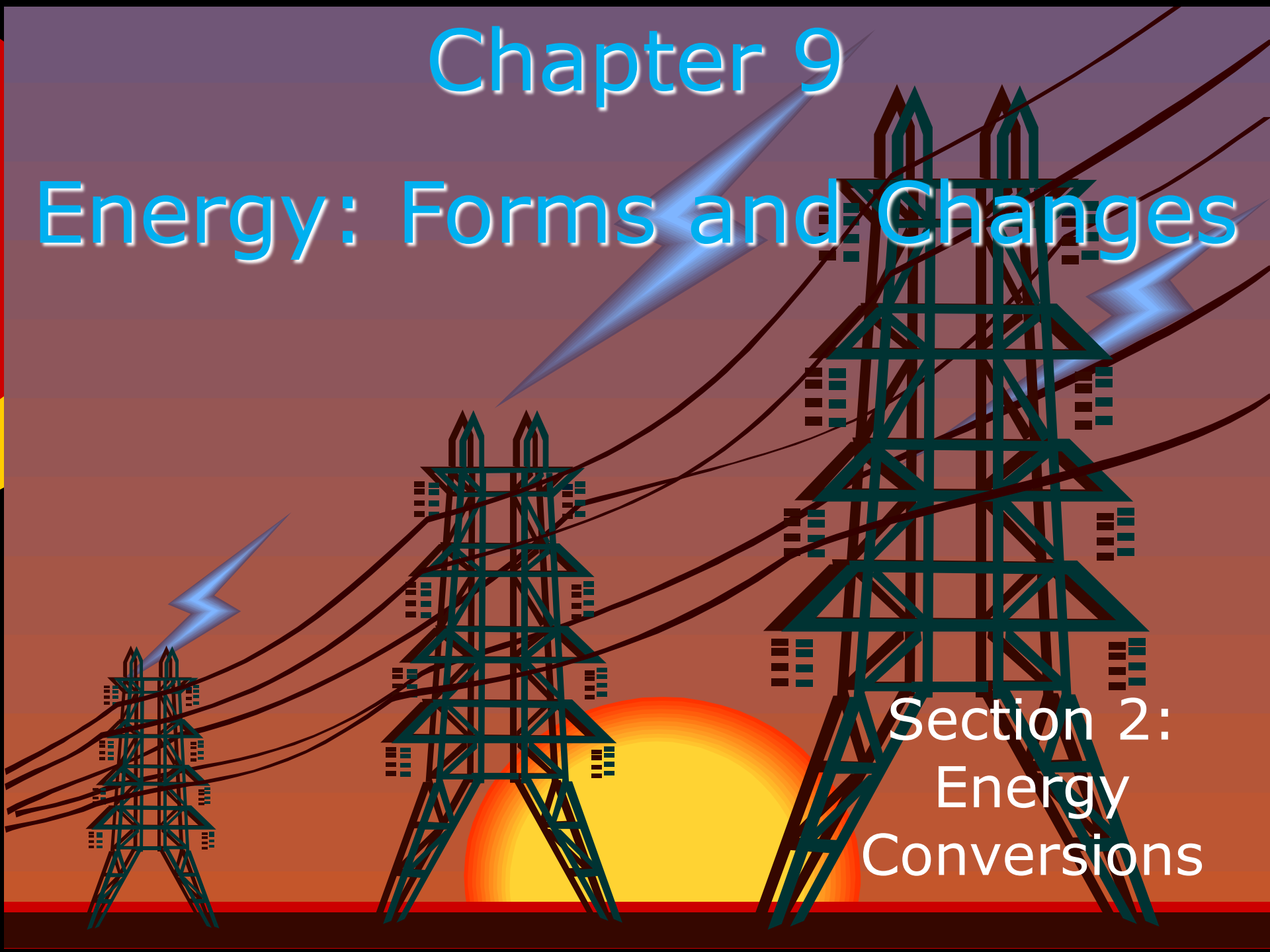


Chapter 9

Energy: Forms and Changes

Section 2:
Energy
Conversions

The background of the slide features a stylized illustration of a power transmission system. Three green lattice towers of increasing size are positioned from left to right. Black power lines stretch across the scene, connecting the towers. The background is a gradient from dark purple at the top to bright orange and red at the bottom, where a large, glowing sun is partially visible. Several blue lightning bolts are scattered across the sky, adding a dynamic and energetic feel to the composition.



