Pop Rockets

Orbital ATK

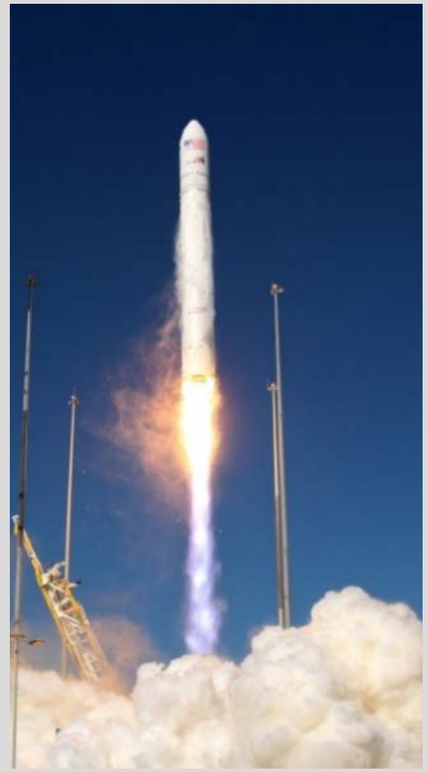
What to Do

1. Fill a canister ½ with water.
2. Put in ½ of an alka-seltzer tablet.
3. Put the cap on.
4. Place on ground (cap side down).
5. Stand back.
6. Watch your rocket soar!!!

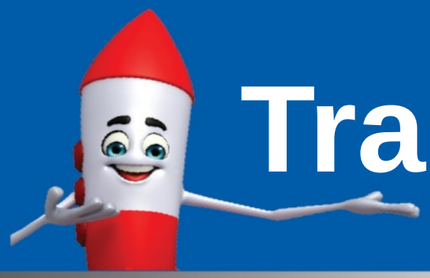
The Rocket Science

- In order for a rocket to liftoff, the thrust (force) has to be more than the rocket weight.
- How much force is required to lift a rocket that weighs 50,000 pounds?

FUN FACTS



Newton's Third Law of Motion – "Every action has an equal and opposite reaction". The gas rushing out of one end of the canister (the action) causes your rocket to move in the opposite direction (the reaction). This is exactly how all rockets work whether you use an effervescing tablet as your fuel or a chemical propellant.



Transformer Rail Gun

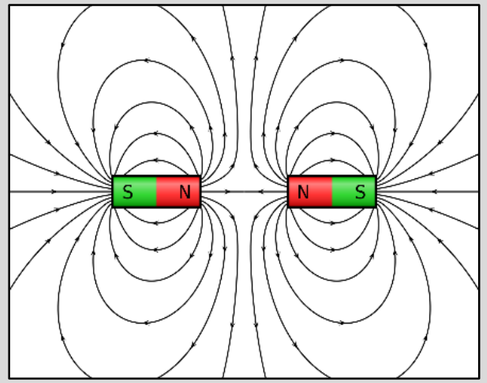
Orbital ATK

What to Do

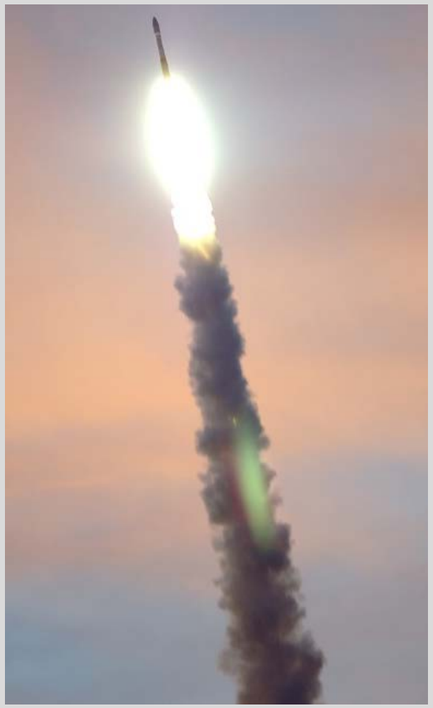
1. Put a ball on the rail.
2. Push it towards the first magnet.
3. Watch each magnet accelerate the next ball.
4. What happens if you add more magnets?

The Rocket Science

- Each series of magnets and balls is transferring potential energy (mB) to kinetic energy (½ mv^2).
- The magnetic field is the potential energy; the ball mass and speed is the kinetic energy.
- On a rocket the fuel is the potential energy; the rocket mass and speed is the kinetic energy.



Magnetic Field



FUN FACTS

The Antares rocket consumes 530,000 pounds of liquid propellant in 215 seconds to get to a speed of 9,500 miles per hour at an altitude of 335,000 feet.