Weekly Sheet for MS1/ HS1a PHYSICS

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Week #8, Week of Tues(10/17) to Mon (10/24)

Topics/Content/Skills:

Vectors/ How things Move/Measuring velocity

Skills:

- Identify and calculate the acceleration of a pulley with 2 weights (Atwood Machine)
- Identify a velocity and Acceleration graph from a Displacement vs Time graph.
- Solve 1 and 2 step algebra problems for trig.
- Can convert to and from Scientific notation.
- Can convert between 1 level of units. (ex. from cm to Meters)
- Understand What Kinematics means, and knows the basic equations of kinematics.
- Understands that Projectile motion has 2 types of motion going on.

Vocabulary/Key Terms/Formulas:

Vectors, components, atwood machine, Tension, Compression, truss, engineering.

Homework/Classwork: (All homework is due the next class day unless indicated.)

	In Class	Homework Due in this Class
Monday 10/17	FBD/Dynamics Review	**Hmwrk sheet #18** **EXTRA HELP SESSION>>>>>> MS1 & HS1a at Lunch esp. But also MS2 & HS1b**
Tuesday	**Inquiry based Lab- Pendulums Springs (if time)**	**Hmwrk Sheet #19**
Wednesday Not HS1		**Hmwrk sheet #20 Basic not boring- Notions about Motions, Which Law**
Thursday HS1 Double	**Quiz #4** **Khan Academy (HS1)**	**Hmwrk sheet #21 (and #20 (HS1)) Problems with Trains, What is you motion IQ (THIS one is bonus)**
Friday	**No Class on Fridays**	**NA**
Monday 10/24	**Prezi Practice**	**#22 Try Bonus Questions/ Finish any unfinished work…**

Tests/Due Dates: **There will be a 35 min quiz (#4.5) on Thursday Oct. 20 The Last Quiz was cancelled… due to PSAT's**

Quiz- Test Topics: Equation Circles, Conversions, Solving for trig questions, REVIEW of all other Material so far: Density, Perimeter/Circumference, Area (rectangles, circles), volume (rectangular prisms, Spheres) , Scientific notation, Vectors & components, Pugging into equations, *1-2 Step Algebra problems, STEM Review, Extra ordinary Review, Graphs of DVAJ, Basic Trigonometry, Atwood Machines.*

Vocabulary/Key Terms/Formulas:

Vectors, components, Truss, Cable Stayed Bridge, Atwood Machine, Tension, Compression, etc.

Special Events/News:

The Towers Are coming Nov. 22, 2011, will be our Tower competition for 2011.

Extraordinaries/Mastery Review Topics:

Summations, 15%, DVAJ, Trigonometry, Base 2.

Name/ Grade:_____/ Date:_____

Homework Sheet #19 Pendulum Lab Worksheet

PhET Pendulum Lab (only for checking)

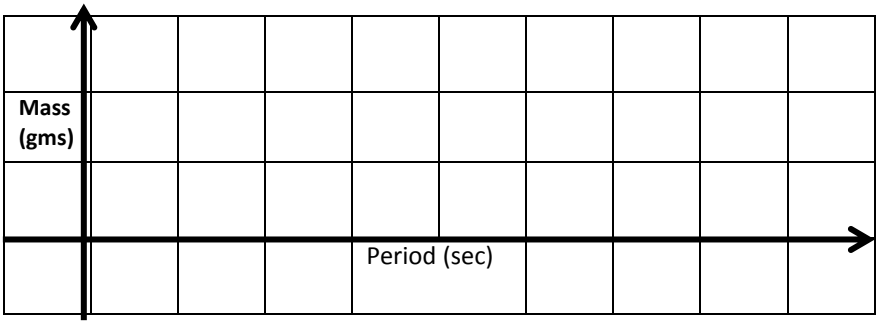
http://phet.colorado.edu/sims/pendulum-lab/pendulum-lab_en.html

You can also run the above program, which will simulate the motion of a pendulum and allow you to change the variables of mass, length, and angle.

1. **How does the period depend on the Mass**?

