

Light and the eyes: Outcomes and activities

God is Pure and Holy Year 6

Spiritual Overview: God is Light

God created light on the first day of creation. Light is essential to life. God Himself is light.

Light is a symbol of goodness and purity, as opposed to darkness (a symbol of that which is evil). God wants us to walk in His light and live a life of purity.

God is light. To walk in God's light is to walk in purity. To exclude God is to walk in darkness. Before the sun was created, the earth was illuminated by God's own light. From the book of Revelation we understand that God's light will not allow any darkness or night in the Kingdom. Jesus Christ is a light to the world. As Christians we should reflect this light so that others may see Him.

Values: Our response to 'God is Pure and Holy'

- **Integrity:** always doing the right thing; showing the Fruit of the Spirit in our lives
- **Civic pride:** keeping our environment clean; obeying the law
- **Respect** for what is right
- Showing **obedience** to God by doing the things He wants us to do; admitting when we make mistakes and asking for God's forgiveness.
- understand that to live in God's light, we need to be forgiven for our sin
- understand that to live in the light we need to follow God, trust and obey and read His word.
- understand that as Christians we need to daily ask God's forgiveness for the wrong things we have done so that we become pure and blameless in God's sight

Outcomes: Students will

- explore the properties of light, including reflection, refraction, spectrum and shadows
- make a study of the eye
- Explain the Biblical parallel between light, (things of God), and darkness, (things of Satan)

Bible stories and passages

Genesis ch 1 God said "Let there be light."

Matthew 5:13-16 Christians as salt and light.

Galatians 5:22 Goodness is a fruit of the Spirit.

Ephesians 5:8-11 Live as children of the light.

Matthew 6:22-23 If your eye is clear your whole body will be full of light.

The parables: Seeing with spiritual eyes in order to understand the meaning.

Bible verses

1 Peter 2:9 He has brought you out of darkness into His wonderful light.

Romans 13:12 Put on the armour of light.

John 8:12 Jesus said, "I am the light of the world. Whoever follows me will have the light of life and never walk in darkness."

1 John 1:5 God is light and there is no darkness at all in Him.

1 John 1:7 If we live in the light, just as He is in the light, then we have fellowship with one another, and the blood of Jesus, His Son, purifies us from every sin.

Key Questions

What is light?

How does light make you feel?

What is darkness?

How does darkness make you feel?

Why does light remind us of the things that come from God?

Why does darkness remind us of things that come from Satan?

What does the Bible mean by 'walking in the light'?

Who is the light of the world?

How is life dependent on light?

Has God always been there?

What is the meaning of the word 'create'?

Why did God call the light 'good'?

Activities

- Make a shadow stick and measure shadow length.
- Look at light through materials: transparent, translucent, opaque.
- Make a spectrum to see colour and rainbows.
- Explore light rays that are both reflected and refracted.
- Explore the possibilities of flashlights e.g. large, small, for strength and distances of beam.
- Study the eye and relate this to the camera.
- Study some optical illusions.
- Study light and reflection associated with road transport e.g. reflectors, car lights, rear vision mirrors, traffic lights, flashing lights, illuminated signs.
- Research the history of lighting.

Assessment

1. Draw a diagram to show how light rays can be reflected or refracted.
2. Explain the meanings of transparent, translucent and opaque.
3. What have I learned from the study of light and colour...
 - a. about God?
 - b. about doing what God wants me to do?
 - c. about the Bible?

Year 6 Values

God is Pure and Holy

Responsibility

Responsibility is...

- Being willing to be accountable for your behavior
- Acting in a mature way
- Being in charge of a person, a group of people, or material things

Being responsible is a sign of maturity. Parenting requires a great amount of responsibility. A baby depends on its parents to care for it in a responsible way. To be away from the baby, the parents will have to organize a baby sitter.

A responsible person...

- does whatever they agree to do. They follow through on their commitments.
- answers for their own actions. They don't make excuses or blame others for what they do. They accept their responsibility of being in charge.
- takes care of their own matters. They don't rely on others to remind them when they are supposed to be somewhere or what they are supposed to bring.
- is trustworthy. If somebody lends them something, that person knows it will be taken care of, and returned.
- makes good judgments, wise decisions and wise choices.
- doesn't put things off. When they have a job to do, they do it.

