



PHYSICS

INTRO TO PHYSICS AND MOTION

Learning Goals

INTRO - Begin to understand motion and measurement and the importance of converting units.

Success Criteria

- Understand that an object's state of motion is tied to either a Frame of Reference or a defined Rest Position.
- A Significant Digit is any integer in a stated value (except leading zeros)
- Understand the metric system prefixes and be able to convert units.



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PHYSICS DEFINED

Definition:

MECHANICS

Mechanics is a branch in physics that deals with the study of **motion**. This consists of both *Kinematics* and *Dynamics*.

Kinematics:

Dynamics:

Motion can be pictured in 2 ways:

a) With respect to a FRAME OF REFERENCE

b) At Rest



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MOTION AND MEASUREMENT

Motion is a concept that all of us are aware of without fully understanding it. At some point, we have all asked questions like:

How fast can you run?

How long does it take for that car to go from 0 to 60?

Do heavier objects fall faster?

<https://www.youtube.com/watch?v=E43-CfukEgs>

All of these questions deal with the concept of motion. Quite simply, motion takes the concepts of distance, speed, and acceleration and relates them to time.

Measurement

It is quite important to measure correctly. The accuracy of your calculations can only be as accurate as your measurements. It is also extremely important to always include a unit with your measurements.

The certainty of your measurements is accurate to the number of **SIGNIFICANT DIGITS** your measurements include. The more significant digits, the more accurate your measurements and eventual answer will be.

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

Ex.

a) 307.0 cm

b) 0.03 m

c) 61 m/s

d) 0.5060 km



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CONVERTING UNITS

It is important to be able to convert units from one form to another in physics calculations. In some questions, the units given may not be the one you need to solve the problem.

Ex 1. Convert 2.6 km into meters (Note: 1 km = 1000 m)

Ex 2. An athlete completed a 5 km race in 19.5 min. Convert his time to hours.

Ex 3. A train is traveling at 95 km/h. Convert 95 km/h to m/s.



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Unit Conversions Practice

Make the following conversions:

- 1) Convert 16.7 inches to feet

- 2) Convert 25 yards to feet (there are 3 feet in a yard)

- 3) Convert 90 centuries to years

- 4) Convert 84 miles to kilometers (there are 0.6 miles in a kilometer)

- 5) Convert 4.75 centimeters to meters

- 6) Convert 48,987 minutes to days

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HOMEWORK

- 7) Convert 27 months to fortnights (there are 14 days in a fortnight and ~ 30 days in a month)

- 8) Convert 0.09 miles to inches (there are 36 inches in a yard and 1760 yards in a mile)

- 9) Convert 4.66 centimeters to miles (there are 0.6 miles in a kilometer)

- 10) Convert 100 km/h to m/s

- 11) Convert 20 m/s to km/h