- Keep the angle constant at about 30^{o}, and length constant What is your Length:_____
- Gather data for 2different masses, and enter results in your Table below:

Mass	Time for 10 cycles (complete Swings)	Time for 1 swing (Period) (sec)
Mass 1=_____gm		
Mass 2=_____gm		

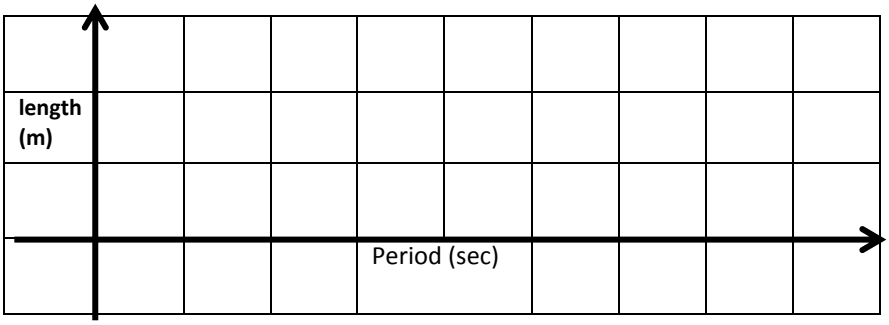


- Label and graph your data points above.
- Analyze the graph as above. **Do you think the period depends on Mass? Yes or No**

2. **How does the period depend on the Length?** Be sure to keep the mass and angle constant

- Create another data list in your excel spreadsheet, this time label the axes Length (m) and period (s)
- Keep the angle constant at about 30^{o}, and Mass constant . What is your Mass:_____
- Gather data for 2 different lengths, and enter results in your Table below:

Mass	Time for 10 cycles (complete Swings)	Time for 1 swing (Period) (sec)
Mass 1=_____gm		
Mass 2=_____gm		



- Label and graph your data points above.

- Analyze the graph as above. **Do you think the period depends on Length? Yes or No**

3. IF TIME **How does the period of the pendulum depend on the angle of the swing?**

Be sure to keep the mass and length constant

Name:_____

HOMEWORK #20

Motion & Force

NOTIONS ABOUT MOTIONS

Skydivers leaping out of an airplane, kids doing tricks on skateboards, rollercoasters circling in upside-down loops, commuters riding on subways, people dancing—motion is all around us. In order to describe a motion, you have to know where the object begins. The beginning position (the skydiver in the airplane) is the reference point from which you can describe the distance moved (200 feet into a freefall). Many other terms are used to describe aspects of motion. Many of them are scrambled below. Find the scrambled term that matches each clue. Then unscramble it, and write it next to the clue.

yolevict deeps tear talicecerona

trainie noctrifi ster smas snotnew

tommemun nertlaim ira traicnesse

tridenioc spira noholzatir clatrive

lateptricne crofe

vragyti sperruse

_____ 1. the rate of change in velocity

_____ 2. describes the speed and direction of an object

_____ 3. the amount of an object

_____ 4. the greatest velocity a falling object reaches

_____ 5. velocity parallel to Earth's surface

_____ 6. the force on an object pulling toward the center of a circular path

_____ 7. the rate of change in position (or rate of motion)

_____ 8. ratio between two different quantities

_____ 9. property of a body that resists any change in velocity

_____ 10. zero velocity

_____ 11. mass of an object multiplied by its velocity

_____ 12. upward force of air against a moving object

_____ 13. velocity in an up or down direction

_____ 14. unit of measurement for force

_____ 15. a push or pull exerted on one body by another

_____ 16. Forces always come in _____ .

_____ 17. Two objects with the same velocity must be moving in the same _____ .

_____ 18. a force that acts on all objects on Earth

_____ 19. the force that opposes the motion of two touching surfaces

_____ 20. amount of force per unit area

WHICH LAW?

We're told that Sir Isaac Newton discovered some things about motion when an apple dropped on his head. Whatever "force" was behind his discoveries, we have benefited from his discoveries.
Here are his three laws of motion. You should be familiar with them. Fill in the missing words in each of the three laws. Then tell which law fits each example below.

Which law? First, Second, or Third?

_____ 1. A frog leaping upward off his lily pad is pulled downward by gravity and lands on another lily pad instead of continuing on in a straight line.

_____ 2. As the fuel in a rocket ignites, the force of the gas expansion and explosion pushes out the back of the rocket and pushes the rocket forward.

_____ 3. When you are standing up in a subway train, and the train suddenly stops, your body continues to go forward.

_____ 4. After you start up your motorbike, as you give it more gas, it goes faster.

_____ 5. A pitched baseball goes faster than one that is gently thrown.

_____ 6. A swimmer pushes water back with her arms, but her body moves forward.

_____ 7. As an ice skater pushes harder with his leg muscles, he begins to move faster.

_____ 8. When Bobby, age 5, and his dad are skipping pebbles on the pond, the pebbles that Bobby's dad throws go farther and faster than his.

