Potential and Kinetic Energy

Only write what is in underlined

This is Newton’s Cradle

It demonstrates **potential and kinetic energy** – which is our notes

Newton's Cradle

Energy…

- is NEVER created or destroyed!

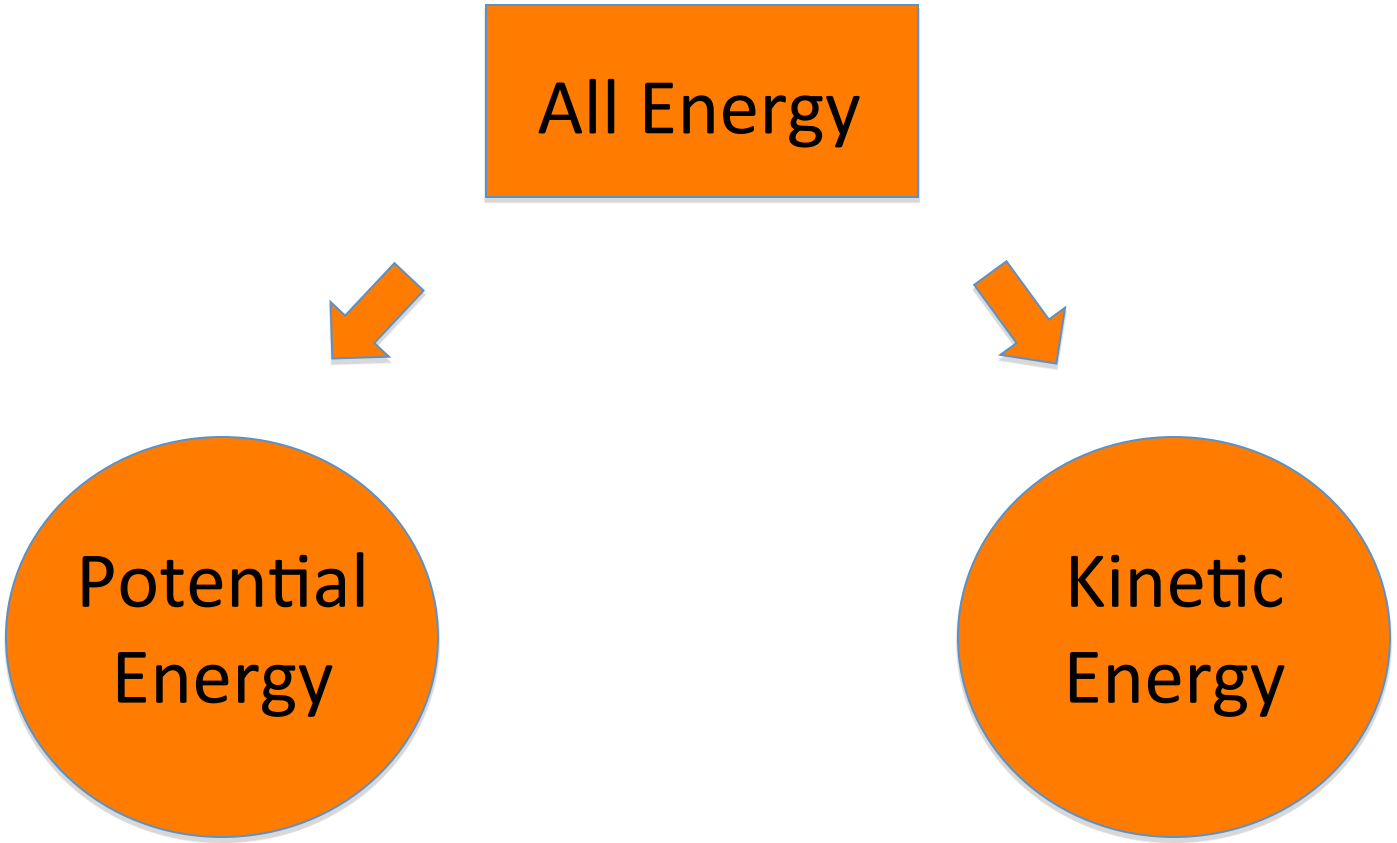
- can only be STORED or TRANFERRED.

11. **WORK: is done when an object is caused to move a certain distance.**

12. ENERGY: the ability to do work or cause change.

- Example: When a breeze blows a leaf through the air, it causes a change. In this case, the change is the position of the leaf. So, the wind has energy.

