

## JAF02 Unit 4 Energy

### Task 1 Speaking

Study the collocation of the word “energy”. In pairs, discuss your associations.  
Brainstorm other ideas.

inexhaustible      surplus      renewable      creative      burst of  
be full of      to lack      to direct      to channel      to save      to waste      to work off

ENERGY
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production      demands      resources      prices      shortage

### Task 2 Energy and machines

Match the beginnings and endings of the sentences

1. Energy is the ability...
  2. Kinetic energy and potential energy are the two basic forms...
  3. The principle of the conservation of energy states...
  4. Nuclear fission is the splitting...
  5. Nuclear fusion involves combining...
  6. Collisions may be either elastic...
  7. A machine is any device...
  8. The efficiency of a machine is reduced...
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- a) or inelastic.
  - b) two or more small nuclei to produce energy.
  - c) of energy.
  - d) that increases the effect of a force.
  - e) to do work.
  - f) by friction between moving parts.
  - g) of the nucleus of an atom and produces large amounts of energy.
  - h) that energy can neither be created or destroyed but can be converted from one form to another.

### **Task 3 The many forms of energy**

**Complete the gaps with suitable words.**

Energy is the ability to do work. When a hammer strikes a nail, it \_\_\_\_\_ a force on the nail that causes it to move. The movement of the hammer has the ability to do work and therefore has a form of energy that we call kinetic energy. Kinetic energy is the energy of \_\_\_\_\_.

An object may have energy not only because of its motion but also because of its \_\_\_\_\_ or shape. For example, when a watch spring is wound, it is storing energy. When this energy is \_\_\_\_\_, it will do the work of moving the hands of the watch. This form of energy is called the potential energy. Potential energy is stored energy. Water in a dam is another example of potential energy.

There are many types of kinetic and potential energy. \_\_\_\_\_ energy is potential energy that is stored in gasoline, food, and oil. Thermal energy may be defined as the kinetic energy of molecules. When a substance is \_\_\_\_\_, the molecules move faster, which causes the substance to feel hot. Mechanical energy is energy \_\_\_\_\_ to the movement of objects. Electric energy is energy that is produced by electric \_\_\_\_\_. Nuclear energy is the energy that is stored in the \_\_\_\_\_ of atoms.

### **Task 4 Energy conversion**

**Can you deduce the series of energy changes that occur when a carpenter hammers a nail into a piece of wood?**

What energy does the carpenter have in his/her body before beginning to work?

What energy is present in the raised hammer?

As the carpenter moves the hammer down to the nail, what form of energy will the moving hammer have?

What happens when the hammer hits the nail?

## Using English to define

Aristotle suggested that a good definition should include the general classification of a term plus the specific characteristics that differentiate the term from other members of its class.

### Definition formula:

**Term = Class + Characteristics**

*Chemical energy is potential energy that is stored in gasoline, food, and oil.*

*Mechanical energy is energy related to the movement of objects.*

*Energy is the ability to do work.*

*Kinetic energy is the energy of motion.*

Note: When defining, remember the following:

1. Definitions require the present simple tense.
2. The definite article, *the*, is usually not used with the term being defined because definitions are general statements. For example, we would define *a scientist* (in general), not *the scientist* (a specific one).

### Sentence Patterns

Term		General class word		Specific characteristics
An astronomer	is	a scientist	who	studies the universe.
A barometer	is	an instrument	that	measures air pressure.
Conduction	is	a process	by which	heat is transferred.
Physics	is	the study		of matter and energy.
A volt	is	a unit		for measuring electrical pressure.
Mercury	is a	liquid		metal.
A triangle	is a	three-sided		plane figure.
A dinosaur	is a	prehistoric		reptile.

### Task 5 Correcting definitions

**Determine what is wrong in the following definitions.**

1. A scientific theory is a theory like Darwin's theory.
2. An apple is round, red, and about the size of a fist.
3. An ear is an auditory appendage of Homo sapiens and other species.
4. A unicorn is not a real animal.
5. Tornadoes are very dangerous.
6. Radium is an element.

### **Task 6 Complete these definitions**

1. A machine is a device that ...
2. An insulator is a substance that does not conduct ...
3. Biophysics is a science which...
4. Fog is a cloud...
5. A satellite is a celestial body that...
6. A meteorite is a piece of rock from outer space that...

### **Task 7 Formulating definitions**

**Write a definition using the information given.**

1. An antibiotic / drug / cures bacterial diseases
2. Lung / organ / breathing
3. Acoustics / science / sound
4. Photosynthesis / process / plants manufacture food
5. Catalyst / substance / speeds up but is not changed by a chemical reaction
6. Calorie / unit / measures heat

### **Task 8 Creating definitions**

**Formulate a definition for each of these words.**

An x-ray  
Medicine  
Maths  
An echo  
Caffeine  
A wedge  
Work  
Nuclear energy  
Cyclotron

(Task 3,5 and 7 adapted from Zimmerman F. *English For Science*. Prentice Hall Regents, 1989. Task 2 and 4 adapted from Kelly, K. *Science*. Macmillan, 2007 )

### **Task 9 Video – My hand in the LHC**

**Watch the video and then summarise the answers to a peculiar question.**

[http://www.sixtysymbols.com/videos/hand\\_in\\_the\\_LHC.htm](http://www.sixtysymbols.com/videos/hand_in_the_LHC.htm)