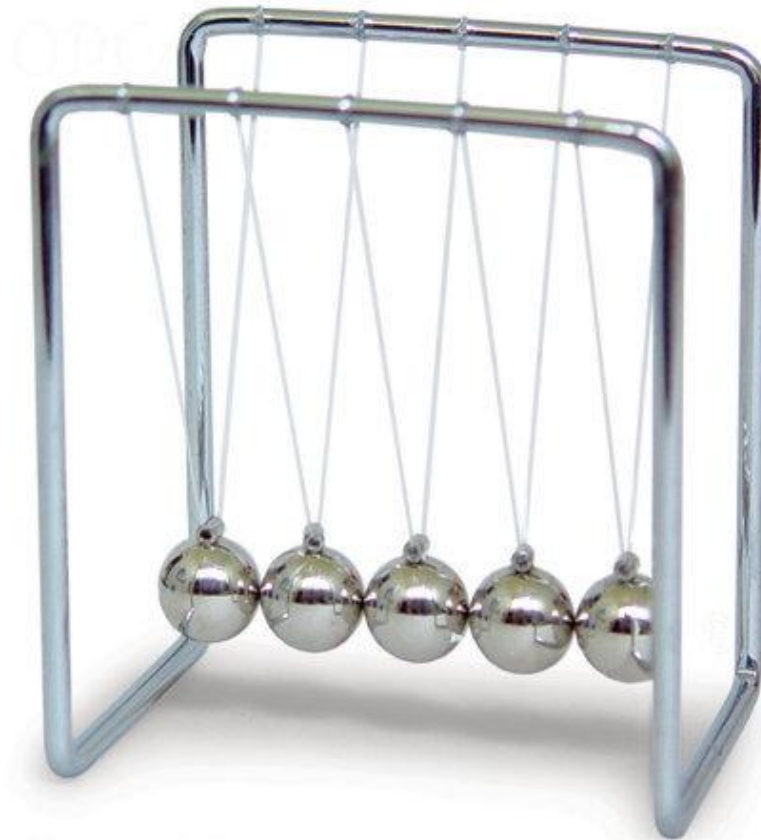


Potential and Kinetic Energy

Only write what is in underlined

This is Newton's Cradle

It demonstrates **potential and kinetic energy** – which is our notes
[Newton's Cradle](#)

