Science 9
Wednesday, January 8/20

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ELPA
STEM - Thursday, February 6/20 (Morning)

1. Activity: Human Genetic Disorders -> Continue
   -> Due: Friday, Dec. 20/19
   -> 2 Days Late

2. Crossword Puzzle - Cellular Processes (Optional)

3. Genetic Engineering - Video Clips - Continue

4. Canadian Contributions to Biotechnology and Genetic Engineering

5. Pros and Cons - Handout and Graphic Organizer

Physics 112
Wednesday, January 8/20

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1. Questions?
   Worksheet: Types of Energy and Work-Energy Theorems
   -> Elastic Potential
   -> Mandatory Problems

2. FA - Elastic Potential Energy - Due: Wed., Jan. 8/20

3. The Law of Conservation of Energy - Continue

4. Worksheet - Systems and Conservation of Energy

5. FA - Mechanical Energy - Optional -> No LC Required
   FA - Conservation of Energy

6. SA - Work, Types of Energy, W $\Rightarrow \Delta$ E, Conservation of Energy
   - Date: Tuesday, Jan 14/20

7. Exam Review - Sample Problems

Example:

A pendulum is allowed to swing as shown in the diagram below. The bob has a mass of 16 kg and reaches a maximum height of 0.46 m.

$E_T = E_g = 72\,J$

$E_T = E_g + E_K$

0.46 m

$E_T = E_K = 72\,J$ ref level

A   B   C   D   E
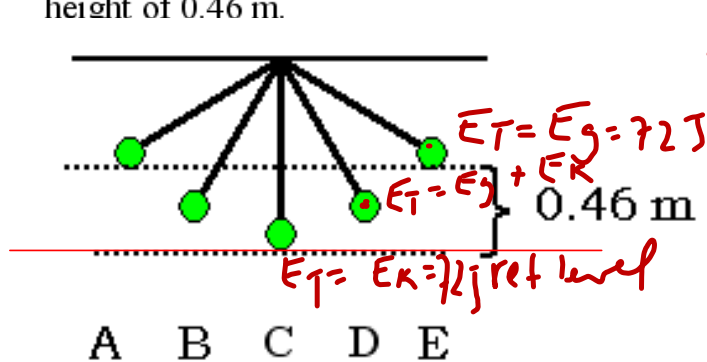
a) What is the gravitational potential energy of the bob at position E?
b) What is the kinetic energy of the bob at position D? (Assume D is halfway between the highest and lowest positions of the pendulum.)
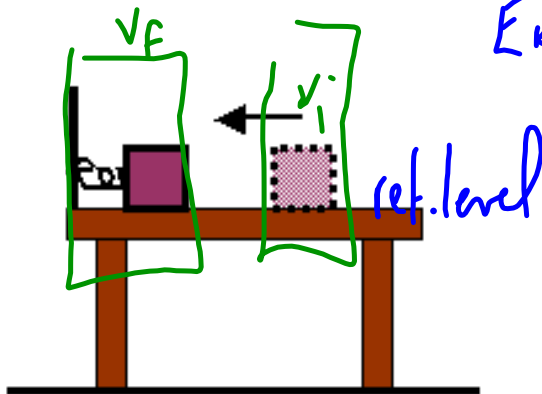c) What is the velocity of the bob at position C?

a) $E_g = mg\Delta h$

$E_g = (16)(9.8)(0.46 - 0)$

$E_g = 72\,J$

b) $E_T = E_g + E_K$

$E_K = E_T - E_g$

$E_K = 72 - (16)(9.8)(0.23)$

$E_K = 72 - 36$

$E_K = 36\,J$

c) $E_K = \frac{1}{2}mv^2$

$72 = \frac{1}{2}mv^2$

$v = 3.0\,m/s$

Example:

An object is sliding along a frictionless table with an initial speed of 0.64 m/s. It strikes a coiled spring with a spring constant of 450 N/m and compresses it 7.8 cm. What was the mass of the object?