Activities

1. Make a list of jobs a responsible parent has to do when caring for their baby.
2. Make a list of responsibilities YOU have in your life at the moment.
3. Make a list of things you could improve on to become a more responsible person.

What does the Bible say about responsibility?

Luke 16:1-10 The parable of the dishonest manager

Art Year 6

God is Pure and Holy

Light and the eyes

Wall art text: Live like people who belong to the light. Ephesians 5:8

Visual observation

Aim: To encourage the students to use their eyes to see in detail the things around them, and to develop the skill of visual observation.

- Look through a small hole in a piece of cardboard. Take your cardboard outside and look at plants, trees, flowers, grass, stones. Look at these things carefully.
- Paint some of the things you saw outside.

Painting: experimenting with colour

- Experiment with primary colour, mixing to make other colours.
- Create a colour wheel using the colours of the rainbow.
- Paint a composition using warm colours.
- Paint a composition using cool colours.
- Paint a composition using earthy colours, e.g. browns, reds, oranges
- Paint a watercolour scene using wet paper and a sponge. Watch how the colours merge together.
- Paint a colourful scene, e.g. snorkelling on a coral reef; a flower garden
- Paint a colourful scene, e.g. fireworks; an explosion in the paint factory

Painting: tone and hue

- Create a 'wash-off' painting. First paint the page with thick white paint. Allow to dry. Now paint with thin black paint. Wash off.
- Make a charcoal drawing and paint over it with a thin wash.
- On a practice piece of paper, practice blending black and white in various tones.
- Now paint a scene of your choice using only black and white paint.
- On a practice piece of paper develop various hues of one colour, e.g. if you choose green, start with white, then add a tiny bit of green for light green. Then add more, little by little, until you have dark green. Show the colours on your page from lightest to darkest.
- Paint a scene of your choice using white and one other colour. Try to include as many hues as possible.

Practical Science Year 6

Topic: Light

Split light to make a rainbow

http://www.madaboutscience.com.au/store/index.php?main_page=page&id=40

Split light without a prism Want to make a rainbow but don't have a prism? Here's a simple way to make one anytime the sun is shining. Suitable for kids aged 5 +

What you need:

- Shallow dish
- White wall (or large piece of white paper/card)
- Small mirror
- Water
- Sunlight (the stronger the better)

What to do:

1. Pour some water into the shallow dish.
2. Place the small mirror in the water and prop it at an angle against the side of the dish.
3. Put the dish near a sunny window and position the mirror so that sunlight bounces off it onto a white wall.
4. If you don't have a white wall you can use a large piece of white card or paper attached to the wall.
5. You should see a faint rainbow appear on the white wall or paper. If not, adjust the mirror until you see it.

How does it work?

The water in the shallow dish acts like a prism. When the sunlight travels from air into water it slows down and bends. The seven different colours that make up white light travel at different speeds and therefore bend at slightly different angles. The mirror reflects the different colours so the rainbow spectrum appears on the wall.

Practical Science Year 6

Topic: Light

Bend a Straw with Your Eyes (Optical illusion)

<http://www.sciencekids.co.nz/experiments/strawbending.html>

Using the power of your eyes, bend a straw sitting in half a glass of water without even touching it! It sounds like magic but it's really another amazing scientific principle at work.

What you'll need:

- A glass half filled with water
- A straw
- 2 eyes (preferably yours)

Instructions:

1. Look at the straw from the top and bottom of the glass.
2. Look at the straw from the side of the glass, focus on the point where the straw enters the water, what is strange about what you see?

What's happening?

Our eyes are using light to see various objects all the time, but when this light travels through different mediums (such as water & air) it changes direction slightly. Light refracts (or bends) when it passes from water to air. The straw looks bent because you are seeing the bottom part through the water and air but the top part through the air only. Air has a refractive index of around 1.0003 while water has a refractive index of about 1.33.

