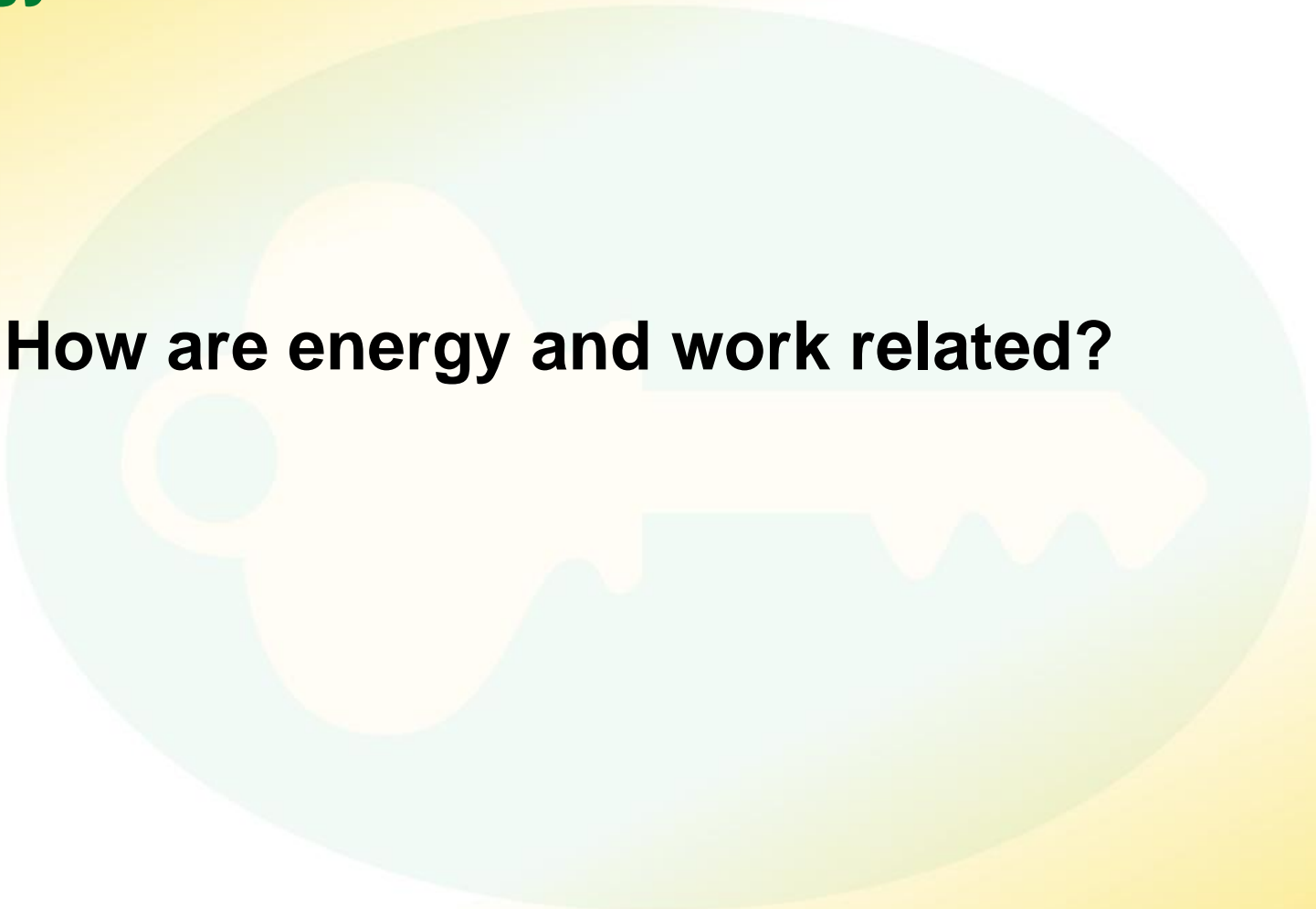


Energy and Work



How are energy and work related?



