

# Energy and Energy transfer

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Do not answer the following questions. Consider them as you go through the work.

- What do we need energy for?
- Where does energy come from?

## Energy for life

Scientists say energy is the ability to do work. We need to understand what this means. A way to think of it is that energy can make something happen.

## A. Energy is the ability to do work

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- energy
- work
- movement

The word energy comes from the Greek word *energeia*.

The idea of this activity is to have some fun playing a game so that you get tired afterwards. You will then understand the idea that you used energy to run around - energy is the ability to do work and move.

Let us have some fun playing a game!



**INSTRUCTIONS:**

A.1. Play "Hide and Seek" with your brother or sister..

A.2. These are the rules of the game:

1. One person needs to be the seeker.
2. The seeker needs to find a home - a hiding place well.
3. The seeker closes their eyes and counts to 20.
4. One must hide. That person is the hider.
5. When the seeker has counted to 20, (s)he must find the other and tag them by touching.
6. You then change roles. The hider becomes the seeker and the seeker becomes the hider.
7. You must play this game very fast and quickly.

A.3. Return to your worksheet/activity after 10 minutes and think about how you feel. Describe how you are feeling after the game.

A.4. Write down some of the descriptive words below.

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This game requires that you do a lot of running. You might even get tired from it. This means that energy is being used to do work.

**Questions for you to think about and answer.**

- A.5. Why do we need energy?
- A.6. Where do you get your energy from?
- A.7. What other things have energy? (other animals, plants, machines, houses and cars)
- A.8. Where do these things get their energy from?
- A.9. What would happen without these sources of energy?

We saw that we got tired from running and playing a game in the last activity. We use energy for everything we do.



Even when you do a handstand you are using energy!

# B. Energy is all around us.

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## INSTRUCTIONS:

B.1. Think about what you do from when you get up in the morning until you go to sleep at night. Think about what happens around you every day.

B.2. Write down five things that you have thought about that you could not do without energy.

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In our daily lives, there are many things that we do that need energy. As we get energy from food, it is important for us to eat breakfast. Cleaning teeth, walking, running, reading, writing all need energy. Turning on lights and cooking food use energy. Warming our homes in winter or cooling our homes in summer uses energy. Drying clothes on the washing line. There are bicycles, motor cars, motor bikes and aeroplanes; all these kinds of transport need energy to move.

B.3. We need energy to carry out all our life processes. Do you remember learning about life processes in the beginning of the year?

B.4. Write down the 7 life processes that are carried out by all living organisms.

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You love running around, but where do you get all my energy from?!

That is a very good question. Think about why you need to eat! We get our energy from the food we eat.

We eat plants and the food made from plants to give us energy. We also eat the meat from animals to give us energy.



We get our energy by eating plants and animals.

But where does this energy in the food come from? Energy in our food comes from the Sun!

## Energy from the Sun

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- solar energy
- fossil fuels
- energy chain or food chain
- reflect
- absorb
- transfer

Before going on with the rest of this chapter, let's identify some of the new words we will be learning about.

## Word search

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### INSTRUCTIONS:

