TEST YOUR ZERO WASTE MATH SKILLS

We have all been taught we need to recycle, but does it save water? This worksheet focuses on the water consumption needed to create new materials. By recycling, we can reduce that water use.

The questions build on each other. The data given to you in each question might help you solve other questions.

Let's get started!

Name: _____ Grade Level: _____

Date: _____ Score: /13

SHOW YOUR WORK IN THE SPACE PROVIDED BELOW EACH QUESTION.

1. A standard single-use plastic water bottle holds 16.9 ounces of water and is made of 0.3 ounces of plastic. It takes 24 gallons of water to make 16 ounces of plastic. How many ounces of water does it take to make 0.3 ounces of plastic?
For reference, 128 ounces = 1 gallon. Round up to the nearest whole number.

Answer: _____ ounces

2. With the answer from the previous question, how many ounces of embedded water is in a full 16.9-ounce single-use plastic bottle of water?
Embedded water in this scenario is the water used to both manufacture and fill the bottle. Round up to the nearest whole number.

Answer: _____ ounces

3. A standard 32-ounce steel reusable bottle (standard Hydro-flask size) is made of 14 ounces of steel. It takes 31 gallons of water to make 16 ounces of steel. How many ounces of water does it take to make 14 ounces of steel?
For reference, 128 ounces = 1 gallon. Round up to the nearest whole number.

Answer: _____ ounces

4. With the answer from the previous question, how many ounces of embedded water is in a full 32-ounce steel reusable bottle of water?
Embedded water in this scenario is the water used to both manufacture and fill the bottle.

Answer: _____ ounces

5. How many single-use plastic water bottles would you need to buy to be able to drink the same amount of water that was used to make the steel bottle?
Round up to the nearest whole number. Use the number from #3.

Answer: _____ bottles

6. How many ounces of water was used to make the single-use plastic bottles from the last question?

Answer: _____ ounces

7. How many times would you have to use the steel bottle to drink the same amount of water that was used to make the 32-ounce steel bottle?
Hint: Use your answer from #3. Round up to the nearest whole number.

Answer: _____ uses

8. How many ounces of water have been used to both manufacture the 205 bottles as well as drink the water in 205 single-use plastic bottles?
Hint: use the answer from #2. Round up to the nearest whole number.

Answer: _____ ounces

9. How many ounces of water has been used to manufacture the stainless steel bottle as well as drink the water in 109 refills of the reusable steel bottle?
Hint: use the answer from #4. Round up to the nearest whole number.

Answer: _____ ounces

10. If you were to drink a gallon of water a day, how many days would it take to refill the steel bottle 109 times or drink 205 plastic single-use bottles?
Hint: the answer is the same for both calculations. Use this as verification you have the right answer. Round down to the nearest whole number.

Answer: _____ days

11. In the number of days you calculated in #10, how many gallons of water do you save using the steel reusable water bottle 109 times compared to using 205 single-use plastic water bottles?
Hint: use your answers in #8 and #9. Round up to the nearest whole number.

Answer: _____ gallons

12. Following the same calculation you made in #11, how many gallons do you save in 54 days?

Hint: round up to the nearest whole number.

Answer: _____ gallons

13. Following the same calculation you made in #11, how many gallons do you save in one year?

Hint: during your calculation, keep your number to the tenth place and then for your answer, round up to the nearest whole number. There are 365 days in one year.

Answer: _____ gallons

Numbers are based on a study by Lisa DiNicolantonio, Emma Hansen-Smith and Sloane Rice from the University of California Davis.

ANSWERS

Question 1 answer: 58 ounces

$\frac{24 \text{ gal.}}{16 \text{ oz.}} = \frac{x \text{ gal.}}{0.3 \text{ oz.}}$

16x = 7.2 gal.
x= 0.45 gal.
Conversion: 0.45 gal. x 128 oz. = 57.6 oz. or 58 oz.

Question 2 answer: 75 ounces

58 oz. + 16.9 oz. = 74.9 oz. or 75 oz.

Question 3 answer: 3,472 ounces

$\frac{31 \text{ gal.}}{16 \text{ oz.}} = \frac{x \text{ gal.}}{14 \text{ oz.}}$

16x = 434 gal.
x= 27.125 gal.
Conversion: 27.125 gal. x 128 oz. = 3,472 oz.

Question 4 answer: 3,504 ounces

3,472 oz. + 32 oz. = 3,504 oz.

Question 5 answer: 205 bottles

3,472 oz. / 16.9 oz. = 205.4 or 205 bottles.

Question 6 answer: 11,890 ounces

205 bottles x 58 oz. of water = 11,890 oz.

Question 7 answer: 109 refills

3,472 oz. / 32 oz. - 108.5 refills

ANSWERS

Question 8 answer: 15,375 ounces

205 bottles x 75 oz. = 15,375 oz.

Question 9 answer: 6,960 ounces

3,472 oz. embedded water + 32 oz. x 109 refills = 6,960 oz.

Question 10 answer: 27 days

Steel bottle: 109 refills x 32 oz. = 3,488 oz.
3,488 oz. / 128 oz. = 27.25 days

Plastic bottle: 205 bottles x 16.9 oz. = 3,464.5 oz.
3,464.5 oz. / 128 oz. = 27.066 days

Question 11 answer: 66 gallons

Difference: 15,375 oz. - 6,960 oz. = 8,415 oz.
Conversion: 8,415 oz. / 128 oz. = 65.74 gal.

Question 12 answer: 159 gallons

Plastic bottle: 15,375 oz. x 2 = 30,750 oz.
Steel bottle: 3,472 oz. embedded water + 32 oz. x 109 refills x 2 = 10,448 oz.
Difference: 30,750 oz. - 10,448 oz. = 20,302 oz.
Conversion: 20,302 oz. / 128 oz. = 158.6 gal. or 159 gallons

Question 13 answer: 1,227 gallons

365 days / 27 days = 13.5
Plastic bottle: 15,375 oz. x 13.5 = 207,562.5 oz.
Steel bottle: 3,472 oz. embedded water + 32 oz. x 109 refills x 13.5 = 6,960 oz. = 50,560 oz.
Difference: 207,562.5 oz. - 50,560 oz. = 157,002.5 oz.
Conversion: 157,002.5 oz. / 128 oz. = 1,226.58 gal.