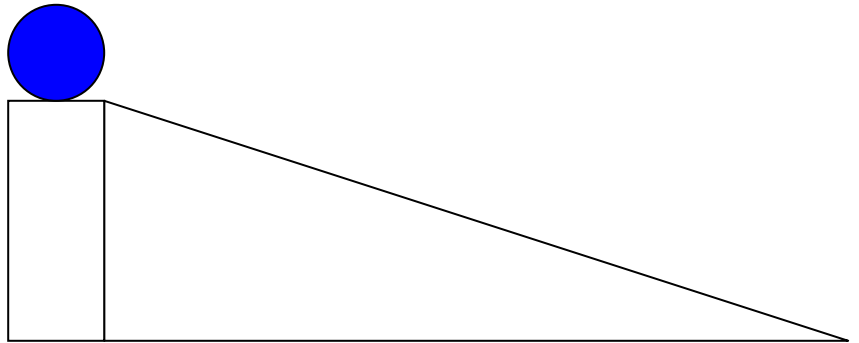


Energy

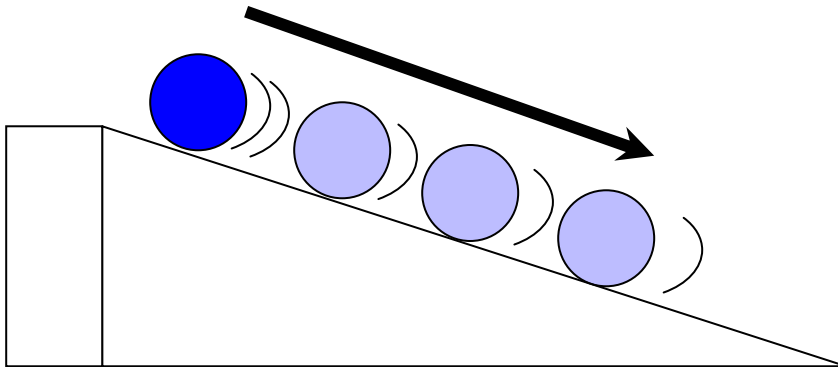
Energy is the ability to do work.

Potential energy = stored energy

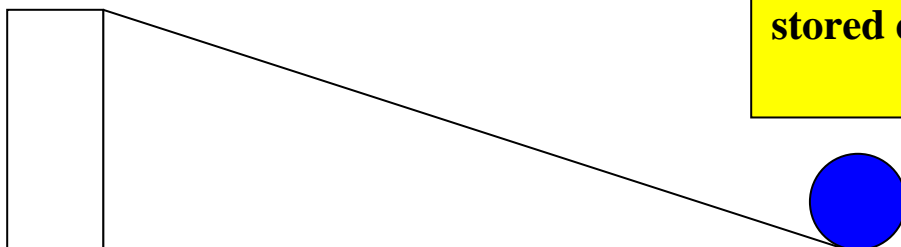
The ball has a high level of potential or stored energy.



Kinetic energy = the energy of motion



The ball has a lower level of potential or stored energy.



Conservation of Energy

**“Energy is neither created nor destroyed”
in other words . . .**

Energy is never lost, but just changed into a different form.

So what in the world does this have to do with ME??

- ☺ **Our bodies need to use the ENERGY we get from our food to help us stay **ALIVE!****
- ☺ **It does this by carrying out millions of chemical reactions that take place constantly inside our bodies**
- ☺ **These chemical reactions within our cells drive all the activities associated with life**
- ☺ **Some of these reactions release energy**
- ☺ **Some of these reactions absorb energy**
- ☺ **All of the chemical reactions occurring in an organism are called METABOLISM**

- ☹️ The energy needed to start a chemical reaction is called ACTIVATION ENERGY
- ☹️ Chemical reactions that happen in cells need very high temperatures in order to occur
- ☹️ These high temperatures would kill most of the cells in our bodies . . .

So how do all of these chemical reactions that we need to survive continue to occur without killing us????



Enzymes

- ☹️ ENZYMES lower activation energy for chemical reactions (allowing them to occur in our bodies at temperatures that won't KILL US)!

WHAT ARE ENZYMES?

- ☑ Important types of proteins found in living things
- ☑ Enzymes are biological catalysts –
 - ❖ Speed up a chemical reaction without being used up in the process
 - ❖ Some reactions occur up to one million times faster with enzymes than without them
- ☑ Involved in nearly all metabolic processes
 - ❖ Digestion
 - ❖ Formation of molecules
 - ❖ Storage of energy
 - ❖ Release of energy

HOW DO ENZYMES WORK?

- ↪ Each enzyme is specific for just one type of cell reaction
- ↪ The enzyme binds to the specific molecule
(We call the specific molecule the SUBSTRATE)
- ↪ The area where this binding occurs is called the enzymes ACTIVE SITES
- ↪ An enzyme's substrate will fit into the active site (just like your foot fits into a shoe)
- ↪ Activation energy is lowered
- ↪ The reaction takes place
- ↪ The product(s) are released
- ↪ The enzyme is ready to repeat the process again

ENZYMES CAN HAVE HELPERS!

→ Coenzymes

- ☑ Small non-protein molecules
- ☑ Help the enzyme bind to the substrate

ENZYMES CAN HAVE COMPETITORS!

→ Inhibitors

- ☑ Regulate enzyme activity
- ☑ Block the active site of the enzyme
- ☑ Distorts the enzyme so it cannot bind to the substrate

WHAT CAN AFFECT THE RATE OF AN ENZYME?

- Temperature
- pH
- Concentration

TEMPERATURE

- ☑ Each enzyme functions best within a certain temperature range
- ☑ Too high – rates of reaction decrease
 - Enzymes can be denatured or destroyed
- ☑ Too low – rates of reaction also decrease
 - Enzymes become inactive

pH

- ☑ **When the acidity inside an organism gets too high or too low, the enzyme cannot function properly**

CONCENTRATION

- ☑ **Concentration of enzyme**
- ☑ **Concentration of substrate**