Preparing Petri Dishes

Materials:

- **Sterile petri dishes:** These can be purchased commercially. I recommend these. (These can be purchased as part of a kit, described below.)
- **Nutrient Agar:** While you can buy powdered agar, I prefer to buy prepared agar. It has already been reconstituted and sterilized. Therefore, you can just melt the agar in the microwave and use it to pour your petri dishes. This is what I typically use. It contains enough agar to pour up to 10 petri dishes. (This can be purchased as part of the kit below)
- Home Science Tools has a Bacteria Growing Kit that comes with 20 petri dishes, two bottles of prepared agar, 20 sterile, disposable swabs, iodine (an antibacterial), blotting paper, and bags for disposing of your petri dishes after your experiments are done. They also include some ideas for using the kit.

Procedure:

Melting the agar

- Loosen cap (but don't remove completely. Removing the cap may allow contamination of your agar from microbes in the air).
- Microwave the bottle of agar on high for 30 seconds. Swirl bottle. Continue to microwave in 15-second increments followed by swirling until agar begins boiling and is melted. Use heat-resistant gloves on hot bottles. Warning: Bottle will be very hot. Use caution.

Pouring the plates

- Set the petri dishes out on a clean surface, lid side up. DON'T remove the lids! Every time the lid is off your petri dish, you run the risk of letting contaminants onto your dish.

- Remove the lid from the agar. Keep the bottle tilted to prevent any airborne microbes from falling into your bottle. Lift the lid of your first petri dish. Pour just enough agar in the dish to cover the bottom and then replace the lid. You can gently rock the petri dish to evenly distribute the agar along the bottom. Continue the process until all of your petri dishes are poured.
- Leave your petri dishes undisturbed so that the agar can solidify. If you don't plan to use your dishes right away, you can store them upside down (with the lid side down) in the refrigerator.

Petri dish alternatives : (Please note that I have not tested these alternatives myself).

- Homemade Petri Plates Using Gelatin
- Homemade Agar Plates

Testing for Bacterial Growth

Now that you have your petri dishes prepared, it's time to explore! There is almost no end to the experiments you can do with petri dishes.

How well do you wash your hands? Label 2 petri dishes: label one unwashed and other washed. Using a sterile swab or Q-tip, rub your unwashed hands. Be sure to get between your fingers, on your palm, and around your finger nails. Then, lightly swab your sample onto the surface of the petri dish labeled unwashed. Wash your hands as you normally would. Then, repeat the above steps with a new sterile swab or Q-tip making sure to spend the same amount of time sampling your hands as you did the first time. Swab this sample on the surface of your petri dish labeled washed. Place your covered petri dishes somewhere where they can be undisturbed. Within a few days, you will be able to see not only how many germs were on your unwashed hands, but also how well you do at washing your hands.

But don't stop there! Use your petri dishes to explore further!

Which surface of your home is host to the most bacteria? First, decide what surfaces in your home that you'd like to test. Ideas can include the toilet handle or seat, the bathroom or kitchen faucet, your cell phone, the bottom of your shoe, the TV remote, etc. Use a marker to label the bottom of a petri dish with the location you will be testing. Use a sterile swab or Q-tip to rub your first surface for about 5 seconds. Then gently swab your sample onto the surface of a petri dish. Cover your dish and leave it undisturbed. Repeat this procedure for all of the surfaces you wish to test, using a different swab for each sample to avoid cross-contamination. Depending on how warm it is, you can start to see colonies form within days. Which surface of your home had the most bacteria? Which surface of your home had more different kinds of bacteria (as seen by differences in colony color and shape)?

In this related experiment, from Science Buddies, you don't actually swab surfaces. Instead, you leave petri dishes uncovered in different rooms of your house to see which room has the most bacteria.

Which cleaner is most effective at disinfecting household surfaces? My son did this experiment from Science Buddies as an elementary school science fair project. A link to the full experiment (including materials and procedure) can be found here. Of course, you can modify the experiment to test whatever disinfectants you'd like.

Are there really bacteria in my yogurt? This is another experiment from Science Buddies. I haven't personally tried it, but it sounds neat.

Design your own experiment! What will you test? Is the "5 second rule" really a good rule to follow? Is a dog's mouth really cleaner than a human's mouth? Does the popular mouthwash really "kill germs that cause bad breath"?

Disposing of Your Used Petri Dishes

Even though you isolated the microbes on your dishes from places around your home, they have been allowed to grow to high numbers on your petri dishes. For that reason, you must

dispose of them safely. You can do this by adding 1 tablespoon of dilute household bleach to each petri dish. Cover the dish, then use tape to seal the dish shut. Place the sealed dishes in a plastic bag (preferably one that zips close). Discard in the trash. Make sure to wash your hands when you are done.