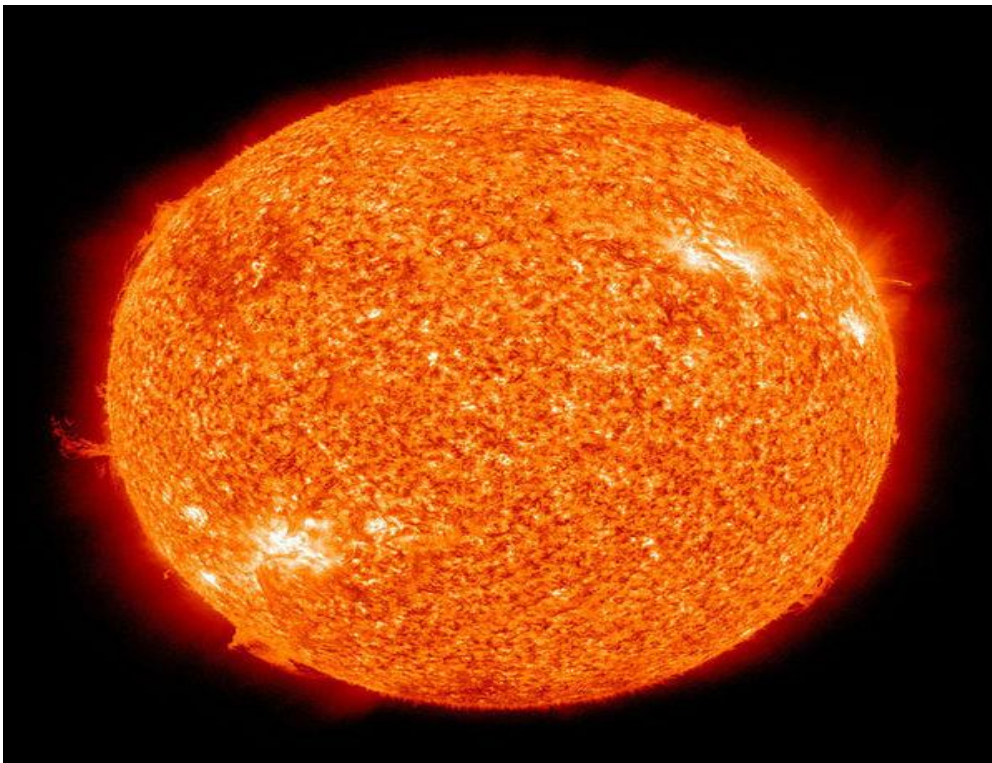
1. Complete the wordsearch by finding the words listed below.
2. Circle them with a coloured pen or pencil.
3. Once you have found all the words, write down what you think the word means to you.

R S U N Q F D L W E A M  
C E D J G O D O O K S O  
H H F F S O W O R K K V  
A C O L I D W X L S A E  
N O H D E N E R G Y S M  
G F G A I C W J U S N E  
E V V X I B T Z L Q K N  
H E X Q W N H E E D B T  
E Q V C T R A N S F E R  
A E Y U J E D F N Y Y B  
T T T Z U T K L I G H T  
K E P A B S O R B H U M

**Words to find:**

food, energy, work, movement, Sun, energy, change, light, heat, absorb, reflect, transfer, chain

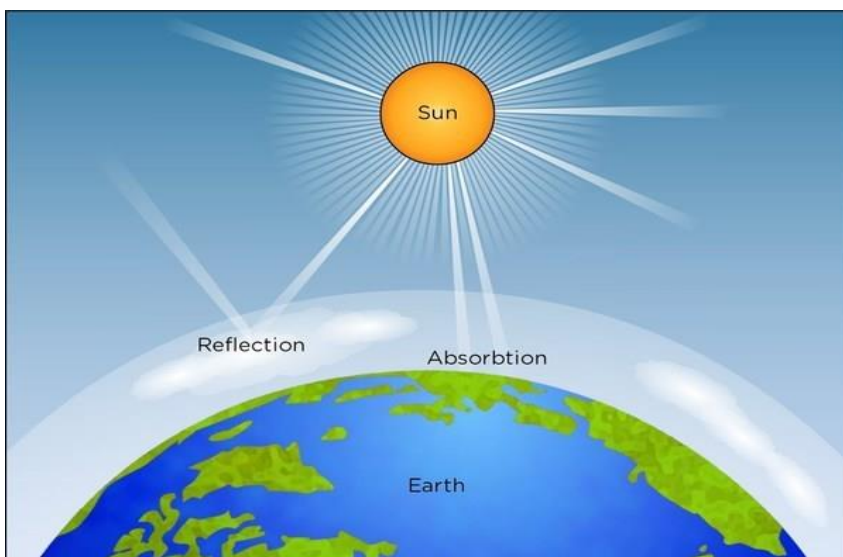
We get almost all of our energy on Earth from the Sun. We call this energy solar energy. Sol means Sun. Next term in Earth and Beyond, we will learn a lot more about the Sun!



The Sun photographed by NASA

The Sun is the closest star to Earth. A star is a giant ball of gas which releases energy. Some of this energy from the Sun travels to the Earth in rays. Some of the rays are light that we can see. Other rays like ultraviolet light and X-rays we cannot see.

When the rays reach the Earth, some reflect back into space. The Earth absorbs most of the solar energy. This heat warms the Earth and the air around it.



