



Conceptual Physics Labs – Chapter 3

Name _____

Where appropriate – ALWAYS show your formulas and your work!
Use the back of your paper if you need to.

Mass vs. Weight

On the moon's surface, the force of gravity is about 0.37 pounds per kilogram. If an object with a mass of 2.0 kilograms were carried to the moon, it would weigh 0.74 pounds.

$$2.0 \text{ kg} \times \frac{0.37 \text{ pounds}}{\text{kg}} = 0.74 \text{ pounds}$$

So – what is the weight, in pounds, of a 7.0 kilogram bowling ball on the surface of the moon?

What is the mass of a 7.0 kilogram bowling ball on the surface of the moon?

Think About It:

If you were to take a bathroom scale into an elevator and stand on it, what would happen to the reading on the scale as the elevator began to move upward?

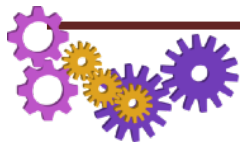
How about if it starts to move downward?

Newton's First Law of Motion: Inertia Examples

You will have several inertia demos set up in the classroom today. Try each of them.

- ☐ Hoop and nickels
- ☐ Inertia tower
- ☐ Egg drop
- ☐ Coin into cup
- ☐ Tablecloth trick

Write Newton's First Law of Motion here:



Acceleration

What is the acceleration of a 2000-kg truck if a force of 4200N is used to make it start moving forward?

How much force is needed to accelerate a 68-kg skier at 1.2 m/s^2 ?

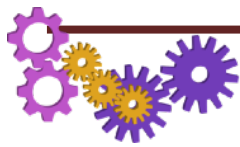
What is the mass of an object that requires a force of 30N to accelerate at 5 m/s^2 ?

State Newton's Second Law of Motion – okay to give the formula ☺

Gravity

Of all the planets in our solar system, Jupiter has the greatest gravitational strength. If a 0.500-kg pair of running shoes would weigh 11.55 newtons on Jupiter, what is the strength of gravity there?

An astronaut weighs 104 newtons on the moon, where the strength of gravity is 1.6 newtons per kilogram. What is her mass?



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Free Fall

Stand on the step ladder and drop the following objects in pairs. Record which hits the ground first

Pair	Ground first
Parachute army man Vs Non-parachute army man	
Flat piece of paper Vs Balled up piece of paper	
Parachute army man Vs Flat piece of paper	
Non-parachute army man Vs Balled up piece of paper	

Explain what happened – use your science terms.

How fast did the non-parachute army man accelerate?

Had you stood on top of a ten-story building and dropped your parachute army man – would his speed have continued to accelerate? Why or why not?

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Discovery...

Use a post-it note and put your name on your textbook. Now put them all in a stack on one table. You'll need all the textbooks in the classroom. Put one book in one stack and all the rest in another. Set up the tape measure along the side of the table. Now, using a stopwatch do three time trials for each situation. Measure how far you can move each 'stack' in one second. (Have someone at the end so that all the books don't hit the floor.)

Trial #	One book	Stack of books
1		
2		
3		

Average distance to move one book across the table _____

Average distance to move the stack _____

Why? Come up with three reasons.

- 1.
- 2.
- 3.