# PPP
# Physics Phun Pfor Parents
# Take home Labs

by
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# Activities can be done for homework or extra credit

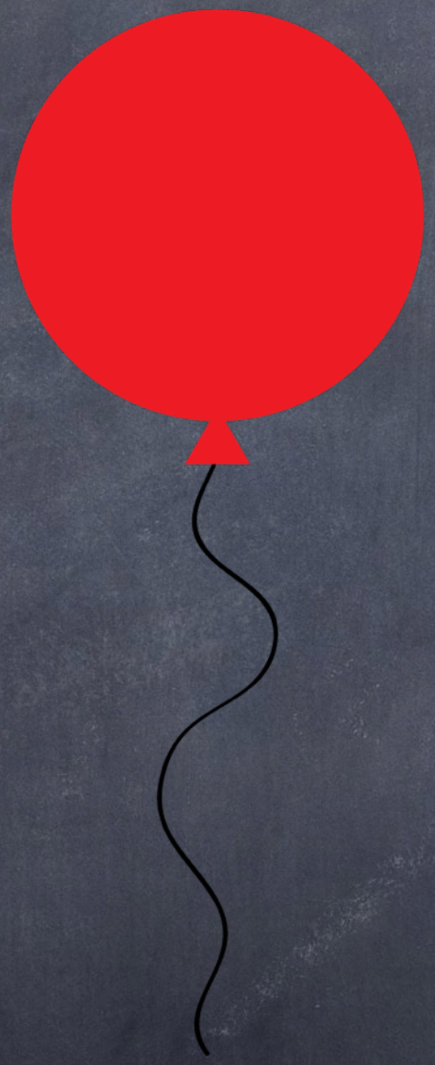
- Road trip - Newton's 1st + 2nd law
- Reaction time - Dollar bill trick
- Mirror Images - Spoon images or Steam the mirror
- 20/20 Vison - Eye Chart in Mirror

# Road Trip

## Newton's 1st + 2nd laws

- Obtain a Helium balloon
- Go on a ride in the car with Parents
- Make observations of balloon when car accelerates, decelerates, travels at a constant velocity and goes around a curve
- Parents write observations

# The balloon is key



# Reaction time

- Demo Dollar bill trick
- Can you catch it 2 out of 3 tries
- Replace dollar bill with ruler
- Student tests family members
- Student calculates reaction times

# The Chicago Tribune printed this award winning picture in November of 1994

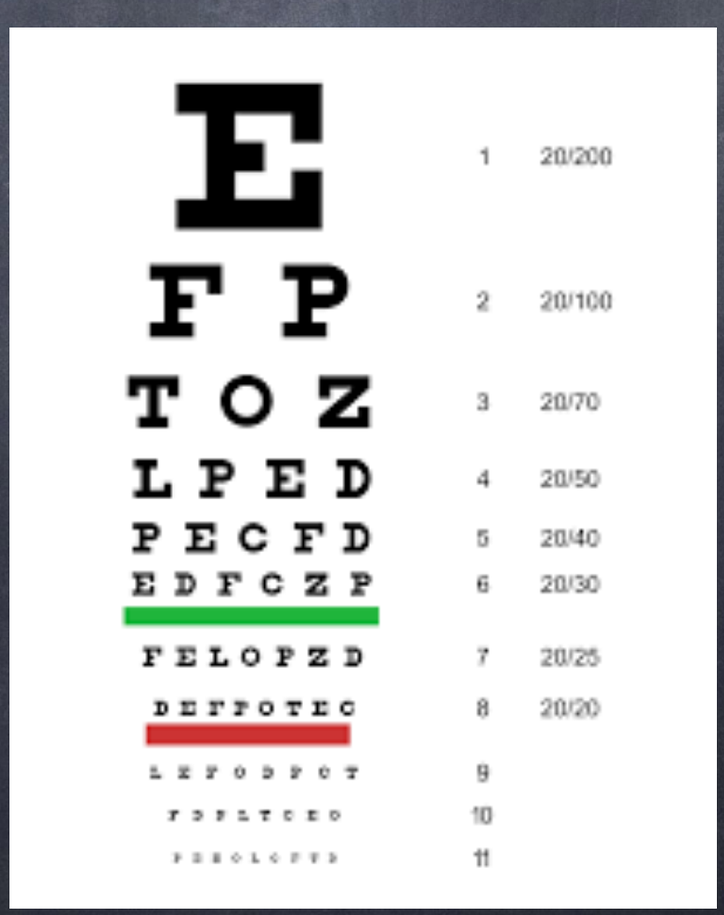
- Editors did not notice it was upside-down

