interactive CD included

Name:.....

Year:.....

School: .....

HEINEMANN
Queensland
Science Project

Middle Years Science

A Contextual Approach

STUDENT WORKBOOK

Maggie Spenceley

hi.com.au/scicontextual

PEARSON
Heinemann

Contents

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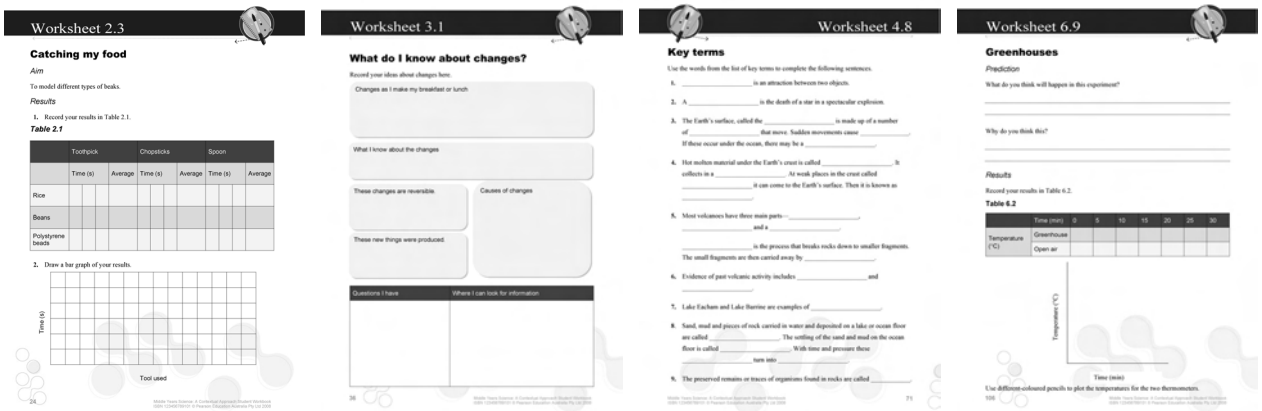
Introduction

Heinemann Middle Years Science: A Contextual Approach Student Workbook contains worksheets that support and enhance the *Heinemann Middle Years Science: A Contextual Approach Textbook*.

The worksheets include stand-alone activities suitable for homework, extension and revision, and those that support activities such as Thinking about, Science@work and Science in action from the textbook.



Icons within the textbook indicate where and when a worksheet should be undertaken. These can be done in class or at home.

The workbook includes a copy of *eLearning*.

This interactive CD is integrated with the textbook and workbook and includes:

- interactive tutorials and animations
- games that assist learning
- worksheets repeated in Word format
- useful weblinks
- interactive glossary.

Middle Years Science Companion Website

The Companion Website contains all the advice and support needed to readily and effectively implement a middle years science course. It includes:

- syllabus correlation grid
- a work program that ensures syllabus coverage and shows how to integrate all components of this package
- assessment advice and assessment tasks
- practical safety notes and advice
- answers to chapter questions
- answers to all worksheets
- chapter tests.

The Middle Years Science: A Contextual Approach package

Don't forget the other Middle Years Science: A Contextual Approach components that will help engage and excite students in science:

☑ *Middle Years Science: A Contextual Approach Textbook*
☑ *Middle Years Science: A Contextual Approach eLearning Student CD*
☑ *Middle Years Science: A Contextual Approach Companion Website*

For further information, go to www.pearsoned.com.au

About the author

Maggie Spenceley has over 30 years' experience as an educator, having taught in schools in New South Wales, Queensland, New Zealand and Papua New Guinea. In addition, she has taught courses in science teaching methodology at Griffith University and Queensland University of Technology. Maggie was involved in the development of the Years 1 to 10 science syllabus with the Queensland School Curriculum Council.

What is science?

1. When I hear the word **science**…

2. My partner had these interesting ideas:

3. Dictionary definition of science:

4. Comparison of my definition and the dictionary definition:

5. My ideas of what scientists do:

6. My ideas of where scientists work:

7. An interesting idea from my partner:

8. Interesting ideas from the rest of the class:

9. What do these scientists study?

Chemist

Zoologist

Botonist

Physicist

Pathologist

10. What does a herpetologist study? _____

11. To which group of scientists above would a herpetologist belong?_____

12. What does an ecologist study? _____

13. Which sciences mentioned above would an ecologist need to know something about?

_____

Worksheet 1.2

Galileo Galilei

1. How many years is it since Galileo was born?

_____

2. Do you think there are people alive today who will be remembered that many years into the future? Why do you think so?

_____

_____

_____

_____

_____

_____

3. What instrument did Galileo use to observe the night sky? _____

4. Can you remember first seeing something that took your breath away? How do you think Galileo might have described his experience of seeing the mountains and shadows on the Moon for the first time? Either describe your own breathtaking experience or put yourself in Galileo's shoes and write a description of the Moon.

_____

_____

_____

_____

_____

_____

_____

_____

_____

5. Why was Galileo put under house arrest?

6. In what ways was Galileo's description of the relationship between the Earth and the Sun different from the view commonly held at the time he was alive?

