Explore use of scientific notation in real life context and use the context to convert numbers between standard form and scientific notation. CCSS.MATH.CONTENT.8.EE.A.3 | US_EN_08_MAT_C11_WS_m1

The power plant you built is runs. But due to some seasonal changes, the water in the dam and the power generated by the plant has reduced.

1 At present, the amount of water in the dam is 100,000 gal. Check the correct exponential form for the given amount of water in the dam.

☐ 10^4 gal ☐ 10^3 gal

☐ 10^6 gal ☐ 10^5 gal

2 Due to reduced water levels, the power generated is also low. The maximum power that the power plant generates is 1.2×10^3 kW. Write this value of power generated in standard form in the boxes given below.

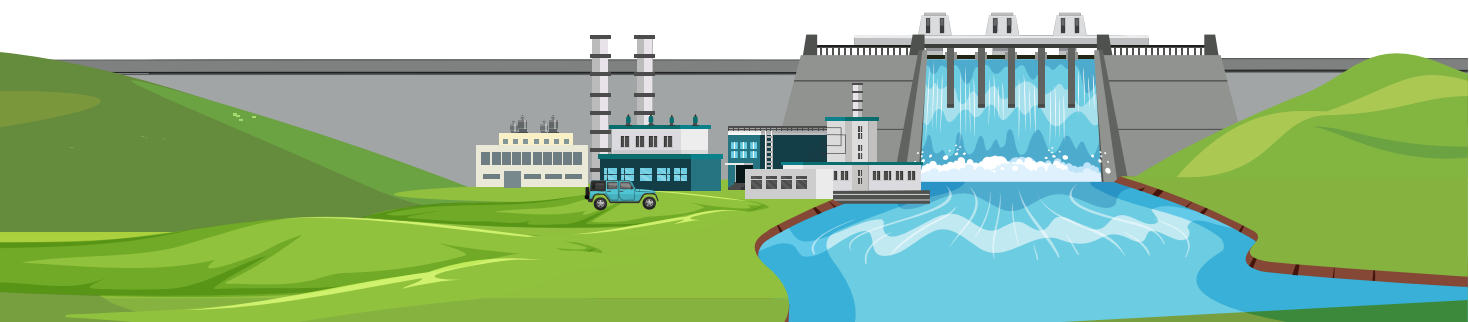
The maximum power generated by the power plant is ☐☐☐☐ kW.

3 Compare the water level in the dam before and after summer.

Before summer
0.0534574×10^4 ft

☐

After summer
534574×10^{-4} ft



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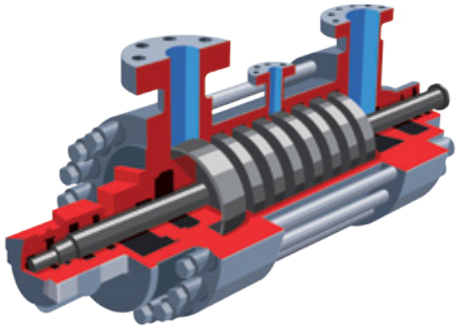
4 Motor pumps are used to speed up the water flow. These pumps release pollutants with a density 0.0000435 micrograms per cu m. Circle this density (in micrograms per cu m) of pollutants when represented in scientific notation.

4.35×10^{-5} 43.5×10^{-5}

4.35×10^{-6} 435×10^{-5}



5 According to the management, there is a huge loss for the power plant. The loss is estimated to be 3.2×10^{5} million dollars. Write this amount in standard form in the boxes given below.

The loss is estimated to be ☐☐☐☐☐☐ million dollars.

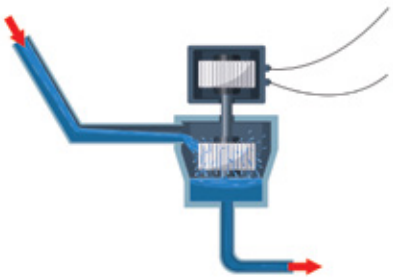
6 The amount of water flowing through the turbine per second is 0.025 m^3. The options below show the steps to convert the value into liters and then its representation in scientific notation. Check the box that represents an incorrect step.

Hint: 1 m^3 = 1000 L

☐ Step 1: 0.025 $m^3 = 0.025 \times 10^3$ L.

☐ Step 2: Scientific notation is 25 L.

☐ Step 3: Scientific notation is 2.5×10^1 L.