max compression

$v_i?$ $h_i?$ $x_i?$ $v_f = 0$ h_f x_f

$$E_{ki} + E_{gi} + E_{ei} = E_{kf} + E_{gf} + E_{ef}$$

ref. level

$$E_{ki} = E_{ef}$$ $x_f = 7.8 cm$

$$\frac{1}{2}mv_i^2 = \frac{1}{2}kx_f^2$$

m
$v_i = 2.64 m/s$

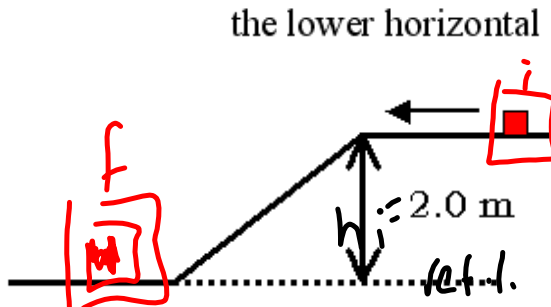$$m = \frac{kx_f^2}{v_i^2}$$

$$m = \frac{(450)(0.078)^2}{(0.64)^2}$$

$$m = 6.7 kg$$

wb

Example:

A 1.6 kg block slides along a frictionless horizontal surface at a constant speed of 4.5 m/s. The block then slides down a frictionless incline and over a second horizontal frictionless surface.

a) What is the kinetic energy of the block on the lower horizontal surface?

b) What is the speed of the block as it slides along the lower horizontal surface?

$h_i := 2.0$ m

ref.l.

$v_i?$ $h_i?$ $x_i?$ $h_f?$ $x_f?$

$E_{Ki} + E_{gi} + E_{Xi} = E_{KF} + E_{gf} + E_{xf}$

$E_{Ki} + E_{gi} = E_{KF}$

$E_{KF} = \frac{1}{2}mv_i^2 + mgh_i$

$E_{KF} = \frac{1}{2}(1.6)(4.5)^2 + (1.6)(9.8)(2.0)$

$E_{KF} = 48\,J$ ←

b) $E_{KF} = \frac{1}{2}mv_f^2$

$v_f = \sqrt{\frac{2E_{KF}}{m}}$

$v_f = 7.7$ m/s

a) 48 J

b) 7.7 m/s

Physics 122
Wednesday, January 8/20

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1. Questions?
   SA - SHM and Projectiles
   Redo - Friday (During Class)

2. Coulomb's Law - 3 Charges - Check Example (b)

3. Worksheet - Electric Charge and Coulomb's Law

4. Electric Fields

5. Strength (Intensity) of an Electric Field

6. Worksheet - Electric Charge and Coulomb's Law

7. Review - Gravitational Potential Energy

8. Electric Potential Energy

9. Electric Potential Difference

10. Unit 3 - Section 2: Electric Circuits

11. Potential Difference and Flowing Charge

12. Electric Current

13. Circuit Symbols

14. Conventional Current vs. Electron Flow

15. Ammeters vs Voltmeters

16. Resistance to Flow of Charge

17. Ohm's Law

18. Series Circuits

19. VIR Chart

20. Parallel Circuits

21. Complex/Combination Circuits

22. Worksheet - Electric Circuits

Science 10
Wednesday, January 8/20

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1. Check -> Review - SA Physics #3

2. SA Physics #3 - Date: ____Friday, Jan. 10/20____

3. Practice Exam

Topics - SA: Physics #3

1. definitions: scalar quantity, distance, speed, vector quantity,
   reference point, position, displacement,
   constant velocity, resultant displacement,
   average velocity, acceleration

2. directions: positive (east, north, up , right)
   negative (west, south, down, left)

3. physical quantities: type, symbol and unit

4. determine the slope of a line using:

   $$m = \frac{\text{rise}}{\text{run}} \quad \textbf{OR} \quad m = \frac{y_2 - y_1}{x_2 - x_1}$$

5. identify types of motion:
   1. uniform (constant velocity)
   2. uniformly accelerated motion (changing velocity)
      ✗ acc. is constant

6. answer questions about position vs. time graphs

7. draw a velocity vs. time graph given a position-time graph

8. answer questions about velocity vs. time graphs

9. describe the motion of an object by comparing the directions
   of the object's velocity and acceleration

   $\vec{v} +$
   slowing down
   $\vec{a} -$

10. solve word problems:
    (i)   displacement
    (ii) constant velocity
    (iii) average velocity
    (iv) acceleration (including freely falling body)