

Lower Key Stage 2 Physical Processes B Light & Sound / Electricity

Introduction

This book of Science activities aims to help the busy teacher deliver high quality Science lessons with as much manageable practical classroom work as possible.

This book covers all of the National Curriculum Science work on 'Physical Processes – Light & Sound + Electricity' at a level suitable for **LOWER KS2**. Other books in this series cover the same work at a level suitable for Upper KS2 and KS1. Used together, these books can provide differentiated work for children of different age groups and abilities or a spiral curriculum visiting each concept at least three times in a pupil's primary school career.

All the activities are cross-referenced to the QCA Science Curriculum.

Each lesson follows a similar format with the following elements:

- 1 A simple information sheet with questions that explore the main concept to be studied during the lesson.
- 2 A classroom based experiment which on the whole can be carried out by small groups of children working independently.
- 3 A simple homework sheet which reinforces the concept discussed and the knowledge gained from the experiment carried out.
- 4 Detailed teacher notes which list the Learning Objectives, the main points to be talked about, the equipment needed for the experiment, how the experiment should be carried out and the conclusion that can be made from it.

The book also contains simple assessment activities that can be used to help indicate the National Curriculum Level each child is working at and whole class record sheets for keeping track of the results.

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Contents

| | |
|---|--------------------------------|
| Notes for Teachers | 3 |
| Scientific Investigation Attainment | 7 |
| Light & Sound | |
| Lesson 1: Sources of Light | Information 8 |
| | Experiment 9 |
| | Homework 10 |
| Lesson 2: Shadows | Information 11 |
| | Experiment 12 |
| | Homework 13 |
| Lesson 3: Opaque, Translucent and Transparent | Information 14 |
| | Experiment 15 |
| | Homework 16 |
| Lesson 4: How We See Things | Information 17 |
| | Experiment 18 |
| | Homework 19 |
| Lesson 5: How Sounds Are Made | Information 20 |
| | Experiment 21 |
| | Homework 22 |
| Lesson 6: Sound Travels Through Materials | Information 23 |
| | Experiment 24 |
| | Homework 25 |
| Lesson 7: Sound Can be Changed | Information 26 |
| | Experiment 27 |
| | Homework 28 |
| Lesson 8: How We Hear Sound | Information 29 |
| | Experiment 30 |
| | Homework 31 |
| Assessment Test | 32 |
| Record Sheet | 34 |
| Electricity | |
| Lesson 1: Two Types of Electricity | Information 35 |
| | Experiment 36 |
| | Homework 37 |
| Lesson 2: Switches | Information 38 |
| | Experiment 39 |
| | Homework 40 |
| Lesson 3: Conductors and Insulators | Information 41 |
| | Experiment 42 |
| | Homework 43 |
| Lesson 4: Batteries | Information 44 |
| | Experiment 45 |
| | Homework 46 |
| Lesson 5: Circuit Diagrams | Information 47 |
| | Experiment 48 |
| | Homework 49 |
| Assessment Test | 50 |
| Record Sheet | 52 |

P.17 Lesson 4

How We See Things

Unit 6F

Learning Objectives:

To know light travels from a source, bounces off an object and enters the eye enabling us to see.

To experiment with mirrors.

Talk about:

We see light sources because light enters our eye.

All surfaces reflect light.

We can see an object because reflected light enters our eye.

Shiny objects are very good at reflecting light.

When light is reflected from a mirror an image is formed.

Light is reflected from a mirror at the same angle that it hits the mirror.

Experiment: Can you play tricks with a mirror?

Equipment: Two small plastic mirrors and some Blu-tack.

Method: Use Blu-tack to help you place two mirrors at an angle with a rubber in between. Place two mirrors opposite each other with a rubber in between. Use a mirror to find out which higher case letters of the alphabet are symmetrical. Try to write your name looking into a mirror at the same time.

Conclusion: Mirrors can sometimes cause 'tricks' or optical illusions.

P.20 Lesson 5

How Sounds are Made

Contains elements of QCA Science Unit 5F

Learning Objectives:

To know all sounds are made by something vibrating.

To know some vibrations can be seen and some can not.

Talk about:

The many different sources of sound.

Sound travels in all directions.

Compare to the ripples in a pond.

Demonstrate: Sound waves with a slinky spring. How

banging one drum can make rice on another move.

How plucking a guitar string can make a sound.

Experiment: Can a ruler make different sounds?

Equipment: A plastic ruler.

Method: Press one end of your ruler firmly onto your desk and 'twang' the other end. It will vibrate and make a noise. Varying the length of overhang will vary the noise made. Record your observations in the table provided.

Conclusion: A ruler can make different sounds by varying the length of ruler overhanging a desk.

P.23 Lesson 6

Sound Travels Through Materials

Contains elements of QCA Science Unit 5F

Learning Objectives:

To know all sounds can pass through air.