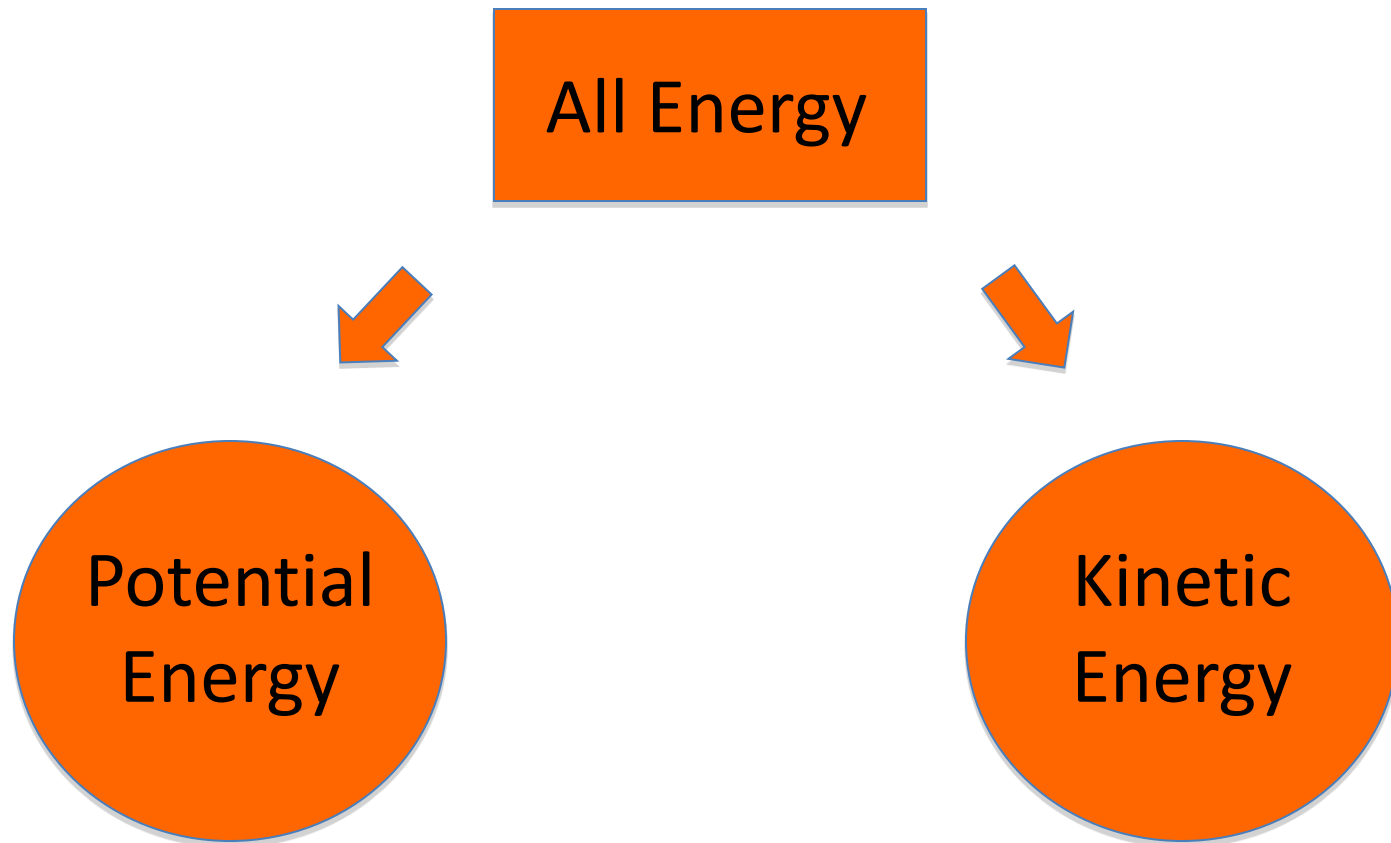


Energy...

- is NEVER created or destroyed!
- can only be STORED or TRANSFERRED.

- A. WORK: is done when an object is caused to move a certain distance.
- B. 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?



C. Kinetic = energy that is in motion

- Because a moving object (such as the wind) can do work, it has energy. The energy an object has due to its MOTION is called:
- KINETIC ENERGY of an object depends on both its mass and its speed. Kinetic energy increases as mass increases, and also when speed increases.
- Kinetic energy = $\frac{1}{2} \times \text{mass} \times \text{speed}^2$

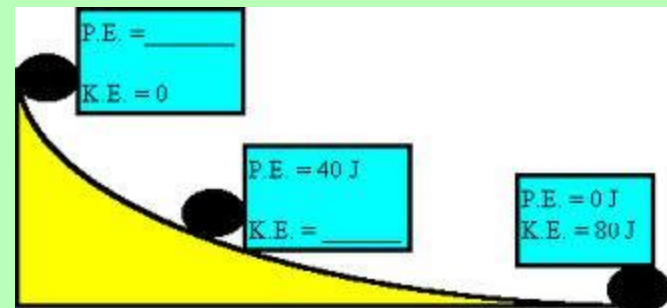
- Kinetic energy is measured in JOULES.
- 1 joule = 1 kg X (m/s)²

Kinetic Energy = $\frac{1}{2} m v^2$

↓ J

kg m/s

wikiHow



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.

