IN THE AIR

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Connecting Activity #3

"Now You See It,
Now You Don't"

K-3 EDUCATION MODULE

EPA

Missouri Botanical Garden

Correlation with Education Standards Summary

Connecting Activity #3
"Now You See It, Now You Don't"

For a narrative description of these standards please refer to the Teacher's Guide.

National Standards

SOURCE: www.education-world.com/standards

Grades K-4:
- NPH-H.K-4 .1
- NPH-H.K-4 .3
- NS.K-4.1
- NS.K-4.6

Grades 5-8:
- NPH-H.5-8 .1
- NPH-H.5-8 .3
- NS.5-8 .1
- NS.5-8 .6

Missouri Show-Me Standards

SOURCE: www.dese.mo.gov/standards

Performance Standards:

GOAL 1: 2
GOAL 4: 1, 4, 7

Knowledge Standards:

CA 1
HPE 5
SC 8

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Connecting Activity #3

"Now You See It, Now You Don't"

Recommended Grade Level:
K-6
Preparation:
Time is needed to purchase materials and to make photocopies of the worksheet. Approximately 10 minutes is required to mix frosting samples.
Presentation Time:
Time: 30 minutes

Overview

Many harmful substances are difficult to detect by sight or smell. Using crackers and frosting, students will make various observations to detect mock "pollutants" and draw conclusions from their observations.

Caution! Before conducting this activity, check if any student has a food allergy and plan accordingly. Familiarize yourself with any guidelines and policies that your school or local health department may have regulating the use of foods in the classroom.

Goals

- To illustrate that human senses are not always reliable to alert us to potentially harmful substances in our environment

Objectives

By the end of this activity, students will be able to do the following:

- Detect a potential contaminant using the sense of sight, touch, and smell.
- Relate that some substances may escape our detection.

Materials

The following materials will be needed:

- Animal crackers (four per student)
- One container of prepared vanilla frosting
- Three containers large enough to mix mock "contaminants" into 1/4 of the frosting (empty yogurt cups work well)
- Four spoons for mixing
- One to three teaspoons of ground black pepper
- One to three teaspoons of white vinegar
- One to three teaspoons of salt
- One to three teaspoons of baking soda
- Non-washable marker
- Small paper cups (four for each group of three or four students)
- Paper towels
- Plastic knives or craft sticks to spread frosting (one per student)
- Copy of the worksheet for each student

Vocabulary

pollutant:

an unwanted substance in the air, water, or soil that can harm living things and/or damage the environment.

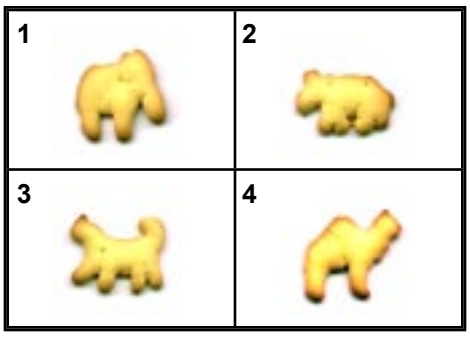
Procedures

1. Before the lesson, divide the frosting evenly into fourths.
2. In one part, mix a small amount of vinegar into the frosting, enough to make the consistency noticeably different but not so much as to make it runny.
3. In one part, mix in black pepper, enough to make its appearance noticeable.
4. In one part, mix in small amounts of baking soda and salt until frosting begins to stiffen.
5. Write numbers one to four on paper cups, one set for each group of three - four students.

   Distribute frosting into paper cups.
   - Cup #1: Frosting with vinegar
   - Cup #2: Frosting with black pepper
   - Cup #3: Plain frosting
   - Cup #4: Frosting with baking soda and salt

At the beginning of the lesson tell the students: In this experiment we are only using safe ingredients. The purpose of this activity is to determine if the frosting contains an unwanted ingredient or "pollutant" using our senses of sight, touch and smell only.

6. Divide class into groups of three or four students.Distribute worksheet, paper towels, spreading utensils and four animal crackers to each student. Distribute cups of frosting labeled #1 through #4 to each group.
7. Have students draw a table on their paper towel. The table will have two columns and two rows which will create four squares.
8. Have students number the squares one through four. (See *figure 1*)
9. Tell students to place one cracker in each box.
10. Spread the animal cracker in space #1 with a sample of frosting from cup #1.
11. Repeat for the other three samples.
12. Using the worksheet, have students record their observations. For younger students the teacher can guide the discussion and record observations.
13. After the observations are completed discuss the findings.



(figure 1)

Optional: After the activity, you may allow students to eat the cracker with the plain vanilla frosting from cup #3. If they are interested in eating the other samples, explain that the sample mock "pollutants" will not hurt them but they might not enjoy the taste.

Discussion Questions

- Explain that a pollutant is an unwanted substance in our air, water or soil that may cause harm to human health or to the environment.
- How might someone detect pollution? *Answers will vary but should include using human senses.*
- Ask the students to give examples of when their senses have alerted them to a potentially unsafe situation. Spoiled food and noxious odors such as natural gas are two examples. If a substance has a strong odor it might be bad for you.
- Discuss that most pollutants cannot be detected through observation alone. To protect us from harmful pollution, scientists use air monitors to measure pollutants in the air. Some harmful substances have no odor or color at all; carbon monoxide is one example. Many homes have monitors that can detect carbon monoxide.

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Ask the students: If you don't know what something is, why should you never use your senses of taste, smell, or touch, to identify it?

Answer: Because an unknown substance might harm you.

Conclusion

Our human senses of sight and smell are important in detecting hazardous substances in our environment and warning us away from them. Some pollutants cannot be detected by our senses alone. To detect hazardous air pollutants scientists use air monitors. Air monitors are sensitive pieces of scientific equipment. By learning what is in our air, people can protect our health by reducing our exposure to toxic chemicals.

Extension

Use the activity from the website below to detect dust and particles in your air. The activity includes assessment questions and correlations.
http://web.stclair.k12.il.us/splashd/airquexp.htm

For More Information

To learn about some of the concerned citizens, scientists, and government agencies that are working to protect us from airborne toxics, check out the following sites on the Internet.

http://www.stlcap.org

http://www.epa.gov Click on Explorers' Club for Kids

Learn what kids can do to protect themselves from pollution.
http://www.epa.gov/airnow/aqikids/actions.html

Now You See It, Now You Don't

STUDENT WORKSHEET

NAME: _____

	What does it look like?	What does it does it smell like?	How did it spread? (Was it stiff, runny, smooth?)	Has something been added to the frosting? Yes or No
Cracker One				
Cracker Two				
Cracker Three				
Cracker Four				

Based on this activity, do you agree that some of the ingredients cannot be easily seen or smelled? Give an example from your observations.