P–2

Inquiry Science

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Light
Electricity
Air
Force and Movement
Water and Weather
Magnets
Colours

VELS Edition

HAWKER BROWNLOW
EDUCATION

Contents

About this book

Inquiry Science is designed to engage children in investigation and discovery, through hands on, student-centred activities. These easily-resourced learning centre tasks provide opportunities for children to verbalise their observations and make inferences. The children are encouraged to ask questions such as; What just happened? Why do you think it happened? What do you now know? When could you use this information another time?

Each lesson includes:

Gearing up: Guides you through all the preparation you need to engage the children in the task.

Process skills used: The steps, procedures or activities learners employ when engaged in the learning process

Guided discovery: Gives the teacher background information on the topic to help you complete the activity.

Materials needed for each group: A full list of easily-resourced materials to complete the task.

Activity: A clear explanation of an activity that will engage the children in authentic investigations.

Responding to discovery: This section will help children to focus on the experiment and to record and think about the discoveries.

Applications and extensions: Challenge the children to scientifically question their ideas and project their thinking further about their experiments.

Partners in learning: Learning together has a focus on partnerships in learning and the strategies used to support them. This metacognitive thinking enables the child to reach a deeper understanding in their learning.

Reflection: Reflection questions focus attention on using these science concepts in real life situations. Students also reflect on how they learn, and what skills and tools they use to support their learning.

Encourage your children to become effective and skillful thinkers!

How does this book support the Victorian Essential Learning Standards?

The science investigations in this book incorporate the three interwoven strands of the Victorian Essential Learning Standards (VELS) – Physical, Personal and Social learning, Discipline-based learning and Interdisciplinary Learning.

While there are no specific learning standards in the p-2 age range, the focus encouraged by the VELS materials is to set the scene and prepare students for the achievement of level 3 standards in Science. As students work towards this goal, the VELS statements encourage simple investigations (for example, measuring plant growth), involving observation and measurement and basic procedures including collecting and recording data.

About this book

Students are directed to use their senses to explore and record the world around them. For example, activities might involve sorting objects according to size, colour, shape and weight. They are encouraged to begin generalisations based on their data. They should also be made aware of using safe procedures in their activities.

The following are the domains incorporated in these learning centre activities.

STRAND PHYSICAL, PERSONAL AND SOCIAL LEARNING	
Domain Interpersonal Development	**Domain** Personal Learning
Dimension Working in teams	**Dimension** The Individual learner Managing personal learning
Task Objectives Share resources at learning centres fairly Reflect on their contribution to the teams Complete group tasks	**Task Objectives** Reflect on how you work in a group Assigning roles within a group Using the individual checklist

STRAND DISCIPLINE-BASED LEARNING		
Domain Mathematics	**Focus Domain** Science	**Domain** English
Dimension Measurement, chance and data	**Dimension** Science knowledge and understanding Science at work	**Dimension** Reading Writing Speaking and Listening
Task Objective and Skills Estimation and making inferences Time Pictograms Sorting and categorising	**Task Objective and Skills** Activities to promote understanding of concepts about force, energy, light, air and colour Investigation tasks	**Task Objective and Skills** Read instructions Record in writing and pictures Use scientific language to discuss and explain findings

STRAND INTERDISCIPLINARY LEARNING			
Domain Communication	**Domain** Design, creativity and Technology	**Domain** I.C.T.	**Domain** Thinking
Dimension Listening, viewing and responding Presenting	**Dimension** Investigating and design	**Dimension** I.C.T. for communicating	**Dimension** Reasoning, processing and inquiry Creativity Reflection, evaluation and metacognition
Task Objectives and Skills Active listening and responding to others Group presentations	**Task Objectives and Skills** Design games	**Task Objectives and Skills** Activities using Kid Pix Activities using Internet Activities using Curriculum at Work CD on force	**Task Objectives and Skills** Investigation tasks Application and extension tasks Self-evaluation tasks

Transparent or opaque

Gearing up

Ask the children to close their eyes.
What can you see? (darkness)

Open your eyes. What can you see? (light)

What makes it light? (the sun)

How do we see at night? (moon, stars, electric lights)

How could people see at night before there was electricity? (fire, burning torches, candles, lamps, lanterns)

Discuss lights we use in the daytime and lights we use in the night-time.