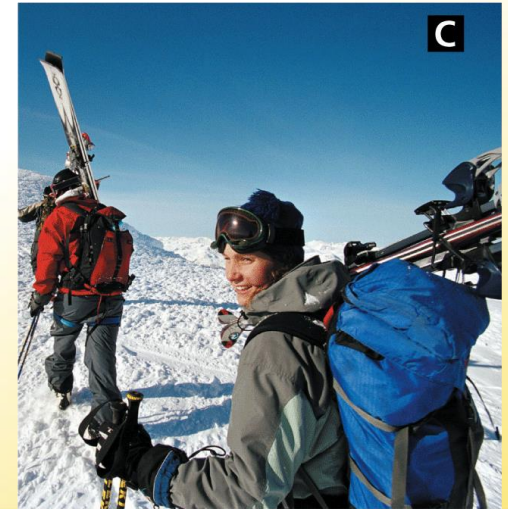
Energy and Work

Energy has different forms.

- A. The sun -
- B. Plants -
- C. People convert –

DOK Question:

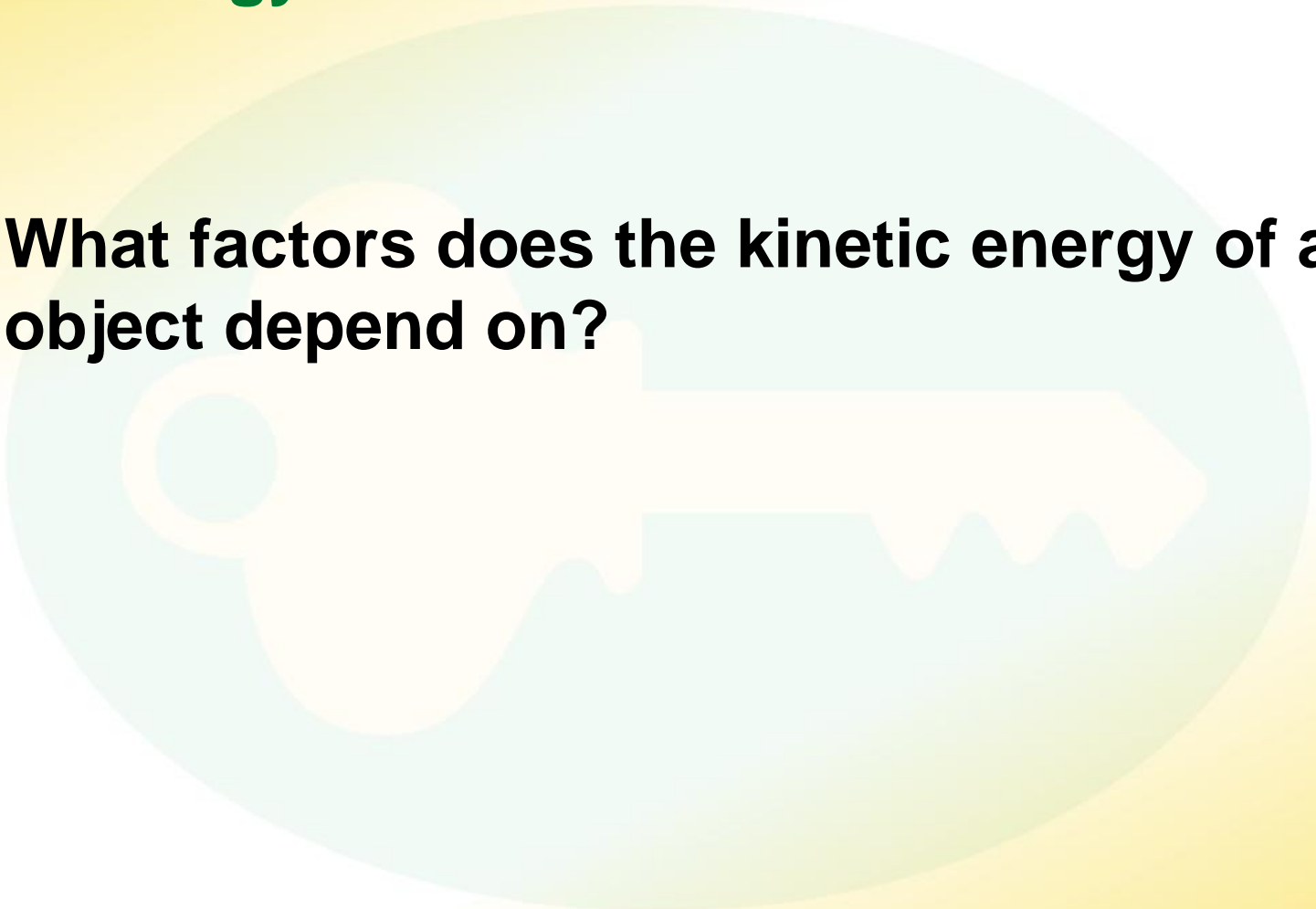
Differentiate the above forms of energy.