_____ 9. When you paddle a canoe, the canoe goes forward.

_____ 10. A little girl who has been pulling a sled behind her in the snow is crying because when she stopped to tie her hat on, the sled kept moving and hit her in the back of her legs.

NEWTON'S FIRST LAW OF MOTION:

An object at _____ stays at _____ or an object that is _____ at a _____ in a straight _____ keeps moving at that _____ unless another _____ acts on it.

NEWTON'S SECOND LAW OF MOTION:

The amount of _____ needed to make an object change its _____ depends on the _____ of the object and the _____ required.

NEWTON'S THIRD LAW OF MOTION:

For every _____ (or force), there is an _____ and _____ action (or force).

Name:_____

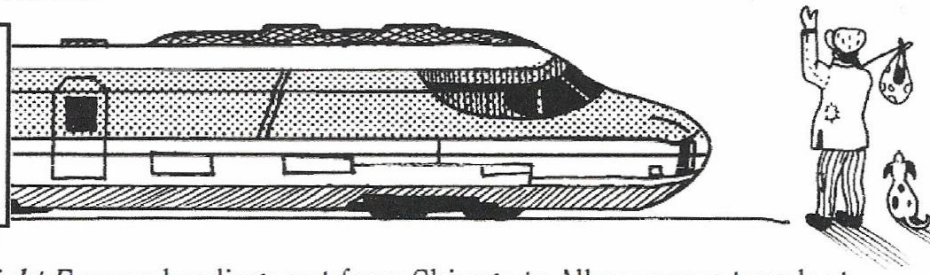
HOMEWORK #21

Rate of Motion

PROBLEMS WITH TRAINS

What is it about trains that makes them so popular in problems about motion? Well, probably it's the fact that it's usually speeding along or chugging along in a steady motion—going somewhere beyond wherever you are. In keeping with the tradition of train problems, practice your calculations with rate of motion by solving these questions.

REMEMBER:
Distance = rate x time
SO: Time = distance ÷ rate
AND: Rate = distance ÷ time



_____ 1. The *Midnight Express* heading west from Chicago to Albuquerque travels at 100 mph for 160 miles. How much time does this take?

_____ 2. A train that's heading west leaves a station at the same time that an east-bound train 840 miles away leaves its station. They both travel at an average speed of 120 mph. How long will it take before they meet?

_____ 3. If the *West Coast Skyliner* is traveling north at 120 mph and the *Skyliner II* is traveling south at 120 mph, do these trains have the same speed?

_____ Do they have the same velocity?

_____ 4. The *Black Giant* heads west for 16 hours traveling at an average speed of 120 mph. The *Speed Demon* leaves the same station and heads west on a parallel track, traveling at 95 mph for 20 hours. After these amounts of time, which train will have covered more distance?

_____ 5. Two trains leave their stations, which are 2860 miles apart, at the same time—8:00 A.M. central time. They both travel at 110 mph toward each other on the same track. At what time (central time) will they meet?

_____ 6. The *Rocky Mountain Cruiser* covers 3105 miles in 27 hours. What is its rate?

_____ 7. You are on a train that is going east at 95 mph. You are walking at 5 mph toward the front of the train. In relation to the passengers seated on the train, how fast are you moving?

_____ 8. In the same situation above, how fast are you moving in relation to the kid standing beside the railroad track, watching the train go by?

_____ 9. The *Appalachian Express* and the *Mississippi Streamer,* starting 2184 miles apart, leave at the same time, heading toward each other. They meet in 12 hours. The *Appalachian Express* has traveled at a rate of 85 mph, and the *Mississippi Streamer* has traveled at a rate of 97 mph. How far has the *Mississippi Streamer* traveled when they meet?