Rays from the Sun reach the Earth. Some are reflected and some are absorbed by the Earth.

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B.5. Use your dictionary to write down definitions for

B.5.1.reflect

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## Energy from the Sun causes heating

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When light energy from the Sun hits objects, some of the energy is absorbed. Some of the energy bounces back.

Without the Sun, the Earth would be a cold place with no life. Energy from the Sun has many different uses.

**Light and warmth:** We use the light from the Sun so that we can see during the day. We use the energy from the Sun to warm us.



People enjoying the Sun on the beach

**Plants use light from the Sun to grow.** Do you remember learning about what plants need to grow in the first term?



Plants use the energy from the Sun to make food, such as these mealie plants.

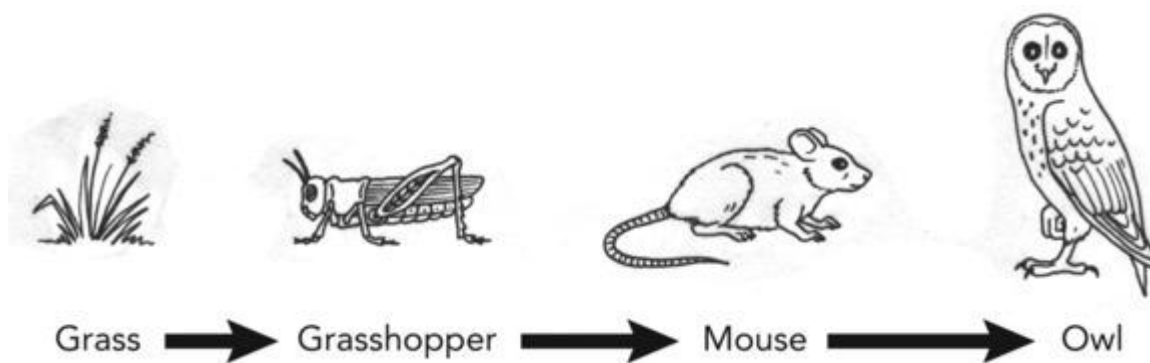
**Animals eat plants to grow.** The energy stored in the plants is used by the animals for life processes.



These cows are eating grass to get their energy.

The transfer of energy from the Sun to plants to people is called an **energy chain** or **food chain**. It is a chain because each organism forms a link in the chain as energy is passed along from one organism to the next.

The arrows show the direction of the energy flow from one thing to the next. Look at the example of the food chain below.





An example of a food chain

First question "What sort of energy does the Sun give off?" The answer is light and heat energy. The light energy given off by the Sun is used by the grass to make food and the energy is transferred from one organism to the next in the food chain.

In this food chain, the Sun gives off light energy which is used by the grass to make food. The grasshopper eats the grass. The mouse then eats the grasshopper and the energy is transferred (moved) from the grasshopper to the mouse. Lastly, the owl eats the mouse.

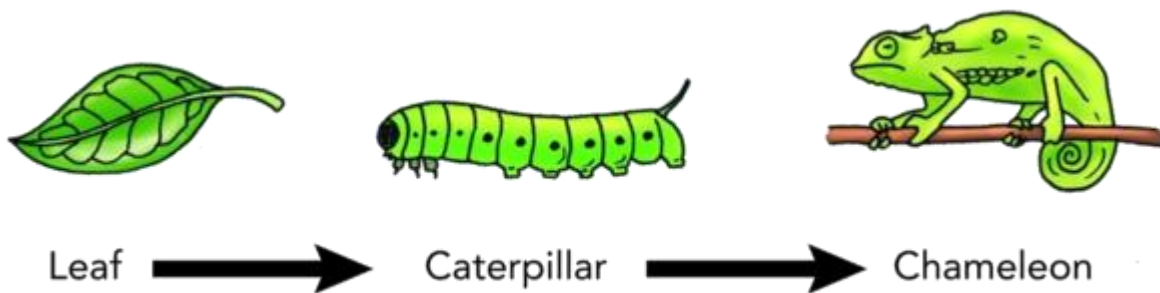
## C. Describing the transfer of energy from the Sun

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### INSTRUCTIONS:

C.1. Look at the following food chain.

C.2. In the space below, describe the transfer of energy from one organism to the next.