Kinetic Energy



What factors does the kinetic energy of an object depend on?



Kinetic Energy

- Doubling the mass -
- Doubling the speed –

DOK Question:

Formulate a formula explaining the above situations.

Kinetic Energy

$$\text{Kinetic energy (KE)} = \frac{1}{2}mv^2$$

Kinetic Energy

Math Practice

1. A 70.0-kilogram man is walking at a speed of 2.0 m/s. What is his kinetic energy?

Answer:

Kinetic Energy

Math Practice

2. A 1400-kilogram car is moving at a speed of 25 m/s. How much kinetic energy does the car have?

Answer:

Kinetic Energy

Math Practice

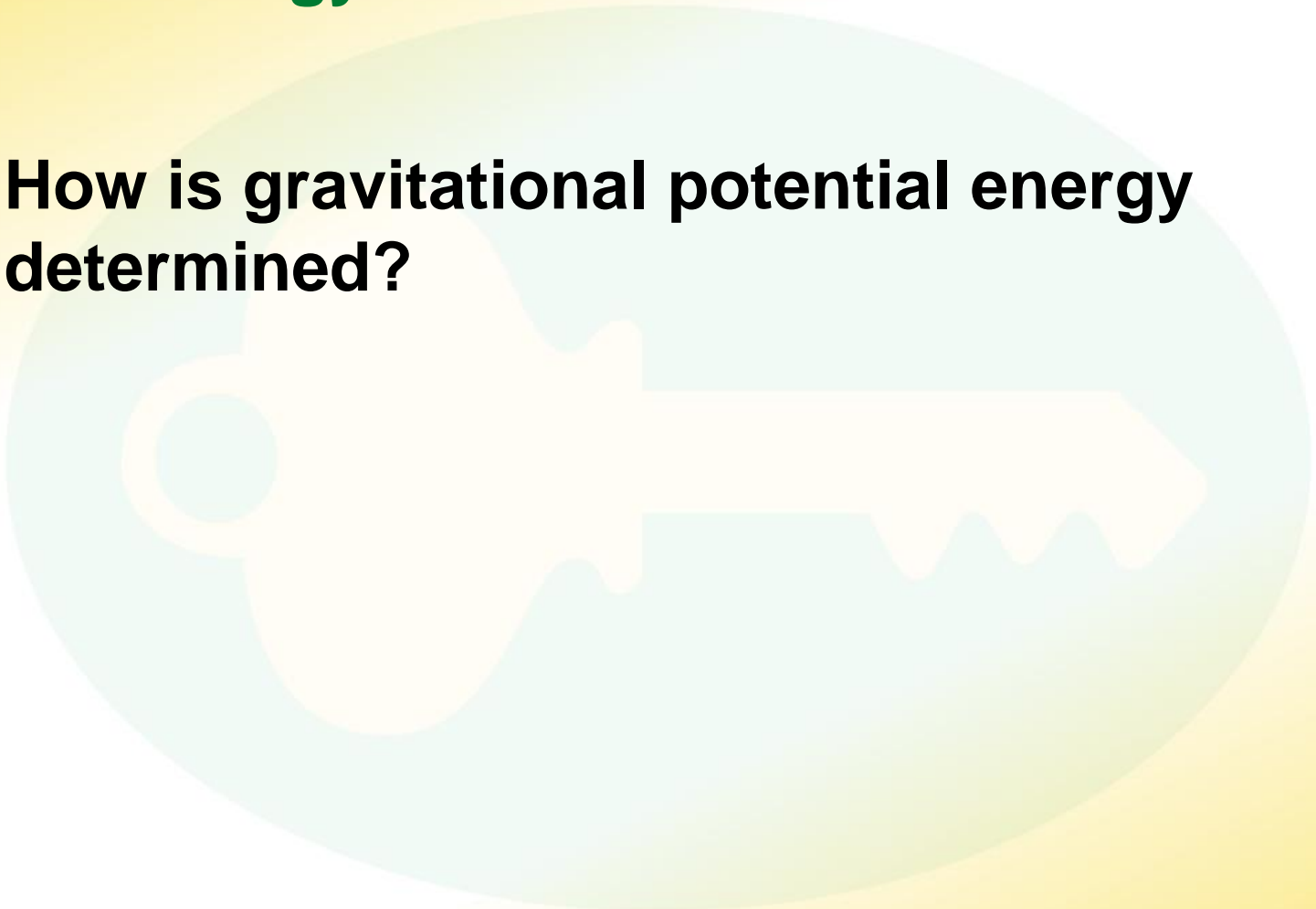
3. A 50.0-kilogram cheetah has a kinetic energy of 18,000 J. How fast is the cheetah running? (*Hint:* Rearrange the equation to solve for v .)