Essential Questions

- What is an energy conversion?
- What are some examples of energy conversion for the different forms of energy?
- How can energy conversions make energy useful?
- What is the role of machines in energy conversions?



Energy Conversion

- Energy can be changed from one form to another. These changes are called energy conversions.



Energy conversions

- All forms of energy can be converted into other forms.
 - The sun's energy through solar cells can be converted directly into electricity.
 - Green plants convert the sun's energy (electromagnetic) into starches and sugars (chemical energy).



States of Energy

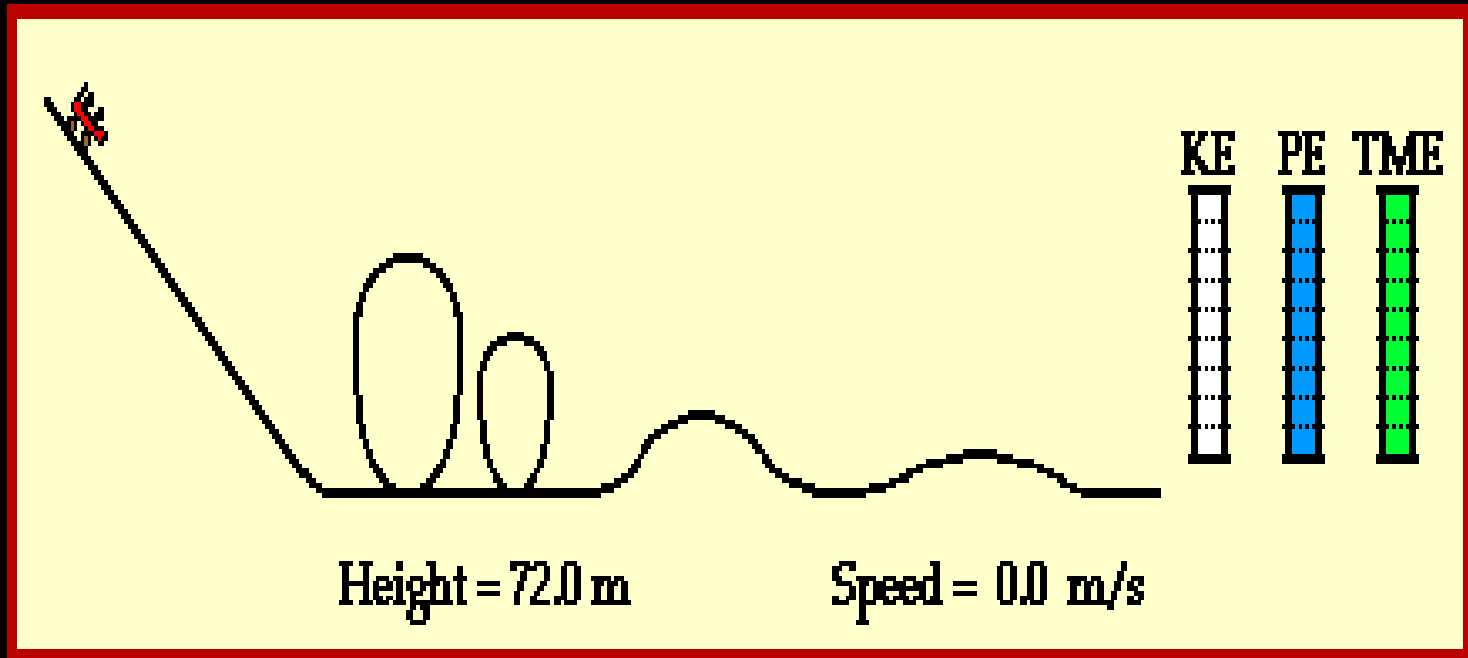
- Most often, the conversion is between potential and kinetic energy.
- All forms of energy can be in either of two states:
 - Potential
 - Kinetic

Kinetic-Potential Energy Conversion

Roller coasters work because of the energy that is built into the system. Initially, the cars are pulled mechanically up the tallest hill, giving them a great deal of potential energy. From that point, the conversion between potential and kinetic energy powers the cars throughout the entire ride.



