



TeachEngineering

STEM Curriculum for K-12

Exploring Energy: Kinetic and Potential



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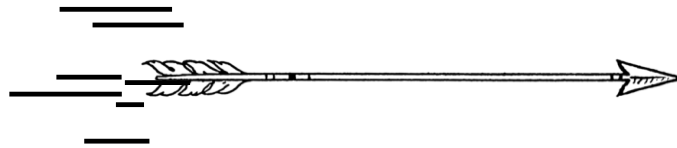
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What did we learn last time ?

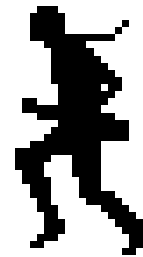
- energy
- kinetic energy
- potential energy
- energy transfer

Kinetic Energy

- Kinetic energy is **motion energy**



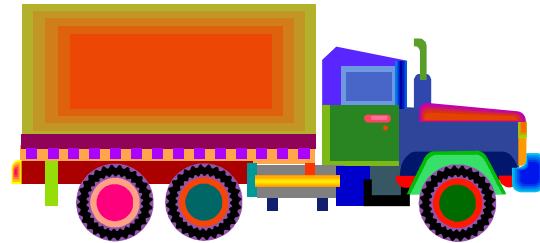
- What does the kinetic energy of an object depend on?



Which one has more kinetic energy?



The blue car weighs 1 ton and is traveling 50 mph



The truck weighs 2 tons and is traveling 50 mph

Which one has more kinetic energy?



The blue car weighs 1 ton and is traveling 50 mph



The racing car weighs 1 ton and is traveling 100 mph

Kinetic Energy

$$KE = \frac{1}{2} mv^2$$

Kinetic energy changes with the mass of an object

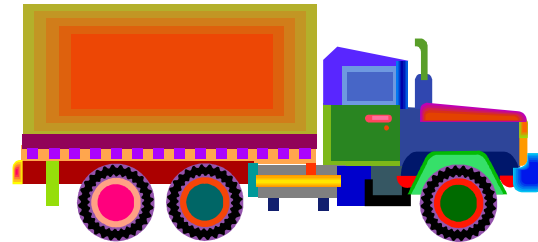
Kinetic energy changes with the speed of an object squared

$$KE = \frac{1}{2} mv^2$$

How much more kinetic energy does the truck have compared to the car?



The blue car weighs 1 ton and is traveling 50 mph



The truck weighs 2 tons and is traveling 50 mph

The truck has 2 times kinetic energy as the blue car.

$$KE = \frac{1}{2} mv^2$$

How much more kinetic energy does the racing car have compared to the blue car?



The blue car weighs 1 ton and is traveling 50 mph



The racing car weighs 1 ton and is traveling 100 mph

The racing car has 4 times kinetic energy as the blue car.

Potential Energy



- Potential energy is **stored energy**
- **What ways can potential energy be stored?**

Gravitational Energy

Gravitational energy is potential energy stored in an object's height.



Where is the potential energy stored?
What is this called?



What are other examples of gravitational energy?

Where is the potential energy stored?

What is this called?



What are other examples of elastic energy?

Elastic Energy

Elastic energy is potential energy stored in the stretching or compression of an object.

Thermal Energy

Thermal energy is stored in an object's temperature.



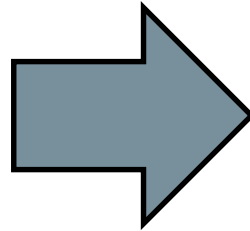
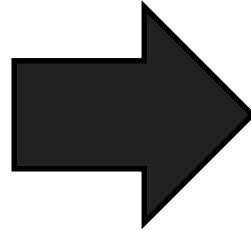
Where is the potential energy stored?

What is this called?

At a large scale it looks like potential energy, but on a small scale it looks more like kinetic energy.

We'll talk more about that later!

What type of potential energy is stored?



**Chemical
Energy**

Chemical energy is potential energy stored in chemical bonds.

It's all energy!

- **kinetic**
- **gravitational**
- **elastic**
- **thermal**
- **chemical**

Quick Assignment

You are a superhero!

You have three energy superpowers!

Write a paragraph explaining what your superpowers are, how you use them, and what kind of energy they use.

Word bank: kinetic energy, potential energy, energy transfer, gravitational energy, chemical energy, elastic energy, thermal energy