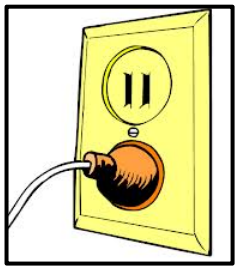
4th GRADE MINIMUM CONTENTS-NATURAL SCIENCE

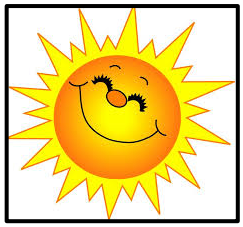
UNIT 14: ENERGY & LIGHT

► ENERGY

We need energy for everything we do. Energy moves cars along roads, it keeps our homes warm and it gives us light. There are many different **forms of energy**, from different sources:



- **Electrical energy** is the energy that makes machines in our homes work. We convert energy from many sources, for example, the wind and fossil fuels, into electrical energy.
- **Thermal energy** is energy caused by **heat**. The Sun produces a lot of thermal energy.



- **Light energy** is energy from light sources, such as a light bulb or the sun.
- **Kinetic energy** is energy in **moving** objects, such as machines or a ball that is rolling.
- **Chemical energy** is energy stored in food, fuel and batteries. Our bodies change chemical energy from food into thermal energy or kinetic energy.
- **Nuclear energy** is energy found inside substances such as uranium.

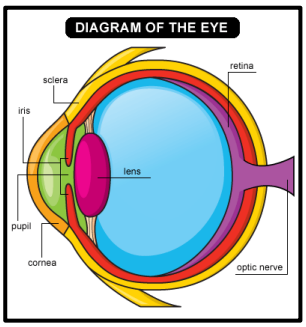
► RENEWABLE AND NON-RENEWABLE ENERGY SOURCES

- **Renewable energy sources**. These sources will never run out. We can use them again and again, for example, the Sun, water and wind. They do not pollute our planet.

- **Non-renewable energy sources**. These sources will run out. We consume them faster than they are made, for example, coal, natural gas and petroleum. The use of these sources of energy causes pollution; because of that…

… we should limit the use of non-renewable energy sources.

► LIGHT



We need light in order to see. Remember: "*Light enters the eye and passes through the cornea, the pupil and the lens. Then, the retina captures this light and sends the information to the brain through the optic nerve*".

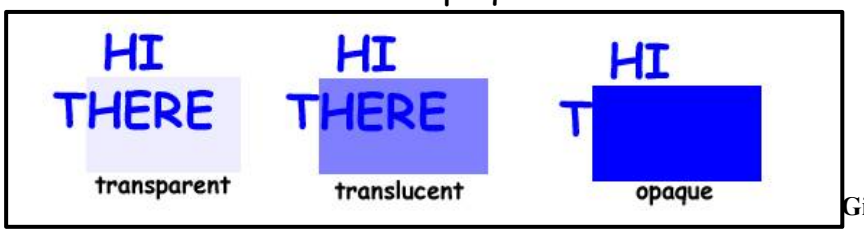
Light is a form of energy. It allows us to see objects around us. Light comes from **natural sources**, like the Sun, and from **man-made sources**, like light bulbs and candles. Light has several **properties**:

- **Light travels in all directions**. When you switch on a light in a room, light travels to every part of the room.
- **Light travels in a straight line**. Light cannot move around objects.
- **Light travels very fast**. When you switch on a lamp, the light travels so fast you cannot see it moving. It travels at 300000 kilometres per second.

► OBJECTS AND LIGHT

There are three different types of objects, depending on how much light passes through them.

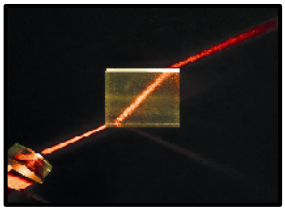
- **Transparent objects**. Light can pass easily through transparent objects. We can clearly see objects on the other side. Glass is transparent.
- **Translucent objects**. Only some light can pass through translucent objects. When we look through them, we see blurred objects on the other side. Lampshades are translucent.
- **Opaque objects**. Light cannot pass through opaque objects. A shadow forms on the other side. Wood is opaque.



