

→ Welcome to PHYS2010. This course will cover:

Forces, Energy, Momentum: collectively, "MECHANICS"

Waves and sound

Fluids and heat

Class consists of:

These lectures (NOTES WILL GO ON THE WEB 1-2 DAYS AFTER LECTURES)

Recitations } these will be in the same time slot,
Labs } (roughly) alternating weeks.

Exam (evenings)

CAPA online homework (sets are personalized!)

→ Need to register: see website.

CAPA will be due at 10PM FRIDAYS (first set next wk)

→ grace period: automatic extension to 8AM Saturday.

CAPA sheets are printed, avail in hallway boxes (late this week)

Lecture participation counts! You will participate using "clickers."

Buy one at book store: we start counting lecture participation next week (Monday). Register on web site.

For those who already have clickers, test them here:

(the walk/bus question)

(the education level question)

The basic drill will be: 1) I put up a question

2) Think of the answer

3) Discuss it with your neighbors! (Most important step!)

web:

www.colorado.edu/
physics/phys2010

4) Select answer with clicker

5) I'll call time and we'll discuss the results.

Math requirements: You MUST know basic algebra for this class. If you're a little rusty, try to review.

→ Do math concept tests here:

1-1: square roots

1-2: $10^5 = ?$

~~1-3: 10^5 = ?~~

If these were easy, you're probably in fine shape for preparation.
If they were hard, you'll want to do some math review.

If they appeared to be in a foreign language, this course will be very difficult for you.

OK, now let's start with some physics:

Much of basic physics is concerned with motion: simplest case to study is in one dimension:

Speed vs. Velocity:

$$\text{Speed} = \frac{\text{distance traveled}}{\text{time elapsed}}$$

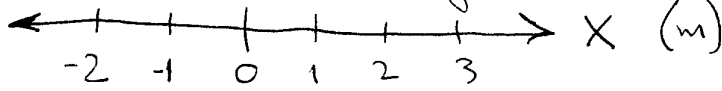
Units: mph, $\frac{\text{km}}{\text{hr}}$, $\frac{\text{m}}{\text{s}}$, $\frac{\text{inches}}{\text{year}}$
 $\underbrace{\text{mph}}_{= \frac{\text{miles}}{\text{hour}}}$

Distance, elapsed time ≥ 0 by definition,
so speed is always positive or zero.

Now, velocity is commonly used in everyday life to mean just speed. But there's a difference: it includes the direction of motion.

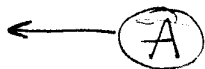
In 1-D, this is represented by a sign:

Position: - is to left, + is to right (almost always)

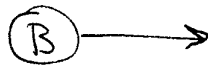


So velocity is **NEGATIVE** if you're moving left
(to lower values of x)

POSITIVE if you're moving right.
(to higher values of x).



$$v_A = -5 \frac{m}{s}$$



$$v_B = +5 \frac{m}{s}$$

Speed $s = |v| = 5 \frac{m}{s}$ for both objects.

Now, look closer at the units. They can be manipulated algebraically: if, say, 1 hour = 3600 s, then

$\frac{3600 s}{1 hr} = 1$ and this can be multiplied without changing

answer:

$$5 \frac{m}{s} = 5 \frac{m}{s} \cdot \frac{1 \text{ km}}{1000 m} \cdot \frac{3600 s}{1 hr} = 18 \frac{km}{hr}$$

Can also convert to mph: $18 \frac{km}{hr} = 18 \frac{km}{hr} \cdot 0.62 \frac{mi}{km} = 11.1 \frac{mi}{hr}$

UNITS ARE VERY IMPORTANT in this course! [concept test 1-3: units]

