



2008 MCAS-Alt

**WORK DESCRIPTION for Competency Portfolio in
High School Science and Technology/Engineering
INTRODUCTORY PHYSICS**

[THE ATTACHED STUDENT WORK SAMPLES WERE TAKEN FROM A PORTFOLIO THAT SCORED *NEEDS IMPROVEMENT*]

The attached piece of evidence addresses the following strands and learning standards:

<input type="checkbox"/> Motion and Forces	<input checked="" type="checkbox"/> x	<input type="checkbox"/> 1.1	<input checked="" type="checkbox"/> x	<input type="checkbox"/> 1.2	<input type="checkbox"/> 1.3	<input type="checkbox"/> 1.4	<input type="checkbox"/> 1.5	<input type="checkbox"/> 1.6	<input type="checkbox"/> 1.7	<input type="checkbox"/> 1.8		
<input type="checkbox"/> Conservation of Energy and Momentum	<input type="checkbox"/>	<input type="checkbox"/> 2.1	<input type="checkbox"/>	<input type="checkbox"/> 2.2	<input type="checkbox"/>	<input type="checkbox"/> 2.3	<input type="checkbox"/>	<input type="checkbox"/> 2.4	<input type="checkbox"/>	<input type="checkbox"/> 2.5		
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<input type="checkbox"/> Electromagnetism	<input type="checkbox"/>	<input type="checkbox"/> 5.1	<input type="checkbox"/>	<input type="checkbox"/> 5.2	<input type="checkbox"/>	<input type="checkbox"/> 5.3	<input type="checkbox"/>	<input type="checkbox"/> 5.4	<input type="checkbox"/>	<input type="checkbox"/> 5.5	<input type="checkbox"/>	<input type="checkbox"/> 5.6
<input type="checkbox"/> Electromagnetic Radiation	<input type="checkbox"/>	<input type="checkbox"/> 6.1	<input type="checkbox"/>	<input type="checkbox"/> 6.2								

Assignment:

The student participated in a whole-class lab, collected data, performed calculations, and responded to questions.

Laundry Brook Lab: Questions



Answer the following questions using complete sentences.

1. In this lab, you calculated average speed? Is average speed a vector?

No it is not a vector.

2. Velocity is a vector quantity. What information, in addition to the speed, would you need to include to give velocity?

We need to know the direction to
know the velocity.

3. List and describe three possible sources of error. (Be specific: DO NOT just say "Human Error;" you need to explain what the human error was.)

Error Source 1 & Description:

if someone messed up by starting the stopwatch late. That time would not be the same as the others.

Error Source 2 & Description:

if the measurers didn't pull the measuring tape tight and straight ~~the~~ the measurement would be wrong.

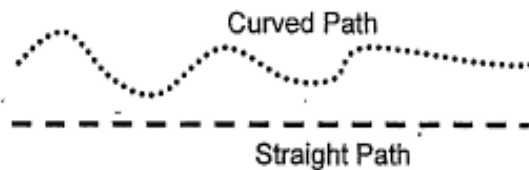
Error Source 3 & Description:

The cheetos kept getting stuck in the rocks and tree branches.



4. How does the path of the object affect the speed? To answer this question, use the situation below:

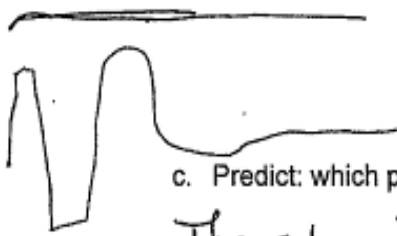
Imagine you do two trials. In the first trial, the object follows a very curved path. In the second trial, the object follows a straight line.



- a. For which path does the object travel a greater distance?

The curved path is the greater distance ✓

- b. Predict: which path will take a longer time?



The curved path will take longer. ✓

- c. Predict: which path would end up with a higher average speed?

The object traveling the ^{straight} ~~curved~~ path will have a higher average speed. ✓
It will go faster down the straight path.

5. If we were to do this lab again, what suggestions do you have to make this lab better?

I liked the lab the way it was.

Class:

- We could remove rocks and debris
- We could use a different object like a boat to float down the water.
- Give the starter a device to be able to yell louder for the timers to hear. ✓



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<input type="checkbox"/>	Conservation of Energy and Momentum	<input checked="" type="checkbox"/>	2.1	<input checked="" type="checkbox"/>	2.2	<input type="checkbox"/>	2.3	<input type="checkbox"/>	2.4	<input type="checkbox"/>	2.5						
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Assignment:

Student completed a review worksheet entitled, "Energy Practice" in class.