► REFLECTION OF LIGHT

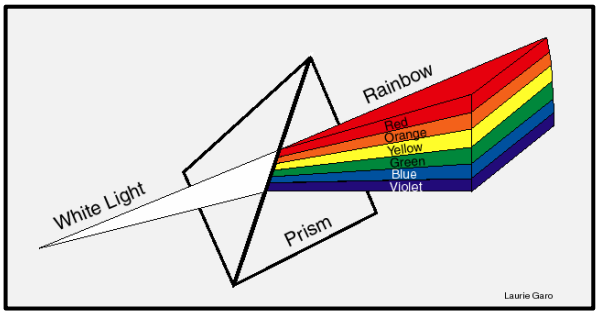
When light hits an opaque object, it bounces off, just like a tennis ball bouncing off a racket. This is called **reflection**. Reflected light enters our eyes. This is how we see. Most objects only reflect part of the light that hits their surface. Some objects reflect light better than others. Smooth, shiny surfaces, for example, **mirrors**, reflect light well. However, dull and dark surfaces do not reflect light well.

► REFRACTION OF LIGHT



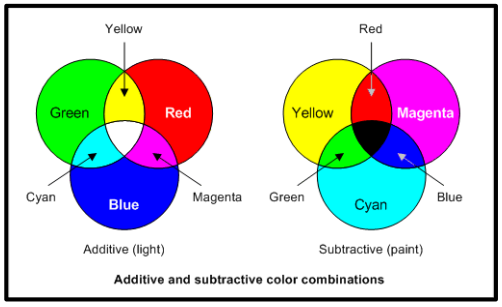
Light bends and changes direction when it passes from one transparent medium to another. This is called **refraction**. Water, clear glass, lenses and air refract light. Here is an example of refraction: if you put a pencil in a glass of water, it looks bent. This is because light is refracted when it passes from the air to the water.

► THE COLOURS OF LIGHT



Light looks white, but it is actually made up of seven colours: red, orange, yellow, green, blue, indigo and violet. These are the colours we see in a rainbow. We can separate white light into all its colours by shining it through a **prism**.

THE PRIMARY COLOURS OF LIGHT



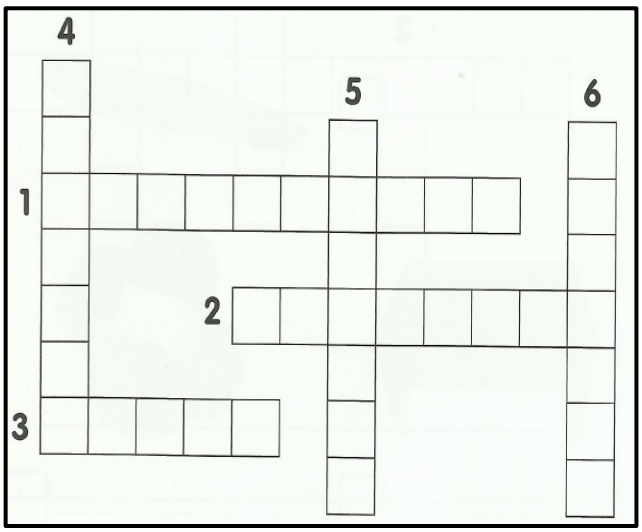
The primary colours of light are red, green and blue. By mixing these colours in different combinations we can make the

secondary colours of light: magenta, cyan and yellow. When we mix all the colours together we make white light.

UNIT 14: ENERGY & LIGHT

ACTIVITIES

1.- Complete the crossword about forms of energy.



