

Newton's Attic Field Trip

Engineering Process

1. There are 6 steps in the engineering process. How many can you name?

1. need.
2. specification.
3. feasibility.
4. creative design synthesis.
5. fabrication.
6. testing and use.

G Force

1. Acceleration is a change in speed.
2. A simple machine is used to amplify force and pull the cart back.
3. Two types of energy are potential and kinetic.

The Ballista

1. Great force is required to pull back the bow strap.
2. The coiled ropes store potential energy.
3. When the pumpkin or melon is flying through the air, it has kinetic energy.
4. The projectile follows a parabolic pathway.

Rockets

1. Pressure is defined as force over area.
2. When the rocket blasts from the end of the barrel, what kind of energy does it have?
kinetic.
3. What type of energy is this converted into? potential.

SPINtron

1. Why was the multi-axis trainer invented in the first place?
It was invented by NASA to train astronauts to recover from a tumble in a spacecraft.
2. What is center of gravity? The point of an object at which the weight is evenly dispersed and all sides are in balance. Or, the point at which the entire weight of a body may be considered as concentrated so that if supported at this point, the body would remain in equilibrium in any position.
3. What is a degree of freedom, and how many does SPINtron have?
The degree of freedom is a direction in which independent motion can occur. SPINtron has 3 degrees of freedom.

Science at Newton's Attic

Things you will learn about today:

1. Simple Machines
2. Stored Energy
3. Mechanical Advantage

Three different simple machines used today at Newton's Attic:

1. Lever found on G-Force
2. Windlass found on G-Force
3. Wheel and Axle found on Ballista

Three examples of stored energy:

1. Elastic Potential found on G-Force
2. Compressed Gas found on Rocket Launcher
3. Spring (Tension) found on Ballista

Three ways we used simple machines to get mechanical advantage:

1. Windlass used to pull back cart on G-Force
2. Lever used to crank winch on Ballista
3. Lever used to trigger on G-Force