

In a Pickle

How did we keep food safe before refrigerators?



Before refrigerators people had to find ways to keep food from rotting. People tried lots of ways to keep food fresh. The goal was to stop the growth of life forms that can make people sick. Most of these are too small to see. Yeast, bacteria and some molds are all examples of these life forms also called **microorganisms**.

Food cannot get too warm or too wet. When it does, food is the perfect home for microorganisms. Before refrigerators, one way to keep microorganisms from growing was to pickle foods. Storing foods in an acidic environment, like vinegar, is called **pickling**. An acidic environment prevents microorganisms from growing, and is a great way to store food.

There are many ways to pickle food, but be careful! Too much vinegar can make food tart, tough or shriveled. Too little vinegar may not kill all of the microorganisms that can make you sick. Let's find out how much vinegar you need to make perfect pickles!

DOODLE BUGS

Name one method used to keep food safe.

In the reading, underline the examples of microorganisms that make people sick.

Circle the household liquid needed to pickle food in the reading.

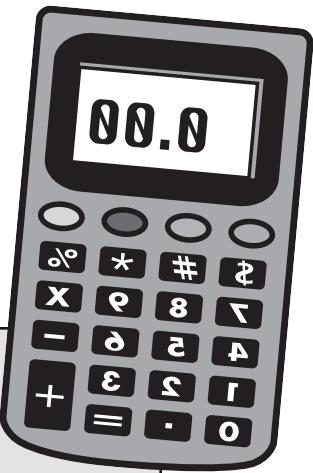
MATHEMATICS INVESTIGATIONS: **Ratios and Microorganisms**

You will need:

- 1 pencil
- 1 ruler
- 1 calculator

Things to know:

- Water to Vinegar = 1:1
- 1 cup = 16 tablespoons
- Tablespoon = Tbsp



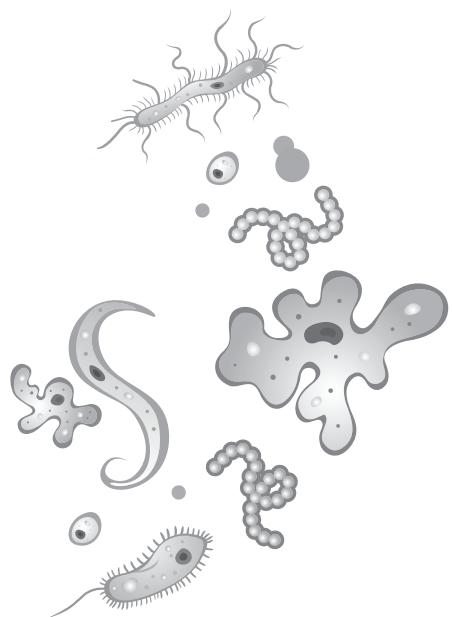
Your teacher will demonstrate how to use your perfect pickles table and plot your points on a line graph. Then your group will calculate multiple water to vinegar ratios and record your findings in a chart. Once the calculations are recorded, your group will enter your calculations in a line graph to find the perfect match.

Calculating your water to vinegar ratios

1. Subtract $\frac{1}{4}$ from 1. Record your answer in 1C.
2. Subtract $\frac{1}{2}$ from 1. Record your answer in 2C.
3. Subtract $\frac{3}{4}$ from 1. Record your answer in 3C.

Convert cups to tablespoons

1. Multiply 1B by 16. Record your answer in 1E.
2. Multiply 2B by 16. Record your answer in 2E.
3. Multiply 3B by 16. Record your answer in 3E.
4. Multiply 1C by 16. Record your answer in 1D.
5. Multiply 2C by 16. Record your answer in 2D.
6. Multiply 3C by 16. Record your answer in 3D.

