

# Why Is My Bread Fuzzy?

## Exploring Molds

### Science, Family and Consumer Sciences

#### **Materials**

2 slices of bread (whole meal is best)  
Resealable sandwich bags  
Spray bottle filled with water  
Magnifying glass (optional)  
Copies of Student Worksheet A: Daily Observations

#### **Overview**

The purpose of this lesson is for student to see what organisms are living on counters or surfaces in the classroom. They will compare these organisms to which ones are picked up from the air alone.

#### **Objectives**

1. Students will learn the definition of mold.
2. Students will understand the difference between good and bad mold.
3. Students will use the scientific method to perform an experiment.
4. Students will compare observations from the experiment.
5. Students will form a conclusion based on the experiment's data.

#### **Background Information**

##### What are molds?

Molds are microscopic fungi that live on plant or animal matter. They are multi-cellular organisms. The body of mold consists of three areas: root threads, stalk, and spores. Estimations for the number of species of mold exceed 300,000.

##### What are spores?

Spores are the reproductive tool used to spread molds through the air. Spores give mold the color individuals can see with the naked eye.

##### Where are molds found?

Molds are found virtually in every environment, indoors and outdoors, year round. Mold growth is encouraged in warm, humid environments indoors, and shady, damp areas outdoors.

**Grade Level:** 4-12

**Time:** Day 1 - 30 minutes;  
Day 4, 7, 12 - 5 minutes;  
Day 14 - 30 minutes

#### **Standards:**

Science as an Inquiry  
Science in Personal and  
Environmental  
Perspectives

*For Kansas standards, visit  
[www.ksde.org](http://www.ksde.org)*



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## Are food molds beneficial?

Many food production processes involve mold. Cheese is one of the best examples of this. Mold can be found internally and on the surface of many different types of cheese. These types of molds are safe to eat.

## How can molds be harmful?

Some molds can produce harmful toxins that can be poisonous to humans. These toxins are known as mycotoxins. The majority of mycotoxins are found in mold on grain or nut crops, but can be found on other plants as well. The most severe type of mycotoxin is known as an aflatoxin. Aflatoxins are cancer-causing poisons that are harmful to humans and many types of livestock.

## How to minimize mold growth?

Cleanliness is important. Clean kitchen appliances, dishcloths, and towels regularly. Keep the humidity level in the house or building below 40%.

## Additional Questions?

Food Safety and Inspection Service: [www.fsis.usda.gov](http://www.fsis.usda.gov)

USDA Meat and Poultry Hotline: 1-888-MPHotline or 1-888-674-6854

*Information adapted from the USDA Food Safety and Inspection Service (2010).*

*<http://www.fsis.usda.gov/PDF/Molds.onfood.pdf>*

## What are the steps in the scientific method?

1. Ask a question.
2. Do background research.
3. Construct a hypothesis.
4. Test your hypothesis through an experiment.
5. Analyze your data and draw a conclusion.
6. Communicate your results.

## **Preparation**

Fill spray bottle with water. Have a cleared area in mind to complete Step 1 of the procedure. An area near a sink in the classroom would be ideal. If there is no sink, any surface receiving heavy traffic will be sufficient.

## **Instructional Format**

1. Share background information about mold, and review the scientific method.
2. The experiment will be set up during the first class period with observations following throughout the two-week period.
3. After two weeks, students will make conclusions about the experiment.

## **Procedures**

1. Share background information and vocabulary terms about mold with the students. The



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- students will complete the top portion of the handout during this time.
2. Review the steps of the scientific method and begin the process of setting up a proper experiment.
  3. After looking over the handout, students will form a hypothesis about the experiment.
  4. Wipe only ONE slice of bread on the counter near a sink in the classroom (Bread A). The second slice (Bread B) will act as a control to the first.
  5. Spray both slices very lightly with water from the spray bottle.
  6. Seal the slices in separate sandwich bags and label them A and B.
  7. Place the wrapped bread slices somewhere fairly warm.
  8. Starting on the first day the students will take an observation of what they see in the bag. On days 4, 7, 12, and 14 have the students take observations.
  9. On the 14th day remove the bread from the bags. The students can look at the mold colonies under a magnifying glass. (Be sure to tell the students not to breathe in or touch the dust from the mold as if may cause medical complications.)
  10. The students will complete the conclusion questions with the help of their observation sheet. Discuss the students' findings after questions are completed.

### **Conclusion Questions (Assessments)**

1. What is mold?  
*Molds are microscopic, multi-cellular fungi that live on plant or animal matter.*
2. Was your hypothesis correct?  
*Answer depends on what student's hypothesis entailed.*
3. Compare the difference between Bread A and Bread B.  
*Bread A contained more variety of mold colors, and possibly more total mold.  
Bread B contained more typical bread mold, should not be as much.*
4. How can you protect yourself from harmful mold at home?  
*Cleanliness is key. Wipe down appliances and wash towels and washcloths regularly. Use safe kitchen practices when dealing with mold on food.*

### **Resources**

Adapted from Green Planet Solar Energy (2010). The Bread Mold Experiment.  
<http://www.green-planet-solar-energy.com>

USDA Food Safety and Inspection Service (2010) Molds on Food: Are They Dangerous?  
<http://www.fsis.usda.gov/PDF/Molds.onfood.pdf>



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### **Want More? Extensions**

Add different types of bread to the experiment, such as garlic, sourdough, or cinnamon. These breads have antimicrobial properties that would alter the outcome of the experiment. Additional Information on antimicrobial food may be found at <http://watoxics.org/files/antimicrobials.pdf>

You could take the experiment one step further and have the students test different brands of disinfectants. Students could divide and clean the “wiping area” with the different disinfectants. Be sure to follow the directions listed on each bottle of cleaner.



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### Molds Vocabulary

**Aflatoxin:** A cancer causing poison produced by certain fungi in or on foods and feeds, especially in field corn and peanuts.

**Control:** A sample in your experiment involving no variables. Used to compare your results to the norm.

**Fungi:** The animal kingdom consisting of heterotrophic organisms. Can be multi-cellular and single-celled.

**Mold:** A microscopic multi-cellular fungi that lives on plant or animal matter. Can be helpful and harmful to humans.

**Mycotoxin:** A poisonous substance produced by certain molds found in mainly grain and nut crops.

**Root:** The bottom section of mold. Usually used to attach to the food it lives on.

**Spore:** The reproductive tool for mold. Usually spread through air movement.

**Stalk: Stalk:** The middle section of mold. Used to raise and hold the spores.



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Daily Observations

Day	Observations

