



## Chapter 2

# Food Safety

Food safety is handling, storing and preparing food in ways to keep food safe. Poor food safety can make people sick. Any illness caused by food is called foodborne illness. As safety experts, your students can keep their friends, family and themselves safe by practicing good food safety and sanitation and telling others about food safety.

Enjoy discovering your super safety powers!

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### Virtual Lessons:

*(See Virtual FoodMASTER CD)*

#### **Bold Bacteria**

Bacteria Beware

#### **Danger Zone**

Temperature Testing

#### **Food Storage Protector**

Safe Storage

# Safe Kitchen Cooks

## Summary

Students will measure the temperature of cold, lukewarm and hot water using a thermometer. Students will learn about the growth of microorganism by observing yeast growth at varying temperatures.

## Objectives

1. Students will be able to use a kitchen thermometer to measure temperature.
2. Students will be able to state temperatures that slow yeast growth and temperatures that kill yeast.
3. Students will make reasonable conclusions about temperatures in which microorganisms grow best.
4. Students will select food storage locations in which microorganisms grow best.

## Academic Content Standards

### MATH

#### Algebra Standard

Analyze change in various contexts.

Expectation:

- Investigate how a change in one variable relates to a change in a second variable.

#### Measurement Standard

Understand measurable attributes of objects and the units, systems, and processes of measurement.

Expectation:

- Understand such attributes as length, area, weight, volume, and size of angle and select the appropriate type of unit for measuring each attribute.
- Understand the need for measuring with standard units and become familiar with standard units in the customary and metric systems.

Apply appropriate techniques, tools, and formulas to determine measurements.

Expectation:

- Select and apply appropriate standard units and tools to measure length, area, volume, weight, time, temperature, and the size of angles.

### Data Analysis and Probability Standard

Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them.

Expectation:

- Collect data using observations, surveys, and experiments.
- Represent data using tables and graphs such as line plots, bar graphs, and line graphs.

Develop and evaluate inferences and predictions that are based on data.

Expectation:

- Propose and justify conclusions and predictions that are based on data and design studies to further investigate the conclusions or predictions.

**SCIENCE****Science as Inquiry: Content Standard A**

Develop abilities necessary to do scientific inquiry.

Expectation:

- Employ simple equipment and tools to gather data and extend the senses.
- Use data to construct a reasonable explanation.
- Communicate investigations and explanations.

**Physical Science: Content Standard B**

Properties of objects and materials.

Expectation:

- Objects have many observable properties, including size, weight, shape, color, temperature, and the ability to react with other substances. Those properties can be measured using tools, such as rulers, balances, and thermometers.

**Life Science: Content Standard C**

The characteristics of organisms.

Expectation:

- Organisms have basic needs. For example, animals need air, water, and food; plants require air, water, nutrients, and light. Organisms can survive only in environments in which their needs can be met. The world has many different environments, and distinct environments support the life of different types of organisms.

**Science in Personal and Social Perspectives: Content Standard F**

Personal Health.

Expectation:

- Safety and security are basic needs of humans. Safety involves freedom from danger, risk, or injury. Security involves feelings of confidence and lack of anxiety and fear. Student understandings include following safety rules for home and school, preventing abuse and neglect, avoiding injury, knowing whom to ask for help, and when and how to say no.

## SCIENTIFIC INQUIRY: Temperature and Microorganisms

### Materials

**For the teacher:** Permanent marker, hot plate, small pot with lid, water, bimetallic stemmed thermometer, 1 foam cup filled with water (or clear cup or jar).

**For each group:** 1 liquid measuring cup, 3 small foam cups, 1 bimetallic stemmed thermometer, 3 packets active dry yeast, water (cold, lukewarm, boiling). Optional: 1 ice cube.

### Procedure

1. Ahead of time, label three cups per group “C,” “W” and “H” (C = cold, W = lukewarm, H = hot).
2. Fifteen minutes prior to the activity, begin heating about two cups of water in a small pot on the hot plate. Bring to a light boil.
3. Read *Safe Kitchen Cooks* and complete the Doodle Bugs.
4. Demonstrate how to use the thermometer. First, point out the sensing area on the thermometer from the tip to the dimple. Then place the stem of the thermometer into the cup of water. Remind students that the whole sensing area must be underwater and that the stem should not touch the bottom or sides of the container. Next, watch as the needle moves and then comes to a stop. Explain the meanings of the markings on the thermometer and read the temperature.
5. Divide the class into groups of four.
6. Students will complete *Scientific Inquiry: Temperature and Growth*. For safety, let the boiling water cool slightly (170–210° F). Cold and lukewarm water may come from the tap. Add an ice cube to the cold water to ensure that it is cold enough.
7. While the yeast is growing, students may complete *While You Wait: Kitchen Clean Up*.
8. Students will make observations, complete the chart, discuss results and answer questions.