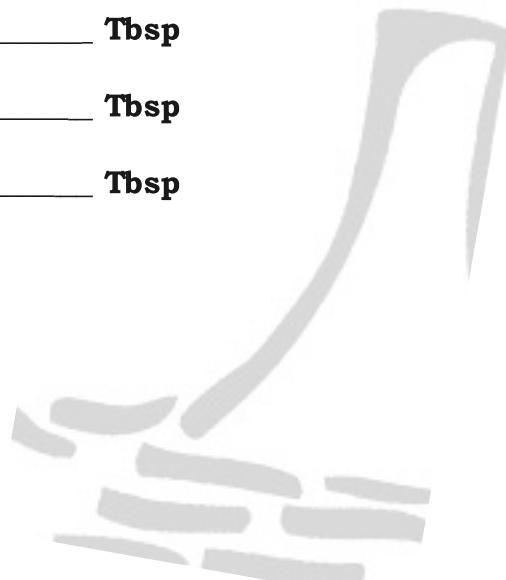


MATHEMATICS INVESTIGATIONS:
Ratios and Microorganisms (continued)

Perfect Pickles

Total Tablespoons of Pickling Mixture Needed (A)	Fraction Vinegar (B)	Fraction Water (C)	Tablespoons Water needed (D)	Tablespoons Vinegar needed (E)
16 Tablespoons (1 cup)	1B. $\frac{1}{4}$	1C. _____	1D. _____	1E. _____
16 Tablespoons (1 cup)	2B. $\frac{1}{2}$	2C. _____	2D. _____	2E. _____
16 Tablespoons (1 cup)	3B. $\frac{3}{4}$	3C. _____	3D. _____	3E. _____

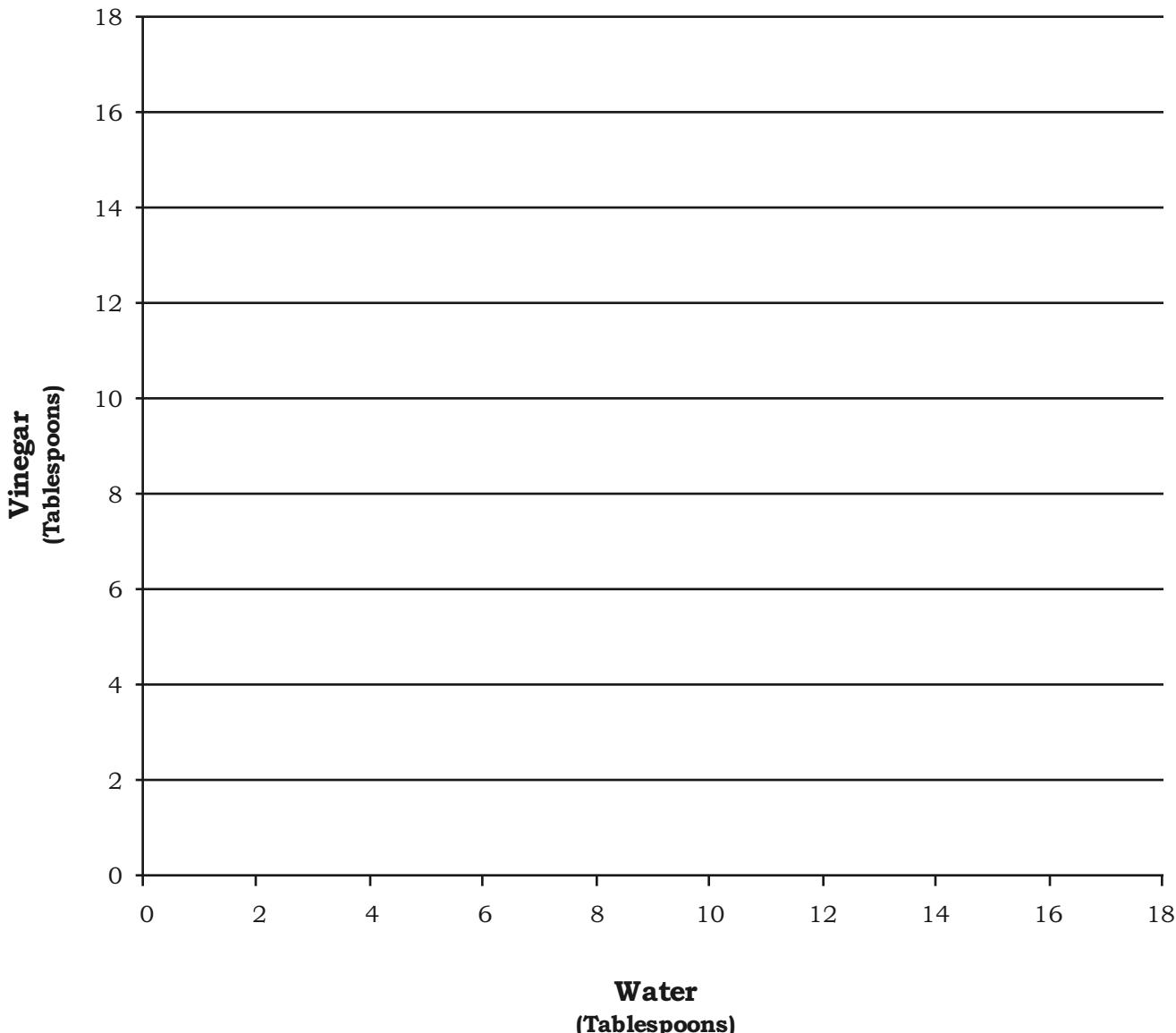
1. Water (1D) _____ Tbsp : Vinegar (1E) _____ Tbsp
2. Water (2D) _____ Tbsp : Vinegar (2E) _____ Tbsp
3. Water (3D) _____ Tbsp : Vinegar (3E) _____ Tbsp