Answer:

Potential Energy



How is gravitational potential energy determined?



15.1 Energy and Its Forms

Potential Energy

- The unit for mass is -
- The unit for height is -
- Acceleration due to gravity, g , -
- The unit for gravitational potential energy is –

DOK Questions:

Hypothesize how these units affect you.

Gravitational Potential Energy

$$\text{Potential energy (PE)} = mgh$$

Potential Energy

What is the potential energy relative to the water surface of a diver at the top of a 10.0-meter-high diving platform. Suppose she has a mass of 50.0 kilograms.

Potential Energy

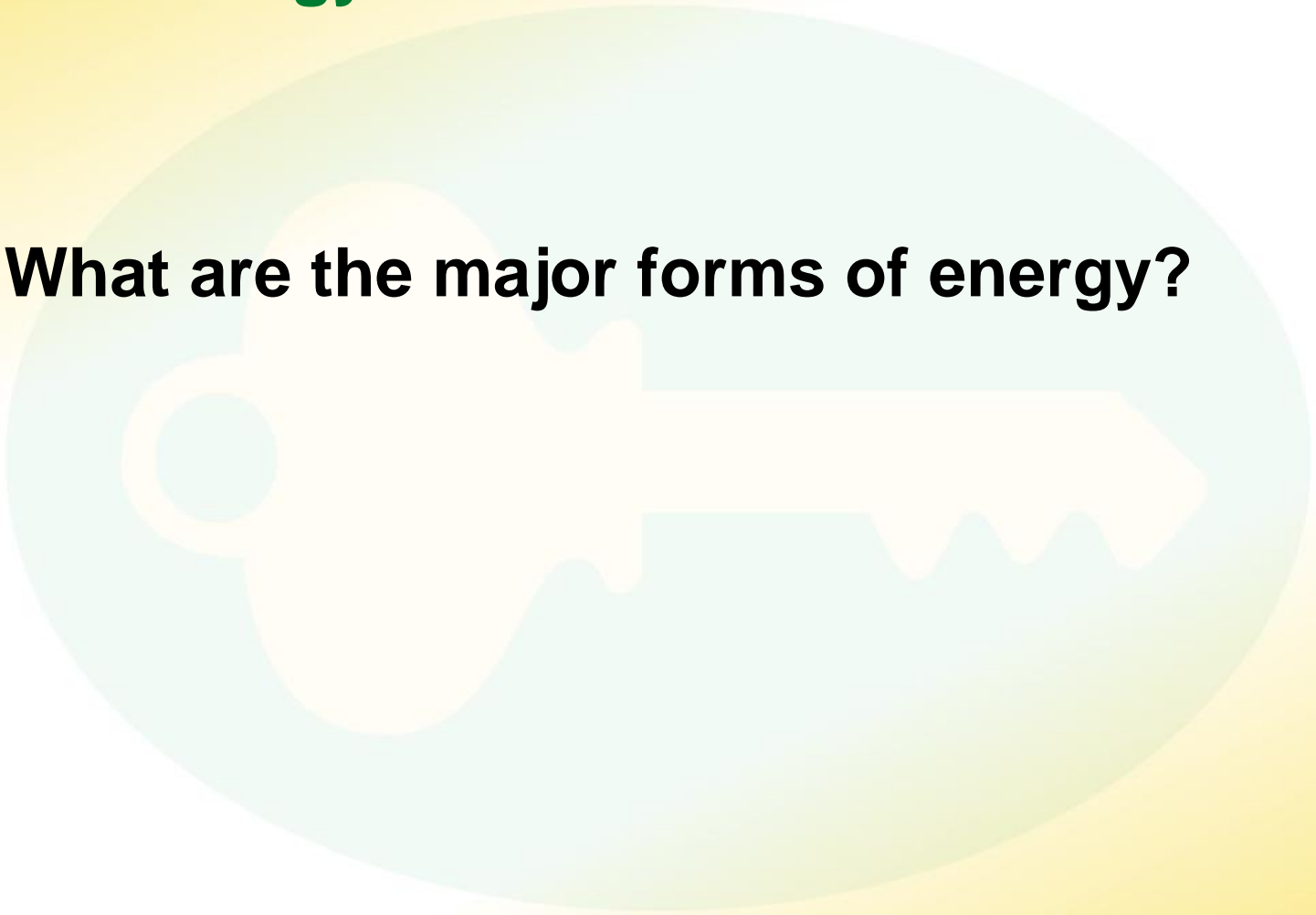
Elastic Potential Energy

The potential energy of an object that is -
Something that is elastic springs back to
its original shape after it is -

Forms of Energy



What are the major forms of energy?



Forms of Energy

Mechanical Energy

The energy associated with the motion and position of everyday objects is -

Forms of Energy

Thermal Energy

The total potential and kinetic energy of all the microscopic particles in an object-

Forms of Energy

Chemical Energy

Chemical energy is -

Forms of Energy

Electrical Energy

Electrical energy is -

Forms of Energy

Electromagnetic Energy

Electromagnetic energy is -

Forms of Energy

- A. Lightning bolts -
- B. Galaxies are –

DOK Question:
Construct a visual model
of the above energies.



Forms of Energy

Nuclear Energy

The nucleus of an atom is -

Assessment Questions

1. How are work and energy related?
 - a. Energy is the rate of doing work.
 - b. Work is a form of energy.
 - c. Work is the transfer of energy.
 - d. Energy is created by work.

Assessment Questions

2. A moving object with a mass of 10 kg has 320 J of kinetic energy due to its motion. How fast is the object moving?
- a. 64 m/s
 - b. 32 m/s
 - c. 8 m/s
 - d. 10 m/s

Assessment Questions

3. Which of these is an example of elastic potential energy?
- a. a bow prepared to release an arrow
 - b. a rubber ball thrown into the air
 - c. a book about to fall from a table
 - d. a truck pulling a trailer

Assessment Questions

4. A small airplane and a helicopter have identical masses. If the airplane's altitude compared to the ground is three times that of the helicopter, how much more gravitational potential energy does the airplane have than the helicopter?
- 0.333 times as much
 - 3 times as much
 - 6 times as much
 - 9 times as much

Assessment Questions

5. The energy stored in the bonds between atoms of a compound is called
- electromagnetic energy.
 - chemical energy.
 - atomic energy.
 - thermal energy.