for the dark grey moth was already present in the population. This change in the population's color could not have occurred if the dark grey gene had not already been present in the population gene pool. The dark grey gene was not expressed before, because the dark grey moths showed-up against the light grey tree and were eaten before they could reproduce.

Natural selection is the mechanism for evolution. A change will occur in a population of animal or plant life in response to some change in the organisms environment. Populations of animals or plants that do not possess genes to allow for change will need to find a new environment similar to the one they are designed to live in, or become extinct.

Natural selection is a change by a population, not an individual. When Darwin spoke of "survival of the fittest", he was referring to populations, not individuals. In an environment that can sustain only one population, the population that is best adapted for that environment will survive. The other will need to move on and find another hospitable biome.