

UNIT 3 - MOTIONCH. 9 - Distance and Speed

Distance - the amount of space between two points. Usually measured in Kilometers (km) or meters (m).

Time is the duration between two events and is usually measured in seconds (s).

Speed is the distance travelled per unit of time. Usually measured in meters/second ($\frac{m}{s}$).

Some speeds:

Speed of sound $340 \frac{m}{s}$
 speed of light $300\,000\,000 \frac{m}{s}$
 $3 \times 10^8 \frac{m}{s}$

some jets $700 \frac{m}{s}$

jog $3 \frac{m}{s}$

sprinter $10 \frac{m}{s}$

cars $28 \frac{m}{s}$ ($100 \frac{km}{h}$)

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Section 9.2

Measurement and Calculations**Certainty and Significant Digits**

When communicating in science you need to be able to express certainty. There is an international agreement about the correct way to record measurements. Record all certain digits plus one.

"Certain Digits Plus One" represents the significant digit process.

All digits included in a stated value (except leading zeros) are significant digits.

Counted or defined values represent exact values. The number of sig. digs. is infinite (as many as you want).

Counted values

4 dogs
 10 CDs
 3 Blue Jays

Defined values

1000 m in a 1 km
 10 mm in a 1 cm
 60 minutes in 1 hour

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Certainty rules

1. Multiplying and Dividing

When multiplying and or dividing the answer has the same number of significant digits as the measurement with the fewest number of significant digits.

2. Rounding

If the digit after the digit to be retained as a significant is a 5 or greater, round up.

3. Precision rule for adding or subtracting

When adding and subtracting measured values of known precision, the answer has the same number of decimal places as the measured value with the fewest decimal places.

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Conventions of communication

The international community of scientists has agreed on a system of measurement called SI, the international system of units from the French Systeme international d'unite (metric system). This is very useful in communicating results.

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Examples: 1.02m 3 sds
 10.120 km 5 sds
 0.015 s 2 sds
 0.00020 s 2 sds.

All non-zeros are significant.

0.00020000

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