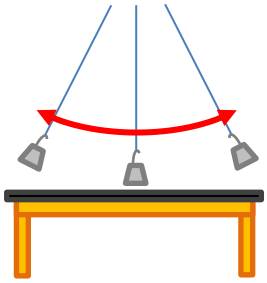
Lab - Pendulum lab

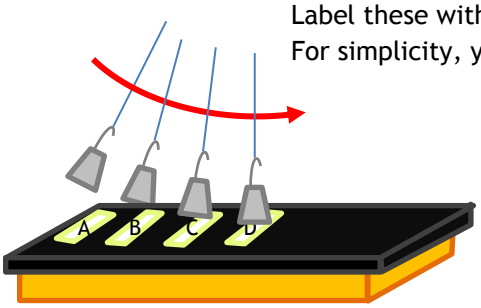
Physics 432

In this lab, you will be using a pendulum to explore conservation of energy. To begin, make sure that you and your partner have a pendulum that is hanging very close to the top of your lab table.



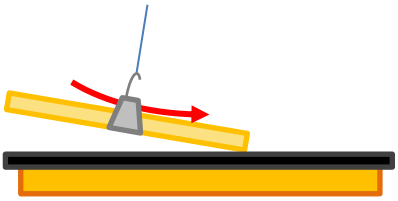
1. Start by observing the pendulum swinging. Mark your answers on the picture at right.
   a. Document where the pendulum will be at the highest and lowest kinetic energy.
   b. Document where the pendulum will be at the highest and lowest potential energy.
   c. Mark one point where the pendulum is losing kinetic energy and gaining potential energy.

2. On your table, place 5 pieces of tape underneath where the pendulum will be swinging (see below left). Label these with letters A-F. For each of these positions, you will be measuring values. For simplicity, you should always release your pendulum above point A.



TO MEASURE VELOCITY

Use V=d/t with the app "Technique", and make sure that the meter stick is in the same direction as the velocity. Do not exceed 0.1 m for your distance measurement. (see right)

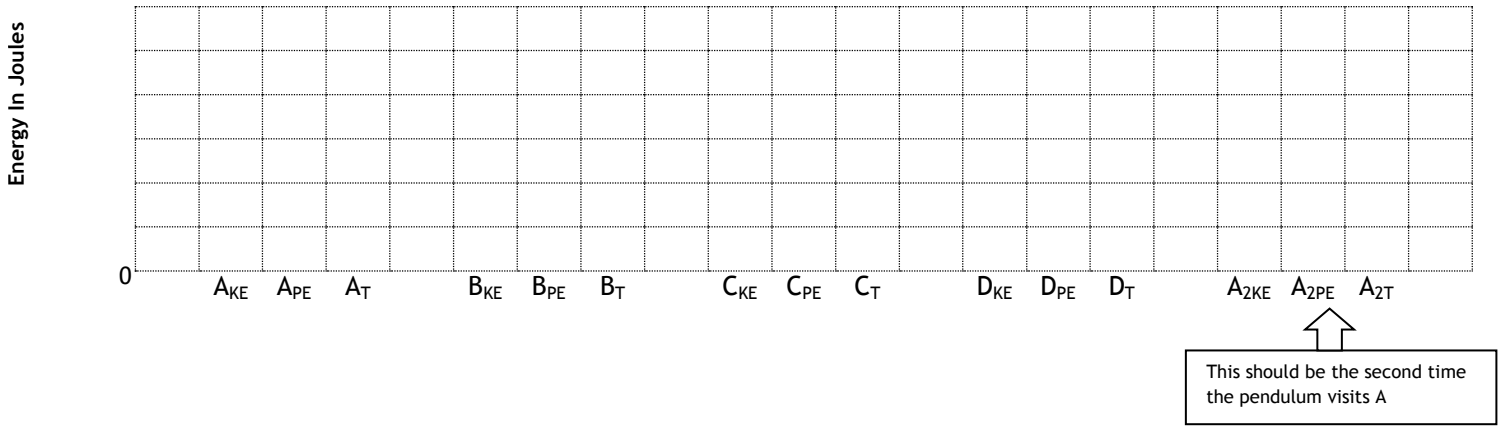


3. Fill in the following table

Location	Height	gravity	mass	velocity	KE	PE_g	$KE+PE_g$
A_1							
B							
C							
D							
A_2							

This should be the second time the pendulum visits A

4. Create a bar graph of each energy type below.



Analysis questions.

1. In your bar graph that you created, how do the total energies (kinetic + potential) compare at points a-d?

2. Calculate the percent difference between the total energy at Point A, and the second visit to Point A.

3. Justify your percent error from question #2. Why is it bigger or smaller than the expected value?

4. If you found the kinetic energy of your pendulum to be 0.1 J, how much potential energy do you expect it to have?

5. If you found that your pendulum is moving at 0.15 m/s, what height do you expect it to be?

6. A boy swings on a rope over a river. If he starts 3 meters above the river, and just misses the water when he swings, how fast is he traveleing at the fastest point?

7. A child is running at 8 m/s when he grabs a playground swing and begins to swing upward. How high do you expect the child to swing to?

8. A common physics demonstration is to have a student place their face at the starting location of a bowling ball pendulum. The ball is released at rest in front of the student's nose, and allowed to swing to and fro. Describe what will happen, and why this is a common demonstration of the conservation of energy.