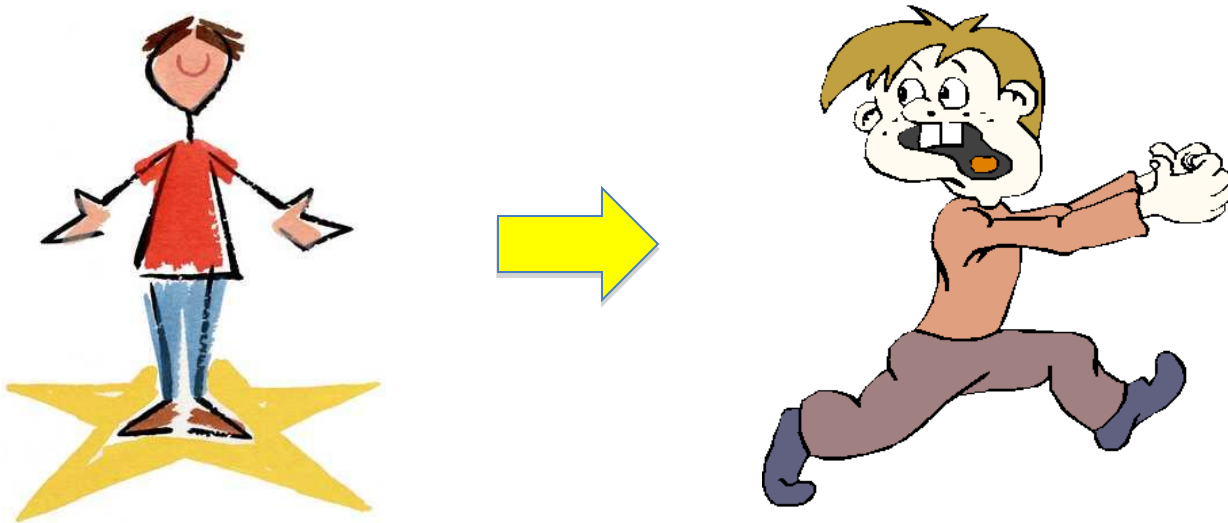


- The greater the mass and speed of an object, the more kinetic energy there will be.

Examples of Kinetic Energy:



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



D. Potential Energy – stored energy that results from the position or shape of an object

- GRAVITATIONAL POTENTIAL ENERGY: depends on an objects **weight and its height.**
- Gravitational Potential Energy = 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

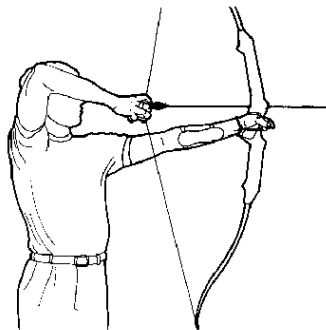
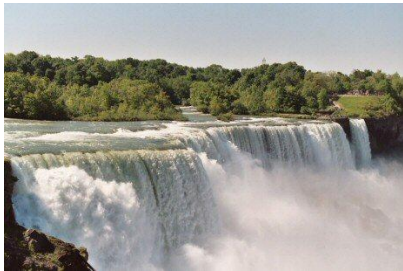


- The higher the object, the more potential energy!

(This information goes with letter D)

