Scientific Notation and Standard Form

LEVEL 1: The Basics

Q1: Write each number in scientific notation

- $5{,}000 =$
- $700 =$
- $1{,}000{,}000 =$
- $120{,}000 =$
- $3{,}400{,}000 =$
- $25{,}000{,}000{,}000 =$
- $98{,}000{,}000 =$
- $60{,}000 =$
- $450 =$

Q2: Write the number in standard form.

- $6 \times 10^{3} =$
- $5 \times 10^{-1} =$
- $1.5 \times 10^{5} =$
- $3.9 \times 10^{-5} =$
- $9.2 \times 10^{7} =$
- $8.0 \times 10^{-3} =$
- $3 \times 10^{2} =$
- $2.5 \times 10^{-7} =$
- $7.8 \times 10^{6} =$
- $6 \times 10^{-2} =$

Q3: Which expression is equivalent to 6.02×10^{23}?

a) 0.602×10^{21}

c) 602×10^{21}

b) 60.2×10^{21}

d) 6020×10^{21}

Q4: What is the value of n if the number 0.0000082 is written in the form 8.2×10^{n}?

a) -6 b) 6 c) -5 d) 5

Q5: A movie earned $1,845,000,000 at the box office. What is the dollar amount written in scientific notation?

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LEVEL 2: Dive Deeper

Q1: Fill in the Blank

- $1.6 \times 10^{2} =$ _____
- $0.0006 =$ _____ $\times 10^{-3}$
- 5.7 million = _____ $\times 10^{6}$
- $0.009 =$ _____ $\times 10^{-3}$
- $1.234 =$ _____ $\times 10^{0}$

Q2: Which is greater: 4.5×10^{5} or 5.2×10^{4} ?

Q3: Order from least to greatest:

$$3.1 \times 10^{-2},\ 0.002,\ 2.5 \times 10^{-3}$$

Q4: True or False: $1.2 \times 10^{3} = 120$

Q5: Which is closer to 1,000,000:

A) 9.8×10^{5} or B) 1.01×10^{6}

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LEVEL 3: Mastering the Concept

$1\ g \approx 6.022\ \times\ 10^{23}\ amu$

$1.661 \times 10^{-24}\ g \approx 1\ amu$

Q1: The mass of an atom is too small to measure grams or milligrams.

Scientists use atomic mass units (amu) to describe the mass of an atom.

The number of atomic mass units in one gram is a constant known as Avogadro's number.

PART 1: Complete the table.

Element	Chemical Symbol	Mass (amu)	Mass (g)
Silver	Ag	1.26×10^{25}	
Oxygen	O		28
Platinum	Pt	9.64×10^{24}	
Helium	He	3.01×10^{22}	
Nitrogen	N		34

PART 2: Arrange the chemical symbols in order of increasing mass. What word do the symbols spell?

Q2: A computer can perform 5.0×10^{9} calculations per second. How many calculations can it perform in 1.5 minutes?

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Word problems / Real application:

1) The Sun is approximately 1.496×10^{8} km from Earth. Express this in standard form.

2) A bacteria is 4.6×10^{-6} meters wide. Express in standard form.

3) A telescope views a galaxy 3.2×10^{10} km away. Write that in expanded form.

4) The mass of a dust particle is 3×10^{-9} g. If there are 100 particles, what is the total mass?

5) A factory produces 2.5×10^{5} cans per day. How many cans in 10 days?

6) A student says $0.0034 = 3.4 \times 10^{-3}$. Is this correct? Explain.

7) Rewrite 62,000 in two different forms of scientific notation.

8) A rocket travels 7.5×10^{4} km per hour. How far will it travel in 1.2×10^{2} hours?

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