### Teacher Tips:

- Take extra caution with the hot plate and hot water.
- For safety, some teachers may choose to demonstrate the hot water yeast experiment.
- Check water temperatures to ensure that temperatures are in the correct ranges. Cold water (32–45°F). Lukewarm water should be warmer than room temperature (85–110°F). Boiling water can be cooled slightly before given to students (170–200°F).
- Buy yeast that does not require added sugar, or add sugar per package directions.
- Compare amount of bacteria growth to bubbles formed:
  - Boiling water kills
  - Cold water slows growth
  - Lukewarm water promotes growth
- Extension: Discuss basic needs of living organisms.
- Practice good sanitation in your classroom by storing food properly and sanitizing desks, counters, cutting boards and other food contact surfaces. (You can prepare sanitizing solution by mixing one teaspoon of bleach with one gallon of water.) Store all cleaning supplies in safe, out-of-reach areas. Keep MSDS (Materials Safety Data Sheet), available from manufacturers’ websites, on any cleaning supplies used in the classroom.

**Class Discussion:**

- What do you need to live and grow? (Water, food, oxygen and a constant body temperature).
- Do you need water to live? (You can only live a few days without water. In the desert, you can only live one day without water. Could you live in super cold temperatures? Could you live in super hot temperatures like on the sun? Could you live in the ocean without air? Could you live without food?)
- What did the yeast need to grow? (Time, right temperature, food (sugar), oxygen, moisture/water).
- At what temperature did the yeast grow best?
- Do other microorganisms grow at the same temperatures as yeast grows?
- What locations/temperatures are best for storing food?

## WHILE YOU WAIT: **Kitchen Clean Up**

**Materials**

**For each student:** Colored pencils.

**Procedure**

While the yeast is growing, students will complete *While you Wait: Kitchen Clean Up*. They will identify poor food safety practices and draw a super safe kitchen.

**Teacher Tip:**

This is an appropriate time to review safe kitchen practices already discussed and to identify additional practices, such as closing the oven door, always using a cutting board when chopping food, never thawing food on the counter, throwing out expired food products, sweeping and mopping the floor and never placing metal in the microwave.

# Healthy Hands

## Summary

Students will learn proper techniques for hand washing. The use of Glo Germ™ gel will visually reinforce the importance of personal hygiene/hand washing.

## Objectives

1. Students will be able to state how long hands need to be washed.
2. Students will be able to demonstrate proper hand-washing techniques.
3. Students will be able to communicate the importance of hand washing.

## Academic Content Standards

### MATH

#### Data Analysis and Probability Standard

Formulate questions that can be addressed with data and collect, organize and display relevant data to answer them.

Expectation:

- Collect data using observations, surveys, and experiments.

Understand and apply basic concepts of probability.

Expectation:

- Describe events as likely or unlikely and discuss the degree of likelihood using such words as certain, equally likely, and impossible.

### SCIENCE

#### Science as Inquiry: Content Standard A

Develop abilities necessary to do scientific inquiry.

Expectation:

- Employ simple equipment and tools to gather data and extend the senses.

### Science in Personal and Social Perspectives: Content Standard F

Personal Health.

Expectation:

- Safety and security are basic needs of humans. Safety involves freedom from danger, risk, or injury. Security involves feelings of confidence and lack of anxiety and fear. Student understandings include following safety rules for home and school, preventing abuse and neglect, avoiding injury, knowing whom to ask for help, and when and how to say no.
- Individuals have some responsibility for their own health. Students should engage in personal care — dental hygiene, cleanliness and exercise — that will maintain and improve health. Understandings include how communicable diseases, such as colds, are transmitted and some of the body's defense mechanisms that prevent or overcome illness.

## SCIENTIFIC INQUIRY:

# Hand Washing

### Materials

**For the teacher:** Glo Germ™ gel, UV light.

**For each group:** 1 piece of paper, pencil, sink, soap, paper towels, 1 yellow marker, 1 red marker. Optional: 1 green marker.