- 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



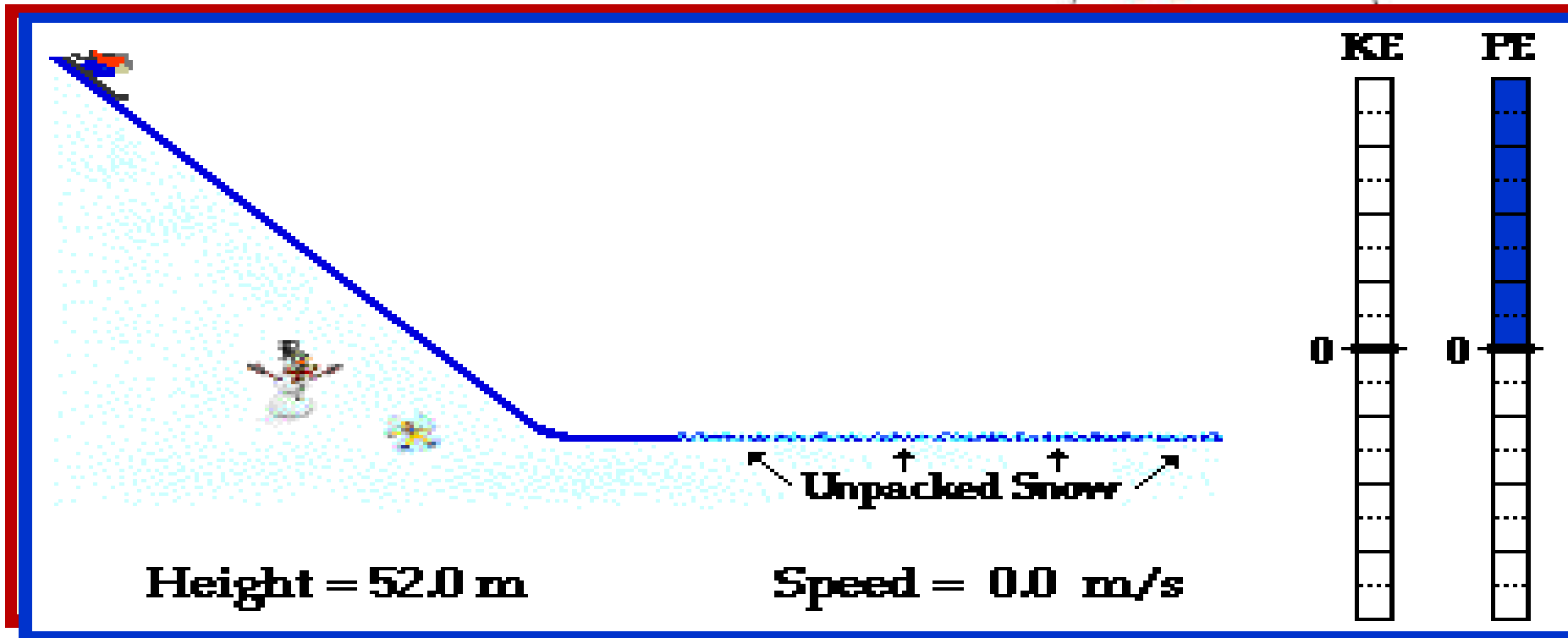
Even this
sleeping
puppy is
using
stored
energy.



We get
our
energy
from
FOOD!

What is Kinetic Energy?

- o Energy an object has due to its motion
- o $K.E. = .5(\text{mass} \times \text{speed}^2)$



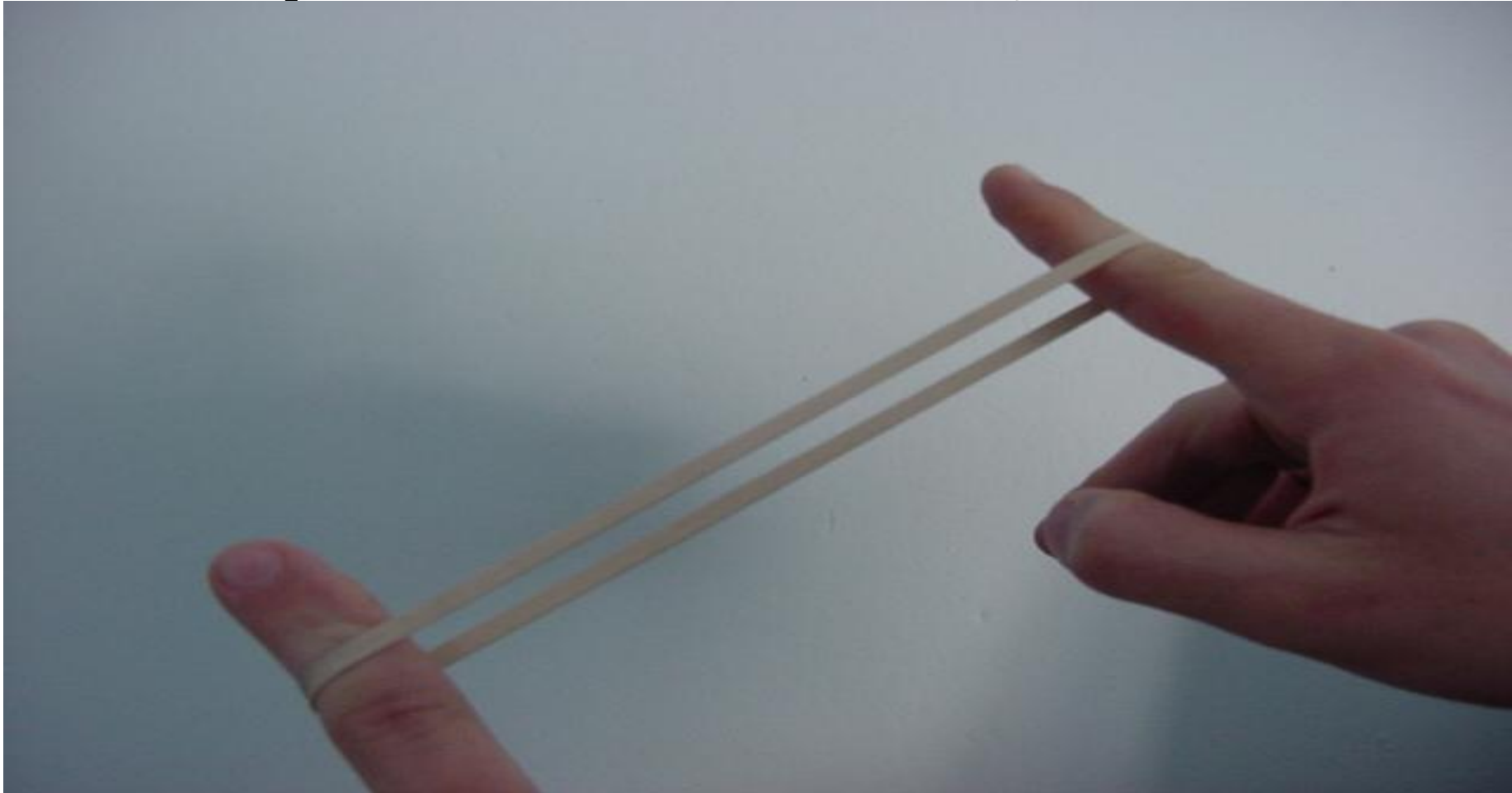
What is Chemical Potential Energy?

