

Potential Energy Helping Quadrant

Now that we have disproved the claim that the magnets were misaligned on Tuesday, we are going to start investigating Claim 2: There was much more energy in the magnetic system on Wednesday than there was on Tuesday. However, the question is, how do magnets get energy in the first place?

Part A: Think About It (Independent)

Thinking Questions:

1. What is potential energy?
2. The article says, “energy is stored in the system of the skydiver and Earth” What is meant by this?
3. What do you think the word “converts” means in the 3rd paragraph?
4. In the sky diving example, where does the force that transfers potential energy into the earth-skydiver system come from?
5. Explain how potential energy is converted into kinetic energy when a skydiver jumps out of a plane.

Annotate the Text

1. Highlight, circle, or underline important information.
2. Write comments and questions about the text in the margin.
3. Use symbols to mark the text

!	This is INTERESTING.
?	This is CONFUSING.

Criteria for Success: A LEVEL 4 will do the all of the following

- Annotations (underlines and symbols) are found throughout the reading, equaling at least 1 per paragraph.
- Key words AND ideas are highlighted.
- At LEAST 2 additional questions/interactions with the text are written in the margins/empty spaces
- All prepped responses are written neatly & in complete sentences, are detailed and written in own words.
- All group responses are answered correctly using evidence from the text, or from prior learning



Skydivers can fall toward earth at speeds of up to 290 kph (180 mph).

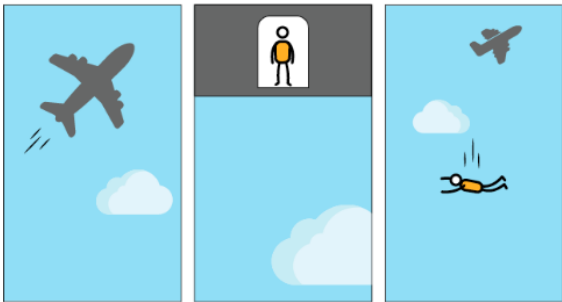
Extreme sports allow us to do exhilarating things our bodies can’t do on their own. To get the speed and height required to perform these acts, these sports rely on two kinds of energy—kinetic energy, which is the energy of motion, and potential energy, which is stored energy. By adding a force to the mix, these two types of energy can be converted back and forth—motion energy can become stored energy, and stored energy can become motion energy. For extreme athletes, that conversion usually means speed, height, or both!

Skydivers looking for a thrill jump out of an airplane thousands of feet above the ground all the time! Skydivers start their dives from airplanes high above the ground and end up falling toward Earth’s surface at speeds as high as 290 kilometers per hour (180 miles per hour). The skydivers aren’t doing anything to make themselves go faster. So where do they get the kinetic energy to fall so quickly?

It’s all about gravity. Gravity is a pulling force that can change the motion of an object and transfer energy into systems of objects. The skydiver and Earth form a system. When the airplane pushes the skydiver high into the sky, it pushes against the force of gravity and transfers energy into the skydiver-Earth system. That energy is stored

as potential energy in that system. When the skydiver starts to fall toward Earth, the force of gravity transfers this potential energy to the skydiver and converts it to kinetic energy. As a result, the skydiver picks up a lot of speed.

What does it mean when we say energy is stored in the system of the skydiver and Earth? To understand this idea, it helps to think of the system as being like a rubber band. If you stretch a rubber band, the energy you’re using to pull the rubber band apart is stored in the rubber band itself. When the rubber band snaps back to its unstretched shape, the stored energy is released. But there is no invisible rubber band between a skydiver and Earth, so where is the energy stored?

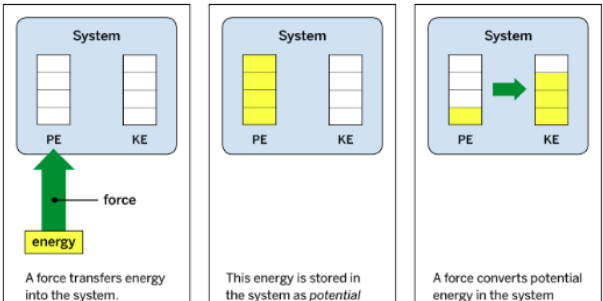


force of airplane transfers potential energy into the Earth-skydiver system

potential energy is stored in the gravitational field between the skydiver and Earth

the gravitational force converts potential energy into kinetic energy, giving the skydiver speed

How does force relate to potential and kinetic energy?



Between Earth and the skydiver is Earth’s gravitational field, the space in which Earth can pull on objects from a distance. We can’t see the gravitational field, but we can feel it in the form of a pull toward Earth. When the airplane carries the skydiver upward and away from Earth, potential energy is stored in the gravitational field between Earth and the skydiver. When Earth pulls the skydiver back down, the force of gravity transfers potential energy from the gravitational field to the skydiver and converts it into kinetic energy—that is, motion. Because the skydiver gains kinetic energy, he or she gains speed during the fall to Earth.

Name_____ Date_____ Per_____

Part B: **Share What You Learned (Groups of 4, but first prepare your own responses before you share with your partners)**

My Prepped Responses – These are open ended and there are multiple acceptable responses.

1. Skydivers gain kinetic energy as they fall to Earth because_____.
 2. We can think of stored energy in a system like a stretched out rubber band because_____.
 3. Potential energy gets converted into kinetic energy when_____.
- For example_____.

Next: As a group, determine the BEST answers for the prepped response questions above. This may be from one person's paper, OR a combination of your group's answers. Then find the BEST text evidence that supports the answer (write it out)

1. Skydivers gain kinetic energy as they fall to Earth because...

Evidence in the text that supports this comes from paragraph ____ where the text states, “

2. We can think of stored energy in a system like a stretched out rubber band because ...

Evidence in the text that supports this comes from paragraph ____ where the text states, “

*3. Potential energy gets converted into kinetic energy when*_____

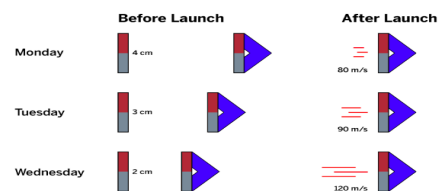
For example...

Evidence in the text that supports this comes from paragraph ____ where the text states, “

As a group, use what you learned in the article to answer the following questions:

1. In the case of the skydivers, how do the force of gravity and magnetic forces act similarly?

2. In our magnetic launcher system, would the most potential energy be found before the launch, or after? Why?



3. According to the image, on which day was the most potential energy stored in the launcher system? How can you tell?
