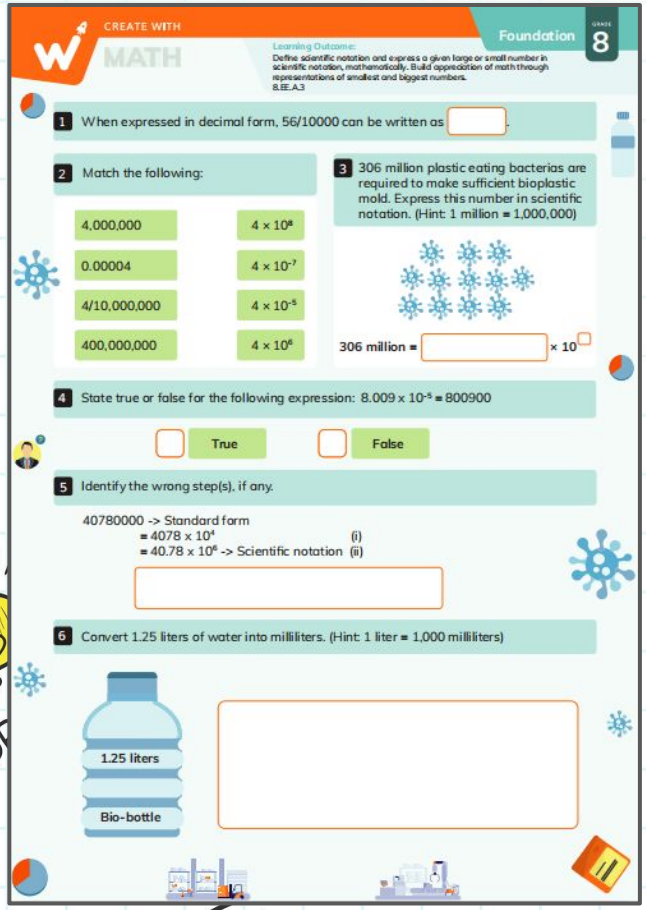


WhiteHat Jr
Live Online Coding for Kids

BYJU'S
The Learning App

CREATE WITH MATH

Worksheet Solutions


CREATE WITH
MATH
Foundation
GRADE 8
Learning Outcome:
Define scientific notation and express a given large or small number in scientific notation, mathematically. Build appreciation of math through representations of smallest and biggest numbers.
8.EE.A.3
1 When expressed in decimal form, 56/10000 can be written as .
2 Match the following:
4,000,000
0.00004
4/10,000,000
400,000,000
4 x 10^8
4 x 10^-7
4 x 10^-5
4 x 10^6
3 306 million plastic eating bacterias are required to make sufficient bioplastic mold. Express this number in scientific notation. (Hint: 1 million = 1,000,000)
306 million = x 10
4 State true or false for the following expression: 8.009 x 10^-5 = 800900
True
False
5 Identify the wrong step(s), if any.
40780000 -> Standard form
= 4078 x 10^4 (i)
= 40.78 x 10^6 -> Scientific notation (ii)
6 Convert 1.25 liters of water into milliliters. (Hint: 1 liter = 1,000 milliliters)
1.25 liters
Bio-bottle

Foundation

1 When expressed in decimal form, 56/10000 can be written as ____.

Given:
56/10000

Solution:

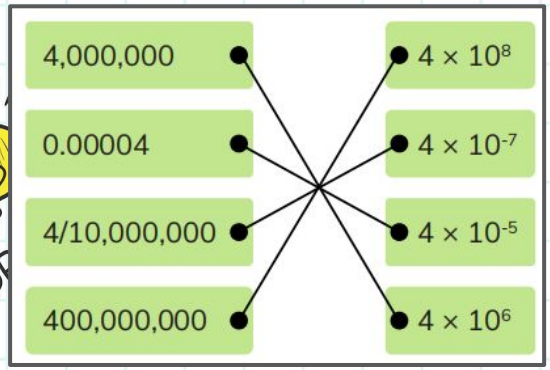
1. We see in 56/10000, there are 4 zeroes in the denominator.
2. Therefore, to convert 56/10000 into decimal fraction count 4 places from the right in the numerator and place the decimal point to the left of the digit.