Practical Science Year 6

Topic: Light and the eyes

Find your blind spot

You will need:

Two symbols drawn on a piece of paper: a cross and a target



What to do:

1. Hold the paper up to your face, so that the cross is in front of your right eye.
2. The picture of the 'target' should be to the right of your face
3. Close your left eye. Focusing on the cross, slowly move the paper away from your face.
4. As you move the page away from your face, you notice that at some point you can't see the 'target' within your peripheral vision; you've found where your blind is!
5. Why Does This Happen?
6. The blind spot occurs due to the structure of the eye. When light travels it reaches the back of the eye, it's wavelength is interpreted by the group of cells collectively called the retina.
7. In the middle of the retina is an area called the fovea, a place where many blood vessels are located. As there are no cells that detect light within the fovea, there is a natural 'blind spot' created in your field of vision. Luckily your eye moves up to 3 times a second, adjusting for this blind spot!

<http://www.fizzicseducation.com.au>

Light 1

God created light

Student research

Light and Colour

It is light that lets you see things.
In the dark you cannot see at all.
The Sun gives us daylight.
The Moon gives us moonlight.
Fire gives us light.
Electricity gives light.
God made these things to give us light.

The Sun sends out rays of light. It shines on the Earth.
But the Sun shines only on one side of the Earth at a time. Half the Earth has daytime while half the Earth has night time.

The moon is like a giant mirror.
It bounces sunlight on to the earth.

Bible verses to read: Genesis 1:1-5

Now copy the sentences filling in the missing words:

Before God created light there was only d_____
God said that the light was g_____. He called the light d_____ and the darkness n_____.

Think:

Why did God call the light good?

Now read from the Bible: 1 John 1:9

Copy and fill in the missing words:

God is l_____ and in Him there is no d_____.

Think and write:

What is the meaning of *light* in this Bible verse?

What is the meaning of *darkness* in this Bible verse?

Explain the difference between a person living in the light and a person living in darkness.

Read and write this Bible verse from John 1:7

Walk in the _____ as He is in the _____.

Light 2

Eyes are important

When God created light He also created eyes, so that people and animals could see His creation. Imagine trying to live without eyes.

1. What things would be difficult to do?
2. What favourite things couldn't you see?
3. What dangers would there be if you didn't have help from others?

How eyes help us

Think and write:

How do eyes help us to stay alive?

e.g. Eyes help us eat the right food.

How eyes help animals

Think and write:

How do eyes help animals to stay alive? Think about the difference between meat-eaters and plant-eaters.

e.g. A lion needs eyes to spot other animals the it wants to hunt.

Think and write:

Why did God give us two eyes and not one eye?

Eyes are important to Jesus

Jesus touched many eyes and healed many blind people.

Read: Matthew 9:27-29

Eyes are an amazing part of God's creation

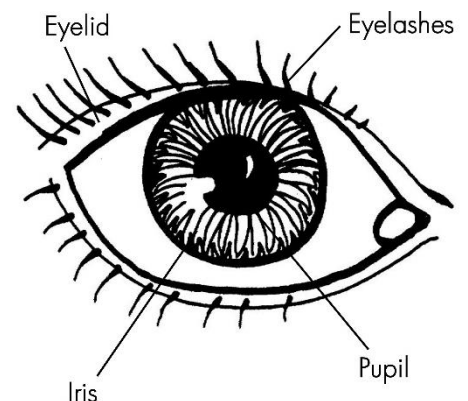
Did you know that inventors have copied ideas from God's creation? The first cameras worked like the eye. They were made of a strong black box. It let light in at only one spot called the *lens*. In the box there was a special black strip called a film. The light coming through the lens made pictures on the film.

Draw:

A picture of your eye, just as you would see it in a mirror. Draw the *pupil* (the black dot in the middle) and label it on the drawing. Draw the *iris* (the round coloured part around the pupil) and label it. You can also draw and label the eye lids and eye lashes.

Find out:

What happens to the pupil when you change from darkness to light?



Light 3

The inside of your eye

Draw:

A picture of the eye that shows the inside of the eye. Label the parts and find out the purpose of each part.

Our eyes are more perfect than a camera. At the back of the eye is the *retina*. That is like the film. Light gets into the eye through the *lens*. The coloured part of the eye is the *iris*. It can be brown, blue or green.

What colour are your eyes?

