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# SCIENTIFIC NOTATION

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- ## Objectives
- Write numbers in scientific notation
  - Put numbers into good scientific notation
  - Perform calculations using scientific notation

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- 3
- ## Writing scientific notation
- Move decimal
  - Bigger than 1 and smaller than 10
  - Big numbers have + exponents
    - 3 000
  - Small numbers (with a decimal) have - exponents
    - 0.000 000 9

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**Write in scientific notation**

1. 354 000
2. 0.004
3. 180
4. 0.0072
5. 780 094
6. 0.000 003 8

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**Write in good scientific notation**

- Ignore the scientific notation part that is already there
- Add or subtract exponents
- $800 \times 10^{12}$

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**Write in good scientific notation**

1.  $0.0093 \times 10^{-2}$
2.  $0.01 \times 10^2$
3.  $79 \times 10^4$
4.  $733 \times 10^{-3}$
5.  $0.000\ 006\ 3 \times 10^{-12}$
6.  $8050 \times 10^{-8}$
7.  $49 \times 10^2$
8.  $0.006\ 02 \times 10^{26}$

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### Calculators and scientific notation

- NEVER EVER **EVER** use  $*10^{\wedge}$
- **EVER** **EVER** **EVER** **EVER** **EVER**
- Find EXP or EE button on your calculator
- EXP or EE replaces "  $\times 10^{\text{---}}$  "
- To enter  $3.4 \times 10^{18}$  you would enter:  
3.4 EXP 18  
3.4 EE 18

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### Adding and subtracting

- Exponents MUST be the same, then add or subtract coefficients
- $4.5 \times 10^3 + 3.9 \times 10^4$
- $0.45 \times 10^4 + 3.9 \times 10^4 = 4.35 \times 10^4$
- $4.5 \times 10^3 + 39 \times 10^3 = 43.5 \times 10^3 = 4.35 \times 10^4$

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### Adding and subtracting

1.  $7.6 \times 10^8 + 5.4 \times 10^7$
2.  $5.2 \times 10^6 - 4.9 \times 10^6$
3.  $1.3 \times 10^{-2} + 4.0 \times 10^{-1}$

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### Multiplying and dividing

- Multiplying:
  - Multiply coefficients
  - **Add** exponents
- Dividing:
  - Divide coefficients
  - **Subtract** exponents

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### Multiplying and dividing

1.  $3 \times 10^4 * 2 \times 10^2$
2.  $2.1 \times 10^5 * 4.6 \times 10^{-4}$
3.  $8.5 \times 10^{-6} * 1.3 \times 10^{-8}$
4.  $\frac{8 \times 10^4}{2 \times 10^2}$
5.  $\frac{3.56 \times 10^{-5}}{4.5 \times 10^{-7}}$
6.  $\frac{6.5 \times 10^2}{5.0 \times 10^{-2}}$

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### Exponents

- Take the coefficient raised to the power
- Multiply exponents
- $(2 \times 10^3)^3 \rightarrow 2^3 = 8$
- $10^{3*3} = 10^9$
- $8 \times 10^9$

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## Exponents

1.  $(3.2 \times 10^5)^6$
2.  $(1.0 \times 10^{-3})^2$
3.  $(5.6 \times 10^{-4})^{-5}$

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