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Crash Course Physics #8: Newtonian Gravity

Name: _____ Date: _____

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- Newton's law of _____ explains how gravity affects objects like apples, moons, and planets.
- Newton realized that the _____ between two objects affects the strength of the gravitational force.
- The gravitational force between objects is proportional to the product of their _____.
- The gravitational force becomes weaker as the _____ between objects increases.
- Newton added a small number, known as the gravitational _____, to his equation to account for very weak forces.
- The variable used to represent the gravitational constant is _____.
- The complete equation for Newton's law of universal gravitation is _____.
- The acceleration of gravity near Earth's surface is known as little *g*.
- The acceleration due to gravity at a planet's surface depends on the planet's _____ and _____.
- Kepler's first law says that planets orbit the Sun in _____, not circles.
- Kepler's second law states that a line from a planet to the Sun sweeps out equal _____ in equal time.
- Kepler's third law involves cubing a planet's _____ and dividing by the square of its period.
- Newton's second law says that net force equals _____ times _____.
- The Moon stays in orbit because it moves sideways fast enough to keep _____ Earth.
- On Mars, the gravitational acceleration is about _____ meters per second squared.

Crash Course Physics #8: Newtonian Gravity KEY

- Newton's law of **universal gravitation** explains how gravity affects objects like apples, moons, and planets.
- Newton realized that the **distance** between two objects affects the strength of the gravitational force.
- The gravitational force between objects is proportional to the product of their **masses**.
- The gravitational force becomes weaker as the **distance** between objects increases.
- Newton added a small number, known as the gravitational **constant**, to his equation to account for very weak forces.
- The variable used to represent the gravitational constant is **G**.
- The complete equation for Newton's law of universal gravitation is **$F = G\frac{Mm}{r^2}$** .
- The acceleration of gravity near Earth's surface is known as little **g**.
- The acceleration due to gravity at a planet's surface depends on the planet's **mass** and radius.
- Kepler's first law says that planets orbit the Sun in **ellipses**, not circles.
- Kepler's second law states that a line from a planet to the Sun sweeps out equal **areas** in equal time.
- Kepler's third law involves cubing a planet's **semimajor axis** and dividing by the square of its period.
- Newton's second law says that net force equals **mass** times **acceleration**.
- The Moon stays in orbit because it moves sideways fast enough to keep **missing** Earth.
- On Mars, the gravitational acceleration is about **3.7** meters per second squared.

15 Questions

Answer Key Included

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