# Mirror Images

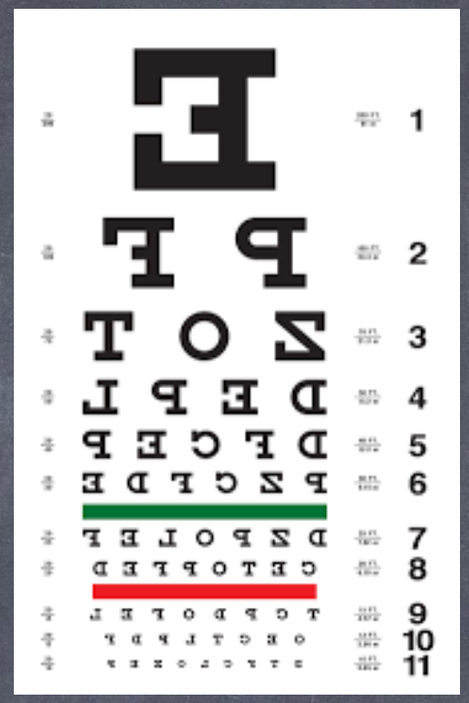
- find a shiny tablespoon
- Compare images on each side
- Steam the mirror, carefully wipe off smallest amount until entire face is visible.
- measure mirror size and face size

# 20 / 20 Vision

- Students take home two eye charts
- Parents move further away from chart until they cannot read the fourth row
- measure distace - chart and parent



# 20 / 20 Vision



- Parent holds backward chart on chest and walks away from mirror until they cannot read the fourth line.
- Measure distance - chart to mirror
- Compare ratio of distances - explain

# Physics Phun Phor Parents

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# Physics Phun phor Parents

Objective: ***Describe the movements of a Helium balloon while driving in a car, in terms of Newton's first and second laws of motion.***

Acceleration (forward):_____

_____

_____

_____

_____

Constant velocity: _____

_____

_____

_____

Decelerating: _____

_____

_____

_____

Going around a curve: _____

_____

_____

_____

Where any of your observations surprising?

Comments:

Signed _____

parent of _____

Date of the experiment _____

# Reaction Time Lab 8

Speed is a general concept that most people have a firm grasp of. Acceleration however is one of the more misunderstood elements in kinematics. Sure we know what it looks like, even what it sounds like. But can you define it to someone else? Today we will seek to explore the intricacies of one of the more crucial accelerations, that of gravity. Misunderstood for its raw magnitude, gravity has a profound effect on speed when objects are in free-fall. Today, we will seek to use a meter stick to test how quickly you and your classmates can react compared to gravity.

**Learning Targets:**

- **Students will experiment with the acceleration due to gravity to understand the magnitude at which it affects objects in free-fall.**

## Procedure

### A. The Meter Stick Test

1. Using a meter stick have you r lab partner test your reaction time first. Place your forearm flat on the table with your hand extended. Your lab partner will then suspend the meter stick between your thumb and forefinger.
2. Note the initial starting position on the meter stick. Once your partner randomly releases the meter stick, pinch your fingers. Note the final position. Subtract the two values and record in Table 9-1 as the vertical height fallen, y. Take three trials worth of data and then average them.
3. Repeat the above step for your lab partner and then test 5 other classmates. Record all data in Table 9-1.

