Alexander Fleming

Alexander Fleming was born in a small town in Scotland in 1881. After going to school in his town as a child, he moved to London at the age of 13 to study at the Royal Polytechnic Institution. His brother worked in medicine, and after spending a few years working in an office, he decided to follow in his brother's footsteps and started medical school. He began research under Sir Almoth Wright, a pioneer in the field of vaccines.

When he was in his 30s, World War I began. Armed with his medical training, he served as a captain in the Royal Army Medical Corps. While treating soldiers, he noticed that not only were they being hurt and killed by the fighting, but also by infections that spread quickly on the battlefield.

Fleming noticed that though the infections were deadly and fast-moving, they were very simple infections. He thought there had to be a way to stop them from spreading so fast. Antiseptics worked well on the surface, but most of the wounds the soldiers had were deep, and antiseptics weren't always able to get deep enough into the wound to kill all the germs.

When the war ended, he continued to study bacteria. However, it was hard convincing other scientists to change their ways. He was sure that there was a better way to treat infections than with antiseptics, but many other doctors didn't believe him.

By 1928, he was studying the virus that causes the flu. Before leaving for a vacation, he stacked all of his samples on his desk. When he came back, he noticed that one of them had grown mold! However, he also noticed that samples near it had no bacteria on them. He wondered if that meant the mold was releasing something that prevented bacteria from growing. He eventually identified the substance and called it penicillin.

Though he had discovered penicillin, he had trouble extracting it so that it could be used in medicine. It wasn't until 1940 that scientists at Oxford were able to isolate it. Penicillin quickly became the go-to treatment for all kinds of bacteria-based illnesses.

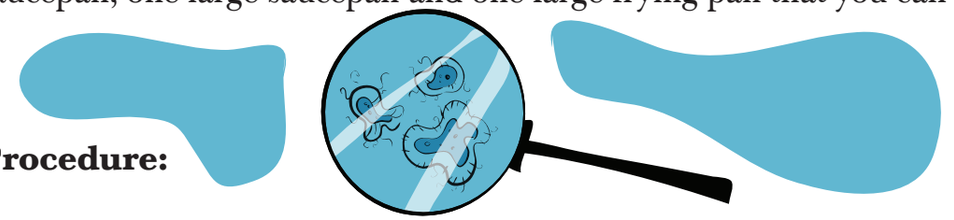
In 1945, he won the Nobel Prize for his discovery of penicillin and his lifetime of work in science.

Although some bacteria and molds cause disease, most organisms you encounter every day are generally harmless unless conditions favor their growth. When you see adults cleaning surfaces in the kitchen that appear to be perfectly clean, the adults are really making sure that there are no bacteria, mold spores or crumbs that could feed these organisms.

This experiment is similar to others often performed using Petri dishes. However, this experiment provides you with the opportunity to practice sterile technique. Surgeons and scientists who do tissue culture practice sterile technique because the introduction of molds or bacteria could hurt the patient or destroy the culture that the scientist is growing.

Materials:

- One can of condensed tomato soup
- Six small custard cups, ramekins or desert dishes. Any dish will do as long as it has a small top no more that 3-4 inches in diameter.
- Plastic wrap
- Six rubber bands
- Kitchen tongs
- One small saucepan, one large saucepan and one large frying pan that you can boil water in
- Camera



Experimental Procedure:

1. Fill the large saucepan with water and bring to a boil. Reduce the heat to a gentle simmer. Place the custard cups and tongs into the boiling water. Simmer for twenty minutes.

2. Open the can of tomato soup and pour it into the small sauce pan. Add ½ can water and stir. Bring to a boil, cover and let simmer very gently for 20 minutes.

3. While the tomato soup is simmering, fill the large saucepan with water and bring to a boil. Reduce the heat to a gentle simmer. Place the custard cups, tablespoon, and tongs into the boiling water. Simmer for twenty minutes.

4. Fill the frying pan with water and bring to a boil. Reduce the temperature so that it is simmering gently.

5. Cut six squares of plastic wrap big enough to fit into the frying pan. Be careful not to get the plastic wrap tangled on it. Gently drop the full sheet you cut into the simmering water. It will immediately shrink. Add all squares to the water. You may have to cut additional squares to use in case the plastic wrap gets tangled.

Experimental Procedure (continued):

6. Make sure that you have a tray next to the stove that has adequate room for all six of the custard cups. Write "Dish #1," "Dish #2," "Dish #3," "Dish #4," "Dish #5" and "Dish #6" on six 3 x 5 cards. Set the cards down individually with the writing facing up.

7. Remove the tongs from the boiling water by hooking the handle of a spoon or fork through the handle of the tongs. Carefully rest the tongs so that they are lying flat across a clean glass. Do not let the tongs touch the table or anything else. Do not touch any part of the tongs except for the handle. The object of this step is to keep the tongs sterile until they cool enough for you to handle comfortably.

8. Once the tongs have cooled, use them to remove the tablespoon from the water. Place the tablespoon across the glad just as you did in step 7. The object here is to keep the spoon sterile while it cools enough for you to comfortably use.

9. Using your sterile tongs, carefully remove one custard cup from the boiling water and set it on the tray. Using your sterile tablespoon, add two tablespoons of soup to the dish. When you set down your tablespoon or tongs, be sure to set them down across the glass to minimize contamination.

10. Using your tongs, remove one square of plastic wrap from the water and place it across the desert cup you prepared in step 9. Set down your tongs across the glass. Secure the plastic wrap in place using a rubber band. This is dish #1.

11. Remove a second custard cup from the water and add soup just as you did in step #9. Wait 30 minutes before covering the dish with plastic wrap just as you did to dish #1 in step 10. This is dish #2.

12. Remove a third custard cup from the water and add soup just as you did in step #9. Since you have very clean hands, get a brother, sister, parent or friend to stick a dirty finger across the tomato soup. Immediately cover the dish with plastic wrap and secure with a rubber band just as you did in step 10. This is dish #3.

13. Repeat step 9 with dishes #5 and #6. For dish # 5, run a finger across the kitchen floor before introducing it to the tomato soup. Immediately cover dish #5, just as you did in step 10. For dish #6, sprinkle a few bread crumbs across the tomato soup and cover promptly.

14. Create a table with seven columns so that you have one column for the date and one for each of your six dishes. In the far left column, you will enter the time and date. Write down your observations for each dish. Continue making observations twice a day for a week.