

Oregon



**Developed By:**

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## Summer Ag Institute Lesson Plans

<b>Title of Lesson:</b>	<b>Ripening Response</b>
<b>Academic Subject:</b>	<b>Science-life science/scientific inquiry</b>
<b>Theme:</b>	<b>Gases</b>
<b>Grade Level:</b>	<b>5</b>

### **CIM/CAM Standards:**

1. The DynamicEarth/5th Grade Benchmark/Identify properties and uses of Earth's materials. S/L/G. Gases (S-12)
2. Forming the Question/hypothesis: Make observation, ask questions or form hypothesis based on observations which can be explored through scientific investigations. (S-17)
3. Designing the investigation: Design safe and ethical scientific investigation to address questions or hypothesis. (S-17)
4. Collecting and presenting data (B2): Conduct procedures to collect and display scientific data. (S-18)
5. Analyze and interpreting results: Analyze scientific information to develop and present conclusions. (S-18)
6. Physical science/matter/5th grade: Understand structure and properties of matter: Distinguish among solids, liquids, and gases- identify unique properties of each state of matter. (S-1)

### **Learner Objective: (The student will)**

1. Identify the three states of matter- solid, liquid, gas.
2. Identify a manner in which harvested products are made ripe through the use of gas; Ethylene.
3. Demonstrate learned skills by completion of their own science inquiry by utilizing taught information and designing their own investigation meeting benchmark requirements.

## Vocabulary:

1. Absorb – to assimilate or incorporate one substance into another, as a blotter absorbs ink; in botany to assimilate water and nutrients.
2. Absorption – the process by which water enters the earth; the intake of water, gases, nutrients other substances by plants.
3. Ethylene – C<sub>2</sub>H<sub>4</sub>; a colorless, inflammable, unsaturated hydrocarbon gas used to hasten ripening of harvested fruits, especially bananas, pears, and green tomatoes and to hull Persian walnuts and other nuts. It is used as a coloring agent for stock, harvested citrus fruits, especially oranges, and as defoliation agent for fall dug nursery especially rose bushes.
4. Gas – a fluid (as air) that has neither shape nor volume but tends to expand indefinitely.
5. Liquid – neither solid, nor gaseous; free movement.
6. Ripe/Ripening – designating fruit which has attained full development. Bringing to a certain condition for use by keeping. Growing to maturity and being fit for food, as in ripe fruit or grain condition for use by keeping.
7. Solid – matter that has three dimensions and does not flow.

## Anticipatory Set:

Did you ever wonder why bananas are separated from apples in the produce section? Do you think that apples stored next to bananas might inhibit the ripening time of one fruit or another? Why do you think some fruits are displayed with others? What reason might a store display fruit in one location over another? Let's find out!

## Instructional Outline (Teaching Content)

1. Place an apple and a banana next to each other.
2. Place an apple and a banana in a paper bag together and fold down to close.
3. Place an apple and a banana in a bowl together.
4. Place all items on a table where class can observe them over the next few days.

## Strategies

(What to do, explain or have students do)

1. Bring apples, bananas, paper bags, bowls and plates to class.
2. Divide students into groups of 3 or 4.
3. Once daily have students record their observations for 10 to 15 minutes. (They may need more time to discuss changes.) Check, smell, firmness, and record evaluation of both.

5. Discuss with Class: Ethylene gas is a product released by some types of fruits, and is absorbed by others. What do you think will happen?
  6. Make a table for each pair of fruit so as to record observations, label each correctly.
  7. After 24, 48, 72, 96 and 120 hours record, and describe observations, for each pair of fruit.
  8. On the fourth or fifth day check firmness, record observations.
  9. On fifth day, taste each pair of fruit, record observations.
  10. Analyze and interpret individual results for each pair of fruit observed.
  11. Make a conclusion based on the data collected.
  12. Form a question based on the observations and the data collected so that you can explore on your own with: Temperature, Container type, Other types of fruit
  13. Repeat steps in your own groups.
  4. Students need to check for firmness, coloration and smell. Describe with detail.
  5. Taste for sweetness, texture, and firmness. Describe with detail.
  6. Let students discuss other strategies of storage for fruits, glass bowls, plastic bags vs. paper bags, metal containers, cardboard boxes, etc.
  7. Discuss other varieties of fruit that could be used.
  8. Design their own inquiry.
  9. Turn in inquiry with hypothesis design, data collection, and analyze interpretation.
- NOTE: This can be used as a portfolio piece.

### **Closure:**

1. What are the definitions of gas? Solid? Liquid?
2. How can we hasten (or speed up) the ripening time of some fruits?
3. Why is it important for stores to keep some fruits/vegetables away from others?
4. How do we use gases to shorten/lengthen the storage time of foods?

## **Resources:**

1. Apples and bananas (or other fruit as needed for inquiry) from local grocery store.
2. Paper bags, paper towels, paper plates.
3. Tables/space to store fruits during experiment.
4. Collection of data sheet, to be used for Science Inquiry portfolio piece.
5. Fruits, vegetables, or items listed by students if students can't bring them from home. Designs will vary.

## **Evaluation:**

1. Grade assignment/data collection table and observation for:
  - Daily observations: \*day 1/24 hours, \*day 2/48 hours, \*day 3/72 hours, \*day 4/96 hours and \*day 5/120 hours
  - Descriptions for color change
  - Descriptions for firmness
  - Description of smell
  - Conclusion
2. Use scoring chart for science inquiry for Benchmark 2.
  - Formation of questions/hypothesis
  - Design of experiment
  - Collection of data
  - Analyze and interpret data