

"Be a Scientist"

A Kindergarten Unit

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Developed for:
History & Philosophy of Science, Summer 2004

Utilizing the
Minnesota Academic Standards

History and Nature of Science
(Sub-Strand: B. Scientific Inquiry):

The Student will raise questions about the natural world.

Benchmark:

The student will observe and describe common objects using simple tools.

Day 1: Mystery Objects

Students will demonstrate the sense of touch as a key element for making scientific observations.

Materials: 4 paper grocery bags, 4 "mystery" objects of interest (pine cone, sea shell, coconut, bird nest)

Place one object in each bag, staple the bag closed and cut a hole in the bag that will allow students to reach in and feel the object without being able to see into the bag.

Arrange students in a circle and explain to students that today they are going to be scientists. They will each investigate 4 mystery objects just by using their sense of touch. Be sure to let students know they will each have a turn to feel the object and make a hypothesis regarding what the object is. After everyone has had a chance to feel inside the bag, talk about how the objects felt and how they came to the conclusions. Make a class list of conclusions and vote on what they think the object is, open the bag and reveal the object. Continue with next 3 bags.

Close: Discuss how scientists depend upon all their senses to make conclusions about discoveries. We are able to make a lot of decisions using only our sense of touch. Our sense of touch makes us better observers.

(Idea adapted from Lynn Wallis)

Day 2: Look Through the Window

Students will recognize the importance in using the sense of **sight** for making **scientific observations**.

Materials: Look, Look, Look by Tana Hoban, old magazines, scissors, glue, 2 pieces of 6x9 construction paper--one with a one inch square cut out of the middle.

Read Look, Look, Look with the class, making guesses as to what each picture could be. Discuss how small clues can give you ideas as to what the big picture really is. Small clues help us make a hypothesis.

Give students the construction paper and instruct them on how to find a picture in the magazine that they think they could reveal just a small portion of to try and stump their classmates as to what the picture actually is. They will cut out their picture, glue it to the plain paper and place the paper with the square window on top (do not glue it down!). *Students may need help with placement of the magazine picture before gluing it down.*

Close: Assemble each students project into a class book and title it, Look, Look, Look Again! Read the book as a class hypothesizing what the actual pictures are. Add the book to the classroom bookshelf.

(Idea adapted from Lynn Wallis)

Day 3: Microscopic Comics

Students will observe colors used in Sunday comics using a microscope.

Materials:

- Sunday comics
- microscopes
- paint and brushes
- extra paint dishes for mixing paint colors in paper

After explaining how and why scientists use microscopes, have students take turns looking into the microscope at a Sunday comic.

Questions to discuss:

- What shape do you see?
- What colors do you see/don't see?
(4 colors: magenta, yellow, cyan, black)
- How do they make it look like they use every color?

Close: Discuss how things are not always as they seem. Have students choose four colors of paint. Have them make their own comic picture by mixing the colors to make lots of colors.

Day 4: Wonderful Water

Students will observe water as matter and predict the changes and weight of the states of matter.

Materials:

- plastic water bottle 1/2 full of water
- freezer
- scale

Have students discuss what they already know about water and ice and how they are alike and different. Make a hypothesis chart with class as to what they think will happen to the water after it freezes. Have students weigh the bottle of water and then put it in the freezer overnight. The next day, have students weigh the bottle of ice.

- What happened overnight?
- Does the water or ice weigh more?
- How long did it take to melt?
- Does the water weigh the same as when the experiment began?
- What happened to it?

Day 5: How Does Mold Grow?

This experiment uses 4 samples to test what conditions mold grow the best in. Depending on the age of the child(ren) you can use only 2 or 3 samples instead of all 4.

Materials:

- bread (4 slices)
- water
- saran wrap (or some other air tight covering)
- 1 to 2 weeks of experiment time
- Magnifying glass
- How Does Mold Grow lab sheet to use for record keeping
- Optional: Information Sheet for teacher/student discussion (send home for parents)

Safety Thoughts:

Some people are allergic to molds. If this is a concern, skip the first sample (just use the last 3) and seal each of them in a clear glass jar, so the child(ren) can examine them without being exposed to the molds.

Directions:

SAMPLE 1: Take a piece of bread and slice it in half (it can be a few days old, but ensure it isn't too stale). Seal one half in saran wrap and expose the other to air.

SAMPLE 2: Take another piece of bread and slice it in half. Leave one half in the dark (a paper bag or cupboard) and the other half in strong light (sunlight works).

SAMPLE 3: Take a third piece of bread and slice it in half. Keep one half very dry and put about 1 tsp of water on the other half. (Spritz the wet piece with a few drops of water each day).

SAMPLE 4: Take a fourth piece of bread and put half of it someplace warm, in the dark (on top of the fridge in a paper bag) and the other

half someplace cold in the dark (the refrigerator).

Examine the samples each day with your naked eye or a magnifying glass and record any changes in appearance. Use the How Does Mold Grow sheets to keep a picture journal.

