Weight Watchers

Problem: How is weight different than mass?

Materials: an object, a balance, a spring scale

Procedure:

1. Measure and the mass of the object in *grams*. Convert the object's mass to units of *kilograms*. Record the mass of the object in kilograms in the data table.
2. Use the equation to calculate the weight of the object on Earth. Record the calculated weight in *Newtons.*
3. Check to see if your calculated weight is accurate by measuring the weight using the spring scale. Record the measured weight in *Newtons*.

Data:

Mass of Object (kg)	Calculated Weight of Object on Earth **WEIGHT = MASS x 9.8** **in Newtons in kg**	Measured Weight of Object on Earth (Newtons)

Conclusion:

1. Was the calculated weight the same as the measured weight? If there is a difference, explain why.

2. Jupiter's gravitational force is about 2.4 times stronger than the Earth's, which would make everything weigh 2.4 times heavier.
   a. What would the object you measured weigh on Jupiter? Show your work.

   b. Why do you think Jupiter has a larger gravitational force than Earth?

c. Jupiter has 16 moons that orbit it. Why do you think Jupiter has so many moons, while Earth only has one?

3. The moon's gravitational force is only 1/6 of the Earth's gravitational force.
   a. What would the object you measured weigh on the Moon? Show your work.

   b. Why does the moon have less gravity than the Earth?

   c. If you traveled to the moon, would your mass change?

   d. Do you think objects would fall faster or slower on the moon? Explain.

4. Explain why you agree or disagree with the following statement.

   Weight depends on where you are, but mass does not.