Are some lights used in both the day and the night? (traffic lights, advertising signs)

Do you think that we can see through everything?

What can we see through?

What can't we see through?

Process skills used

- Observation
- Predicting
- Recording
- Communicating

Guided discovery

Light is a form of energy.

It travels in straight lines.

It reflects-bounces off certain materials, e.g. mirrors.

Our eyes are sensitive to light.

We see an object when light reflects from it and travels to our eyes.

If you can see through a material then light is passing through it.

If light can pass through the object then these objects are called **transparent**. If the light cannot pass through the objects then they are called **opaque**.

Materials needed for each group

- A torch
- A variety of materials such as: newspaper, cellophane, foil, tissues, cardboard, wood, water, wool, plastic
- One worksheet per child
- Pencil or similar for recording findings.

Activity

Each child predicts (a sensible guess) whether they think light will pass through the materials they are to test. They test the materials by shining a torch on them and noting whether the light shines through them or not. They draw or write down the material they tested and colour in the appropriate face next to the item to show whether the material was transparent or opaque.

Responding to discovery

Have the groups share their findings with other groups of children.

Come together as a grade and list the items that were transparent and those that were opaque.

Applications and extensions

Choose three other materials that are in the classroom and predict and then test to see whether they are transparent or opaque.

Can you think of some things in nature that let light through?

Partners in learning

How did it feel to share your work in groups?

Reflection

Why do we need to have some objects that are transparent and some that are opaque?

What would be the advantages or disadvantages of having a totally glass house or a totally brick house?

Transparent or Opaque

Testing using a torch.

Light can pass through: *(colour in one face)*	Yes	No
Newspaper		
Air		
Water		
Paper		
Cardboard		
Foil		
		
		
		
		
		

Shadows

Gearing up

Recap with the children where light comes from.

Take the children outside to stand with a partner in a sunny spot. Ask them to look at their partner and tell you what is on the ground starting at their partner's heels.

Come back inside and read *My Shadow* by R.L Stevenson.

Discuss the sunny day and the resulting shadows.

Process skills used

- Observation
- Predicting
- Recording
- Communicating

Guided discovery

Light cannot pass through opaque materials. Shadows form when light shines on an opaque substance. Light only travels in straight lines and cannot travel around corners.

Materials needed for each group

- A torch
- Large sheets of white paper pinned at intervals around the room
- Enlarged copies of the 'Shadow Tricks' page
- Display these copies at intervals around the room
- Paper and pencils to record own created shadow shapes/tricks.

Activity

Children work with a partner or in a small group. One child holds their hands in front of the white paper and makes a shape with their hands. Their partner shines the torch on their partner's hands and they discuss the shadow shapes that have been made. Children take turns to shine the torch and to make the shadow shapes.

Responding to discovery

Come together as a grade and discuss the shapes that they made.

Applications and extensions

Children use their hands to create their own shadow shapes/tricks and write or draw how they made them.

Make some shadow puppets using black cover paper, masking tape, scissors and pop sticks. Create a puppet play with the cut out shapes to perform to the class.

Play shadow games outside:

- touch your shadow
- hide your shadow
- stand in another shadow
- sit on a large shadow etc.

Go outside and observe the shadow of a tree makes at different times of the day. What happened and why?

How could you use this knowledge in planting a tree?

Partners in learning

How did you decide who would have the first turn with the torch?

Reflection

When you were making your hand shadows on the white paper, what happened if your partner held the torch too close to or too far from your hands?

Shadows

Some shadow tricks to try.