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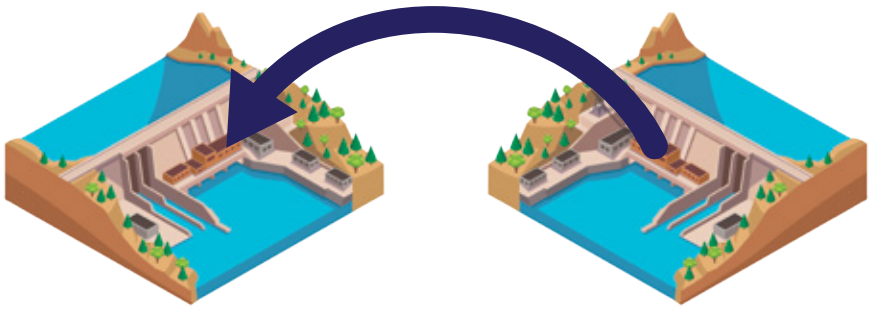
A nearby power plant agrees to supply power to the villages, following the reduced power generation capacity of the power plant.

1 The neighboring power plant supplies 1,000,000 kW of power. Check the box that represents the power supplied in scientific notation.

- ☐ 10^4 kW
- ☐ 10^6 kW
- ☐ 10^3 kW
- ☐ 10^5 kW



2 The distance between the power plants is 0.002536×10^5 mi. Write the standard form of the distance in the boxes given below.

The distance between the power plants is ☐☐☐.☐ mi.

3 To carry the power from one plant to another, you need to use towers. These towers are built specially for power transmission. There are two proposed heights for towers. Compare them and write your answer in the box given below.

0.0032563×10^6 ft ☐ 326530000×10^{-5} ft

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4 The amount of money spent on transferring power from the other plant in four months is given below. Match the amount spent in each month with its standard form.

First month	$0.573 × 10^2 millions ●	● $573,000,000
Second month	$0.573 × 10^3 millions ●	● $5,730,000,000
Third month	$0.573 × 10^1 billions ●	● $5,730,000
Fourth month	$0.573 × 10^1 millions ●	● $57,300,000

5 There can be power loss during transmission because of low quality wires. The amount of power loss through wires is 250×10^{-7} units per wire. Check the box that represents the correct value of power loss per wire.

Hint: 1 micro unit = 10^{-6} units

The amount of power loss through wires is 250×10^{-7} units per wire.

This can be written as ☐☐ x 10 ☐ x 10^{-7}

= ☐☐ x 10^{-6} units per wire

The amount of power loss per wire is: ☐ 25 micro units ☐ 25 units

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To manage the power shortage, you have come up with an idea of using solar panels. Let's help your team build solar panels.

Step 1 : Follow the guidelines and choose an area to fix the solar panels.

Guidelines:
- Select the required area to fix the solar panels.
- The area should lie between 39,000,000 sq ft to 61,000,000 sq ft.
- Area should be a multiple of 1,000,000.

Selected area = ☐☐☐☐☐☐☐☐ sq ft

Represented in scientific notation, we get:

Selected area = ☐.☐ × 10^☐ sq ft

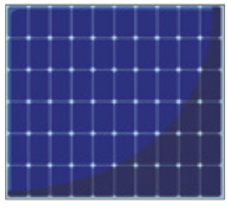
Step 2 : Follow the guidelines to select the area of each solar panel sheet that you are going to fix.

Guidelines:
- Select a sheet of area 10^a sq ft.
- "a" lies between 2 to 4 (both inclusive).

Selected area of solar panel sheet is $10^{\square}$ sq ft.

$$\text{Number of sheets required} = \frac{\text{Selected area}}{\text{Area of solar sheet}} = \frac{\square.\square \times 10^{\square}}{10^{\square}}$$

$$= \square.\square \times \square\square^{\square}$$



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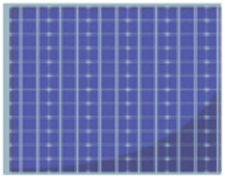
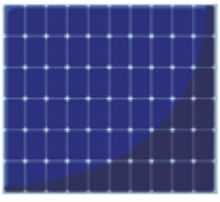
Number of solar sheets required can be written in standard form as

Step 3 : There are two types of sheets with different prices. Select one of them. Then find the total cost that needs to be paid to cover the panels.



The cost of Type A sheet is $\$20 \times 10^{2}$.



The cost of Type B sheet is $\$2 \times 10^{4}$.

Total cost that you need to pay for the solar panels (in $) = Number of sheets × Price per sheet

$$\square.\square \times \square\square \times \square\square \times \square\square$$

$$= \square\square.\square \times \square\square$$

$$= \square\square\square\square\square\square\square\square\square\square\square$$

Great! The panels can be installed and this will help overcome the power shortage in the villages!