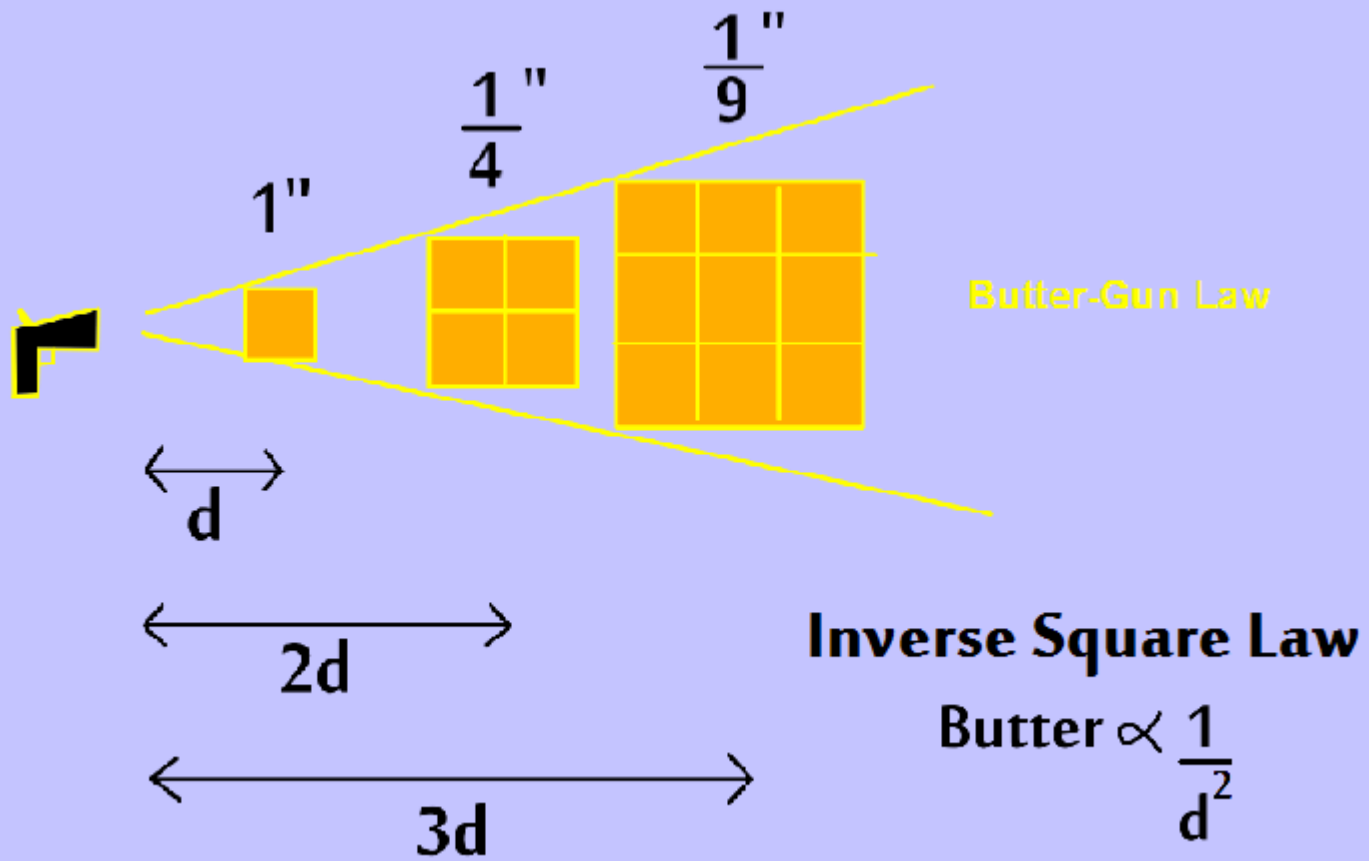