To know sounds can pass through other materials.

Talk about:

The sounds that can be heard outside the classroom with doors and windows closed.

How to hear a quietly ticking clock from a distance.

How tapping spoons underwater can be heard.

How sound travels through air – a squashy material.

How sound travels through liquids – a runny material.

How sounds travel through solids.

What the terms compress and contract mean.

Experiment: Can you hear a clock through different materials?

Equipment: A very quietly-ticking clock and a collection of different materials e.g. felt, corrugated card, wool, fur etc.

Method: Place the clock on a desk or worktop. Listen for the tick some distance away by putting your ear on the surface. (The sound travels through the material the desk is made

from.) Place a material under the clock and listen again (some materials insulate sound better than others.) Repeat this process to see which materials stop the sound and which do not.

Conclusion: You can not hear a ticking clock through all materials.

P.26 Lesson 7

Sound can be Changed

Contains elements of QCA Science Unit 5F

Learning Objectives:

To know sounds can be changed.

To know sounds can be high or low.

Talk about:

Different musical instruments.

How to make a sound with a drum.

How to make a sound with a guitar.

How to make a sound with a recorder.

How to make loud and soft sounds.

High notes and low notes and the word pitch.

How sounds can be varied on different instruments.

Experiment: Which bottle of water makes the lowest sound?

Equipment: A plastic water bottle and access to water.

Method: Quarter fill the plastic bottle with water and blow across the top. Listen carefully to the note made. Repeat the process with the bottle half full and then three quarters full.

Conclusion: The less water the lower the note, the more water the higher the note.

P.29 Lesson 8

How we Hear Sound

Contains elements of QCA Science Unit 5F

Learning Objectives:

To know that sound is passed to the ear by sound waves travelling through the air.

Talk about:

All sounds create vibrations.

There are many different ways of making vibrations.

People make sounds by creating vibrations in their throat.

Vibrations spread out in all directions.

Vibrations enter the ear and messages are sent to the brain.

Experiment: How far can you hear a pin drop?

Equipment: A pin and a metre rule or tape.

Method: Find a quiet place to work. Decide on a 'listener' and the 'pin dropper'. Get the listener to stand one metre from the pin and then listen for it to drop. Try again at 3m, 5M etc. At what point can you no longer hear the pin?

Conclusion: You could no longer hear the pin after _____ metres.

Electricity

P.35 Lesson 1

Two Types of Electricity

Contains elements of QCA Science Unit 4F

Learning Objectives:

To know the difference between mains electricity and low voltage current found in most batteries.

Talk about:

Devices powered by electricity found in the home.

Sockets in the wall use mains electricity which is very dangerous and must never be played with.

Electrons flow when a circuit is made.

Battery powered devices such as torches are generally safe to play with (with the exception of rechargeable batteries.)

Battery electricity is called direct current 'DC'.

Mains electricity is called alternating current 'AC'.

Experiment: How can you make a torch bulb light up?

How Sounds Are Made

Sounds can be made in lots of different ways but they all have one thing in common. Sounds only happen when something vibrates. This means something moves quickly backwards and forwards.

Some vibrations are easy to see e.g.



a plucked
guitar string



a plucked
elastic band



a twanged ruler

Some vibrations are not easy to see e.g.



a cymbal that
has been hit



your larynx as
you talk or sing



a drum

Modern Sounds

Many sounds we hear in our homes come from computers, TVs, radios or Hi Fi systems.

All of these items have a loud speaker with a paper cone, which vibrates backwards and forwards as it makes a sound.



Task

Answer these questions:

1. When do sounds happen?
2. Name one vibration that is easy to see.
3. Name one vibration that is not easy to see.
4. Name some electrical items in your house that make sounds.
5. Which part of a speaker moves backwards and forwards?
6. Draw a picture showing lots of things that make sounds.

Name: _____

Date: _____

Can a ruler make different sounds?

You will need: a plastic ruler

1. Press one end of a ruler tightly onto the edge of your desk and 'twang' the other end. What happens?
2. Vary the length of ruler overhanging the desk. What happens?
3. Try it at the measurements shown below.



First make a prediction

What do you think will happen in this experiment?

Carry out the experiment and write what happens

Picture of what you did:

Record what happens here:

Length of ruler on desk - What happened?

4 cm

8 cm

12 cm

16 cm

20 cm

24 cm

What I did:

What I saw change:

Why I think this happened:

How can a ruler make different sounds?

How Sounds Are Made

Can you make a sound by...

...blowing across
the top of a
bottle?



...plucking an elastic band?



...beating on stretched cling film?



Experiment with a collection of junk materials e.g. yoghurt pots, dried peas, elastic bands, empty plastic bottles, pieces of wood, metal spoons etc.
Draw some of the ways you made a sound.