



DIY Air Force Activities: Budding Bacteria



Materials:

- Water
- Gelatin (plain jello)
- Sugar
- Beef bouillon
- Q-tips
- Petri dishes or portion cups
- Lids or plastic wrap

Bacteria are single cell organisms with distinct structural and evolutionary characteristics. They are incredibly diverse, and form one of the three domains of life. Bacteria have played a key role in advancing genetics and biochemistry research. Some advantages of using bacteria for these studies include their simple structure and their easily accessible genetic material. Bacterial colonies are typically grown in petri dishes on a material called agar. Agar is a firm gelatinous substance at room temperature which is not broken down by the bacteria, making it ideal for growing and observing the organisms. Although agar is the preferred petri plate, other ingredients, such as gelatin, can be used when no agar is available. Following the instructions below you can make your own substitute agar plates at home using common kitchen ingredients. Be sure to wash your hands, your counter, and all dishes you will be using thoroughly to prevent contamination. You may not be able to get totally sterile conditions, but you should be as careful as possible to avoid introducing unwanted germs to your petri dishes before they are ready.

Directions:

1. If needed, have an adult boil some water to sterilize your materials. Dip in spoons and dishes, then set them aside. Keep everything as clean as possible.
2. Mix 1 cup water, 1 envelope of gelatin, 2 tsp sugar, and 1 tsp or cube of bouillon in a sauce pan.
3. Heat the mixture on medium/low heat stirring continuously.
4. Once it comes to a boil, set aside and let cool for 3-5 minutes.
5. Fill sterile petri dishes or portion cups about 1/3 full of your agar mixture.
6. Cover and place the cups in the fridge for 2-3 hours to set. Use within 3 days.

To grow your bacteria, use the Q-tips to lift the germs from the area you want to test. Rub the Q-tip on the gelatin plate. Try your mouth, fingernails, doorknobs, and your phone. Leave the dishes in a warm well lit area with the lid on to allow your colonies to grow. Check back daily to watch their progress!

Air Force Associations:

Bacteria is being explored as a power source for Air Force systems. Bioengineered fuel cells are made from bacteria capable of producing electrical energy through a process called consumption. The bacteria eat various carbon-based waste materials, and the fuel cells convert the food intake into electrical energy! Scientists also want to study these bacteria under controlled conditions to expand their use to environmental cleanup.