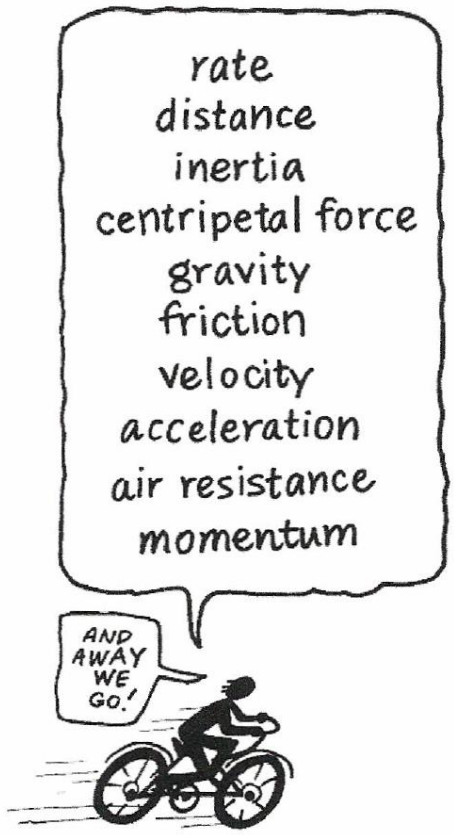
_____ 10. The *Quebec Racer* travels for 6 hours at 105 mph. The *Chicago Skyscraper* travels for 8.5 hours at 92 mph. Which train covers more distance?

_____ How much more?

WHAT'S YOUR MOTION IQ?

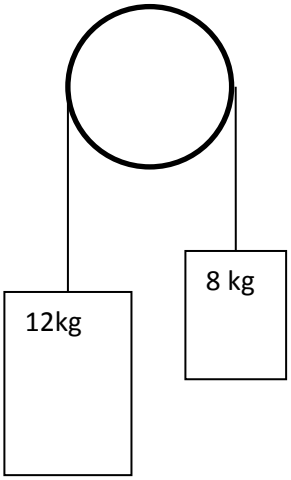
Do you know the difference between velocity and inertia? . . . acceleration and rate? . . . speed and velocity? . . . gravity and centripetal force? . . . momentum and inertia? . . . friction and air resistance? If you have those all straight, you'll be able to tell which is operating in each of these examples. Choose from the list of terms. A term may be used more than once.

1. A car hits a tree and doesn't stop, but keeps going until it's severely damaged. Why? _____
2. When a space capsule returns to Earth after a mission, it glows red-hot as it enters the atmosphere because of _____ .
3. Mark and his friends love the Terminator roller coaster because of its two 360° loops. Nobody falls out when the cars are upside-down because of _____ .



4. Josh and Ramon head toward each other on their rollerblades at the same, breakneck speed. But, because they are going opposite directions, they do not share the same _____ .
5. The blade of an ice skate melts the ice beneath it and reduces _____ .
6. Joleen shoots an arrow at a target many feet away, but the arrow curves toward the ground before it gets to the target, due to the force of _____ .
7. The sleek shape of a bobsled reduces _____ and allows greater speeds.
8. A pool player hits the eight ball which slams into a second ball. The eight ball stops, but the second ball goes forward, because of _____ .
9. Michael waxes his skis so they'll go faster. He's reducing the force of _____ .
10. Scott falls off his skateboard. He comes to a crashing stop against the sidewalk, but his skateboard rolls on because of _____ .
11. Showing off, Megan swings a bucket of water around in circles, upside-down. No water spills out. Why?_____
12. The snowboard sits at the bottom of the hill, unmoving, until Andrea gets on it and pushes it along. _____ kept it from moving.
13. Jim's little sister isn't swinging very high, so he gives her a huge push to get her higher. This shows an increase in _____ .
14. Kate drops her math paper out of her second floor bedroom window to share with her friend, Evan, who is waiting below. It takes a really long time for the paper to get down to him because of _____ .
15. Tom bragged to Tara that he watched a centipede crawl the whole length of his room in the time he did his homework. His room is 16 feet long and his homework took 2.5 hours, so he's saying the centipede traveled at 6.4 feet per hour. What characteristic of motion has he calculated?_____

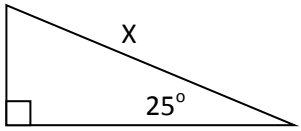
Bonus:



1. *A. What is the magnitude of Acceleration of the blocks?_____*
   B. What is the Tension in the string?_____

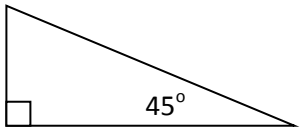
2. *Trig Skills SOH CAH TOA*

a.



2 meters

b. X



6 meters

a. Which trig function would you use?
Sin Cos Tan

Solve for x:

b. Which trig function would you use? Sin Cos Tan

Solve for x:

3.

a. 11_{base2} = _____ base10

b. 15 base 10 = _____ base2

c. 15 base 10 = _____ base16

d. 1111_{base2} = _____ base10