

# ACTIVITIES

## UNIT 7. LIGHT AND HEAT

### CHECK YOUR LEARNING

#### LIGHT & COLOURS

#### 1. Write the correct words to complete the sentences.

1. Light travels at \_\_\_\_\_ kilometres per second
2. light travels in a \_\_\_\_\_ line.
3. Light cannot pass through \_\_\_\_\_ objects.
4. Light passes easily through \_\_\_\_\_ objects.
5. Only some light can pass through \_\_\_\_\_ objects.
6. Raindrops act like tiny \_\_\_\_\_ that separate light into seven \_\_\_\_\_.
7. \_\_\_\_\_ light is made up of the seven colours of the rainbow.

#### 2. Write T (true) or (F). Then correct the false sentences.

- a. \_\_\_ Light is a form of energy.
- b. \_\_\_ The Moon is a natural source of energy.
- c. \_\_\_ Some living things produce light.
- d. \_\_\_ Raindrops bring the seven colours of light together.
- e. \_\_\_ Light is faster than sound.
- f. \_\_\_ Shadows form when light heats transparent objects.

#### 3. Think of all the light sources your family uses. Divide into natural and man-made sources.

Which do you use the most often? \_\_\_\_\_

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4. Which properties of light are shown in this picture?



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5. Match and write one example. Tick (✓) the objects that are most common.

Match and write one example for each. (1 point)

translucent objects

Light passes easily through them

T: \_\_\_\_\_

opaque objects

Only some light can pass through them

O: \_\_\_\_\_

transparent objects

Light cannot pass through them

T: \_\_\_\_\_

6. Are these things usually transparent, translucent or opaque? Write.

a. a book: \_\_\_\_\_

c. air: \_\_\_\_\_

b. a lampshade: \_\_\_\_\_

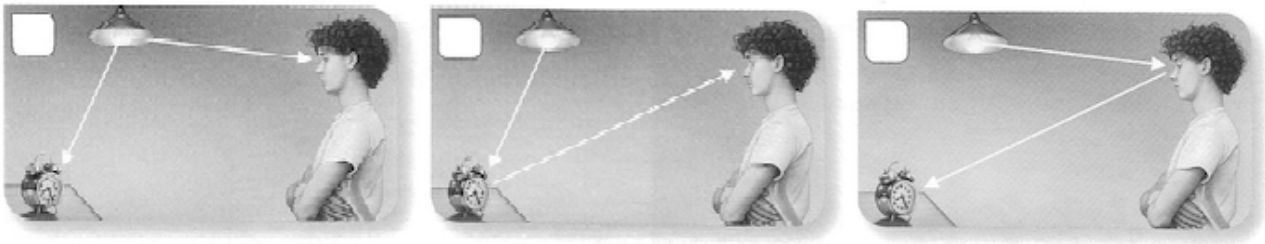
d. a floor: \_\_\_\_\_

7. Can we see colours without light? How does darkness affect our sight? \_\_\_\_\_

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8. Tick (✓) the diagram that shows how we see objects. Then, complete the sentences.



- We only see objects when there is \_\_\_\_\_. The objects \_\_\_\_\_ some of the light that hits their surface. Then, the light enters our \_\_\_\_\_.

9. Which part of the pirate flag reflects all colours of light?

Which part absorbs all colours of light? Explain. \_\_\_\_\_

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10. What is refraction? Complete the sentences about refraction by writing the correct words in the spaces.

telescopes - concave - Lenses - denser - density - air

Refraction happens when light passes from one material to another material with a different \_\_\_\_\_.

Refraction can be observed when light passes from \_\_\_\_\_ to water at an angle.

This is because water is \_\_\_\_\_ than air.

\_\_\_\_\_ refract light. They can be convex or \_\_\_\_\_.

Both types of lenses are used for making glasses, binoculars, \_\_\_\_\_, microscopes or cameras.