Hence, 56/10000 can be written as 0.0056

0.0056

2 Match the following:

4,000,000	4×10^{8}
0.00004	4×10^{-7}
4/10,000,000	4×10^{-5}
400,000,000	4×10^{6}



Solution:

1. 4,000,000 written as a product of a factor and an exponent of 10 is 4×10^{6}

2. 0.00004
   $= 4/100000$
   $= 4/10^{5}$
   $= 4 \times 10^{-5}$

3. 4/10,000,000
   $= 4/10^{7}$
   $= 4 \times 10^{-7}$

4. 400,000,000 written as a product of a factor and an exponent of 10 is 4×10^{8}

3 306 million plastic eating bacterias are required to make sufficient bioplastic mold. Express this number in scientific notation. (Hint: 1 million = 1,000,000)

Given:
306 million
1 million = 1,000,000

Solution:

1. Expressing 306 million in the standard form:
   = 306 × 1,000,000
   = 306,000,000.
2. The factor should lie between 1 and 10, i.e., $1 \leq |a| < 10$. Hence, we select factor 3.06 as the factor as it is larger than 1 but less than 10.
3. Count of digits after 3 in the number 306,000,000 is 8. So, the exponent of 10 will be 8.
4. Scientific notation:
   306 million = 3.06×10^8

306 million = 306,000,000 = 3.06 × 10^{8}

4 State true or false for the following expression: $8.009 \times 10^{-5} = 800900$

☐ True ☐ False

Given:

$8.009 \times 10^{-5} = 800900$

Solution:

1. Exponents can be either positive or negative integers. Negative exponents are only possible in case of fractions when the number is smaller than 1.
2. 800900 > 1 and is a whole number, not a fraction.
3. Therefore, $8.009 \times 10^{-5} = 800900$ is a false statement.

False

5 Identify the wrong step(s), if any.

40780000 -> Standard form
= 4078×10^4 (i)
= 40.78×10^6 -> Scientific notation (ii)

Given:

$40780000 = 4078 \times 10^4$
$= 40.78 \times 10^6$

Solution:

1. To represent standard form as scientific notation, the factor should lie between 1 and 10, i.e., $1 \leq |a| < 10$.
2. Factor in step (ii) is 40.78 which is more than 10. The correct form should be 4.078×10^7, as factor 4.078 lies between 1 and 10.
3. Therefore, Step (ii) is wrong.

IDEA

Step (ii), as 4.078×10^7 -> Scientific notation

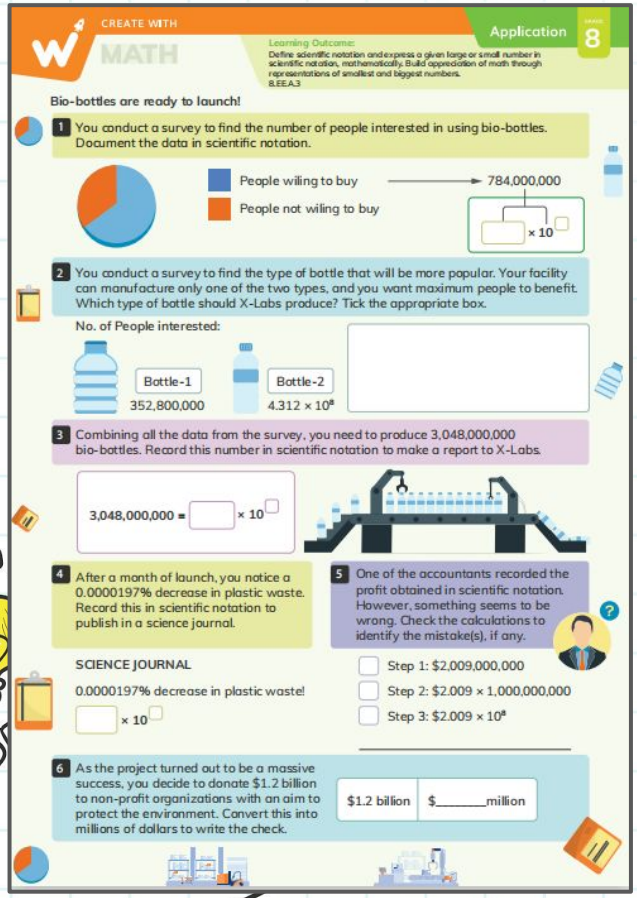
6 Convert 1.25 liters of water into milliliters. (Hint: 1 liter = 1,000 milliliters)

Given:
1.25 liters
1 liter = 1,000 milliliters

Solution:

1. 1.25 liters = 1.25 × 1,000 milliliters
   Hence, 1.25 liters = 1250 milliliters

1250 milliliters


CREATE WITH MATH

Application

Grade 8

Learning Outcome:
Define scientific notation and express a given large or small number in scientific notation, mathematically. Build appreciation of math through representations of smallest and biggest numbers.
8.EEA.3

Bio-bottles are ready to launch!

