

Mold Investigations

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Objectives:

This activity will allow students to observe how molds grow. It will also allow them to investigate the fact that there are many types of molds and that their spores exist in various locations (even in the classroom). Possible modifications/additions allow students to design experiments and use the microscope. This exercise is appropriate for grades 3-8, and discussions can be scaled as required.

Materials Needed:

Each student will need 3-5 slices of bread (inexpensive white bread works fine) and a zip lock sandwich bag for each slice of bread. A simple water spray bottle is also needed. For additional modifications access to a refrigerator is useful. For microscopic observations about 4 microscopes, about two dozen microscope slides and cover slips, and several sets of tweezers are adequate for a class of 20-25.

Strategy:

Give each student several slices of bread and a zip lock sandwich bag for each slice. Each student should find a place in the classroom, hall, etc. and wipe an area in that place with a slice of bread. The slice should be sprayed **lightly** with water and then sealed inside the bag. This can be repeated for other locations with additional slices of bread. Each bag should be labelled with the student's name, the date, and the location which was wiped with that slice. The bags can be stored in a central location or taped to the students' desks to make daily observations more convenient. The students can examine their specimens each day and record their observations in a notebook. It may take 7-10 days or so for visible growth to appear (longer in the refrigerator (see below)), so don't be alarmed if you don't see something after only one or two days.

Controlled experiments can be easily adapted from the basic procedure described in the previous paragraph. For example, two or more slices can be wiped in the same area, but incubated under different conditions. One possibility is to omit the water spray from one slice to investigate whether the water spray enhances the mold growth (here, the unsprayed slice is the "control" for the effect of the water spray). Other experiments could include wiping the same area with several slices, spraying them all, but incubating them under different conditions (e.g., at room temperature or in a refrigerator (here the room temperature incubation is the control for the incubation in the cold); exposed to the light or in a dark location (here the dark incubation is the control for the effect of light); etc.).

If microscopes are available, they can be used to examine the mold that grows (see **Performance Assessment** section below). For each specimen place a drop of water in the middle of a microscope slide. Use the tweezers to sample a small bit of mold from a piece of bread and shake the sample off in the drop of water. Cover the water/mold with a cover slip. Examine under the microscope beginning at the lowest power and then going to higher power if desired. Make sure, however, that you know how to use the microscope before trying this.

Performance Assessment:

After about 7-10 days mold should begin to grow (it may take longer in the refrigerator or for the samples that were not sprayed with water). Microscopic mold spores (which are single cells) exist almost everywhere. When they land on a food source (such as a slice of bread), they begin to multiply and eventually grow into a large, multicellular organism, which can be seen with the naked eye. Different species of molds have different colors, textures, etc. in these "macroscopic" forms, and so students should be able to make a crude estimate of how many different types of molds they are growing. They can see, for example, if different types of mold were wiped from different areas. The experiments with variation of water, temperature, or light will allow the students to see if these variables affect the rate of growth of all or some types of mold. After the mold has grown up on the bread slices, the microscopic observation can be an exciting end point for the exercise, as the students observe and compare the structural details of their various molds (even at the cellular level) with those details that they see with the naked eye.

Students can be assessed on the thoroughness of their notes, the care with which they set up their controlled experiments, and the sophistication with which they explain their results.

References:

Any high school or college general biology textbook should have ample sections on this material.

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