

Grade 4 Science
Week of November 23 – November 27

Unit 3

What is Energy?

Bill Nye – Energy

What is energy?

When we use that word in our everyday talk, we might say "I don't have a lot of energy right now" if we're tired, or maybe we would say "our dog is so energetic right now" if it's running around a lot. But when we're studying science, energy has a different meaning.

Check out the video to see some examples of what energy is in science!



Bill Nye the Science Guy on Energy: <https://youtu.be/0ASLLiuejAo>

What is Energy?

Energy is often defined as:

Energy is a property of objects which can be transferred to other objects or converted into different forms.

or

Energy is the ability to do work.



Physics - <https://youtu.be/d60UWuBAd8M>

Energy in Food

One of the most powerful things about working with energy is that it can be represented in SO many forms. We can even measure the energy within our food. Energy from food is usually measured in joules or calories.

Types of Energy

Electrical

Electrical energy is the flow of **charged particles** which are called **electrons**.

You're using energy right now! Our computers use electricity to run.

You can also find electrical energy in nature; **lighting storms** are a great example.

Another example is **static electricity**;

have you ever rubbed your feet on carpet and then zapped something when you touch it? That's static electricity!



A Story of Electricity: https://youtu.be/0zif9w_vqx0

Light

Light is made of **electro-magnetic** radiation and travels in a straight path.

Light travels at about 300,000 kilometres per hour, nothing travels faster than light.



What is Light Energy? <https://youtu.be/LCEqIvHFIhM>

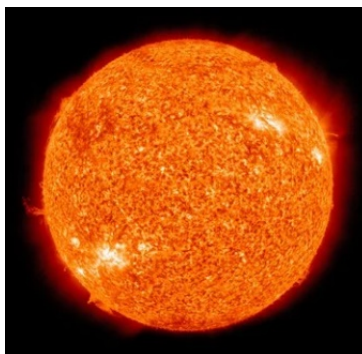
We cannot feel light energy only see it.

There are **natural** forms of light energy such as the **sun**, which gives off light and heat energy.

Other forms of light energy are the **stars** and **fire**.

Unnatural light energies are:

- electric lights
- neon lights
- laser lights



Sound

What is actually travelling to your ear when you're listening to music? Sound energy!



What is Sound? <https://youtu.be/3-xKZKxXuu0>



All sound is made the same way, through **vibrations**. We can't see these vibrations, however, our ears can sense them.

All around us are things called **air molecules**. The vibration of our music vibrates the air molecules beside it, they then vibrate the air molecules next to them. The vibration get passed through the air molecules making a **sound wave**.

Chemical

Chemical energy is energy stored in **chemical bonds**.

The energy is **released** in a chemical reaction.



Potential Energy: <https://youtu.be/enUBooHI5uY>



Some examples of chemical energy are:

- Dynamite
- Digesting food
- Burning paper

Thermal

Everything in the universe is made of **matter** and matter is made of small things called **atoms**; these atoms are always moving. Thermal energy or heat energy comes from the movement of these atoms, the faster these atoms move the more heat is produced.

Examples of thermal energy:

- The sun
- A boiling pot
- A heater



Heat Energy Video:
<https://youtu.be/xGKg3TSO4v8>



Elastic

Elastic energy is found in items that can **stretch** when a **force** is placed on them and then later return to their original shape.



Elastic Potential Energy: <https://youtu.be/YtqmpJegrno>

Examples of elastic energy are:

- **Bow** (in bow and arrow)
- **Spring** (slinky)
- **Elastic band**



Nuclear

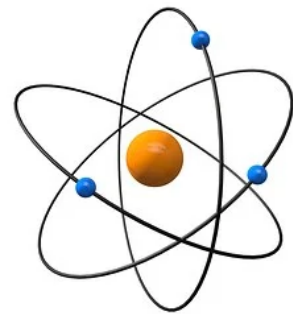
Nuclear energy is used to make electricity.



How Does Nuclear Energy Work? <https://youtu.be/FNNKhE1FNNM>

Nuclear energy is the energy stored in the **nucleus** (centre) of an **atom**.

Power plants split the nucleus of the atom and it makes **heat energy**. Which then changes water into **steam**, that then spin **turbines**. The turbines power a **generator** that then makes **electricity**.



Magnetic



A **magnet** is a rock or a piece of metal that can pull some types of metal toward itself.

Bill Bye Magnetism Part 1: <https://youtu.be/8PyqL9y7VZo>

Gravitational

Gravitational energy is energy that something has because of its **height**. To give an objection gravitational **potential** energy you lift it higher.

