STANDARD FORM (SCIENTIFIC NOTATION)

STUDENT WORKSHEET

Group Members

1. _____
2. _____
3. _____
4. _____

SMP/MTS
VII

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Concept Map

Rational Number

Number Operations (Multiplication, Division)

Decimal Number

Standard Form

General Structure: $a \times 10^n$

Types by Powers

Positive Power

Negative Power

LEARNING OBJECTIVES

1. Students Can Complete Operations Multiplication of Algebraic Forms
2. Students Can Solve Problems Contextual On Algebraic Form Operations

INSTRUCTIONS

1. Pray first before starting the discussion.
2. Read the following Student Worksheet instructions carefully.
3. Discuss with your group members in solving the given problem
4. If you have difficulty studying Student Worksheet , ask your teacher and keep trying your best first.
5. Finish on time (20 minutes)

Mission to Outer Space

Fakih is a member of a young research team invited to a space center. There, scientists are preparing for a space mission to the nearest planet outside the solar system. A scientist explains: "To reach Proxima Centauri, the closest star to Earth, we must travel a distance of approximately 40,200,000,000,000 kilometers." Fakih eyes widen. "Forty trillion kilometers?" you think. That number is way too long and hard to read!

Soon after, another scientist presents data on cosmic particles entering Earth's atmosphere: "Some cosmic particles measure around 0.000000078 meters in size." Again, Fakih amazed. How can scientists record and compare numbers that are so large or so small without getting confused?

💭 Guiding Discussion Questions

Have you ever encountered such numbers in other lessons, in the news, or in everyday life? Give another example!

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How can scientists record and compare numbers that are so large or so small without getting confused?

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📐 Problem Statement

🗣️ Discuss this report the space mission with your group.

- How can we write a number like 40,200,000,000,000 km so it becomes easier to read?
- What are the benefits of writing large and small numbers in a more compact way?

✏️ *Write your discussion results here:*

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📐 Data Collection

Convert the mission data into standard form so that your report looks neater!

Mission Data	Ordinary Number	Standard Form
Distance to Proxima Centauri	40,200,000,000,000 km	
Size of a cosmic particle	0.000000078 m	
Mass of a small meteor	9,800,000,000 kg	
Diameter of a neutron star	0.000012 km	
Number of stars in the Milky Way	200,000,000,000	

Now convert the following standard forms back into ordinary numbers:

Standard Form	Ordinary Number
6.5×10^{-5}	
4.2×10^{12}	
1.9×10^{-8}	

📐 Data Processing

From the activities you have done previously, it can be concluded:

General form of Standard Form (Scientific Notation):

$$a \times \underset{.....}{\square}^{\,n}$$

With the condition: $1 \le a < 10$, and n is an integer.

📐 Verification (Application and Implementation)

Simulation: Space Scientist Mission

1. A new satellite detects a signal from an alien planet located 135,000,000,000,000 km from Earth. Write it in standard form.

2. Your team discovers space dust measuring 0.000000003 meters. Write it in standard form.

3. A space computer shows the speed of particles as 3.2×10^7 m/s. What's this in ordinary form?

4. There're 5.4×10^{23} hydrogen atoms in the experiment room. What happens if we write this number in full?

Answer:

Generalization

Create a summary of what you've learned:

1. What is scientific notation?
2. How do you convert ordinary numbers to standard form?
3. When is scientific notation used in real life?

Write your conclusion below:

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