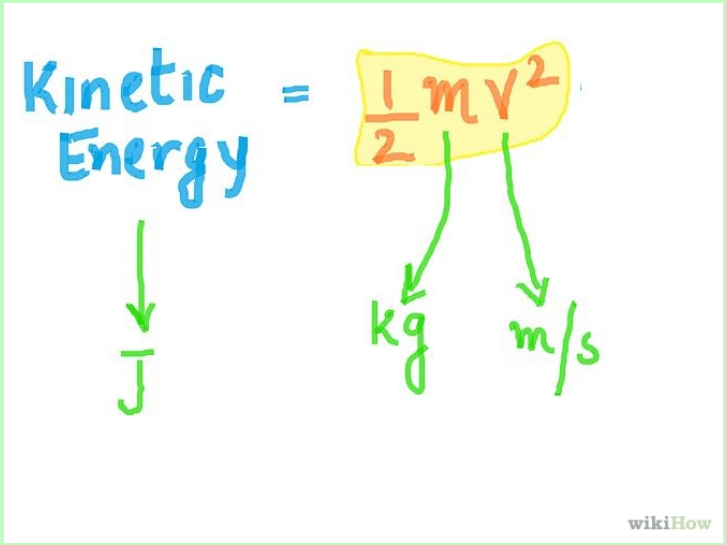
How is all energy divided?

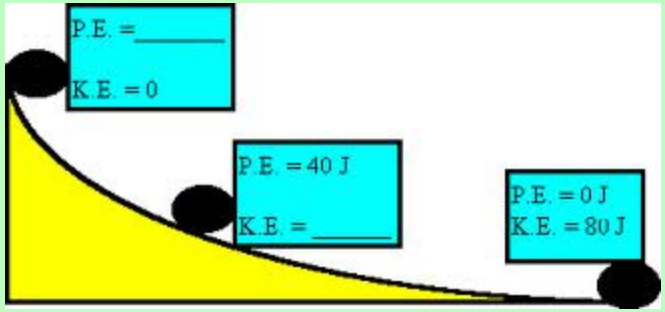


13. Kinetic Energy (KE)

- **energy** that is in **motion**
- **depends on both its mass and its speed**. Kinetic energy increases as mass increases, and also when speed increases.
- **KE = ½ X mass X speed²**

- Kinetic energy is measured in JOULES.
- 1 joule = 1 kg X (m/s)²





A water bottle is knocked off a desk. When does the bottle have the MOST kinetic energy?

A. At the top of the fall.

B. In the middle of the fall.

C. At the bottom of the fall.

- C. At the bottom of the fall.

- It has the most kinetic energy when its *movement and speed are greatest*, which is at the bottom of the fall *right before it hits the ground*.

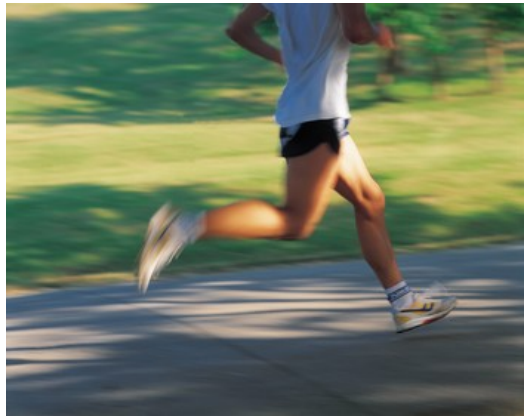
- When an object has the **LEAST potential energy** is when it has the **MOST kinetic energy.**

