

# MUMMIFYING APPLES

## Objective:

Students will conduct a scientific investigation to validate a hypothesis determining the best mineral for mummifying an apple.

## Related Competencies:

### Introduction to Culinary Arts:

- Demonstrate techniques for scaling and measuring volume and weight.
- Describe food-science principles in food preparation.

### Culinary Arts I:

- Demonstrate scaling and measuring techniques for weight.
- Identify culinary units of measurement and measurement tools.

## Materials:

- 2 fresh apples (any variety), each cut into quarters (per group)
- 48 ounce large box of table salt
- 3 pound bag of Epsom salts
- 4 pound box of baking soda
- knife
- eight 12-oz. disposable plastic cups (per group)
- measuring cup (one per group)
- large mixing bowl
- permanent marker (one per group)
- masking tape (one roll for each group)
- scale
- graph paper

## Extension:

Put the dried apple slices under a microscope to allow the students to observe the appearance.

Try this experiment with other types of fruit, such as strawberries, bananas, and cherries.

## Background Knowledge:

Throughout history, countries have used mummification as a way to preserve their family members who have passed on. In order for mummification to occur, all the water must be removed from the body. Although the mummification process evolved over time, body preparers used a natural salt, natron (now called baking soda), to help dry out the body. This investigation will allow students to experiment with different minerals to determine which best dries out an apple. This lesson focuses on conducting an experiment using different salt compounds to determine which will best mummify an apple.

## References:

- [https://www.educationworld.com/a\\_lesson/daily/p/daily/p102.shtml](https://www.educationworld.com/a_lesson/daily/p/daily/p102.shtml)
- <https://www.virginiaapples.net/>

## Activity Steps:

1. Put students in groups of 3 or 4. Pass out eight apple slices, eight cups, and eight pieces of tape to each group of students.
2. Ask the students to create a table on graphing paper.
3. Write "starting weight" on eight pieces of tape. Leave room to write the weight of the apple slices on the tape. Attach one piece of tape to each cup.
4. Select one apple slice, weigh it, and record the slice's weight on the piece of tape on the front of cup 1. Place this apple slice in cup 1.
5. Select the other apple slices, one at a time, and weigh them. As each apple is weighed, place it in a cup and write its corresponding weight on the front of the cup. Complete this step for all apple slices.
6. Ask students to record the data on their data tables. Add  $\frac{1}{2}$  cup of baking soda to Cup 1, completely cover the apple slice. Label this cup "baking soda only."
7. Add  $\frac{1}{2}$  cup of Epsom salt to Cup 2, completely covering the apple slice. Label this cup "Epsom salt only."
8. Add  $\frac{1}{2}$  cup of table salt to Cup 3, completely covering the apple slice. Label this cup "table salt only."
9. Add  $\frac{1}{4}$  cup of table salt and  $\frac{1}{4}$  cup of Epsom salt to Cup 4, completely covering the apple slice. Label this cup "table and Epsom salt."
10. Add  $\frac{1}{4}$  cup of table salt and  $\frac{1}{4}$  cup of baking soda to Cup 5, completely covering the apple slice. Label this cup "table salt and baking soda."
11. Add  $\frac{1}{4}$  cup of baking soda and  $\frac{1}{4}$  cup of Epsom salt to Cup 6, completely covering the apple slice. Label this cup "baking soda and Epsom salt."
12. Add  $\frac{1}{3}$  cup baking soda,  $\frac{1}{3}$  cup table salt, and  $\frac{1}{3}$  cup Epsom salt to Cup 7, completely covering the apple slice. Label this cup as "baking soda, table salt, and Epsom salt."
13. Leave Cup 8 with only the apple slice and label this cup "control".
14. Place all eight cups on a shelf/windowsill in direct sunlight and let them sit for seven days.
15. Ask the students to make a hypothesis about which mineral mixture will work best to dry out (or mummify) the apple slice. Have the students write down their hypothesis in their science notebooks.
16. At the end of the seven days, take down the cups from the shelf. Take each apple slice out of the cup, one at a time, and try to brush off as much salt and baking soda as possible. Do not rinse off the slices, as they will become rehydrated.
17. Weigh each apple slice and ask students to record the data on their data tables.
18. Ask the students to compare the starting weight of each apple slice with its ending weight.
19. Ask the students to record their conclusions in their science notebook and create a graph comparing the different weights of the apple slices.

