Sept 14, 2015 LB 273, Physics I

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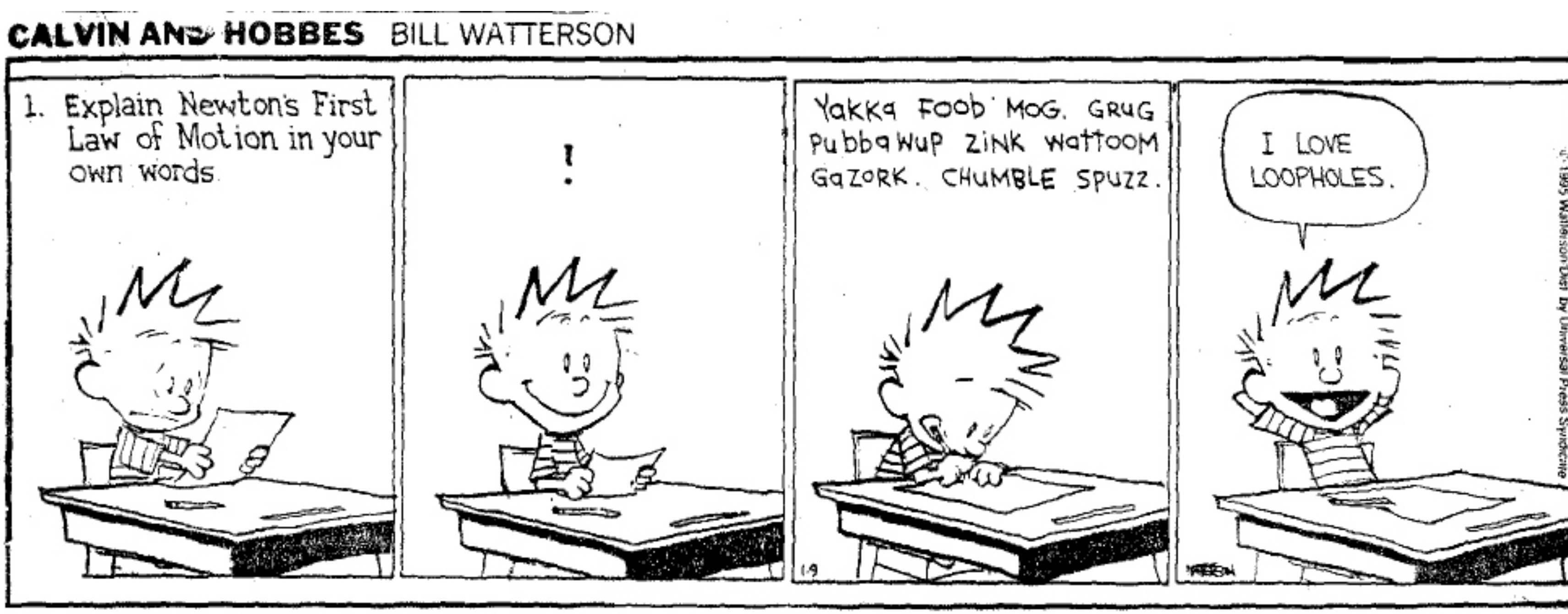
Today:

- How Big Is A Worm?
- Starting Chapter 2: Force and Momentum



The earthworm absorbs oxygen directly through its skin. The worm does have a good circulatory system that brings oxygen to all the cells. But the cells are distributed throughout the worm's volume and oxygen can only enter through the skin. This means the surface area to volume ratio plays an important role.

How big can an earthworm get?

You will be finishing this problem for homework, so take good notes!

The skin of an earthworm can absorb oxygen at a rate
A = .24μmole per square cm per hour

The body of the earthworm uses approximately
B = .98μmole of oxygen per gram of worm per hour.

Which expression describes the amount of oxygen the earthworm **absorbs** in one hour?

A. 3.7g*A
B. $3.9cm^3$*A
C. $24cm^2$*A
D. .95 g/cm^3*A
E. Something else

The skin of an earthworm can absorb oxygen at a rate
A = .24µmole per square cm per hour

The body of the earthworm uses approximately
B = .98µmole of oxygen per gram of worm per hour.

Can the earthworm take in enough oxygen to survive?

A. Yes
B. No
C. I have no idea
D. Something else

To decide if a particular earthworm can survive, we came up with this condition:

$$2\pi * r * L * A > m * B$$

How can we write the “mass” such that it’s dependence on r and L is explicit?

Announcements

- Ch 1 on-paper homework due Monday in class
  - You can find it on LON-CAPA and the course calendar
  - Bring your answers to **Part D** to class on Friday for a peer-feedback activity
- Ch 2 LON-CAPA homework due on Friday night
  - Help room starts tomorrow
- Next reading questions set (Ch 3.1-3.4) has reflection on peer-feedback

Chapter 2 Reading Questions

I would like to discuss the ways forces are classified and why there are differing methods. Which method is best?

I am still a little confused about the explanation of phenomenological forces.

Hoping to get some more practice with free body diagrams in class.

When dealing with free body diagrams, how do you know how many lines or forces to draw?

Are opposing forces always equal? How does the physics behind collisions stay consistent with this principle?

It is difficult to wrap my head around the directions and magnitude of forces while thinking about how they relate to each other to form the second law.

I did get a little confused for Newton's second law because in high school physics I had learned that newton's 2nd law of motion was just F=ma but the way it was described in the book confused me a little.

Momentum

Consider the momentum of a little girl running to collect plastic eggs in the yard and a football player running to make a tackle

A. $\vec{p}_{girl} > \vec{p}_{player}$

B. $\vec{p}_{girl} < \vec{p}_{player}$

C. $\vec{p}_{girl} = \vec{p}_{player}$

D. I can't tell

Will it take more force to bring the little girl or the football player to a complete stop?

A. The little girl

B. The football player

C. Same force required for both

D. I don't know

You are pulling the block along a table
To keep the block moving at constant speed
you need to

A. Pull with a decreasing force.
B. Pull with a constant force.
C. Pull with an increasing force.
D. Not pull at all.