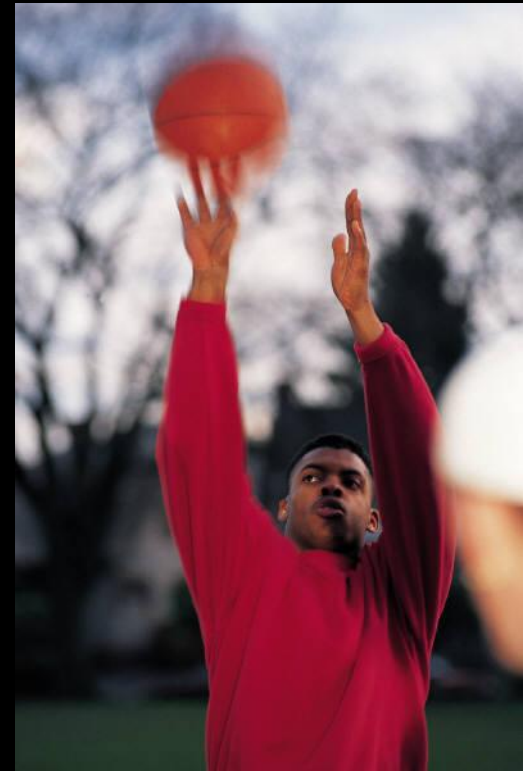
Kinetic vs. Potential Energy



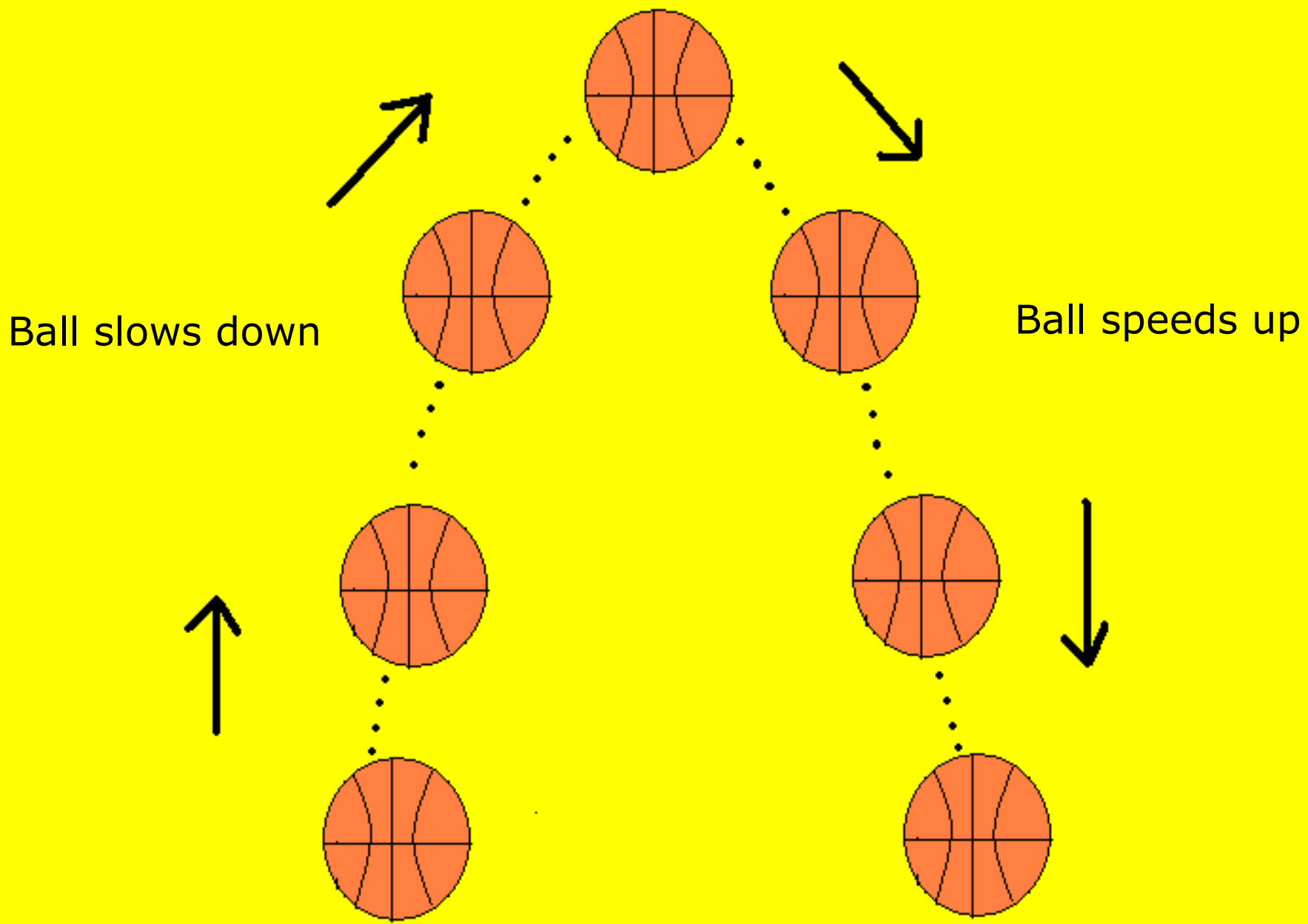
At the point of maximum potential energy, the car has minimum kinetic energy.