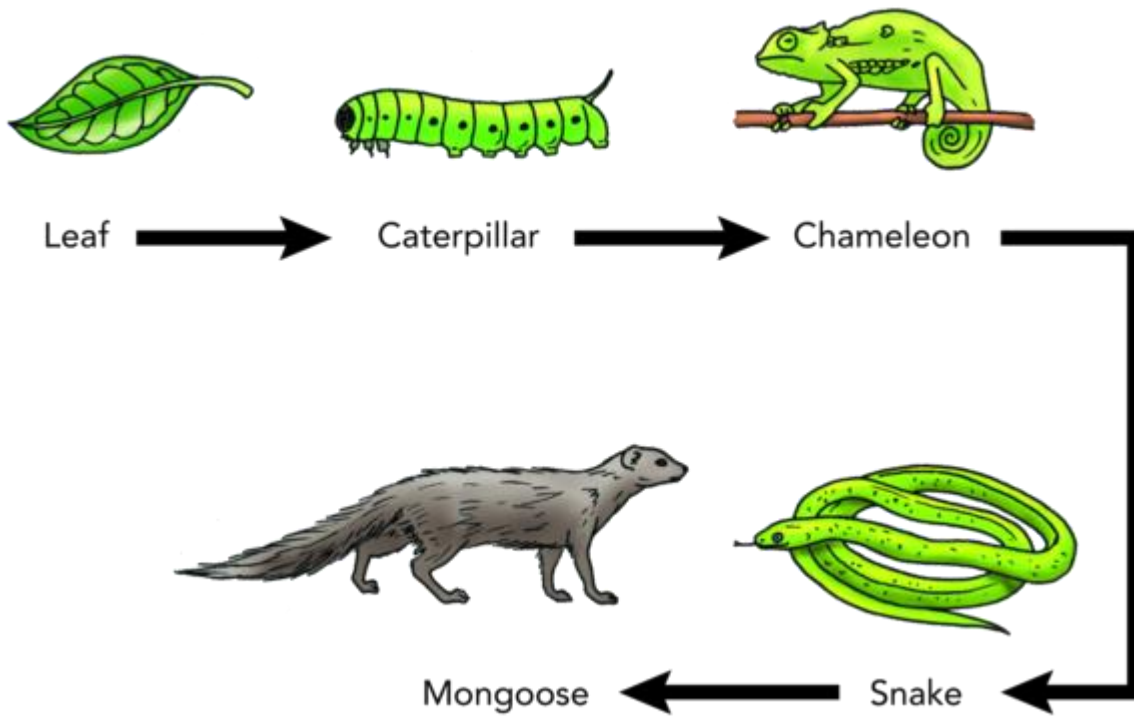
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C.3. This food chain could be much longer! As more organisms eat the previous organisms, the food chain gets longer, and the Sun's energy is passed further along from one animal to the next. Look at the longer food chain below.



C.3.1. In this food chain, what does the mongoose eat to get energy?

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Some people have solar panels on their roofs which traps the Sun's energy directly and can be used to light up their houses and heat water.

Trees are plants and so they get their energy from the Sun to grow. As it grows, the tree stores some of this energy in its wood. When we need heat and light at night and when it is cold, we burn the wood so that we can use the stored energy.



We burn wood to get warmth from the energy that is released.

Long ago before dinosaurs lived on Earth, plants and animals also used the energy from the Sun to grow. Today some of these old dead plants and animals have turned into coal, oil and natural gas. Coal, oil and natural gas are called fossil fuels. We mine fossil fuels so that we can use the energy from the Sun that was stored millions of years ago.

When we use petrol or diesel to make cars or tractors go, we are really using stored energy which came from the Sun millions of years ago.



We use petrol or diesel to drive our cars.

- We use energy for everything we do.
- We get our energy from our food.

- Energy in our food comes from the Sun.
  - An energy chain or food chain is used to show the transfer of energy.
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C.4. What is solar energy?

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C.5. Explain how animals get energy for life processes.

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C.6. Draw a food chain to show the flow of energy from the Sun to a lion that has just eaten an impala.

Do your drawing here:

C.7. List some fossil fuels.

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C.8. Where do fossil fuels come from?

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C.9. Draw and label a diagram to show where you get energy from when you eat rice and when you eat woks.