BrainPop

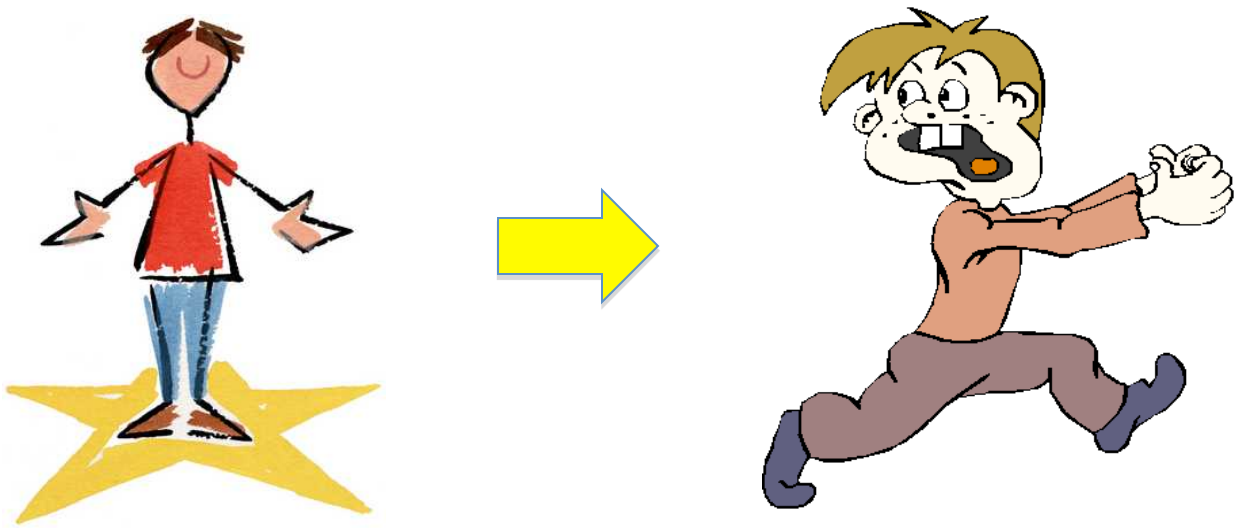
- The faster the object moves, the more kinetic energy is produced.

- The greater the mass and speed of an object, the more kinetic energy there will be.

Examples of Kinetic Energy:



- When stored energy begins to move, the object now transfers from potential energy into kinetic energy.



14. Potential Energy (PE)

- **stored energy** that results from the **position** or shape of an object
- **GRAVITATIAL POTENTIAL ENERGY**: depends on an objects **weight and its height.**
- **Weight X Height**

Energy and a roller coaster

Changing an objects' height can change its potential energy.

- If I want to drop an apple from the top of one of these three things, where will be the most potential energy?

ANSWER

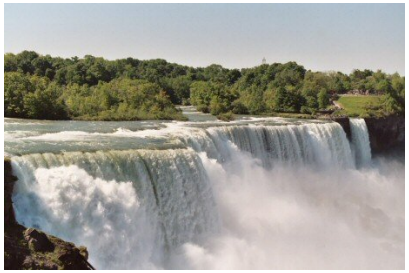
- The higher the object, the more potential energy!

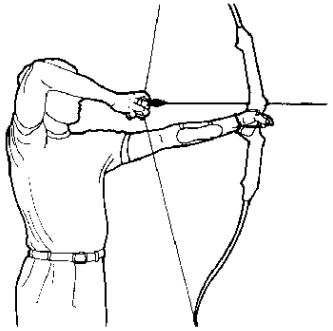
PE = (This information goes with #14)

(mass) X (gravitational pull) X (height)

- **The higher an object, the more potential energy.**
- **The more mass an object has, the more potential energy it has.**

Examples of Potential Energy:





Batteries store energy!