Accuracy: 100%

Independent: 90%

Name: Student

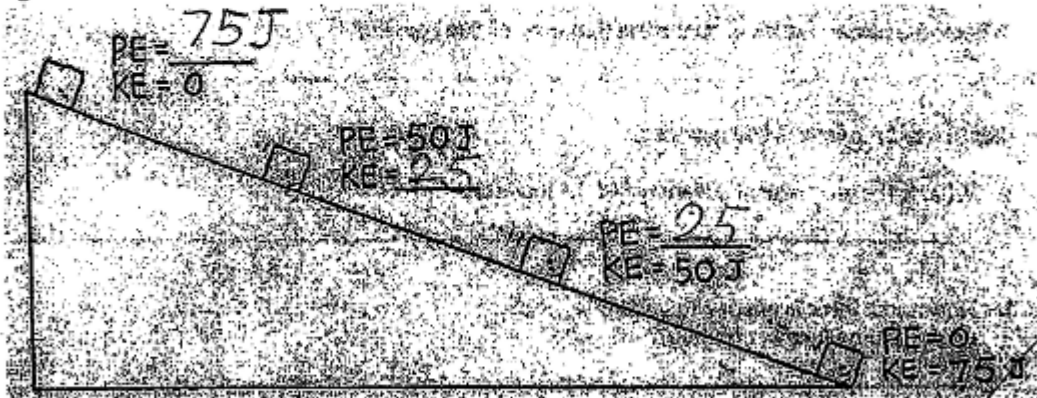
Section:

Date: 12/14/2006

Energy Practice

8/8

1. The KE and PE of a block freely sliding down a ramp are shown in one place below. Fill in the missing values.

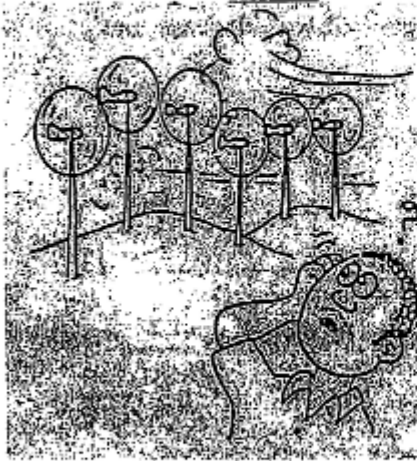


2. Why don't balls bounce as high during the second bounce as they do in the first?



The ball has less energy
so it can't bounce
as high
before the ball drops it is
all PE as it falls it's KE increased and
it's PE decreases. The total amount of
energy is constant where the ball hits
some energy is transferred to the ground
as sound and heat

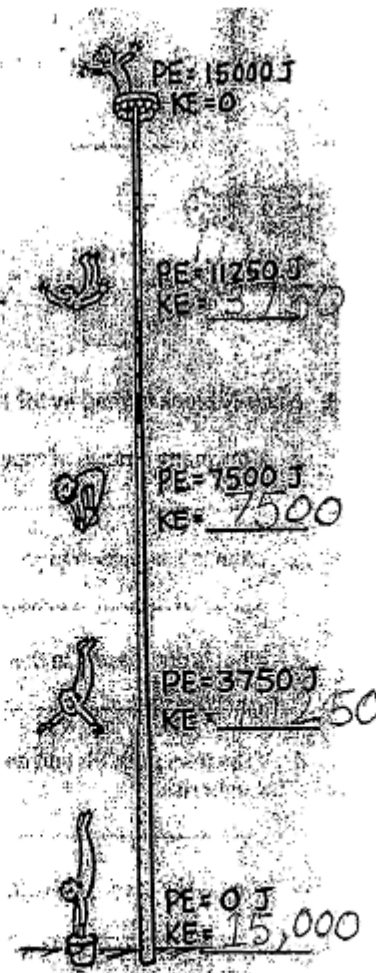
3. Rows of wind-powered generators are used in various windy locations to generate electric power. Does the power generated affect the speed of the wind? Would locations behind the 'windmills' be windier if they weren't there? Discuss this in terms of energy conservation with your classmates.



The wind gives some energy
to the generators so the
wind isn't as strong



4. Fill in the missing KE and PE in the picture of a man jumping from a tall pole.





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Assignment:

The student completed a lab assignment entitled "Sound Waves and Beats."