7. Try drawing a picture to show the difference between the two ideas.

Worksheet 1.3

How observant are you?

Face of 10c coin

Tail of 10c coin

1. How close were you in judging the size of the coin? Circle the appropriate answer.

much smaller a little smaller same a little bigger much bigger

2. Did you have the correct information and pictures on the coin? Describe the differences between your drawing and the real thing.

3. Why do you think there were differences between what you drew and the real thing?

4. Can you spot the ten differences between these two drawings?

5. These examples have used our sense of sight to make the observations.

For each of the other senses, list the sorts of observations you make about your world.

Hearing	Taste

Touch	Smell

6. For each sense, write one or two sentences explaining why it is important to you.

Hearing _____

_____

_____

Taste _____

_____

_____

Touch _____

_____

_____

Smell _____

_____

_____

Quantitatively speaking

Part A

Table 1.1

The table needs an identification number.

The columns need a heading.

The unit of measurement appears in the column heading.

Body part	Length (cm)
Middle finger	
Hand	
Lower arm from elbow to wrist	
Lower leg from knee to floor	
Circumference of head	
Total height	
Foot (from heel to big toe)	

Make sure that the unit used is the same for all measurements.

The measurements you have made are separate from each other. This sort of measurement is displayed in a **bar graph**.

The things you have to remember when creating a bar graph are shown in Figure 1.1.

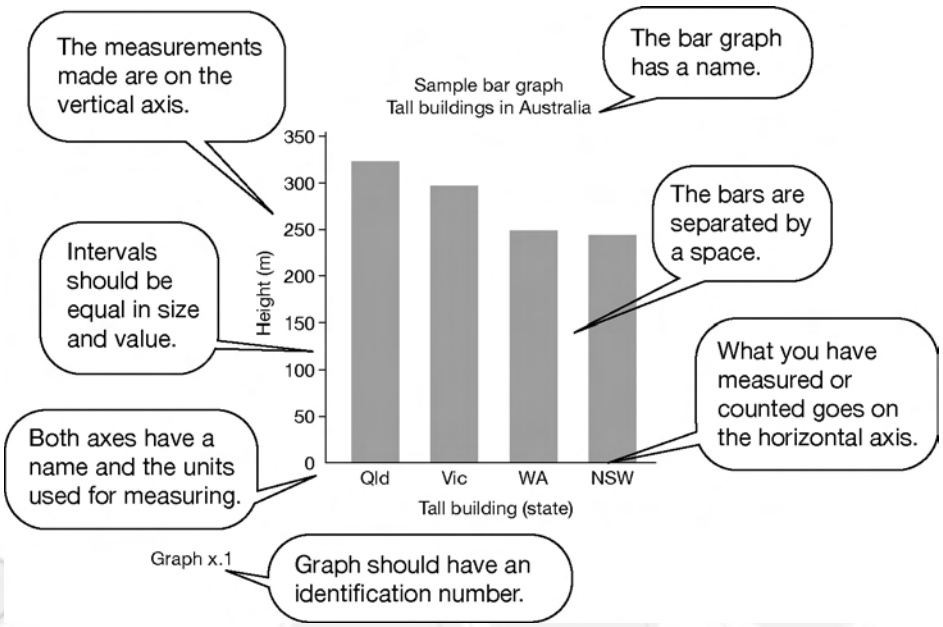
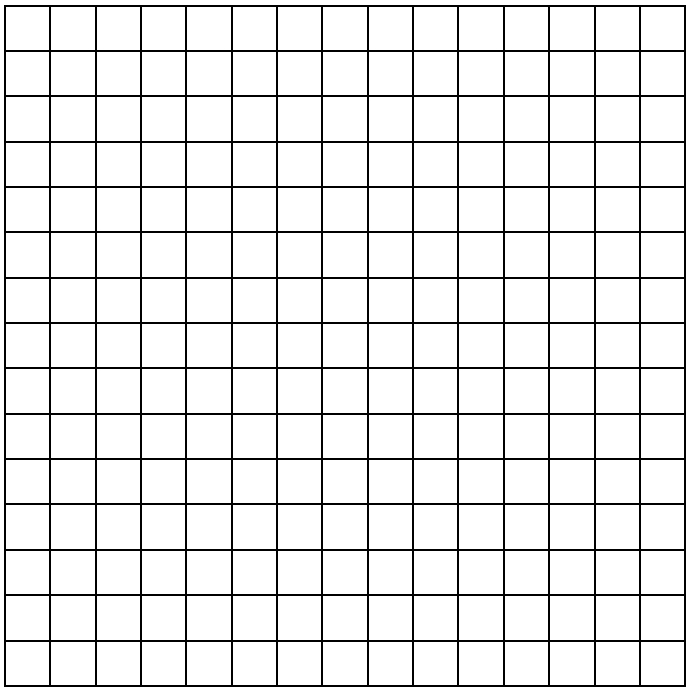


Figure 1.1 How to create a bar graph.