1 You conduct a survey to find the number of people interested in using bio-bottles. Document the data in scientific notation.

People willing to buy → 784,000,000

People not willing to buy

× 10

2 You conduct a survey to find the type of bottle that will be more popular. Your facility can manufacture only one of the two types, and you want maximum people to benefit. Which type of bottle should X-Labs produce? Tick the appropriate box.

No. of People interested:

Bottle-1: 352,800,000

Bottle-2: 4.312×10^8

3 Combining all the data from the survey, you need to produce 3,048,000,000 bio-bottles. Record this number in scientific notation to make a report to X-Labs.

3,048,000,000 = × 10

4 After a month of launch, you notice a 0.0000197% decrease in plastic waste. Record this in scientific notation to publish in a science journal.

SCIENCE JOURNAL

0.0000197% decrease in plastic waste!

× 10

5 One of the accountants recorded the profit obtained in scientific notation. However, something seems to be wrong. Check the calculations to identify the mistake(s), if any.

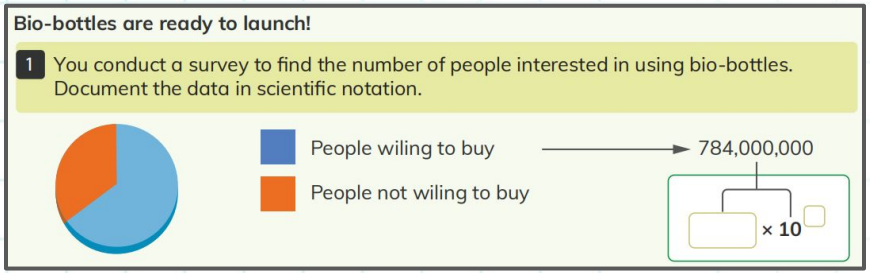
- Step 1: $2,009,000,000
- Step 2: $2.009 × 1,000,000,000
- Step 3: $2.009 × 10^8

6 As the project turned out to be a massive success, you decide to donate $1.2 billion to non-profit organizations with an aim to protect the environment. Convert this into millions of dollars to write the check.

$1.2 billion	$_____million

Application

??!



Given:
784,000,000 people are interested in using bio-bottles.

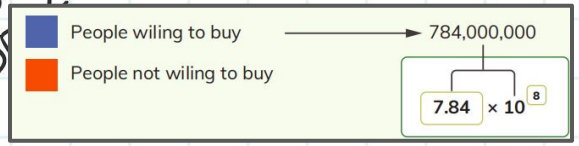
Solution:
To convert the standard form to the scientific equation:

Factor should lie between 1 and 10, i.e., $1 \leq |a| < 10$.

7.84 as it's more than 1 and less than 10.

There are 8 zeros after 7. Hence, the exponent of 10 will be 8.

$\Rightarrow 784,000,000 = 7.84 \times 10^{8}$.



2 You conduct a survey to find the type of bottle that will be more popular. Your facility can manufacture only one of the two types, and you want maximum people to benefit. Which type of bottle should X-Labs produce? Tick the appropriate box.

No. of People interested:

Bottle-1

352,800,000

Bottle-2

4.312×10^8

Given:

Bottle 1: 352,800,000 units
Bottle 2: 4.32×10^8 units

Solution:

1. To reach more people we need to find out the bigger number out of the two.
2. Let's express both numbers in the scientific notation.
3. $352,800,000 = 3528 \times 10^5$
   The factor should lie between 1 and 10. Hence, we choose 3.528
4. $352,800,000 = 3.528 \times 10^8$
5. Number of units of Bottle 1 (3.528×10^8) < Bottle 2 (4.312×10^8), Hence, we choose to make bottle 2.

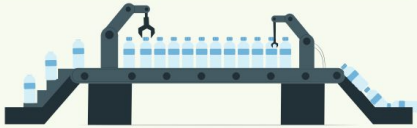
Bottle 1: $352,800,000 = 3.528 \times 10^8$

Bottle 2: 4.312×10^8

Bottle 1 < Bottle 2, hence you should should produce bottle 2.

3 Combining all the data from the survey, you need to produce 3,048,000,000 bio-bottles. Record this number in scientific notation to make a report to X-Labs.

$3{,}048{,}000{,}000 = \square \times 10^{\square}$



Given:

3,048,000,000 bio-bottles are to be made.