MATHEMATICS INVESTIGATIONS: **Ratios and Microorganisms (continued)**

Drawing the line graph

1. Record 1D: 1E by plotting a dot for the ratio on the graph.
2. Record 2D: 2E on graph by plotting a dot for the ratio on the graph.
3. Record 3D: 3E on graph by plotting a dot for the ratio on the graph.
4. Using a ruler or sheet of paper, draw a straight line connecting all three dots.
5. To find the perfect ratio locate the “middle” dot on your graph.
6. Circle the dot that is your perfect pickling ratio!



FUN WITH FOOD: **Puckering Pickles**



You will need:

1 small covered container
1 spoon
1 knife
1 deep bowl
1 small plate and weight

PREP TIME:
1 hour 30 minutes

1 large cucumber
1 tablespoon salt
1 tablespoon sugar
½ cup water
½ cup white vinegar
Help from an adult

Observe, taste and record the cucumber as it transforms into a pickle!

1. Wash cucumber.
2. Slice cucumber thinly.
3. Place the slices in the bowl and sprinkle salt over cucumber.
4. Toss cucumber slices with spoon to mix salt.
5. Cover the slices with a small plate that fits inside the bowl.
6. Place weight on top. Canned food works well as the weight.
7. Let the cucumber sit for 1 hour at room temperature.
8. Rinse and drain the slices and place in covered container.
9. Mix the sugar, vinegar and water. Pour over cucumber slices.
10. Cover and place in refrigerator for three to four hours.
11. Enjoy your pickles!

Fun Facts

Although cucumbers contain mostly water, they make a great healthy snack on the run. You can easily slice cucumbers and put them in your salad, or even carry them in your book bag for a quick snack.

FUN WITH FOOD: **Puckering Pickles**

Record and draw your observations

1. Describe the cucumber appearance, texture and taste before adding salt.



2. Describe the cucumber appearance, texture and taste after sitting in salt for 1 hour.



3. Describe the cucumber appearance, texture and taste after refrigeration.



Proficiency Questions

Circle the best answer:

1. How could microorganisms be described?

- a. life forms that can make people sick
- b. too small to see
- c. both
- d. none of the above

2. Which of the following was a common preservation method before refrigeration was discovered?

- a. wrapping
- b. freezing
- c. pickling
- d. none of the above

3. Which of the following is correct?

- a. 8 Tbsp. + 8 Tbsp. = 8 Tbsp. + $\frac{1}{4}$ cup
- b. 1 cup + $\frac{1}{2}$ cup = 24 Tbsp.
- c. 8 Tbsp. x 2 Tbsp. = 2 Tbsp. + 8 Tbsp.
- d. none of the above

4. If you have $1\frac{1}{2}$ cups of water, how many tablespoons do you have?

- a. 16
- b. 12
- c. 24
- d. 32