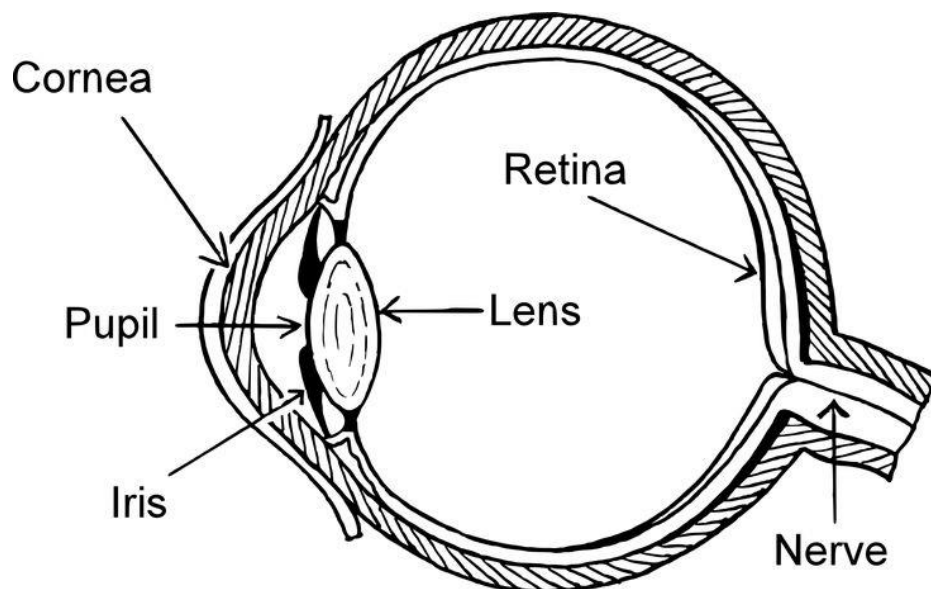
The iris opens and closes to let the right amount of light in.

The *pupil* is the black dot in the middle of your eye. In bright light the pupil is small. This stops too much light getting in. In dim light or darkness the pupil is large because it wants to get as much light for seeing.

Look in a mirror and try to see the iris and pupil of your eyes.

Draw:

- (1) an eye in bright light
- (2) an eye in dim light



Light 3

Caring for your eyes

We know how important our eyes are. We should take good care of them. Think about ways in which your eyes could become damaged.

Write a paragraph on the things that could harm our eyes, e.g. too much bright light or sunlight; watching an eclipse; sharp pointy objects; reading in dim light; spray cans containing chemicals that can harm your eyes; throwing sand or stones.

Why do you think God created our eyes with eye lids and eye lashes?

Sometimes workers wear goggles to protect their eyes. What work might they be doing?

Our eyes are lights

Read from the Bible:
Matthew 6:22-23

These verses tell us that the thoughts and feelings inside us, like love, happiness and hate, show through our eyes. Our eyes help to make an expression on our face. What other parts of our face do we use to show our feelings?

Answer these questions:

How do our eyes look when we are happy?

How do our eyes look when we are sad?

How do our eyes look when we are angry?

Hint:

You may like to ask someone to make these expressions for you. You may like to draw pictures as part of your answers.

Copy and fill in the missing word:

When we are sad, _____ come from our eyes.

Think about this and write your answer:

When people have done something wrong, like telling a lie, they don't want to look into the eyes of another person. Try to guess why this is so.

Light 4

Seeing Jesus, but not through physical eyes

Have you ever heard someone say, “I see”? But the person is not talking about seeing with their eyes.

What the person really means is “I understand”.

When Jesus tells us about “seeing” in the Bible, He usually means “understanding”. It is possible to know a lot about Jesus and the Bible, but not really understand His love for us. Many people may know Bible stories, but they don’t understand that they can come to know Jesus as a person if they ask Him to forgive them for their sin and invite Him to become a friend.

We may see a picture of Jesus, but to really “see” Jesus we must get to *know* Him as a person and a friend. Jesus helps us to understand more about Him from the Bible.