Solution:

1. $3{,}048{,}000{,}000 = 3{,}048 \times 10^{6}$, as the count of zeroes is 6.
2. The factor should lie between 1 and 10. Hence, we choose 3.048 and increase the exponent of 10 by 3
3. $3{,}048{,}000{,}000 = 3.048 \times 10^{9}$.

$3{,}048{,}000{,}000 = 3.048 \times 10^{9}$

4 After a month of launch, you notice a 0.0000197% decrease in plastic waste. Record this in scientific notation to publish in a science journal.

SCIENCE JOURNAL

0.0000197% decrease in plastic waste!

$\square \times 10^{\square}$

0.0000197% decrease in plastic waste!

1.97×10^{-7}

Given:

0.0000197% decrease in plastic waste.

Solution:

1. Convert the percentage to number
   0.0000197% = 0.0000197/100
   = 0.000000197.
2. Factor should lie between 1 and 10.
   Hence, we choose 1.97
3. $0.000000197 = 1.97 \times 10^{-7}$ as the count of places after decimal up to 1 is 7.
4. 0.0000197% decrease in plastic waste is 1.97×10^{-7}

5 One of the accountants recorded the profit obtained in scientific notation. However, something seems to be wrong. Check the calculations to identify the mistake(s), if any.

- [ ] Step 1: $2,009,000,000
- [ ] Step 2: $2.009 × 1,000,000,000
- [ ] Step 3: $2.009 × 10^8

- [ ] Step 1: $2,009,000,000
- [ ] Step 2: $2.009 × 1,000,000,000
- [x] Step 3: $2.009 × 10^8

Step 3 should have been $2.009 x 10^9. Hence, step 3 is wrong.

Given:
Step 1: $2,009,000,000
Step 2: $2.009 × 1,000,000,000
Step 3: $2.009 × 10^8

Solution:

1. $2,009,000,000 is to be expressed in standard notation.
2. The factor should be between 1 and 10.
   ⇒ 2.009 × 1,000,000,000
   This step is correct.
3. But, 2.009 × 1,000,000,000 = 2.009 × 10^9 .
   Step 3 should have been $2.009 × 10^9.
   Hence, step 3 is wrong.

6 As the project turned out to be a massive success, you decide to donate $1.2 billion to non-profit organizations with an aim to protect the environment. Convert this into millions of dollars to write the check.

$1.2 billion	$_____million

Given:
$ 1.2 billion is to be donated

Solution:
1 billion = 1,000 million.

$ 1.2 billion = $ 1.2 × 1,000 million, as

Hence, $ 1.2 billion = $ 1200 million.

IDEA

$1.2 billion	$__1200__million

Lab

??!

CREATE WITH

MATH

Create

GRADE 8

Learning Outcome:
Define scientific notation and express a given large or small number in scientific notation, mathematically. Build appreciation of math through representations of smallest and biggest numbers.
8.EE.A.3

Although bio-bottles are very effective, they alone cannot contribute to reducing environmental damage which was X-Labs' primary motive.
Hence, you decide to make a carbon dioxide absorbing material to reduce global warming which contributes to the welfare of the environment.

Your team in X-Labs came up with a range of ingredients to prepare the required material after a vigorous research.

1 Decide the quantity of ingredients that you want to add in the bioreactor.
The ingredients can be added in the following range:

a) 10.335 g < Calcium hydroxide < 10.399 g

b) 0.248 g < Activator 1 < 0.314 g

c) 0.0114 g < Activator 2 < 0.0129 g

d) 0.00078 mL < Catalyst < 0.00089 mL

e) 12.5 mL < Distilled water < 12.85 mL

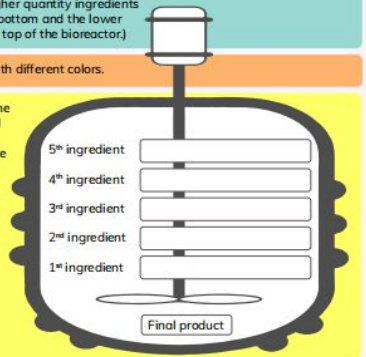
Order of adding ingredients:

2 To add the selected quantity of ingredients in the bioreactor, follow the given conditions.

- Represent them in scientific notation.
- The higher quantity ingredients should be added first, followed by the lower quantity ingredients.
  (Regardless of g or mL, higher quantity ingredients will be represented at the bottom and the lower quantity ingredients at the top of the bioreactor.)

3 Color each ingredient box with different colors.

4 The final product will be of the same color as that of the 3rd ingredient added. Color the box (of final product) with the same color.



Create

??!