What happened:

- Molds will develop on some of the samples.
- Molds grow best in warm, dark and moist conditions.
- In the first sample, the sealed bread should develop mold more slowly than the unsealed bread.
- In the second sample, the bread kept in darkness should develop mold more slowly than the bread kept in light.
- In the third sample, the moist bread will develop mold more quickly than the dry bread.
- In the fourth sample, the mold in the warm place should develop mold more quickly than the bread in the cold place.

Questions to Ask:

1. Where and how should bread be stored to keep it free from molds?
2. What other foods do you think might grow molds if left exposed?
3. What are some ways that people use to preserve their food?

Possible Answers:

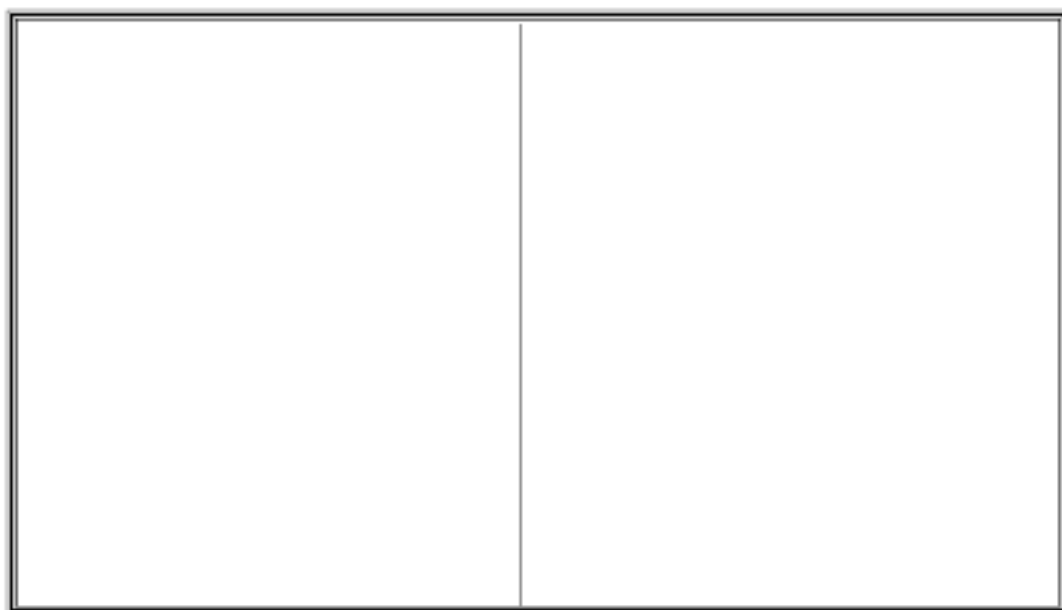
1. someplace sealed, in the refrigerator, in the light, someplace dry, someplace cool
2. cheese, oranges, tomatoes, lemons, onions, used coffee grounds, potatoes (determining what foods mold the best can be an entirely different experiment!)
3. refrigerator, artificial preservatives, natural preservatives like vinegar and salt, tupperware

(Idea from www.kidzone.ws/science)

Name: _____

Date: _____

How Does Mold Grow



Draw a picture of your observations.

What did I do? _____

What did I see? _____

What is mold, anyway?

That fuzzy stuff growing on the bread is mold. There are thousands of different kinds of molds. The mold that grows on bread looks like white fuzz at first. If you watch the mold for a few more days, it will turn black.

Mold is part of a larger family called fungus. Mushrooms are one kind of fungus; molds are another.

Unlike plants, molds don't grow from seeds. They grow from tiny spores that float around in the air. When some of these spores fall onto a piece of damp food, they grow into mold. The tiny black dots that appear on bread after awhile are the bread mold's spores. These spores will be released into the air so that more mold can grow.

Green plants are green because they contain a chemical compound called chlorophyll. Chlorophyll makes it possible for green plants to use sunlight, air and water to make food (sugars and starches).

Unlike green plants, molds have no chlorophyll and can't make their own food. The mold can't turn sun, air and water into food so it eats the bread! The mold feeds itself by producing chemicals that make the bread start to rot. As the bread rots, the mold grows.

Nature Recycles!

That's right, nature is one of the best recyclers around and mold is one of nature's helpers. Although it isn't much fun when our food gets moldy, it's a great help in nature. In a natural environment, rotting things return to the soil, providing nutrients for other plants. Mold is an important part of the circle of life.

Day 6: Hot T-shirts

Students will experiment to see what happens to the temperature of various colors of t-shirts when placed in the sun.

Materials:

- 6 paper t-shirts, each a different color
- 6 thermometers
- clothesline and clothespins
- recording chart

Have students hypothesize which t-shirt will be the hottest after 1 hour of sunshine. Graph the class hypotheses.

Discussion Questions:

- What will happen?
- Why did this happen?
- How does weather effect what you choose to wear in different weather conditions?

Name _____

Hot T-Shirts

Which t-shirt will be the hottest after 1 hour of sunshine?

Color the shirt to match.

Which t-shirt will be the coolest after 1 hour of sunshine?

Color the shirt to match.

Record the temperature for each colored t-shirt.

_____°

_____°

_____°

_____°

_____°

_____°