- o **Potential energy stored within the chemical bonds of an object**



What is Elastic Potential Energy?

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



What is Gravitational Potential Energy?

- o Potential energy due to an object's position
- o $P.E. = \text{mass} \times \text{height} \times \text{gravity}$



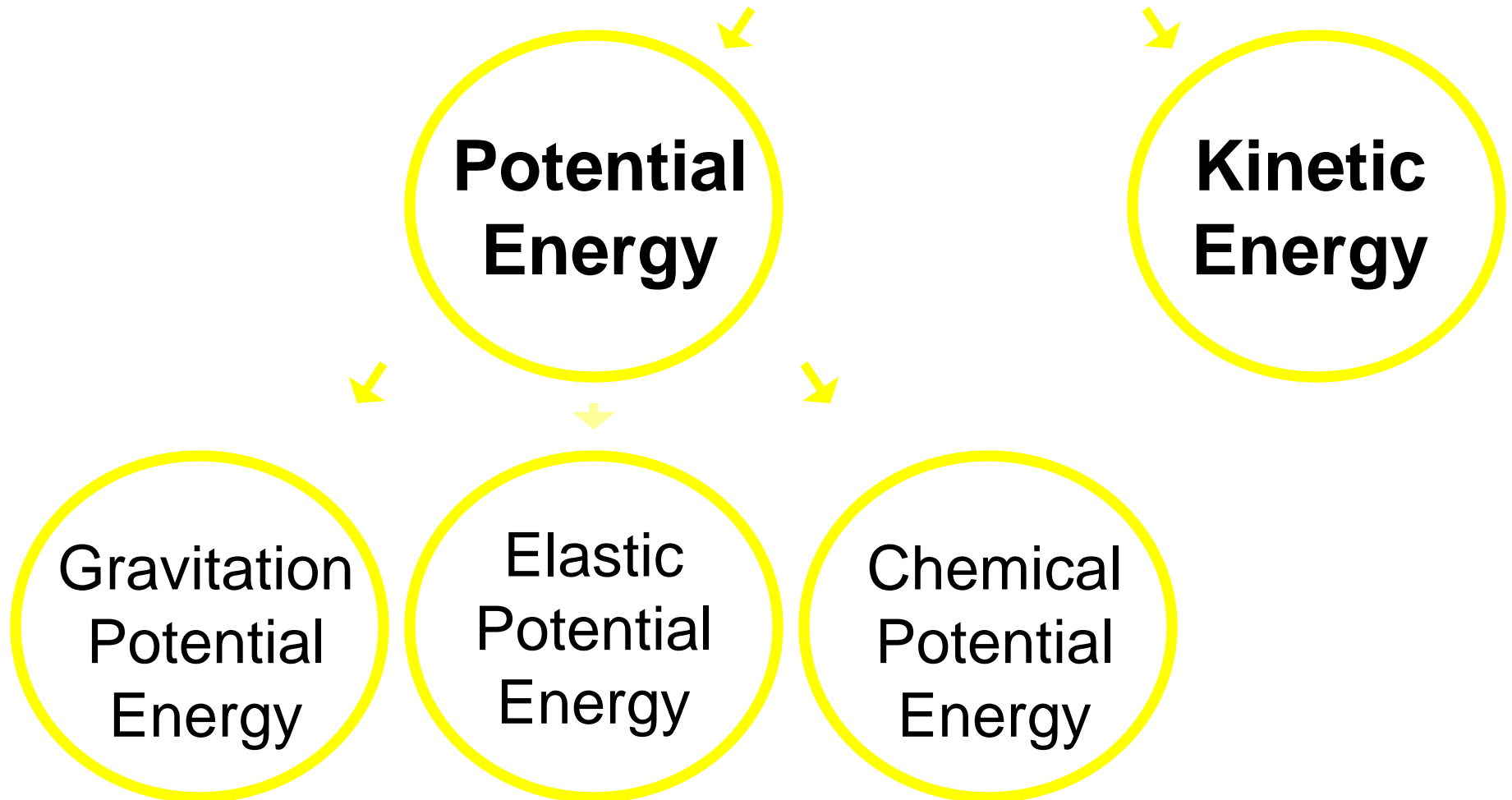
Don't look down,
Rover!
Good boy!