Kinetic-Potential Energy Conversions

- As a basketball player throws the ball into the air, various energy conversions take place.



Maximum Potential Energy



Ball slows down

Ball speeds up

Maximum Kinetic Energy



Conversions Involving Chemical Energy

- Chemical energy comes from the food you eat.
- Your body uses chemical energy to function.



Energy Conversions in Living Things

- Photosynthesis uses the sun's light energy to create chemical energy for the plant.
- In this way, light energy is changed into chemical energy.
- When you eat, that chemical energy is converted into kinetic energy for you to use.

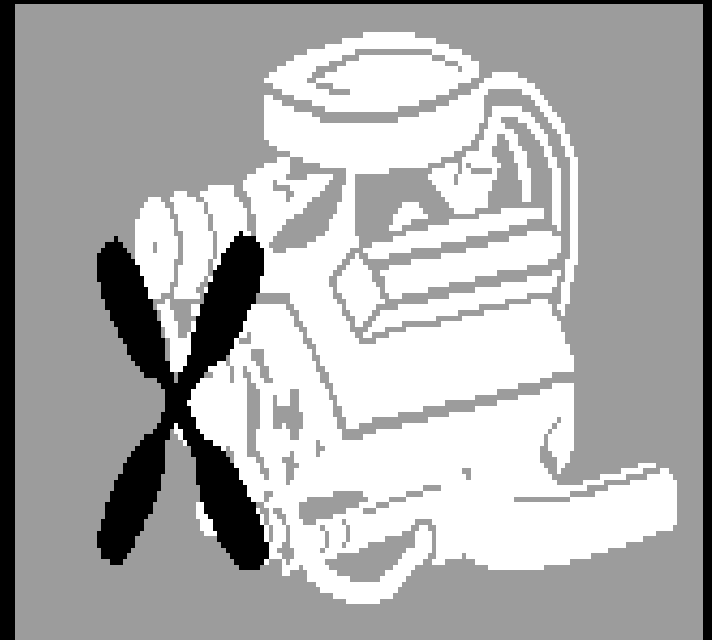


Other energy conversions

- In an electric motor, electromagnetic energy is converted to mechanical energy.
- In a battery, chemical energy is converted into electromagnetic energy.
- The mechanical energy of a waterfall is converted to electrical energy in a generator.

Energy Conversions

- In an automobile engine, fuel is burned to convert chemical energy into heat energy. The heat energy is then changed into mechanical energy.





Chemical \rightarrow Heat \rightarrow Mechanical



Who cares?

- Energy conversions are needed for everything we do.



Energy and Machines

- Machines make work easier by changing the size or direction of force.
- Some machines change the energy put into them into other kinds of energy.



Review for fun!

- Roller coaster energy