Hold the Mold!

- **Grade Level**
  5-8
- **Subject Areas**
  Science
  Health
- **Duration**
  20 minute intro
  15 min experiment prep
  10 min activity discussion
  2 weeks for experiment
  20 minute wrap up
- **Setting**
  Classroom
- **Skills**
  Observation
  Collecting data
  Communication
- **Vocabulary**
  Mold
  Spores
  Fungi
  Humidity
- **Related Websites**

www.epa.gov/mold/
www.epa.gov/children
www.cdc.gov/mold/

Summary

Students will learn about the different kinds of mold and how it grows. They will learn the health effects of mold and how to help avoid the growth of mold.

Objectives:

Students will:

- Understand what mold is and how it grows
- Observe the growth of different kinds of food molds & understand how to identify and prevent mold growth.

Materials:

- Small paper plates
- Sealable sandwich bags
- 5 apples or other fruit: quartered
- Sliced bread, halved
- Spray bottle with water
- Permanent marker to ID bags
- Tape to seal bags
- Observation Worksheets

Materials Tip: Use older apples or fruit "seconds" from a local orchard or market

National Science Standards:

- Unifying Concepts and Processes
  - Changes, constancy, and measurement
  - Evidence, models, & explanation
- Science as Inquiry
  - Abilities necessary to do scientific inquiry
- Science in Personal & Social Perspectives
  - Personal health
  - Science and technology in society
  - Natural hazards
- History & Nature of Science
  - Science as a human endeavor
  - Nature of science

Background:

What is mold?

Mold is the common name for many kinds of tiny organisms called fungi. There are thousands of types of molds that can be found indoors and outdoors. Different molds will grow in colonies, living on dead organisms such as decaying plants and animals, as well as non-living materials such as buildings, food, fabric and books. Some molds even thrive on living organisms as parasites. Molds play an important part of the natural decaying process of living organisms in the natural world. However, they may present a health risk in indoor environments.

Molds need moisture to thrive and usually grow and reproduce spores in damp or moist places. Light and temperature also impact mold growth in different locations such as showers, kitchens, damp basements, and around windows. Mold travels by releasing spores into the air. Spores are reproductive structures that allow organisms such as fungi to spread and survive in almost any environment. Mold spores float through the air, landing on and interacting with thousands of living and non-living objects.

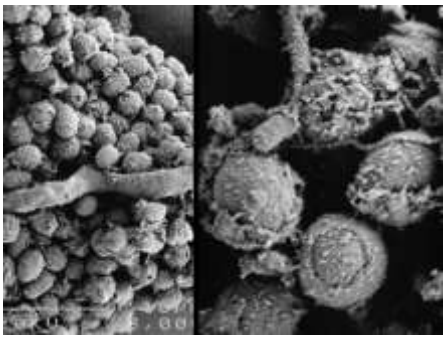

Figure 1. Mold spores magnified.

What does mold look like?
Mold grows in many sizes, textures, and colors such as white, black, green, blue, and orange. Spores are released by mature mold that varies in color, or may not be colorful at all. Each mold growth can be different.

Figure 2. Moldy bread.

What are the health impacts of mold?
Spores from mold growth, while natural, can also pose health risks. Some people, with or without allergies, are very sensitive to mold or may become sensitive to mold from single or repeated exposure. Molds, mold spores, and pieces of mold may impact a person's health by causing minor irritations such as a runny nose or itchy, watery eyes to major health concerns such as difficulty breathing, asthma attacks, infections, fever, and major skin irritations. The best way to reduce and prevent mold growth is to control moisture. To reduce mold growth in homes, schools and other buildings, it is important to keep humidity levels low, between 30-60%. To reduce excess moisture that mold needs to grow, it's also important to repair leaks, completely clean and remove any existing mold growth, ventilate bathrooms, kitchens and basements that are more prone to damp conditions, and use a dehumidifier to remove moisture from the air if necessary. Outside, mold may grow in damp, shaded areas with lots of leaves or compost. People who are sensitive to molds should be careful to avoid such places and areas prone to lots of mold growth.

When cleaning and removing mold at home or in school, use soap and hot water and always wear gloves, and a breathing mask, if necessary. For more information about mold and health concerns about mold, visit http://www.epa.gov/mold.

Procedure:

Warm-Up:

Ask students if they have ever seen mold. Discuss with students what mold is, where it comes from, and what purpose it serves. Show students a picture of moldy bread. Introduce them to the sources and health effects of mold.

Activity

To gain a clear understanding of what mold is, looks like, how it grows and spreads, students will conduct an experiment where they will grow contained household mold samples to observe and document.

1. Have students work in pairs.
2. Each pair gets a paper plate and a sealable plastic bag. Have students write their name and the date on their bag.
3. Students should then put their paper plate inside the bag, but not seal it yet.
4. Instruct students to place one slice of apple and one half slice of bread on their plate, inside the bag.
5. Students should use the water spray bottle to moisten their bread with one spray into the bag.
6. Students then seal their bag and place tape over the seal.
7. Place bags on a shelf where they will get warm, but not hot and can sit still for two weeks.
8. Instruct students that they are going to observe their experiment bag for mold growth. Each student gets worksheets to observe and record their observations and data each day for two weeks. Worksheets include questions to help guide observations and a place for students to sketch a simple drawing of their observations. Note: Sketches will not be shared at the end of the experiment. They are for the student to use as a data tool. Teachers may elect to use digital cameras to record daily mold growth progress and change as well.
9. At the end of two weeks, discuss what happened to the apple and bread. What changes were observed?