Accuracy: 100%

Independence: 80%

Measuring Simple Waveforms

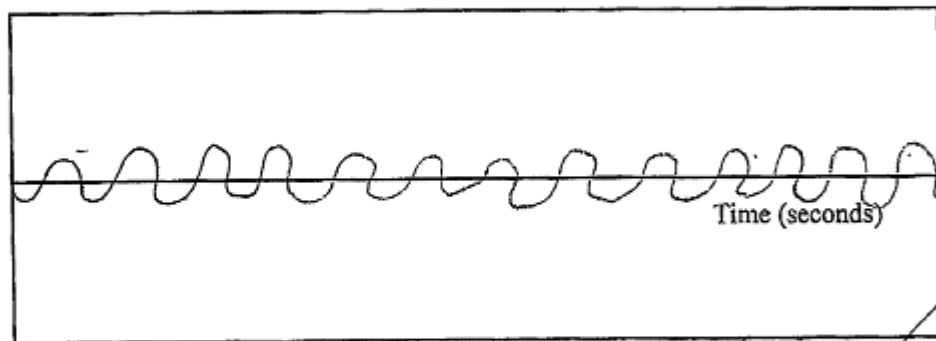
Part A: Data Collection

1. Produce a sound with a tuning fork, hold it close to the Microphone and click . The data should be sinusoidal in form, similar to the sample on the previous page. If you are using a tuning fork, strike it against a soft object such as a rubber mallet or the rubber sole of a shoe. Striking it against a hard object can damage it. If you strike the fork too hard or too softly, the waveform may be too rough; try again.
2. Note the appearance of the graph. Count and record the number of complete cycles shown after the first peak in your data.
3. Click the Examine button, . Drag the mouse between the first and last peaks of the waveform. Read the time interval Δt (shown on the graph as Δx),
4. In a similar manner, determine height of the waveform. Drag the mouse across the graph from top to bottom for an adjacent peak and trough. Read the difference in y values, shown on the graph as Δy .
5. Make a sketch of your graph or print the graph.

Data Table:

Tuning fork or note	Number of cycles	Δt (s)	Δy (V)
255 Hz	12 CYCLES	0.47	0.154

Sound
(A measure
Of pressure)



Experiment 21

Part B: Calculations

1. You have total number of cycles and the total amount of time. How can you find the amount of time for one cycle?

$$\frac{.047}{12} = \frac{T}{1} \quad 4$$

2. Calculate the amount of time for one cycle, or the period of the wave. Show your work.

$$0.00392 \text{ Seconds}$$

3. Given the period of the wave, how can you calculate the frequency?

$$f = \frac{1}{T}$$

4. Calculate the frequency of the tuning fork in Hz. Show your work.

$$f = \frac{1}{0.00392} = 255.1 \text{ Hz}$$

5. You measured the height of the wave from one crest to one trough. How can you find the amplitude of the wave?

$$\frac{AY}{2} = \text{Amplitude}$$

6. Calculate the amplitude of the wave. Show your work.

$$\frac{.154}{2} = .077$$



Relationships between sounds qualities and wave quantities

Now that you know how to measure amplitude, frequency, and period of a wave, you are going to investigate the relationship between various qualities of sounds and wave quantities.

Question #1: Which characteristic(s) of a wave (amplitude, frequency and/or period) are related to the pitch of a sound?

Question #2: Which characteristic(s) of a wave (amplitude, frequency and/or period) are related to the volume of a sound?

Part A: Develop a Procedure to answer the two questions:

Question #2
I made a loud noise and a quiet noise. The computer showed the noises to me. I hit a tuning fork to make the two noises. I counted the number of waves for the two sounds. We measured the amplitude of the two waves.
Question #1
I hit two different tuning forks, one with a high pitched sound and one with a low pitched sound. The computer showed the sounds to me. I counted the number of waves and we measured the amplitude.

Experiment 21

Part B: Data I Collected:

Question #2

I counted 12 waves
for both sounds in .05 seconds.
The loud sound had a bigger
amplitude.

Question #1

high pitch = 12 waves

low pitch = 6 waves

Same amplitude.

Part C: Relationships I Found

I found that the loud sound
had a bigger amplitude.

The amplitude of a wave measures
the volume of a sound.

I found that the high
pitch sound is more frequent.