Moldy Jell-O

adapted from "Fun with Moldy Jell-O" by Bob Farber at Central High School, Philadelphia;

Green plants can make their own food from sunlight, air, and water. This process is called photosynthesis. In contrast, animals must eat to get food.

Molds, mushrooms and other fungi seem like plants because they don't move. However, fungi do not photosynthesize, so they cannot make their own food. Molds and other fungi often grow on decaying plant material, such as fruit, bread, and leaves. The decaying plant material provides the food for molds to grow.

Molds grow well at room temperature, and many can also grow in the lower temperature of home refrigerators. Sometimes, when you leave food in the refrigerator or the kitchen too long and the food spoils, you can see mold growing on it. This happens because molds reproduce by spores that are light enough to float in the air – mold spores in the air in your kitchen will settle on food and then start to grow. For example, an orange can develop a spot of blue mold.

In this laboratory you will design an experiment to evaluate how environmental factors influence the growth of molds. You can design your experiment to answer one or more of the following questions, or another question of your own choosing (subject to instructor approval).

- Does mold grow faster at cold temperatures (in the refrigerator) or at warm temperatures (in the room), or the same at both temperatures?
- Does mold grow faster in the light or in the dark, or the same in both light and dark?
- Does mold grow faster with just protein for food or with protein and sugar for food?
- Can mold grow on a substance that does not contain water?
- Does the air in your classroom contain mold spores?

Materials available for your experiment

- plain gelatin powder (contains protein)
- orange Jell-O powder (contains similar protein plus sugar and flavoring)
- sugar
- small cups of prepared gelatin and Jell-O (made from gelatin or Jell-O powder plus water)
- clean Q-tips for transferring mold
- aluminum foil and plastic wrap to cover cups
- mold from bread, cheese, etc. (Please bring some from home if possible.)

[1] Teachers are encouraged to copy this student handout for classroom use. A Word file (which can be used to prepare a modified version if desired), Teacher Preparation Notes, comments, and the complete list of our hands-on activities are available at http://serendipstudio.org/sci_edu/waldron/.

Laboratory Day 1

1. Your group should choose the question you want to answer, and design an experiment that will help you answer this question. Construct a hypothesis about the question your group has decided to try to answer and write it in the space below.

2. Think about how to design your experiment to answer your question as clearly as possible.

   Plan to have a pair of experimental conditions that differ in only one characteristic. For example, to test the effects of temperature put exactly the same contents in all cups and keep them all in the dark, but keep some of the cups at a different temperature. That way you can identify the cause of any differences in mold growth that you observe.

   If you want to test the effects of two different factors on mold growth, you will need to have two sets of cups; the first set of cups should all be the same except for differences in the first factor you are testing, while the second set of cups should all be the same except for differences in the second factor you are testing.

   Also, you will want to have more than one mold growth cup in each experimental condition to see whether results are consistent for different mold growth cups under the same condition. Use the chart below to provide a description of your experimental design.

	Cup Contents	Location for cups	Covering on cups	Temperature & other specific conditions
Cups 1 & 2				
Cups 3 & 4				
Additional cups, if desired				

3. Once you have designed your experiment check with your teacher for suggestions and approval.

4. Set up your experiment. When applying the mold to your cups, use Q-tips and try to get the same amount of mold in each cup.

5. Plan how you will gather and record the data, using the chart shown below. If possible, you should record mold growth and any other observations every day for 5 days or longer.

Fill in the dates below	Cup 1	Cup 2	Cup 3	Cup 4	
Day 1 (today):					
Day 2:					
Day 3:					
Day 4:					
Day 5:					
Day 6:					
Day 7:					

6. Record your observations carefully over the next week.

Laboratory Day 2

7. At the end of the week, record a final set of observations. Examine each cup with a magnifying glass.

8. Discuss the results you obtained with your group. Compare all of the cups in a given experimental condition (e.g. all the cups at one temperature). Did you find the same result in all of the cups within each experimental condition? If you found differences between cups in the same experimental condition, what might account for these differences?

   What differences do you notice between the cups in different experimental conditions? For example, did mold growth differ depending on temperature?

9. Prepare a report on your experimental hypothesis, results, and interpretation for the rest of the class.

10. Based on the results from all of your class's experiments on mold growth, what can you conclude about the factors that influence mold growth? What can you conclude about the best ways to store food?