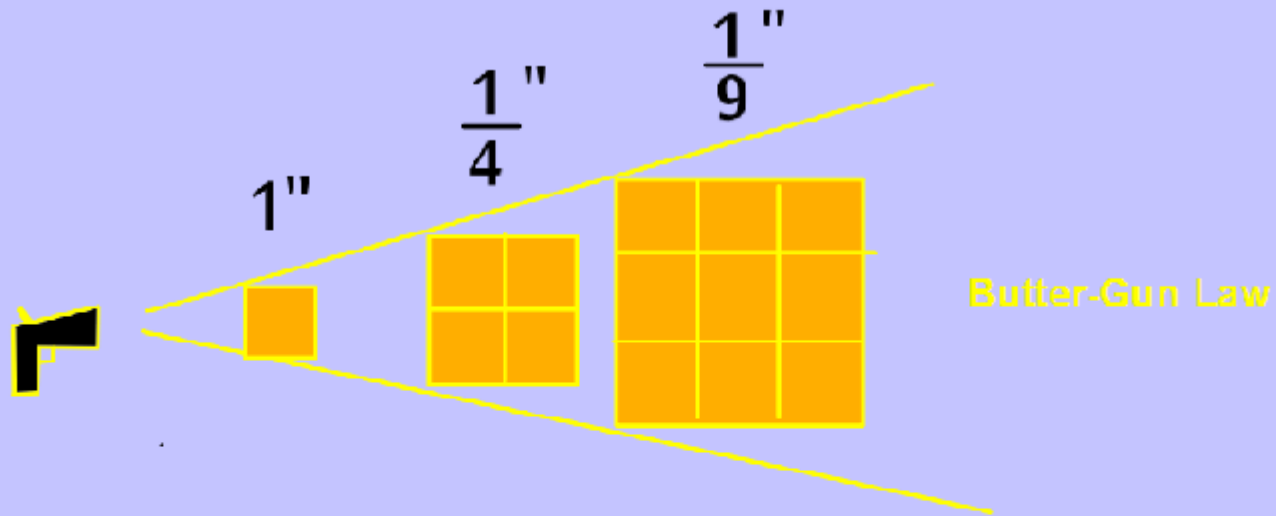