**Table 9-1**

| Name | Trial 1, $y_1$ (m) | Trial 2, $y_2$ (m) | Trial 3, $y_3$ (m) | Average y (m) |
|---|---|---|---|---|
| Self | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| t (sec) |
|---|
| |
| |
| |
| |
| |
| |

4. Using Galileo's 2nd Equation, $y = v_o t + \frac{1}{2}gt^2$, where $v_o$ is 0 m/s and g is the acceleration due to gravity 9.8 m/s$^2$, solve for the reaction time, t, for each person.

## Interpretation Questions

1. Using a dollar bill, measure the distance from the center of George Washington's face to the end in meters. Using that as your vertical height, y, solve for the time necessary to catch the dollar.

   Can you catch the dollar? Did you?

   _____

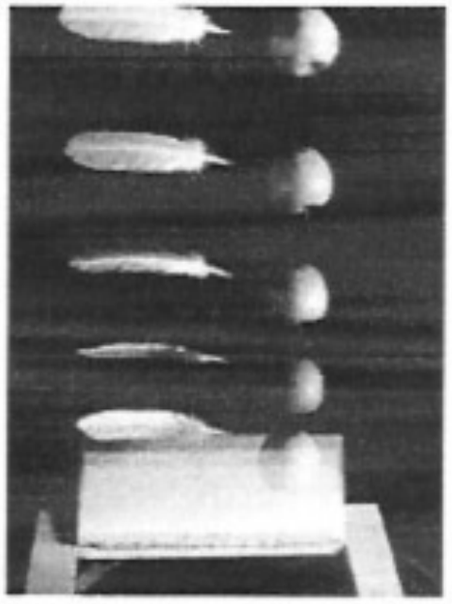
2. Here is picture that was posted by an editor in the Chicago Tribune on Nov. 6th, 1994. Is something wrong?

   _____

   _____

   _____

   _____



# PPP

# Physics Phun for Parents

These projects are for extra credit. Parents / guardians are to write up the answers and observations in their own words and diagrams.
The point value will depend on the quality of the Physics students explanation and guidance to their parental units.

Project one..... *Images in soup spoons*

Notice the images produced by a shiny silver spoon.
Describe the type of image and the characteristics of the images created by both sides of the spoon.

Project Two..... *Mirror mirror on the Wall.....*

**Find the amount (size) of a plane mirror needed to see your face.**

**Explain why the distance away from the mirror doesn't matter.**

**Method 1** **Mark the top of bottom of the image seen, by placing tape on the surface of the mirror. (Understand the image is not on the mirror surface).**

**or Method 2** **Steam up the bathroom mirror, and wipe away just enough to see your entire face.**

***Parents Please*** **include any comments / questions and your signature.**

**Student's Name** _____

**Parent/ Guardian** _____

**Comments:**


OPTOMETRIST WORD PROCESSORS

# Physics Phun Phor Parents

I. Parents, have your son/daughter hold Eye Chart 1 for you.
Gradually move further away until you just cannot read the FOURTH line.
Have your son/daughter measure the distance between you and the eye chart.

**Distance between parent and eye chart:** _____ (meters or feet) (circle one)

II. Parents, now holding Eye Chart 2 (Backward lettering) to your chest, (chart facing away) stand as close as possible to a plane (flat) mirror (a bathroom mirror, hall mirror, etc.).
Looking in the mirror, move away from the mirror until you just cannot read the FOURTH line.
Have your son/daughter measure the distance between you and the mirror:

**Distance between parent and mirror:** _____ (  )

III. Divide the distance in Part I by the distance in Part II:

$$\frac{\textit{distance Part I}}{\textit{distance Part II}} = \_\_\_\_\_$$

IV. Students, explain why the above ratio should be equal to 2.

_____

_____

_____

_____

_____

Parent Signature: _____ Date: _____

Student Name: _____

# Newton's 4th Law