



LIFE·PAC®

Science



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SCIENCE 505
TRANSFORMATION OF ENERGY
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Author:	Barry G. Burrus, M.Div, M.A., B.S.
Editor:	Brian Ring
Illustrations:	Brian Ring



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INTRODUCTION

God designed all living things so that they need energy to survive, grow, and perform the activities of life. You learned in previous LIFE PACs that the sun provides energy for green plants. The green plants use the sun's energy for photosynthesis. During photosynthesis, the green plants produce oxygen and food. This food is used by plants, animals, and other living things to produce the energy that they need to survive. But, what is "energy"?

In this LIFE PAC®, you will learn more about energy and how energy is transformed into several different forms. We call this the transformation of energy. You will also learn how energy is used to do work. You will learn about some of the sources of energy that God has provided for the earth. You will examine some of the concerns that we have about present sources of energy. Finally, you will consider how other energy sources may be used in the future.



OBJECTIVES

Read these objectives. The objectives tell you what you should be able to do when you have successfully completed this LIFE PAC.

When you have finished this LIFE PAC, you should be able to:

1. Describe energy.
2. Identify forms of energy.
3. Describe work.
4. Explain the relationship between work and energy.
5. Identify energy concerns of today that may be problems of the future.
6. Describe several possible energy sources of the future.

VOCABULARY

Study these new words. Learning the meanings of these words is a good study habit and will improve your understanding of this LIFEPAAC.

acids (as' idz). Plural of acid. A chemical compound containing hydrogen that mixes with water.

advantage (ad van' tij). To the good; better position.

biomass (bi' o mas). Any organic material that can be converted into energy or a source of energy. Examples are garbage, liquid wastes, and manure.

chamber (cham' bər). An enclosed space. It is a tube-like space in an engine.

collision (kə lizh' ən). Rushing against strongly; very strong crash.

efficient (ə fish' ənt). Able to produce with little or no waste.

explosion (ek splō zhən). A blowing up with a loud noise.

fission (fish' ən). The splitting of the atomic nucleus of certain elements, especially uranium. It releases of a large amount of energy.

flint (flint). A very hard stone.

friction (frik' shən). Resistance caused when two objects rub together.

fuels (fyü' əlz). Plural of fuel. Something that can be burned to get fire and energy.

fusion (fyü' zhən). The combining of atomic nuclei to form heavier nuclei. It releases an enormous quantity of energy.

hazards (haz' ərdz). Plural of hazard. Something that is dangerous.

ignite (ig nīt'). To set on fire; start burning.

intelligence (in təl' ə jəns). The ability to learn and understand.

kinetic (kin et' ik). Of or relating to the motion of objects.

machinery (mə shē' nər ē). A machine or group of machines. Equipment used to do work.

matter (mat' ər). The material that makes up things.

mechanical (mə kan' ə kəl). Of machines. A form of energy that is of motion or movement.

mental (men' tl). Of the mind or done by the mind.

nuclear (nü' klē ər). Having to do with the center of atoms.

particles (pär' tə kəlz). Plural of particle. A very small part of a material or substance.

piston (pis' tən). A piece of solid material that moves back and forth within a tube or chamber.
Pistons are used in engines to help supply power to machinery.

political (pə lit' ə kəl). Concerned with politics; having to do with governing.

potential (pə ten' shəl). Something possible. The ability to go into action or to produce movement.

radiates (rā' dē ātz). Gives out rays.

reactor (rē ak' tər). A device used to control release of energy from atoms.

renewed (ri nüd'). Made like new again.

solar (sō' lər). Having to do with the sun.

transformation (tran' sfər mǎ' shən). Change in form or condition.

Note: These words appear in **boldface** print the first time they are used in this LIFEPAC. If you are unsure of the meaning when you are reading, restudy the definition given in this LIFEPAC.

Pronunciation Key: hat, āge, cāre, fār; let, ēqual, tērm; it, īce; hot, ōpen, ōrder; oil; out; cup, pūt, rüle; child; long; thin; /ʒh/ for then; /zh/ for measure; /ə/ represents /a/ in about, /e/ in taken, /i/ in pencil /o/ in lemon, and /u/ in circus.

I. ENERGY AND WORK

INTRODUCTION

Energy is one of the most basic parts of God's creation. Whenever anything moves or grows, energy is used. We use energy to do work. Energy lights our homes and cities at night. Our cars, buses, trains, and airplanes all use energy. In our modern world, we have learned to use and control energy to bring about great changes in the way we live. Energy is very important to human beings and to all living things.

Energy is very closely related to work. As stated above, we use energy to do work. Whenever anything moves due to a force applied to it, energy is being used.

In this section of the LIFEPAC, you will learn more about energy and the various forms of energy. You will also learn more about the term "work" and how energy is related to work.

Review these objectives. When you have completed this section, you should be able to:

1. Describe energy.
2. Identify forms of energy.
3. Describe work.

Restudy these words. They will appear for the first time in Section I of this LIFEPAC.

explosion	fuels	kinetic
matter	mechanical	nuclear
particles	potential	radiates
solar	transformation	

ENERGY

Energy makes things happen. If you look around you right now, you can probably see energy being used. If it is daytime, the sun is giving off heat energy and light energy. If it is night, the light bulbs are using electrical energy to give off light energy.

Definition. Energy is commonly defined as *the ability to do work*. Notice carefully this definition. Energy and work are very closely related. When energy is used, work *is* done. For example, when you run or play, your body uses energy to help you move. When energy is stored, work *can be* done. For example, when you are at rest, the energy stored in your body's fat and muscle tissues will allow you to start running when you are ready. So, the *ability* to do work, either actually being done or ready to be done, is called energy.

Types of energy. This leads us to the two basic types of energy. Energy that is stored is called **potential** energy. In this case, no work is being done. However, the energy is ready and available to do work. Therefore, it is called *potential energy*. The other basic type of energy occurs when a body or material thing is moving or in motion. Energy that is moving is called **kinetic** energy. Any **matter** that is moving has *kinetic energy*.