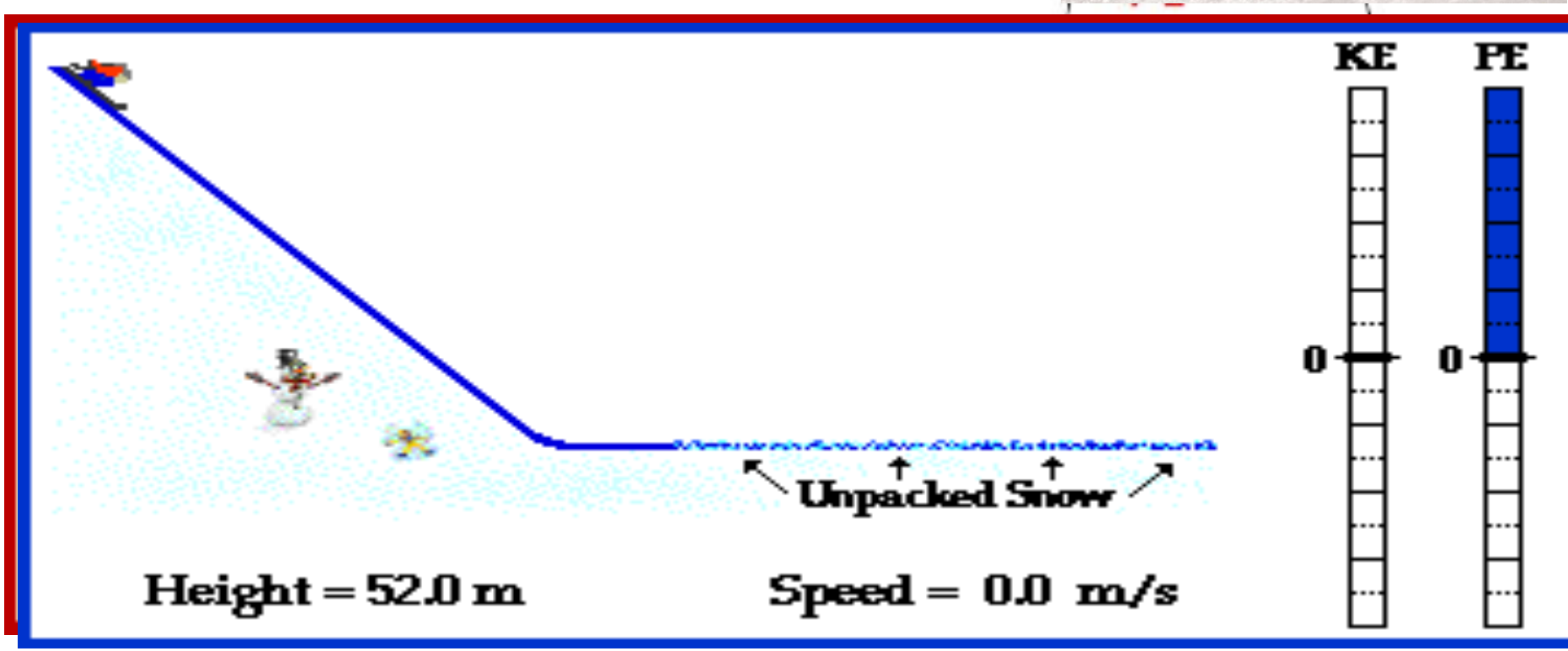
This car uses a lot of energy

Even this sleeping puppy is using stored energy.

We get our energy from FOOD!

What is Kinetic Energy?

- Energy an object has due to its motion
- K.E. = .5(mass x speed^2)

