



Drexel-SDP GK-12 ACTIVITY

Subject Area(s): Science: Biology

Activity Title: Culturing Cells and Medicines

Grade Level: 8

Time Required: 2 hours

Group Size: Groups of 2

Expendable Cost per Group: \$3

Summary:

Microorganisms are continually all around us, on our skin, and even inside of us. In this activity we culture a few of the microorganisms and consider what might keep them from growing or stop their growth.

Engineering Connection

Engineers are interested in subjects such as how microorganisms process chemicals and how they adhere to various surfaces. Cell culturing is a vital element for their study since it is quite difficult to only work with a few at a time.

Keywords

Culture
Agar
Petri dish
Swab

Educational Standards

- Science:
- PA 3.3.7A Describe the similarities and differences that characterize diverse living things.
- PA 3.3.7B Explain that cells and organisms have particular structures that underlie their functions.

Pre-Requisite Knowledge

A background in very basic microbiology may be useful, though it is not essential. The mere understanding that there are organisms such as bacteria and mold that are all around us is sufficient. This activity is an extension of the cell culturing activity and should follow the completion of that activity.

Learning Objectives

After this lesson, students should be able to:

- Understand how different medicines or chemicals affect microorganisms differently.
- Explain how to apply medicines to some types of bacteria or mold cultures.
- Compare and contrast the appearances of some types of bacteria and mold before and after applying medicines.
- Understand ways to keep track of the changes in the cell cultures.

Materials List

Each group needs:

- Petri dish
- Marker
- Cotton swab

To share with the entire class:

- Tape

- Water
- Iodine
- Throat Spray
- One other medicine

Introduction / Motivation

There are billions upon billions of microorganisms on our skin and on the surfaces in the classroom. They grow and multiply whenever they have a food source. There are also hundreds or perhaps even thousands of different types of these organisms in our local environment. Many of these bacteria are helpful, but some are harmful. We will study how we might stop the growth of microorganisms.

Vocabulary / Definitions

| Word | Definition |
|------------|---|
| Petri dish | A shallow, circular container with a lid used to grow microorganisms |
| agar | A gel-like substance containing nutrients used for growing microorganisms |
| Culture | A growth of living cells or microorganisms in a controlled environment |
| Swab | A cotton-tipped tool for sampling by dabbing |
| Iodine | A nonmetallic element that may be used as a germicide |
| Germicide | A substance used to kill germs or microorganisms |
| Control | The standard used for comparison in an experiment |

Procedure

Background

Great care should be taken in order to achieve good results!

Before the Activity

Sterile agar dishes may be purchased from science suppliers.

With the Students

1. Based on your results from the cell culturing activity, swab an area that produced significant cell colonies. For instance, if a large colony grew when the swab was taken from the doorknob, swab the doorknob. This time, only one spot must be swabbed.
2. Mark four areas (quadrants) on the lid of the Petri dish.
3. Carefully use a swab with water and transfer a dab of the water to the surface of the agar. Dab a drop of water from the **same sample location** in all four quadrants. If there are bacteria on the surface, they will be transferred along with the water. Do not press on the agar surface, just lightly dab so that there is a water mark on the surface.

4. Make sure that your dabs line up with the areas that you marked on the lid. There should be one water mark in each quadrant.
5. Soak a piece of tissue approximately 1 cm by 1 cm in each of the three medicines and place these over or next to each dab of water. Notice that one quadrant will not have a medicine. This is your control. Label each quadrant according to the medicine that was used.
6. Tape the lid shut so that the agar doesn't dry out.



Safety Issues

After the cultures are completed, many other groups observe the bacteria using microscopes. Though the great majority of bacteria and mold cultures are harmless, the safest approach is to leave the Petri dishes taped shut in case a harmful bacteria has grown.

Troubleshooting Tips

Make sure the students very lightly dab the surface of the agar being certain to transfer some of the water yet also being certain not to disturb the agar surface significantly. This is also true of the application of the medicines.

Investigating Questions

1. Sketch what you see in after one week. Include this sketch in your lab report.
2. What colors and sizes are the samples? Describe this in detail. Use a ruler.
3. What other information can you record about your culture in your results?
4. Do the bacteria or mold colonies have different sizes and shapes?

5. Did the ?

6. Did the medicines affect the growth differently?

7. How did your results compare to the results of the other groups?

Owner

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