Wrap Up

Review questions & discussion:

- Did mold grow on the apple or bread first?
  Mold tends to grow on the bread first.
- How long did it take to see mold growth?
  Answers may vary based on moisture and temperature of the classroom. By the end of the first week, mold growth should be visible.
- What does the mold look like?
  Mold growth may vary in color, but tends to be white fuzzy spots that grow larger.
- What color is the mold?
  Mold will vary in color from white to green, blue, or grey.
- Texture: Is the mold fuzzy, lumpy, flat, shaped?
  Texture is likely to be fuzzy and bumpy, but will vary.
- Does the mold spread from one object to the other?
  Once mold growth is established, it will spread to other objects in the bag.
- Do you notice different molds on different foods?
  Mold growth will vary on food items used, location, and temperature.
- Why is it important that we not open the bags to smell the mold?
  It is very important that the bags stay sealed t o prevent allergic reactions and the spread of mold spores into the air. Once mold growth is established in the bags, mold will start to release spores. When breathed in, mold and mold spores can trigger allergic reactions and irritations for people who are sensitive to them. Make sure to discard sealed experiment bags at the end of the experiment in the garbage.
- Are there different types of mold? Are some more harmful than others?
  There are thousands of species of mold. While all molds have the potential to cause health effects, not all molds are toxic. Some molds have beneficial uses to create things like cheeses and medicines. The research on molds that produce harmful toxins, called mycotoxins, is on-going. Mold growth in a building does not always indicate the presence of toxic molds, but for health and safety, mold should be removed right away.
- What does mold need to grow and how can you help prevent the growth of mold at home and in school?
  Mold needs moisture and a food source to grow. The best way to reduce and prevent mold growth and home and in school is to control moisture. Keep humidity levels at home and in school low with ventilation systems or a dehumidifier that remove excess moisture from the air. It is also important to repaid leaks and remove existing mold growth with soap and hot water.

Assessment:

Assess students based on their performance in the activity. Each student should have completed a worksheet with sketches and observations of their experiment. Use the wrap-up questions to evaluate the student knowledge gained in this activity.

Extensions:

1. The mold growth experiment can be extended for a longer growth cycle.
2. Repeat the experiment, but cover the plates so that students can compare mold growth in light and dark environments.
3. The experiment can also include the use of a variety of foods to compare different types,. Colors, and shapes of mold growth.
4. Instead of using individual disposable bags and plates, the classroom can conduct a mold experiment using one large glass jar or that can be tightly sealed. Please be careful not to open the mold filled container inside buildings. If the container is to be reused, open it outside, away from children and dispose of the moldy contents in the garbage or a compost container. To thoroughly wash the jar, use soap and hot water.

Resources and Related Links:

U.S. Environmental Protection Agency:
www.epa.gov/mold/
U.S. Environmental Protection Agency:
Learn the Issues: Air
www.epa.gov/mold/moldguide.html
www.epa.gov/mold/pdfs/moldguide.pdf
Centers for Disease Control and Prevention
www.cdc.gov/mold/

Student Mold Growth Observation Worksheet: Name: _____

Instructions:

1. **DO NOT open your experiment bag.**
2. **Look at the bread and apple on the plate in your experiment bag. What do you see?**
3. **Answer the observation questions to record your data and then draw a picture of what you see in the space provided beneath the questions.**

Day _____ Data and Observations: Is mold growing?_____ What is mold growing on?_____
What color is the mold?_____ Describe the texture of the mold (fuzzy, smooth, lumpy):
_____
Draw a picture of your experiment: What do you see?

Day _____ Data and Observations: Is mold growing?_____ What is mold growing on?_____
What color is the mold?_____Describe the texture of the mold (fuzzy, smooth, lumpy):
_____
Draw a picture of your experiment: What do you see?

Day _____ Data and Observations: Is mold growing?_____ What is mold growing on?_____
What color is the mold?_____Describe the texture of the mold (fuzzy, smooth, lumpy):
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Draw a picture of your experiment: What do you see?

Name: ______________________________

Day ______ Data and Observations: Is mold growing?__________ What is mold growing on?________________
What color is the mold?__________________Describe the texture of the mold (fuzzy, smooth, lumpy):
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Draw a picture of your experiment: What do you see?

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Draw a picture of your experiment: What do you see?

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Day _____ Data and Observations: Is mold growing?_____ What is mold growing on?_____
What color is the mold?_____Describe the texture of the mold (fuzzy, smooth, lumpy):
_____
Draw a picture of your experiment: What do you see?

Final Observations:
What changes did you observe from start to finish? _____
What happened to the bread and apple in your bag? _____
How can you use this new knowledge to help prevent mold growth at home or in school? _____
_____
What does mold need to grow?_____