

EDUCATIONAL ASSIGNMENT for JOSEPH JOHN WUNDERLICH for 11th grade

This assignment covers the following Educational Objectives (Subjects marked with a "■" are the main subject, and those marked with an "□" are secondary subjects):

■ PHYSICS

Using only your Physics Textbook as a reference, answer the following problems. Write in Pencil

1. Define each of the following:

a. **SPEED:** the rate that an object travels $Speed = \frac{distance}{time}$

b. **VELOCITY:** the quickness of motion by vector and direction

c. **ACCELERATION:** the rate that the speed of an object changes over time.

2. Define **ISAAC NEWTON'S THREE LAWS OF MOTION:**

a. **LAW 1:** The law of Inertia

Objects have a tendency to remain in motion until an outside force acts upon it, like hitting a speedbump in a car and slowing down.

b. **LAW 2:** Force = Mass times Acceleration

The more mass an object has, the more force is required to move the object.

c. **LAW 3:** For every action there is an equal and opposite reaction

For example: When you jump off the ground, you have to push off the ground more than the gravity of earth is pulling down on you.

3. Find the **UNIVERSAL LAW OF GRAVITATION** on page 124 and calculate the approximate Gravitational force of the moon that pulls on the earth. You may use the computer to find the **Mass** of the Earth and Moon, and the **distance** between them.

$$m = \text{Earth's Mass} = 5.974 \times 10^{24} = 5.974 \cdot 10^{24} = 5.974$$

$$m' = \text{Moon's Mass} = 7.348 \times 10^{22}$$

$$\text{Distance from earth to moon} = 384,400 \text{ km}$$

$$F \sim \frac{m \cdot m'}{d^2} = \frac{5.974 \cdot 10^{24} * 7.348 \cdot 10^{22}}{(384,400 \text{ km})^2} = \frac{4.3896952 \cdot 10^{47}}{1.4776336 \cdot 10^{11}} =$$

All using TI-84) →

$$\frac{4.4 \cdot 10^{47}}{1.5 \cdot 10^{11}} = \boxed{2.9 \times 10^{36}}$$

4. Reflecting on the **UNIVERSAL LAW OF GRAVITATION** on page 124, and then looking at Fig. 7.6 and Fig. 7.7 on page 126, explain **EARTH SATELLITES**.

A satellite is an object that is within range of a planet or star enough to be influenced by its gravity. An asteroid or manmade satellite counts. The moon is considered a satellite of Earth.

5. Reflecting on the **UNIVERSAL LAW OF GRAVITATION**, and referencing your answers to question #4 about **SATELLITES**, hypothesize **WHY THE MOON DOES NOT CRASH INTO THE EARTH**.

The moon does not crash into earth because it is in an orbit. The moon is also slowly moving away from the earth inch by inch every decade. The gravitational force of the moon is also sideways moving from the moon's birth.