ACROSS

1. Energy that makes a computer work

2. Energy in a pizza

3. Energy from a lamp

DOWN

4. Energy produced by a radiator

5. Energy in a ball that is falling

6. Energy inside uranium.

2.- Circle six energy sources and classify them.

s u n p e t r o l e u m w i n d n a t u r a l g a s c o a l w a t e r

renewable energy sources	non-renewable energy sources
-	-
-	-
-	-

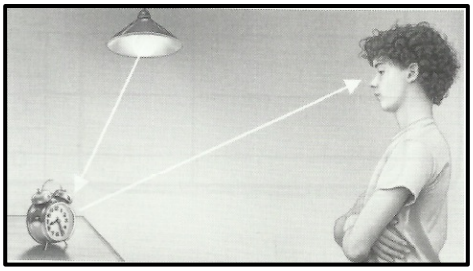
3.- Look at the picture. Unscramble the words and write the sentences.

a. clock - hits - Light - the:

_____

b. the - clock - The - reflects - light:

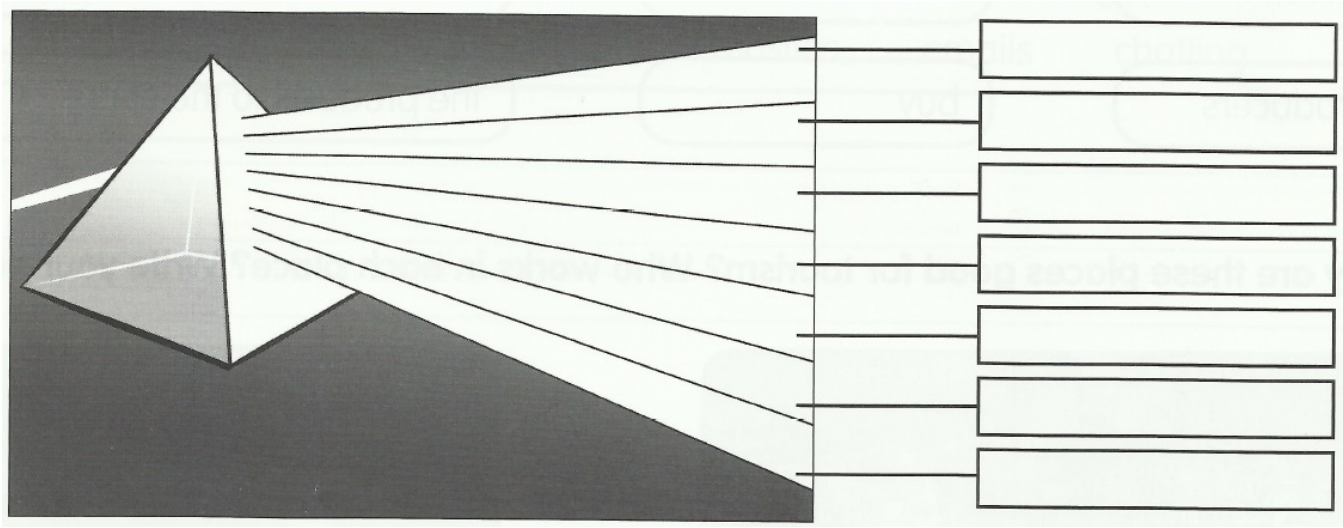
_____



c. enters - boy's - reflected - The - light - the - eyes:

_____

4.- Colour the diagram. Then, label the colours of light.



5.- Complete your bilingual dictionary.

ENERGY AND LIGHT	
- Source of energy: _____	- Opaque object: _____
- make something **work**: _____	- Shadow: _____. - Form: _____
- Heat: _____. - Roll: _____	- Wood: _____. - Hit: _____
- Light bulb: _____. - Candle: _____	- Reflection of light: _____
- Fossil fuel: _____	- Reflect light: _____
- Store: _____. - Fast:_____	- Bounce off: _____
- Kinetic energy: _____	- Surface: _____
- Renewable energy: _____	- Mirror: _____
- Run out: _____. - Pollute:_____	- Smooth: _____. - Shiny: _____
- Coal: _____. - Allow: _____	- Dull: _____. - Dark: _____
- Man-made sources: _____	- Refraction of light: _____
- Switch on: _____	- Refract light: _____
- Switch off: _____	- Bend: _____. - Bent: _____
- Straight line: _____	- Actually: _____
- Through: _____. - Easily: _____	- Indigo: _____. - Cyan: _____
- Clearly: _____. - Side: _____	- Rainbow: _____
- Translucent objects: _____	-

- Blurred objects: _____ - Lampshade: _____	- - -