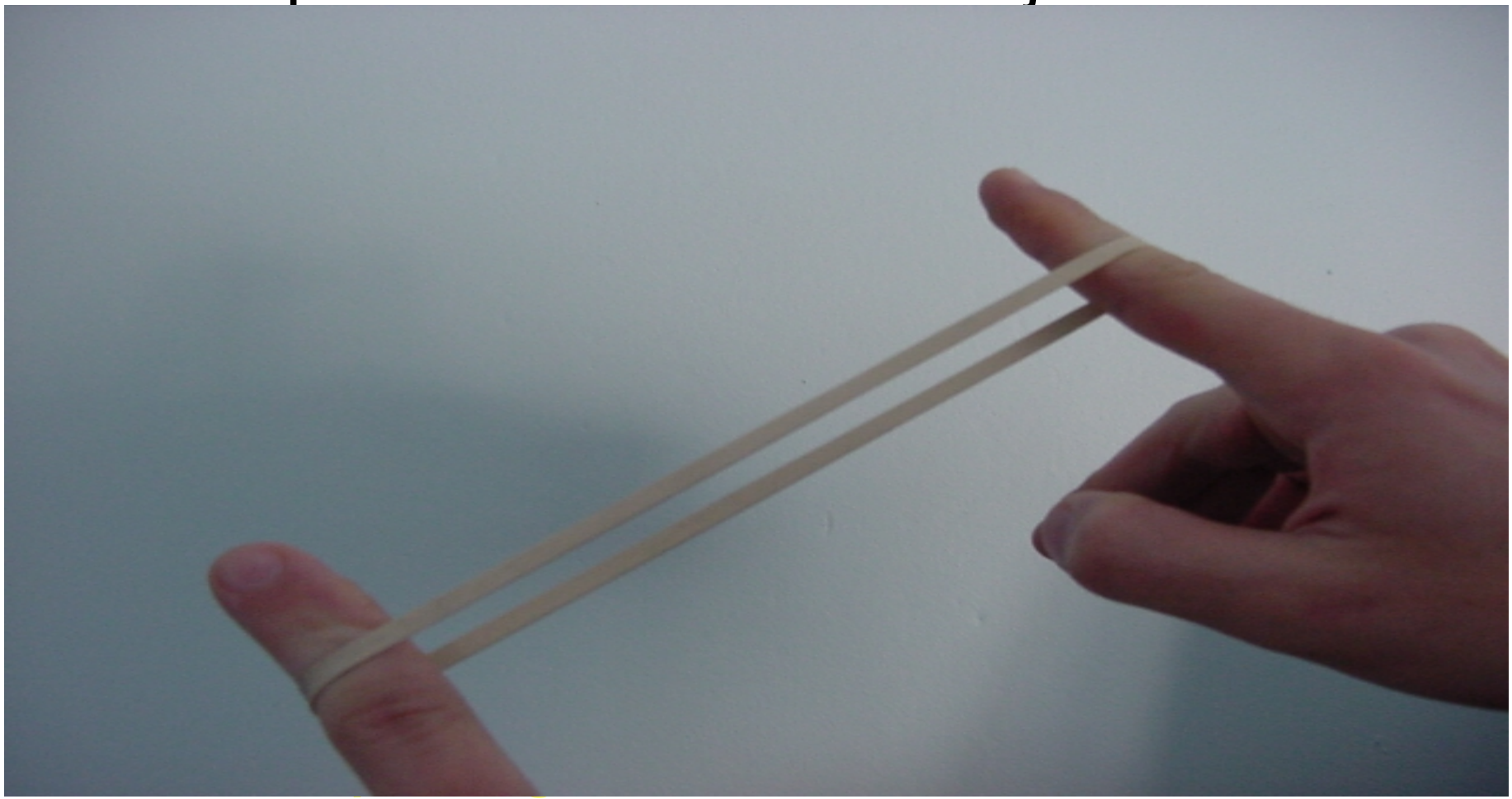


What is Chemical Potential Energy?

- Potential energy stored within the chemical bonds of an object

What is Elastic Potential Energy?

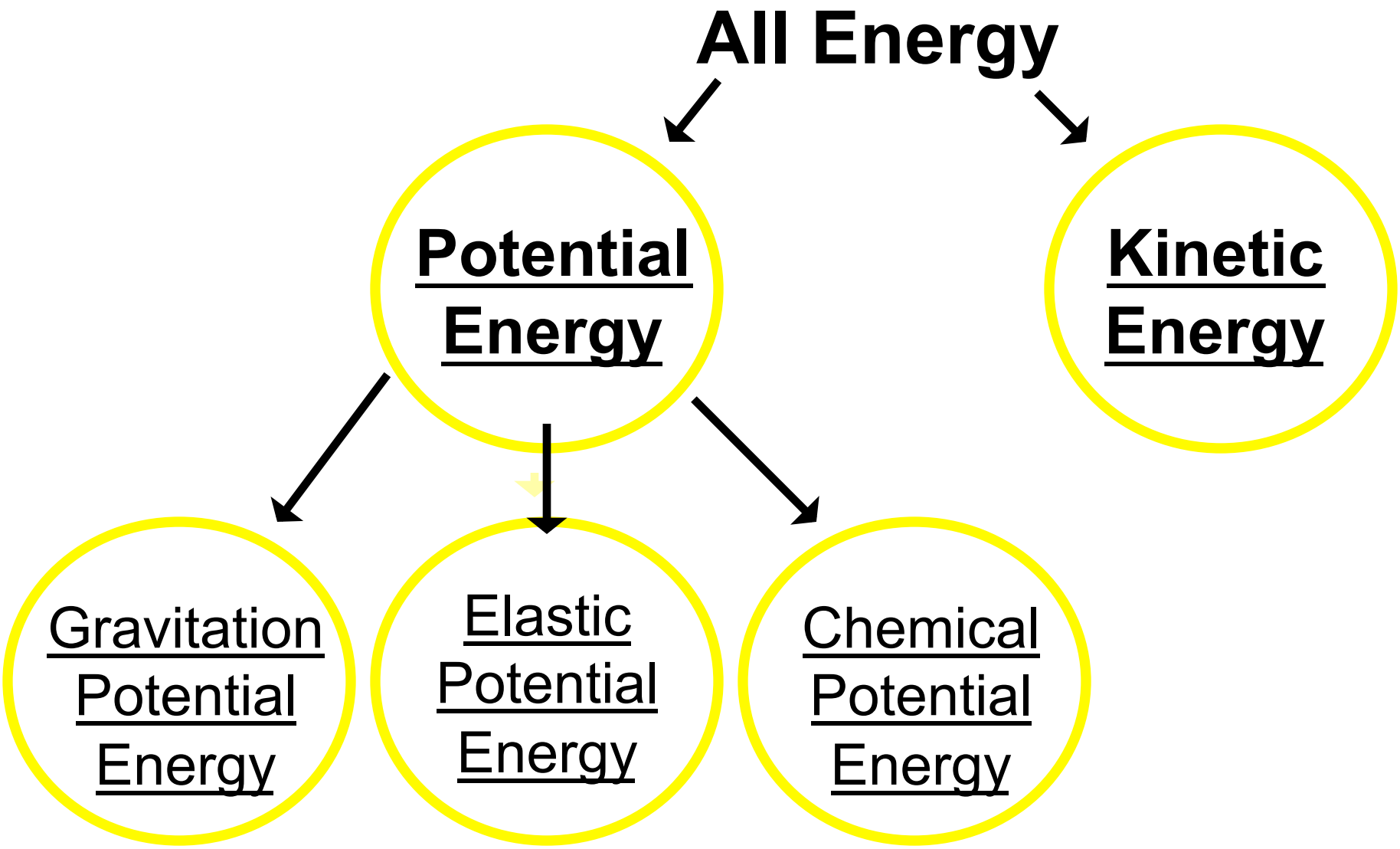
- Potential energy due compression or expansion of an elastic object.