### Procedure

1. Read *Healthy Hands* and complete the Doodle Bugs.
2. Divide the class into groups of four to complete *Scientific Inquiry: Hand Washing*. Each group will need a reader, recorder, washer and prop person.
3. Prop people will gather supplies.
4. Readers will reread the hand washing steps.
5. Recorders will trace an outline of a hand on a piece of paper.
6. An adult will squeeze a drop of Glo Germ™ Gel in each washer's hands and will instruct the washers to rub the gel all over their hands.
7. The prop people will shine the UV light on the washers' hands. Remind prop people that they will need to share the UV light.
8. Each group will observe the glowing areas on their washer's hands. On the traced hand, recorders will use a yellow marker to color the glowing areas from one of the washer's hands. (Glowing areas represent germs.)
9. Washers will wash and dry their hands. Then prop people will shine the light on the washers' hands a second time.
10. Groups will look for any remaining glowing spots and recorders will draw red dots on the traced hand to represent any remaining glowing areas.
11. If extra time remains, repeat the washing and observing glowing areas. This time circle any remaining glowing areas with a green marker.
12. Discuss results and answer questions.

### Teacher Tips:

- Glo Germ™ gel and lights may be purchased from Glo Germ™: <http://www.glo Germ.com/> or 1-800-842-6622. Your local extension agency may also have Glo Germ™ gel and lights available.
- Take extra caution when using the UV light. The light should only be turned on as needed for the experiment and should never be pointed at anyone's eyes. Prolonged UV light exposure could cause sunburn.
- Only a small amount of gel is needed, about the size of a Nickel.
- Students should rub gel all over their hands including between fingers and around nails and thumbs.
- After applying the gel the whole hand should glow, showing that we get germs all over our hands.

## SCIENTIFIC INQUIRY: **Hand Washing (Continued)**

### **Teacher Tips (continued):**

- After washing one time, some glowing spots will probably remain on easily missed areas such as thumbs, wrists, between fingers and around and under fingernails.
- If time allows, students will wash their hands a second time. After properly washing their hands a second time, most glowing areas (germs) will disappear.
- Some teachers like to give all of their students a chance to try the Glow Germ™ gel. If you choose to do so, it may be helpful to have extra backlights and extra time for the activity.

### **Class Discussion:**

- When is it important to wash your hands? (Before you cook and eat. After touching raw meat and eggs, sneezing, coughing, blowing your nose, using the restroom, playing outside and touching your pet.)
- If we plan to cook or eat right after recess, what should we do when we come inside? (Wash our hands.)
- What could happen if we started cooking or eating before we washed our hands?
- Do you think washing with soap and water removes more germs than just washing with water?
- Do you think you would see more or less germs if you rubbed your hands together more? If you washed for a longer or shorter time? If you used hotter or colder water?

# Answer Keys

## Safe Kitchen Cooks

### Doodle Bugs

Fill-in the blank: **Washing hands, washing fruits and vegetables, using clean kitchen tools**

Underline: **Keep hot foods hot and cold foods cold**

Circle: **165° F**

### SCIENTIFIC INQUIRY:

#### Temperature and Microorganisms

1. **32-45° F**
2. **85-110° F**
3. **170-200° F**

Cold: **Medium growth; tan clumps of yeast with some foaminess around the edge, not very big**

Lukewarm: **Most growth; tan, bubbly and foamy, bigger**

Hot: **Least growth; not much change, no foam, water slightly tan in color**

What temperature is more likely to kill the yeast?

Where do microorganisms, like bacteria, grow faster?

What else do wish you could find out?

**Example:** What gives yeast its odor?

**Hot temperatures**

**The counter**

**Answers will vary.**

### WHILE YOU WAIT:

Circle: **Open freezer, unclean counters, dripping meat juice, meat in the temperature danger zone, food left on the counter (in the temperature danger zone), dirty surfaces.**



# Answer Keys (continued)

## Healthy Hands

### Doodle Bugs

Circle: **Your hands**

Underline: **“Happy Birthday to You”**

### SCIENTIFIC INQUIRY:

#### Hand Washing

- A. **Answers will vary. Example:** *The number of microorganisms on my hands surprised me.*
- B. **Certainly**
- C. **Certainly**
- D. **Make hand washing posters, tell our friends about hand washing and make an announcement during morning announcements.**

#### Proficiency Questions (Workbook)

1. **c**   2. **d**   3. **a**   4. **d**

#### Proficiency Questions (Virtual CD)

1. **b**   2. **b**   3. **d**   4. **c**   5. **a**   6. **d**