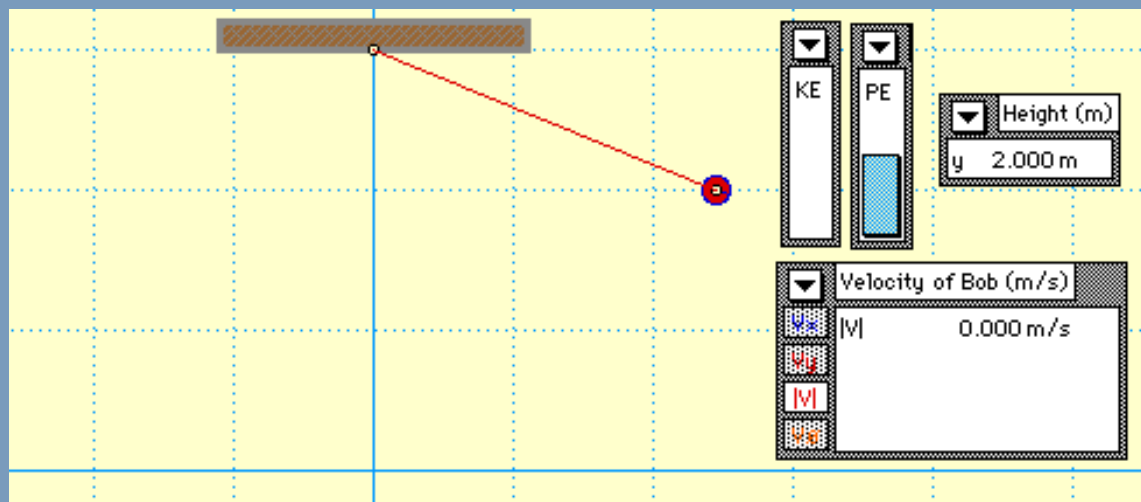


You will COPY this slide down

How is all energy divided?

All Energy





Momentum videos

- http://www.youtube.com/watch?v=Jnj8mc04r9E&list=PL3E788EDA794CCE7B&index=6&feature=plpp_video
- http://www.youtube.com/watch?v=BiLq5Gnp08Q&list=PL3E788EDA794CCE7B&index=17&feature=plpp_video
- http://www.youtube.com/watch?v=OuA-znVMY3I&list=PL3E788EDA794CCE7B&index=20&feature=plp_p_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!