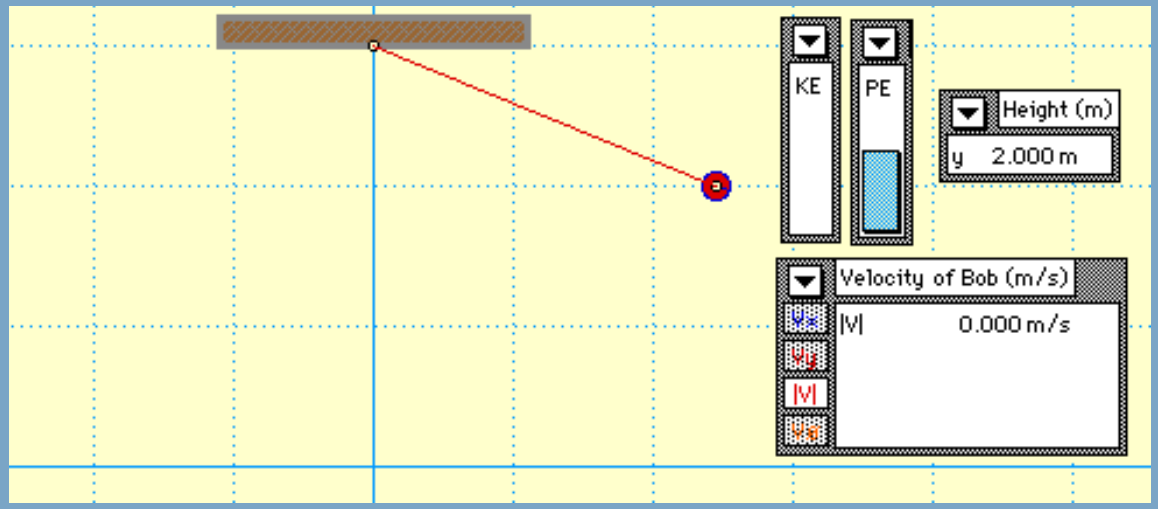


What is Gravitational Potential Energy?

- Potential energy due to an object's position
- P.E. = mass x height x gravity

15. How is all energy divided?




KE
PE
Height (m)
y 2.000 m
Velocity of Bob (m/s)
|V| 0.000 m/s

Momentum videos

- http://www.youtube.com/watch?v=Jnj8mc04r9E&list=PL3E788EDA794CCE7B&index=6&feature=plpp_video
- http://www.youtube.com/watch?v=BiLq5Gnpo8Q&list=PL3E788EDA794CCE7B&index=17&feature=plpp_video
- http://www.youtube.com/watch?v=OuA-znVMY3I&list=PL3E788EDA794CCE7B&index=20&feature=plpp_video

Roller Coasters

- When does the train on this roller coaster have the MOST potential energy?

- AT THE VERY TOP!

- The HIGHER the train is lifted by the motor, the MORE potential energy is produced.

- At the top of the hill the train has a huge amount of potential energy, but it has very little kinetic energy.

- As the train accelerates down the hill the potential energy is converted into kinetic energy.

- There is very little potential energy at the bottom of the hill, but there is a great amount of kinetic energy.

- When does the train on this roller coaster have the MOST kinetic energy?

(When is it moving the fastest?)

(When does it have the LEAST potential energy???)

- At the bottom of the tallest hill!