1 Decide the quantity of ingredients that you want to add in the bioreactor.
The ingredients can be added in the following range:

a) 10.335 g < Calcium hydroxide < 10.399 g

b) 0.248 g < Activator 1 < 0.314 g

c) 0.0114 g < Activator 2 < 0.0129 g

d) 0.00078 mL < Catalyst < 0.00089 mL

e) 12.5 mL < Distilled water < 12.85 mL

Order of adding ingredients:

Decide the quantity of ingredients that you want to add in the bioreactor.
The ingredients can be added in the following range:

a) 10.335 g < Calcium hydroxide < 10.399 g — Calcium hydroxide = 10.365 g = 1.0365×10^{1} g

b) 0.248 g < Activator 1 < 0.314 g — Activator 1 = 0.289 g = 2.89×10^{-1} g

c) 0.0114 g < Activator 2 < 0.0129 g — Activator 2 = 0.0124 g = 1.24×10^{-2} g

d) 0.00078 mL < Catalyst < 0.00089 mL — Catalyst = 0.00088 mL = 8.8×10^{-4} mL

e) 12.5 mL < Distilled water < 12.85 mL — Distilled water = 12. 72 mL = 1.272×10^{1} mL

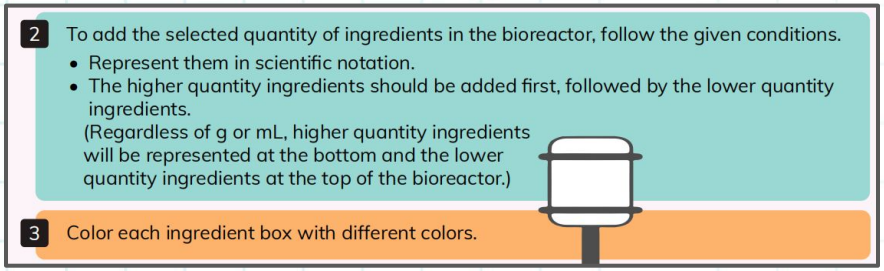
Order of adding ingredients:

Given:
Range of material between which we can choose quantity is given.

Solution: We choose below quantity and convert them into scientific notation.

Calcium hydroxide = 10.365g = 1.0365×10^{1}g
Activator 1 = 0.289g = 2.89×10^{-1}g
Activator 2 = 0.0124g = 1.24×10^{-2}g
Catalyst = 0.00088mL = 8.8×10^{-4} mL
Distilled water = 12.72mL = 1.272×10^{1}mL

Multiple solutions are possible for this sheet.



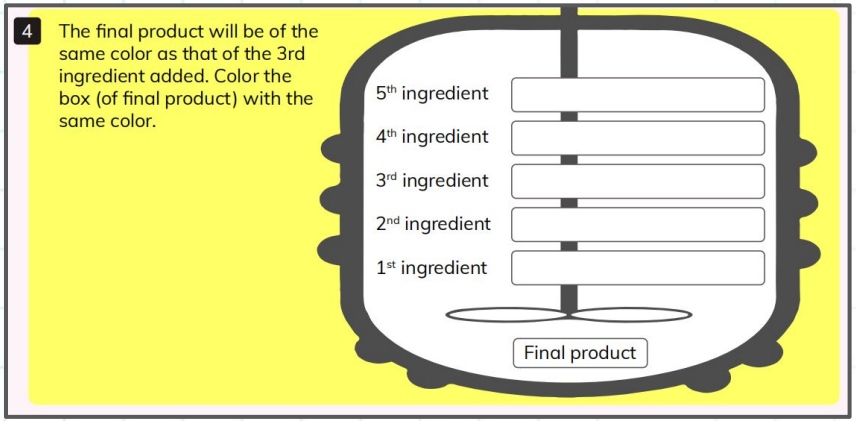
Given:
Exact weight of the material we want to add.
The higher quantity ingredients should be added first, followed by the lower quantity ingredients.

Solution:

Arranging them in descending order as per weight:

1. Distilled water = 12.72mL = 1.272×10^{1}mL
2. Calcium hydroxide = 10.365g = 1.0365×10^{1}g
3. Activator 1 = 0.289g = 2.89×10^{-1}g
4. Activator 2 = 0.0124g = 1.24×10^{-2}g
5. Catalyst = 0.00088mL = 8.8×10^{-4}mL

Order of adding ingredients:
Distilled water > Calcium hydroxide > Activator 1 > Activator 2 > Catalyst.



Given:
Order of adding ingredients:
Distilled water > Calcium hydroxide > Activator 1 > Activator 2 > Catalyst.

Solution:
Write down names of ingredients with weight in list as per decided order.