# Virginia Grown Apples: Mummifying Apples

## Activity Steps:

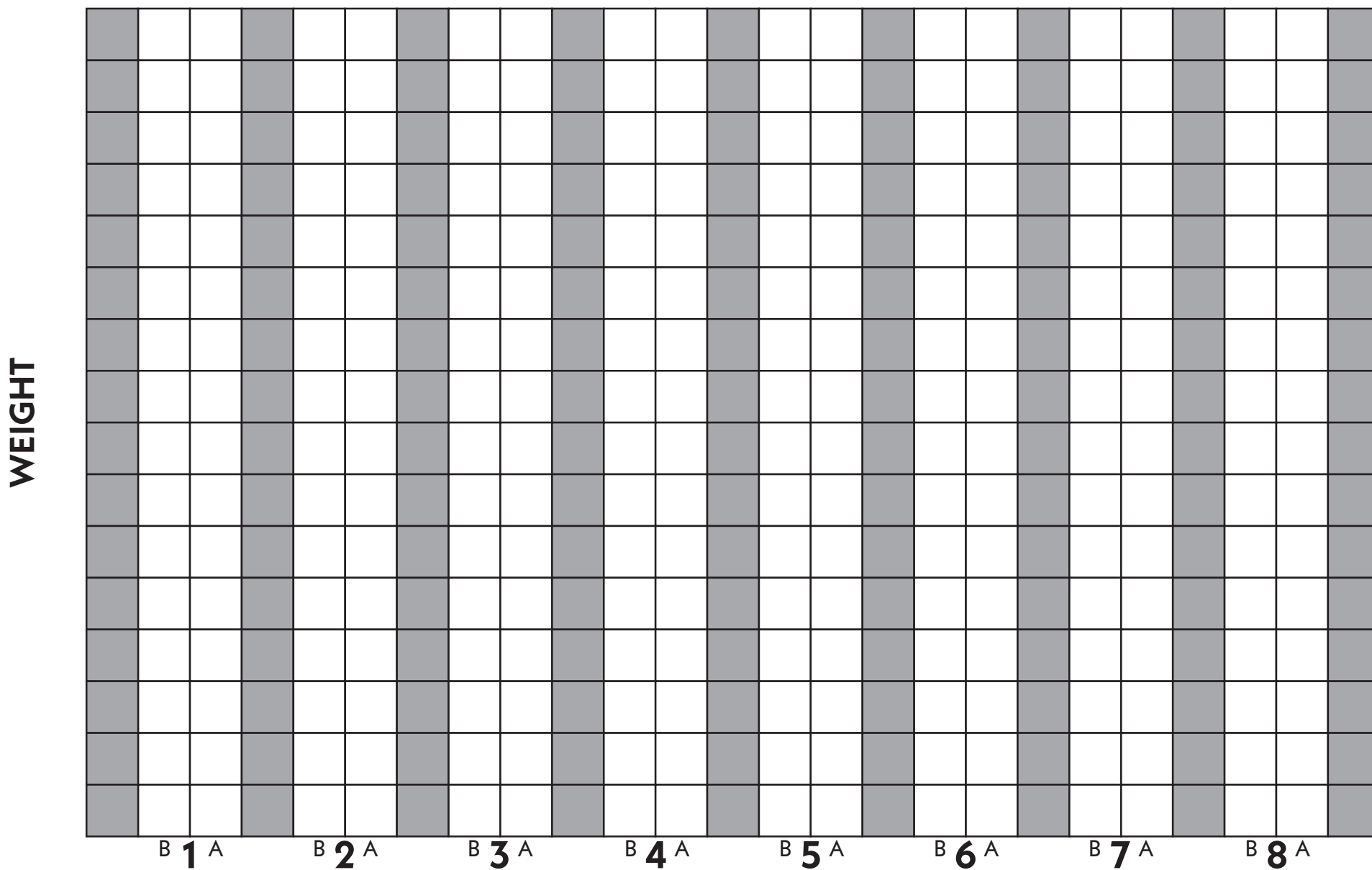
1. Put students in groups of 3 or 4. Pass out eight apple slices, eight cups, and eight pieces of tape to each group of students.
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3. Write "starting weight" on eight pieces of tape. Leave room to write the weight of the apple slices on the tape. Attach one piece of tape to each cup.
4. Select one apple slice, weigh it, and record the slice's weight on the piece of tape on the front of cup 1. Place this apple slice in cup 1.
5. Select the other apple slices, one at a time, and weigh them. As each apple is weighed, place it in a cup and write its corresponding weight on the front of the cup. Complete this step for all apple slices.
6. Ask students to record the data on their data tables. Add  $\frac{1}{2}$  cup of baking soda to Cup 1, completely cover the apple slice. Label this cup "baking soda only."
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8. Add  $\frac{1}{2}$  cup of table salt to Cup 3, completely covering the apple slice. Label this cup "table salt only."
9. Add  $\frac{1}{4}$  cup of table salt and  $\frac{1}{4}$  cup of Epsom salt to Cup 4, completely covering the apple slice. Label this cup "table and Epsom salt."
10. Add  $\frac{1}{4}$  cup of table salt and  $\frac{1}{4}$  cup of baking soda to Cup 5, completely covering the apple slice. Label this cup "table salt and baking soda."
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12. Add  $\frac{1}{3}$  cup baking soda,  $\frac{1}{3}$  cup table salt, and  $\frac{1}{3}$  cup Epsom salt to Cup 7, completely covering the apple slice. Label this cup as "baking soda, table salt, and Epsom salt."
13. Leave Cup 8 with only the apple slice and label this cup "control".
14. Place all eight cups on a shelf/windowsill in direct sunlight and let them sit for seven days.
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17. Weigh each apple slice and ask students to record the data on their data tables.
18. Ask the students to compare the starting weight of each apple slice with its ending weight.
19. Ask the students to record their conclusions in their science notebook and create a graph comparing the different weights of the apple slices.

HYPOTHESIS:

APPLE	BEFORE WEIGHT	AFTER WEIGHT
1		
2		
3		
4		
5		
6		
7		
8		

CONCLUSION:

# Virginia Grown Apples: Mummifying Apples



## APPLES

B= Before Weight    A= After Weight

## Reflection Questions

After reading the passage, please answer the questions below by writing your response.

1. Which mineral mixture was the most effective? Least effective?
2. What did you observe by completing this experiment?
3. What conclusion did you draw about your hypothesis?

## Application Questions

After reading the passage, please answer the questions below by writing your response.

1. How can we use the information that we gathered from this experiment in our life?
2. What are ways that we use mineral mixtures already?
3. How can you use the information you learned in other ways?