Examples of gravitational energy are:

- **Rollercoaster**
- **Waterfall**
- **Bouncy ball**

Physics ~ Learning Guide Name: _____

Instructions:

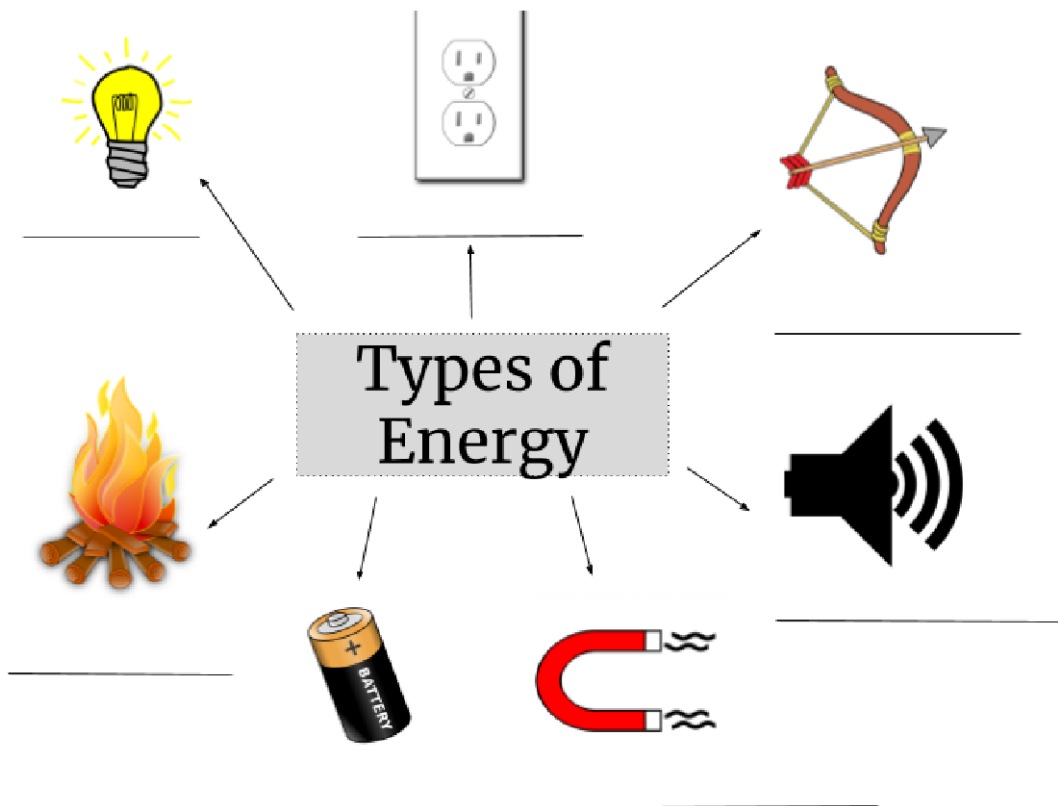
Using a pencil, complete the following notes as you work through the related lessons. Show ALL work as is explained in the lessons. You are required to have this package completed BEFORE you write your unit test. Do your best and ask questions if you don't understand anything!

3.1 What is energy?

1. Energy can be _____ from one object to another, but it cannot be _____.
2. Energy is the ability to _____.
3. Our body uses _____ for energy.
4. Lightbulbs convert electrical energy into _____ energy.
5. What is one example of where electrical energy is from?

3.2 Types of Energy

1. Label the different types of energy on the picture below.



2. T or F Electricity is energy.
3. What are 3 natural forms of light energy?
 - a.
 - b.
 - c.
4. Name a man made source of light energy.

5. How do we hear sound vibrations?

6. What type of energy moves fast and that makes an object warm?
 - a. potential
 - b. heat
 - c. sound
7. What type of energy vibrates and moves through the air in waves?
 - a. heat
 - b. light
 - c. sound
8. What type of energy has electrical charges around an object and has north and south poles?
 - a. heat
 - b. potential
 - c. magnetic

9. Match the energy:

<p>___ Light</p> <p>___ Sound</p> <p>___ Magnetic</p> <p>___ Thermal</p> <p>___ Electrical</p> <p>___ Elastic</p> <p>___ Nuclear</p> <p>___ Gravitational</p> <p>___ Chemical</p>	<p>a. Flow of electrons</p> <p>b. The sun is a natural form of this energy</p> <p>c. This energy is made through vibrations</p> <p>d. Energy is released through a chemical reaction</p> <p>e. When atoms move really fast they are producing this type of energy.</p> <p>f. An item that can stretch can have this type of energy.</p> <p>g. When an atom is split.</p> <p>h. A piece of metal that can attract other metals has this type of energy.</p> <p>i. At the top of a rollercoaster you have a lot of potential energy or also this type of energy.</p>
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