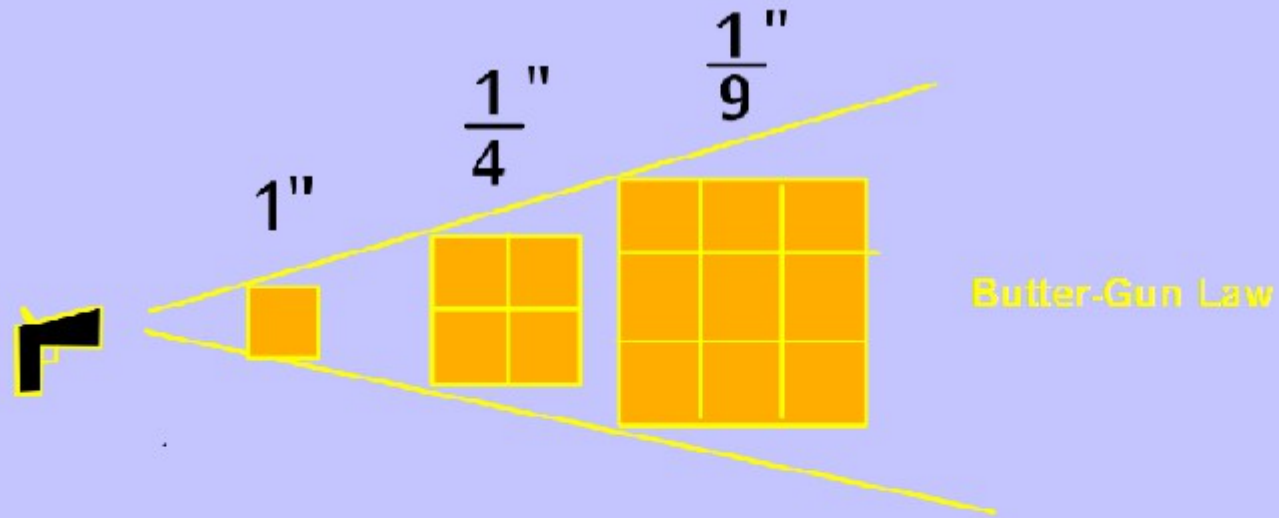
Gravitation

THE Butter Gun

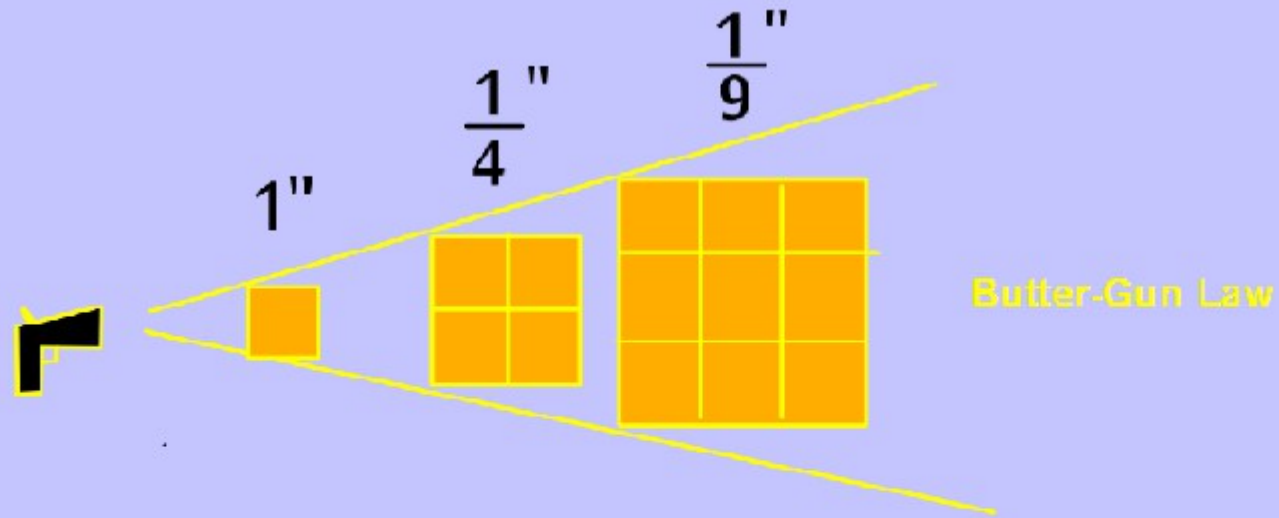




$$\frac{1}{d^2} = \frac{1}{1^2} = \frac{1}{1} = 1''$$



$$\frac{1}{d^2} = \frac{1}{2^2} = \frac{1}{4}$$



$$\frac{1}{d^2} = \frac{1}{3^2} = \frac{1}{9}$$

PROBLEMS

- Two types:
- Calculation
 - Inverse Square Problems

EXAMPLE PROBLEM

$$F = \frac{G m_1 m_2}{d^2}$$

What is the gravitational attraction between a 4 kg baby and the planet Mars?

$$\text{Mass of Mars} = 6.4191 \times 10^{23} \text{ kg}$$

$$\text{Closest Distance from Earth to Mars} = 5.6 \times 10^{10} \text{ m}$$

$$F_g = \frac{(6.67 \times 10^{-11}) (4) (6.4191 \times 10^{23})}{(5.6 \times 10^{10})^2}$$

$$F_g = 5.46 \times 10^{-8} \text{ N}$$

EXAMPLE PROBLEM

$$F = \frac{G m_1 m_2}{d^2}$$

If you double the distance between two objects, and double the mass of one of the objects, what happens to the force of gravity between them?

BEFORE

$$\frac{(1)(1)}{(1)^2} = 1$$

AFTER

$$\frac{(2)(1)}{(2)^2} = \frac{2}{4} = \frac{1}{2}$$