The Parables

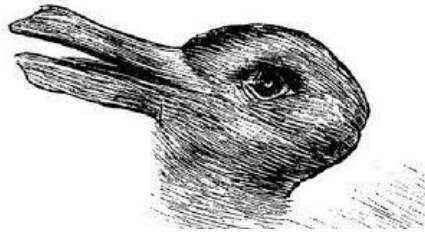
Jesus often told stories called parables. These were stories with hidden meanings. Many people listened to the stories but did not understand the hidden meaning. They did not “see” the meaning. They did not understand.

A project

Find a parable from the Bible. Write the story in your own words. Then explain the hidden meaning.

Light 5 Optical illusions

Look at this optical illusion:



.This is a picture that can be seen two ways. Can you see a rabbit or a duck? Try to see both.

Perhaps you didn't see the rabbit at first, or perhaps you didn't see the duck at first.

If the artist wanted us to see a rabbit and we could only see a duck, then we wouldn't be getting the right meaning.

Sometimes people don't get the right meaning from the Bible. They have to ask Jesus for special 'eyes to see' the meaning of the words of the Bible.

To "see" Jesus, we must get to **know** Him. Jesus helps us to understand his word.



Try to find the face of Jesus in this photograph. It is a photograph of melting snow. A photographer who did not believe that God existed, saw the face of Jesus in the photograph he had taken. He no longer doubted who Jesus really was!

To find the face, look at the larger black parts.

Light 6

What makes shadows?

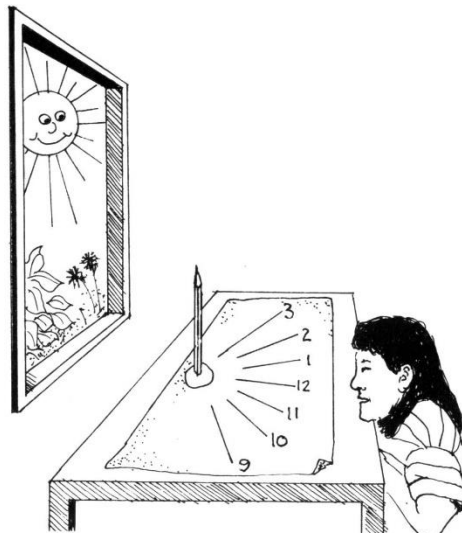
Shadows are made when something blocks the light shining on it.

A sun dial

In the olden days, people did not have clocks like the ones we have today. They measured time by the sun. They could tell the time by the length of the shadow made by a shadow stick (also called a Sun dial).

To make a sun dial:

1. Cut a circle from stiff cardboard to make a dial.
2. Push a sharp pencil or skewer through the middle of it.
3. Push the pencil into the ground.
4. Mark on the dial where the pencil's shadow falls each hour.



Light 7

What is white light?

You can make a rainbow colour spinner.
When you spin it you will see white light.

White isn't a colour, but different colours together make white.

Light passes through some materials, like glass or water.

The light rays bend when they pass through a glass prism or water droplets in the sky.



The different colors that make up white light become separated. This makes a rainbow.

1. Draw a rainbow showing the seven colours in the right order.
Red, Orange, Yellow, Green, Blue, Indigo, and Violet. (Red is at the top edge of the rainbow and violet at the bottom.)
2. What is white light?

Colour mixing

What happens when you mix colours together?
If you mix colours together you will make other colours.

Write the answers:
What happens when you mix:
Blue and yellow?
Yellow and red?
Red and blue?
Red, blue and yellow?

Red, blue and yellow cannot be made by colour mixing. They are called Primary colours.

How do you make brown?

Black and white are not colours. They are tones.
What happens when you mix black and white?

Light 8

Light Facts

What is light?

Light is a form of energy which our sense of sight can detect. It is made of electro-magnetic radiation and travels in a straight path.

What is the speed of light?

The speed of light is the speed at which light travels. It is about 300,000 kilometres per second. Nothing travels faster than light.

Why are there different colours of light?

There are different colours of light because they are light waves which have different wavelengths. Red light has the longest wavelength while violet light has the shortest wavelength.

What is reflection?

The bouncing back of light waves when they hit an object with a very smooth and shiny surface, like a mirror, is called reflection.

What is refraction?

The bending of light as it passes from one transparent substance to another, like air to water, is called refraction.

After you have read the questions and answers, get someone to test you. Do you know the answers to the questions?