11. What do you know about reflection? Select the true statements about reflection; tick (✓) them.

- A. Reflected light allows us to see everything.
- B. An object appears red because it absorbs red light and reflects other colours.
- C. Mirrors reflect most of the light that hits their surface.
- D. White objects absorb most colours of light.
- E. Objects absorb all colours of light and reflect some of them.
- F. Black objects absorb all colours of light.

12. Explain one example of reflection and one example of refraction in the photograph.



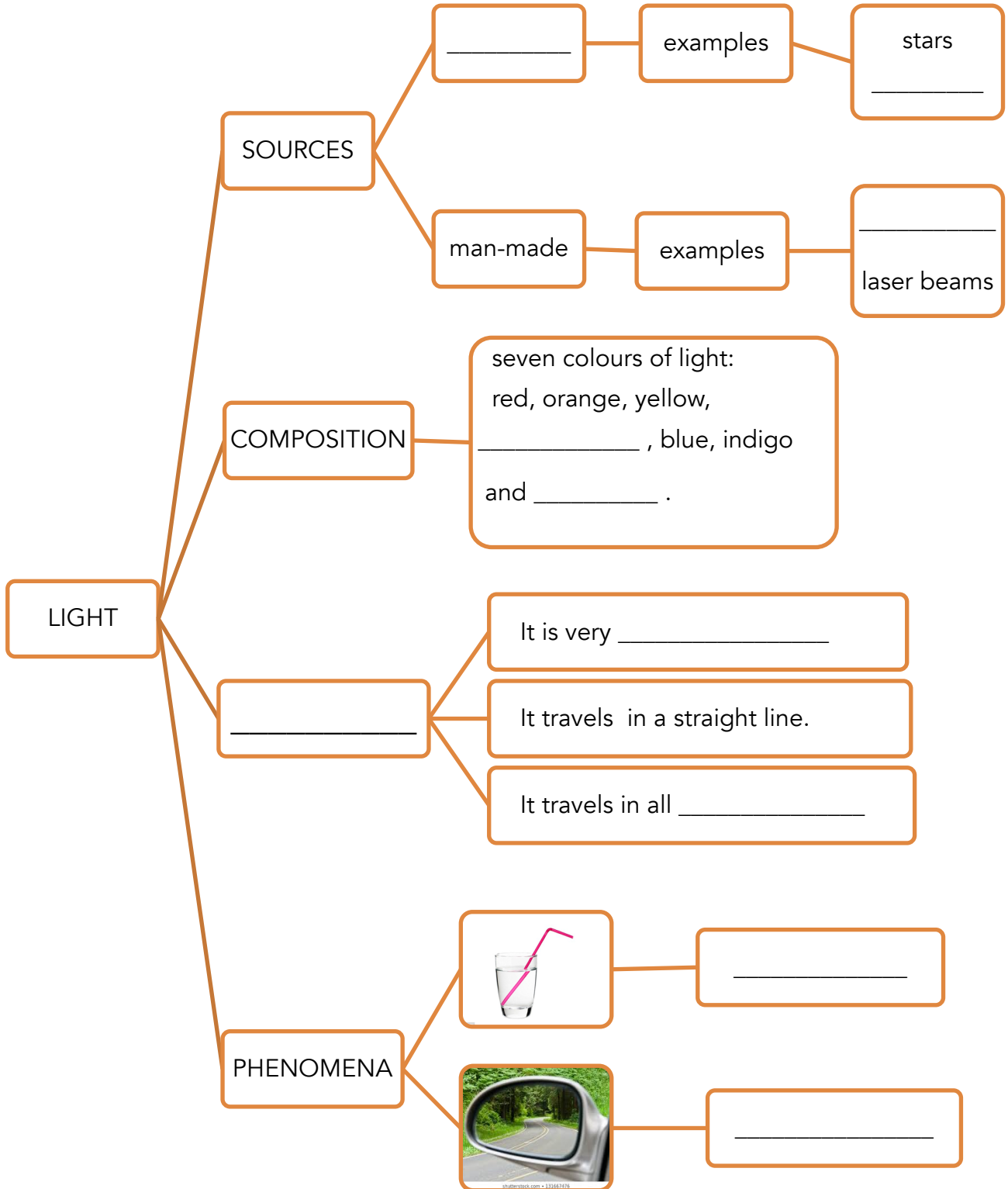
- Reflection: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- Refraction: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

13. Are these examples of reflection or refraction

- You see yourself in a car window. \_\_\_\_\_
- A straw look bent in water \_\_\_\_\_
- The leaves on a plant appear green. \_\_\_\_\_
- A fish looks larger in the water. \_\_\_\_\_
- You see the sky on the surface of a lake. \_\_\_\_\_

14. Use the words to complete the mind map.

properties - fast - candles - refraction - violet - natural - green  
 directions - reflection - fire



## HEAT

15. Complete the sentences about heat using the words from the box.

thermal - volume - change - measurement - heat -  
thermometer - temperature

- In order to heat a substance we have to add \_\_\_\_\_ energy.
- \_\_\_\_\_ is the flow of thermal energy from a warm substance to a cooler substance.
- Heat and \_\_\_\_\_ are not the same. Temperature is the \_\_\_\_\_ of how hot or cold something is.
- To find out the temperature of a substance, we use a \_\_\_\_\_.
- When we add thermal energy to a substance we produce either a \_\_\_\_\_ in its state or an increase of its \_\_\_\_\_.

16. Write heat conductor or heat insulator. Then, answer the question.



- If you deep both spoons in hot chocolate, which spoon will warm your fingers? Explain your answer \_\_\_\_\_

\_\_\_\_\_

17. Why do we use metal pans and wooden spoons when we are cooking? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

18. Classify these materials: plastic, iron, cork, copper, air, steel, wool, wood.

HEAT CONDUCTORS	HEAT INSULATORS

19. What happens when two objects at different temperature come in contact? Tick (✓) the correct answer.

- A. Heat transfers from the hotter object to the colder one until they both reach the same temperature.
- B. Heat transfers from the cooler object to the hotter one until they both reach the same temperature.

20. Complete with the correct temperature.

- a. Water boils at \_\_\_\_\_ degrees Celsius.
- b. The temperature of the human body is about \_\_\_\_\_ degrees.
- c. Water freezes at \_\_\_\_\_ degrees Celsius.

21. Imagine a kitchen. The air in the kitchen is 20 °C. on the table there is a glass of milk that is 4 °C and a bowl of soup that is 40 °C. Answer the questions.

- What will happen to the milk? \_\_\_\_\_  
\_\_\_\_\_
- What will happen to the soup? \_\_\_\_\_  
\_\_\_\_\_
- Will the milk and the soup end at the same temperature? Explain \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

22. THINK. In areas with hot weather, houses are painted white. Why do you think they use this colour? \_\_\_\_\_

\_\_\_\_\_

23. What causes an object to expand? And contract? \_\_\_\_\_

\_\_\_\_\_

24. "The Moon is a natural light source". Is this sentence true? If you think it is false, write the correct information. \_\_\_\_\_

\_\_\_\_\_

## SUMMARY

25. Complete the summary using the correct words.

transfer - reflection - bounces - degrees Celsius - conductors -  
Temperature - straight line - translucent - refraction - changes

Light travels very fast, in a \_\_\_\_\_ and in all directions.

Depending on how much light passes through them, objects can be: transparent, \_\_\_\_\_ or opaque. Light \_\_\_\_\_ off objects and changes direction. This is called \_\_\_\_\_. Light bends when it passes from one material to another. This is called \_\_\_\_\_.

Heat is the \_\_\_\_\_ of thermal energy. It causes \_\_\_\_\_.

\_\_\_\_\_ tells us how hot or cold an object is. Heat is measured in \_\_\_\_\_. Depending on how materials transmit heat, they can be \_\_\_\_\_ or insulators.



## 26. Check your progress.

\_\_\_ 1. What are some examples of natural light sources?

- a. The Sun, fire and some animals    b. Lightbulbs, candles and laser beams.

\_\_\_ 2. How fast does light travel?

- a. At 30.000 kilometres per hour.    b. At 300.000 kilometres per second.

\_\_\_ 3. If light passes easily through an object, we say it is ...

- a. ... translucent.    b. ... transparent.

\_\_\_ 4. What happens when light bounces off an objects and changes direction?

- a. Reflection    b. Refraction

\_\_\_ 5. What causes light to bend when it passes from one material to another material with a different density?

- a. Reflection.    b. Refraction

\_\_\_ 6. What is heat?

- a. The transfer of thermal energy from something hotter to something cooler    b. The temperature of an object.

\_\_\_ 7. What happens to a substance when its temperature increases?

- a. It expands    b. It contracts.

\_\_\_ 8. What is an insulator?

- a. A material that transmits heat quickly.    b. A material that transmits heat slowly.



**THINK**

Answer the following questions. Use full sentences and be careful with your handwriting.

27. Look at the photograph and answer the questions.

- When can you see a rainbow? How do rainbows form?

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28. Is it better to wear white or black clothes in summer? An in winter? Explain

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29. Is it better to serve a hot drink in a glass cup or a metal cup? What about a cold drink?

Explain \_\_\_\_\_

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30. Why do some windows open easily in winter, but not in summer? \_\_\_\_\_

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## DID YOU KNOW?

# FIREFIGHTER SUITS

31. Read the text, and answer the questions.



Firefighters need to get very near fires to put them out, or to rescue people started on burning buildings. For this reason, firefighters started wearing special clothing in the 19<sup>th</sup> century. This clothing included thick wool shirts and trousers, long leather jackets and high leather boots.

In 1920, firefighter clothing included a new insulating material, called asbestos. However, in 1980, asbestos was found to cause cancer. It was replaced by new insulating materials, such

as fabrics made of silicon fibres.

Modern firefighter suits include three types, depending on how close the firefighter need to get to the fire. The strongest suit protects firefighters even when they are walking through flames!



- Why do firefighters need to use special suits? \_\_\_\_\_  
\_\_\_\_\_
- What kind of clothes did early firefighters wear? \_\_\_\_\_  
\_\_\_\_\_
- When and why did they stop using asbestos in firefighter suits? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- What are modern suits made of? \_\_\_\_\_
- Why are there different types of modern suits? \_\_\_\_\_  
\_\_\_\_\_
- THINK. Heat insulating material are used to protect firefighter, but they have many other uses as well. What do you think some of these uses are?  
\_\_\_\_\_  
\_\_\_\_\_

# ISAAC NEWTON

32. Read the texts and match the headings to the paragraphs. There is one extra heading.

Windmills

Light and sound

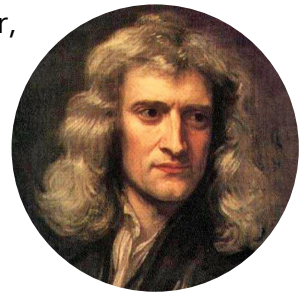
Importance

Forces

Childhood

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Isaac Newton was a British astronomer, mathematician, inventor, philosopher and physicist. He was born in 1643 and was very curious as a boy. His hobbies included drawing and the construction of wooden objects. His earliest inventions were a sundial and a windmill.



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Newton is most famous for his ideas about motion, forces, gravity and light. According to legend, Newton started working on the gravitational theory after he saw an apple fall from a tree. He argued that gravity explains why objects fall to the ground, why planets orbit the Sun and why ocean tides occur.



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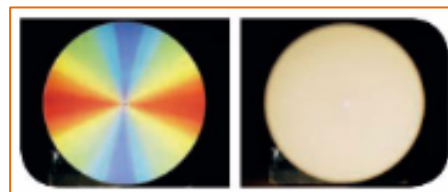
Newton also investigated the properties of light. He shone a white light through a prism (a transparent piece of glass with a triangular cross section) and demonstrated that white light refracts into seven separate colours. He also studied the speed of sound and built the first reflecting telescope.

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Isaac Newton is considered to be one of the greatest scientists of all time. His ideas changed the way people understand the Universe.

## SHOW YOUR SKILLS: EXPERIMENTS & RESEARCH!

- 1. A Newton's disc is made with the colours of the rainbow. When we spin the disc, it looks white. What does this experiment tell us about light?



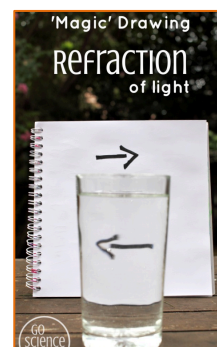
Make your own Newton's disc! Here you have two videos with instructions.

- <https://www.youtube.com/watch?v=TBIGkjPu97I>
- <https://www.youtube.com/watch?v=7iV1m4j2wJQ>

And here you will find the explanation of this phenomenon!

<https://www.stevespanglerscience.com/lab/experiments/disappearing-color-wheel/>

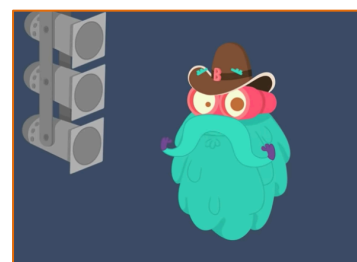
- 2. "Magic drawing with refraction of light" Draw two arrows, both pointing the same way, and then look at one (or both) through a glass of water. Which way are they pointing now? Does it matter how far away the glass of water is? What happens if you move your head from side to side?



<https://gosciencekids.com/refraction-light-glass-water-play-steam-kids/>

- 3. **Shadows** When light is blocked by an opaque object, it produced a shadow. The shadow appears on the opposite side of the source of light. What happens if you use two sources of light? Find the answer in this video!

<https://www.youtube.com/watch?v=IOIGOT88Aqc>



- 4. In the past, candles were used to tell the time. Look at the photo and try to work out how.

<https://historyplex.com/candle-clock-history-facts-limitations>

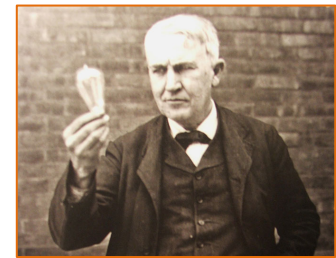
Watch this video:

<https://www.youtube.com/watch?v=F59bcxTICxg>



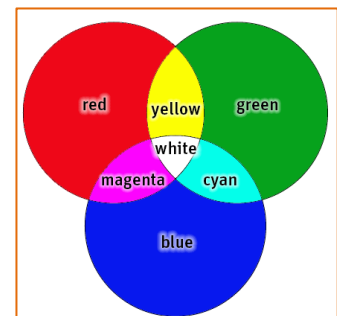
- 5. Who invented the light bulb? If you want to find out who this guy is... check the following video!

<https://www.youtube.com/watch?v=XWWgDn0C6DA>



- 6. Primary colours of light.

When different colours of light mix together, new colours are produced. In fact, we can make other colours, included white by mixing red, green and blue light. This is why red, green and blue are called the **primary colours of light**. In the diagram to the right, we can see how the primary colours of light mix to produce other colours. For example, yellow light is produced when red light and green light mix together.



Black and white are not colours. Snow is white because it does not absorb any colour.

Coal is black because it absorbs all the colours.

Watch these videos with **BILL NYE... THE SCIENCE GUY!!!**

<https://www.youtube.com/watch?v=g5BHxozBPuA>

<https://www.youtube.com/watch?v=6Os6ySXyuH0>

[https://kids.kiddle.co/Primary\\_color](https://kids.kiddle.co/Primary_color)