1. Now create your own graph from the information in Table 1.1.



Part B

Table 1.2

Time (minutes)	Temperature (°C)
0	
3	
6	
9	
12	
15	

The measurements you have made here are linked to each other. The temperature of the water after a few minutes of cooling depends on the starting temperature. When there is a link of this nature between the measurements, we draw a line graph.

Most of the rules for drawing a line graph are the same as for drawing a bar graph.

2. Which axis will the time go on? _____

3. Which axis will the temperature go on? _____

Creating the graph line

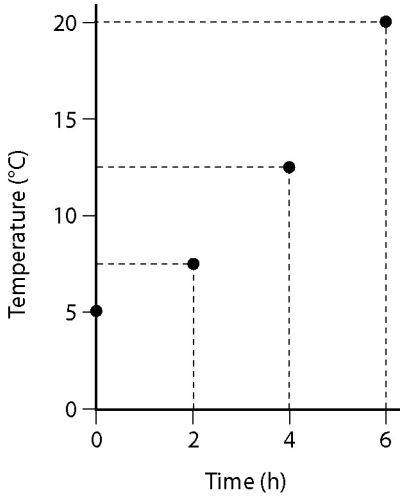
The temperature at a particular time is represented by a dot. The dot is placed vertically above the time the temperature was recorded and on the horizontal line extended from the temperature.

4. Join the dots using a ruler.

Look at the following example.

Sample table

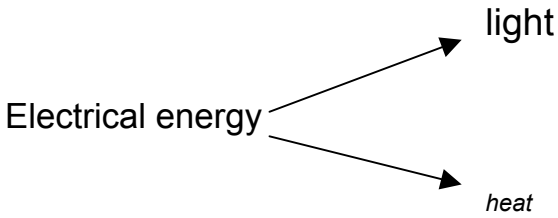
Time (h)	Temperature (°C)
0	5
2	7
4	12
6	20



5. Draw a graph by using the temperatures that you measured.

It's changed!

The energy we use has been converted from one form into another. On page 161 of your textbook, a flow diagram showed that the electrical energy coming into a light bulb was changed into two other forms of energy—light and heat.



On pages 165–167, there is information about four different ways of producing electricity—photovoltaic cells, wind power, hydroelectricity and biomass.

1. For each of these, draw a flow diagram that identifies the changes that take place as the original source of energy is converted to electricity.

Photovoltaic cells

[ ] → [ ] → [Electrical energy]

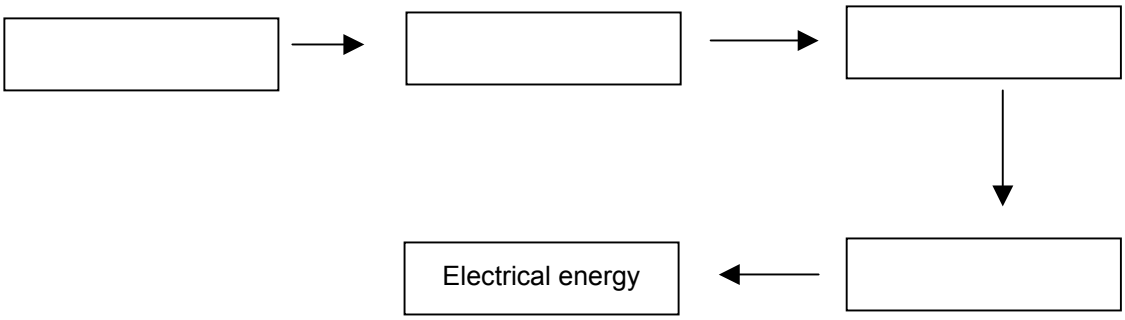
Wind power

[ ] → [ ] → [Electrical energy]

Hydroelectricity

[ ] → [ ] → [Electrical energy]

Biomass



In all of these energy conversions, the intended end product was electrical energy. However, we saw that with the energy conversions in the light bulb (page 161) and for the train (page 162) some of the energy was converted to other forms of energy such as heat and sound. The heat and sound energy in these instances are wasted forms of energy because they are not useful and we cannot capture them and use them in any way.

2. What wasted forms of energy do you think would occur as:

a. electrical energy is produced by photovoltaic cells?

b. wind power is converted to electrical energy?

c. hydroelectricity is produced?

d. biomass is burnt to produce electricity?

Explain your reasoning in each case.

3. Which method of producing electrical energy do you think is most efficient? Give reasons for your answer.

Stem cells

1. What were scientists doing when they discovered stem cells?

2. What are stem cells?

3. How long ago was it that human embryonic stem cells were first discovered?

4. Why do scientists think that embryonic stem cells are more useful than adult stem cells?

5. Why do some groups of people want to stop all research using embryonic stem cells?

6. Why do some scientists think that this research is very important and should continue?

Research

7. Christopher Reeve was an actor famous for playing Superman. Find out why he was a supporter of stem cell research.

_____

_____

_____

_____

_____

_____

Challenge

8. Record some of your ideas here.

Reasons I would support stem cell research	Reasons I would oppose stem cell research
Adult:	Adult:
Embryonic:	Embryonic: