Contents

Go to your eBook to access the Step-up chapter.

Access the worksheets for the Step-up chapter in Psychology on your eBook. Answers are available in the teacher version of the eBook and on Productlink

Pearson Science 2nd edition Activity Book

An intuitive, self-paced approach to science education, which ensures every student has opportunities to practise, apply and extend their learning through a range of supportive and challenging activities.

Pearson Science 2nd edition has been updated to fully address all strands of the new Australian Curriculum: Science, which has been adopted throughout the nation. This edition also captures the coverage of Science curricula in states such as Victoria, which have tailored the Australian Curriculum slightly for their students.

The *Pearson Science 2nd edition* features a more explicit coverage of the curriculum. The activities enable flexibility in the approach to teaching and learning. There are opportunities for extension as well as reinforcement of key concepts and knowledge. Students are also guided in self-reflection at the end of each topic.

Explicit scaffolding makes learning objectives clear and includes regular opportunities for reflection and self-evaluation.

In this edition, we provide a structured approach that integrates a seamless, intuitive and research-based learning hence **differentiating** the course for every student.

The Activity Book also provides richer application opportunities to take the Student Book content further with explicit coverage of Inquiry Skills, Science as a Human Endeavour and Science Understanding.

The diverse offering of worksheets allows students to be challenged at their level. Students have the flexibility to be self-paced and this new edition comes with the advantage of each worksheet being self-contained.

Be guided

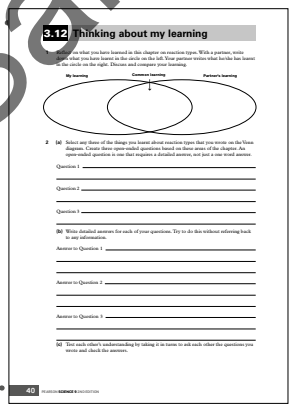
A new handy **Toolkit** at the beginning of the Activity Book has been created to build skills in the key areas of practical investigations, research, thinking, organising, collecting and presenting. Each skill developed in the toolkit is directly relevant to applications in questions, investigations and research activities throughout the student and activity books. A toolkit spread provides guides and checklists alongside models and exemplars.

Be supported

Vocabulary boxes provide definitions for key terms, within the relevant context of the task. **Hints** help students get started on a worksheet and provide support in overcoming a barrier.

Be reflective

The **Thinking about my learning** feature provides the opportunity for self-reflection and self-assessment. It encourages students to look ahead to how they can continue to improve and assists in highlighting focus areas for skill and knowledge development.


3.12 Thinking about my learning

1 Reflect on what you have learned in this chapter on reaction types. With a partner, write down what you have learnt in the circle on the left. Your partner writes what he/she has learnt in the circle on the right. Discuss and compare your learning.

My learning | Common learning | Partner's learning

2 (a) Select any three of the things you learnt about reaction types that you wrote on the Venn diagram. Create three open-ended questions based on these areas of the chapter. An open-ended question is one that requires a detailed answer, not just a one word answer.

Question 1 _____

Question 2 _____

Question 3 _____

(b) Write detailed answers for each of your questions. Try to do this without referring back to any information.

Answer to Question 1 _____

Answer to Question 2 _____

Answer to Question 3 _____

(c) Test each other's understanding by taking it in turns to ask each other the questions you wrote and check the answers.

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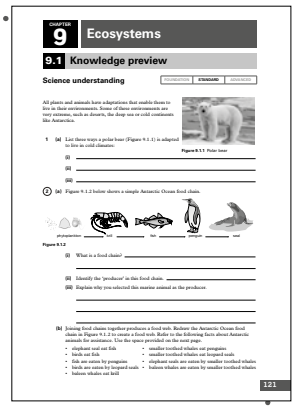
Be ready

A **Knowledge preview** at the beginning of every chapter, activates prior knowledge relevant to the topic, providing an opportunity for students to show what they currently know. This handy tool supports teachers in assessing students' prior knowledge.


CHAPTER 9 Ecosystems

9.1 Knowledge preview

Science understanding

FOUNDATION | STANDARD | ADVANCED

All plants and animals have adaptations that enable them to live in their environments. Some of these environments are very extreme, such as deserts, the deep sea or cold continents like Antarctica.

1 (a) List three ways a polar bear (Figure 9.1.1) is adapted to live in cold climates:

(i) _____

(ii) _____

(iii) _____

2 (a) Figure 9.1.2 below shows a simple Antarctic Ocean food chain.

phytoplankton krill leopard seal fish penguin killer whale

Figure 9.1.2

(i) What is a food chain? _____

(ii) Identify the 'producer' in this food chain. _____

(iii) Explain why you selected this marine animal as the producer.

(b) Joining food chains together produces a food web. Redraw the Antarctic Ocean food chain in Figure 9.1.2 to create a food web. Add the following facts about Antarctic animals in the space provided on the following page.

- elephant seal eat fish
- birds eat fish
- fish are eaten by penguins
- birds are eaten by leopard seals
- baleen whales eat krill
- smaller toothed whales eat penguins
- smaller toothed whales eat leopard seals
- elephant seals are eaten by smaller toothed whales
- baleen whales are eaten by smaller toothed whales

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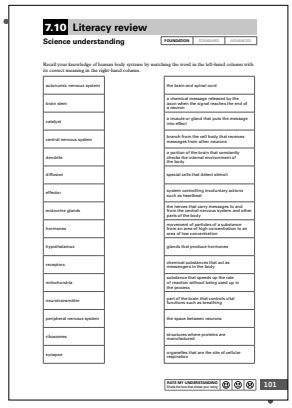
Be literate

Newly improved **literacy reviews**, in consultation with our Literacy Consultant Dr Trish Weekes, provide a deeper and broader range of language building tasks. Every chapter concludes with a literacy review which focuses on building a deeper understanding of key terms supporting students to correctly apply key terms from the topic.


7.10 Literacy review

Science understanding

FOUNDATION | STANDARD | ADVANCED

Recall your knowledge of human body systems by matching the word in the left-hand column with its correct meaning in the right-hand column.

autonomic nervous system	the brain and spinal cord
brain stem	a chemical message released by the axon when the signal reaches the end of a neuron
catalyst	a muscle or gland that puts the message into effect
central nervous system	branch from the cell body that receives messages from other neurons
dendrite	a portion of the brain that constantly adjusts the internal environment of the body
diffusion	special cells that detect stimuli
effector	system controlling involuntary actions such as heartbeat
endocrine glands	the nerves that carry messages to and from the central nervous system and other parts of the body
hormones	movement of particles of a substance from an area of high concentration to an area of low concentration
hypothalamus	glands that produce hormones
receptors	chemical substances that act as messengers in the body
mitochondria	substance that speeds up the rate of reactions without being used up in the process
neurotransmitter	part of the brain that controls vital functions such as breathing
peripheral nervous system	the space between neurons
ribosomes	structures where proteins are manufactured
synapse	organelles that are the site of cellular respiration

RATE MY UNDERSTANDING: Shows me have that shows your rating

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Be set

Visit www.pearsonplaces.com.au to enjoy the benefits of the following digital assets and interactive resources to support your learning and teaching:

- New interactive activities and lessons
- New Untamed Science videos
- Web destinations
- Student investigation templates and teacher support
- New STEP-UP student book and activity book chapters with answers at Years 9 and 10
- Full answers to all Student Book and Activity Book questions
- SPARKlabs
- Risk assessments
- Full teaching programs and curriculum mapping audits
- Chapter tests with answers

Worksheets

Each worksheet is classified according to the degree with which it deals with curriculum understandings.

- **Foundation** indicates the focus is on the basics like terminology.
- **Standard** indicates a focus on the core ideas, understandings and skills.
- **Advanced** indicates transfer and extension of core science understanding and skills to new or more sophisticated situations.

Teachers may use this tool to **differentiate** the worksheets allocated to students. They may select worksheets for students based on whether basic, core or extension exercises are required. The categories do not indicate the degree of difficulty of tasks on the worksheet. A worksheet labelled advanced may have tasks ranging from lower level through to higher-level thinking.

The main science **strand** is identified for each worksheet: Science Inquiry Skills, Science Understanding, Science as a Human Endeavour.

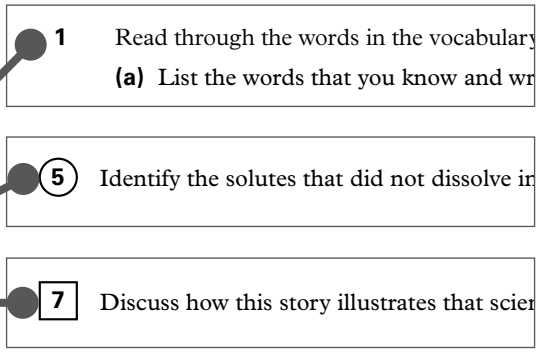
Science Inquiry Skills relevant to the worksheet are identified: Questioning and Predicting, Planning and Conducting, Processing and Analysing, Evaluating, Communicating.

Each question in a worksheet is identified according to the degree of difficulty. Bloom's taxonomy is used as the basis for question classification. The classification is intentionally subtle and unobtrusive. This tool may be used to differentiate between students, matching questions to their levels of ability.

Questions with a straight number indicate a remembering or understanding lower-order question.

Questions with a circle around the question number indicate an analysing or applying middle-order question.

Questions with a square around the question number indicate a creating or evaluating higher-order question.



An innovative tool for students to quickly and easily reflect on their understanding of each worksheet. The teacher may use the student responses as a formative assessment tool. At a glance, teachers may assess which topics and which students need intervention for improvement.

CHAPTER 2

Materials

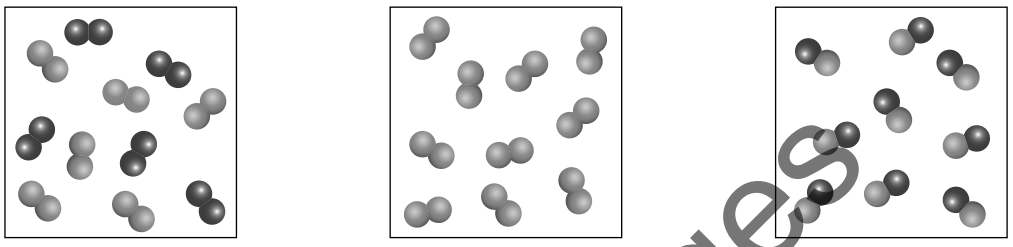
2.1 Knowledge preview

Science understanding

FOUNDATION | STANDARD | ADVANCED

1 The diagrams below show an element, a compound and a mixture. Identify which is which by adding a label above each diagram.

(a) _____ (b) _____ (c) _____



2 Define each of the following terms:

(a) element: _____

(b) compound: _____

(c) mixture: _____

3 Use your existing knowledge about acids and bases to answer the following questions:

(a) What happens to red litmus paper when it comes in contact with a base?

_____

(b) What colour would blue litmus paper turn when dipped in vinegar?

_____

(c) An alkali is always a base but a base is not always an alkali. Suggest a reason why.

_____

4 In this module you will be learning about metals. State three things you already know about metals:

(a) _____

(b) _____

(c) _____

2.2 Atomic symbols

Science understanding

FOUNDATION | STANDARD | ADVANCED

Scientists use atomic symbols to communicate information about an atom. The atomic symbol is made up of the chemical symbol for the atom, the atomic number and the mass number. The atomic symbol of the carbon atom is shown in Figure 2.2.1

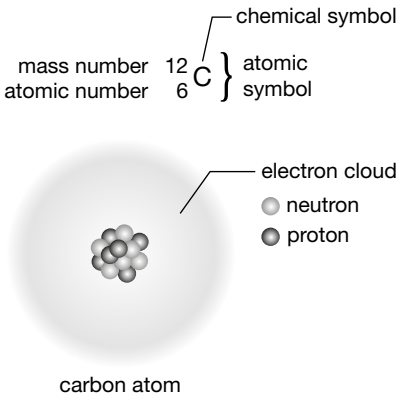


Figure 2.2.1

1 The atomic number is equal to the number of protons. The mass number is equal to the number of protons plus the number of neutrons. Count the number of protons and neutrons in the atoms below, then state the atomic number and mass number for each atom.

(a)

protons = _____
neutrons = _____
atomic number = _____
mass number = _____

(b)

protons = _____
neutrons = _____
atomic number = _____
mass number = _____

(c)

protons = _____
neutrons = _____
atomic number = _____
mass number = _____

(d)

protons = _____
neutrons = _____
atomic number = _____
mass number = _____

(e)

protons = _____
neutrons = _____
atomic number = _____
mass number = _____

(f)

protons = _____
neutrons = _____
atomic number = _____
mass number = _____

(g)

protons = _____
neutrons = _____
atomic number = _____
mass number = _____

(h)

protons = _____
neutrons = _____
atomic number = _____
mass number = _____

2 Match the letter for each atom in question 1 to its correct atomic symbol below.

$^{16}_{8}O$	$^{1}_{1}H$	$^{14}_{7}N$	$^{7}_{3}Li$
_____	_____	_____	_____
$^{4}_{2}He$	$^{9}_{4}Be$	$^{11}_{5}B$	$^{19}_{9}F$
_____	_____	_____	_____

2.3 Atomic models

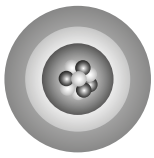
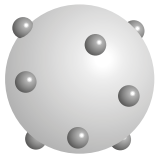
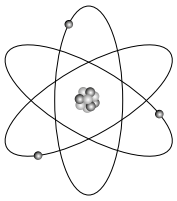
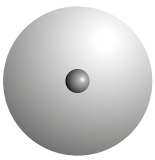
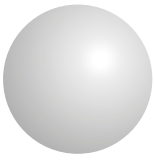
Science understanding

FOUNDATION | **STANDARD** | ADVANCED

Scientists, understanding of chemistry and of atoms has grown significantly over the last 2000 years and has led to the development of more detailed and accurate models of the structure of atoms.

1. The table below includes information about some of the models of atoms developed over time. Look at the jumbled columns of diagrams, names and descriptions of the different atomic models. Connect the diagrams, to their correct names and descriptions by drawing lines between them.

Atomic models

Diagram	Name of model	Description
	nuclear model	Atoms are made up of a positive nucleus that has both protons and neutrons. The nucleus is surrounded by electrons orbiting it like planets orbiting the Sun.
	solid-ball model	Atoms are made up of a positive nucleus that has both protons and neutrons. The electrons form shells around the nucleus.
	plum pudding model	Atoms are made up of a solid, positively charged nucleus surrounded by an electron cloud.
	electron cloud model	Atoms are made up of a positively charged ball with negatively charged electrons stuck to it.
	planetary model with neutrons	Substances are made of hard, ball-like building blocks called atoms that cannot be broken apart.

2. List the atomic models from the oldest to the most recent.

_____

_____

RATE MY UNDERSTANDING
Shade the face that shows your rating ☺ 😐 ☹

2.4 Comparing alloys

Science inquiry skills

FOUNDATION | **STANDARD** | ADVANCED

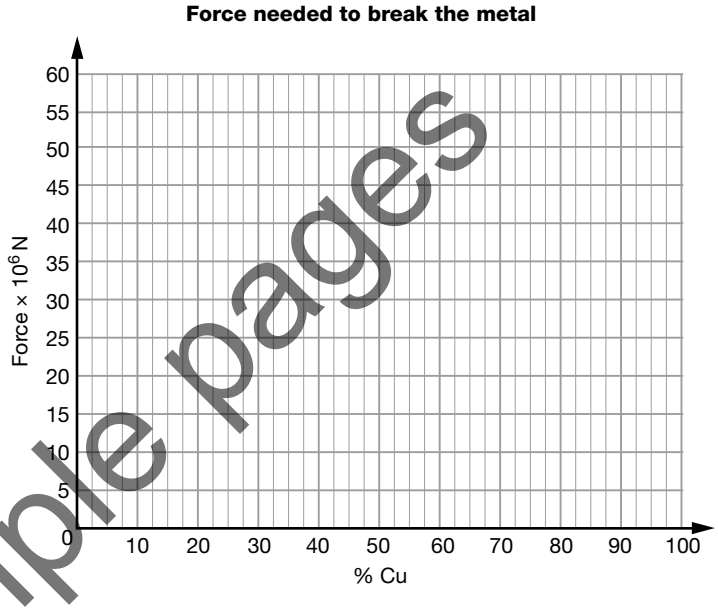
Processing & Analysing **Communicating**

Copper (Cu) and zinc (Zn) can be mixed together to form alloys of different strengths. For example, different strengths of brass can be obtained by mixing different proportions of copper and zinc. Table 2.4.1 shows the force that different alloys of copper and zinc can take before breaking.

Table 2.4.1

Brass with different proportions of copper and force needed to break it											
% Cu	0	10	20	30	40	50	60	70	80	90	100
Force (× 10^6 N)	19	16	12	8	5	32	58	40	23	21	33

1. On the grid provided, construct a line graph of force (*y*-axis) plotted against the percentage of copper (*x*-axis). Connect the points together with a curve drawn smoothly through them.



2. Which point on the graph indicates the breaking point of pure copper? Colour the point in red.

3. Which point on the graph indicates the breaking point of pure zinc? Colour the point in green.

4. Use your graph or table to predict the breaking strength of:

   (a) a 50/50 alloy of copper and zinc. Plot this point on your graph. _____

   (b) an alloy of 25% Cu and 75% Zn _____

   (c) an alloy containing 25% zinc. _____

5. Use the graph to identify the proportions of copper and zinc that are needed to make the alloy stronger than pure copper.

2.4 Comparing alloys

6. Identify the proportions of zinc that make the alloy weaker than pure zinc.

_____

7. State the percentage of copper that makes the strongest alloy. _____

8. State the composition of three alloys that all break when a force of 25×10^6 N is applied to them.

9. Conduct research into the metal composition of Australian coins. The coins are made of two different types of alloys. Complete the table identifying the composition of the alloys used to mint the coins. Propose reasons why these alloys are used for minting Australian coins.

mint (coin) (*v*) to produce money by stamping metal

Australian coins and their composition		
Australian coins		
composition of alloy		
reason for using this alloy		

RATE MY UNDERSTANDING
Shade the face that shows your rating

2.5 Glass, steel and temperature changes

Science as a human endeavour

FOUNDATION | STANDARD | **ADVANCED**

Materials such as glass and steel develop different properties when heated. Table 2.5.1 describes two processes which glass and metals may be subjected to.

Table 2.5.1

Changing properties of metals and glass with heating		
Name of processes	**Description of processes to treat metals and glass**	**Changed properties of metals or glass**
annealing (or normalising)	Glass and steel are heated and then left to cool naturally.	Glass is toughened by the process. Steel is softened, making it easier to shape into wires and cables.
tempering	Glass and steel are repeatedly heated and then cooled rapidly, usually by being dipped into cold water. This rapid cooling is called quenching—the material has been quenched.	Tempered glass is also known as safety glass because it forms small (and safe) rounded beads when broken. Tempering makes the substances stronger. For centuries, blacksmiths have used tempering to toughen and shape steel tools, horseshoes and the blades of knives and swords.

1 State alternative names for:

(a) annealing _____

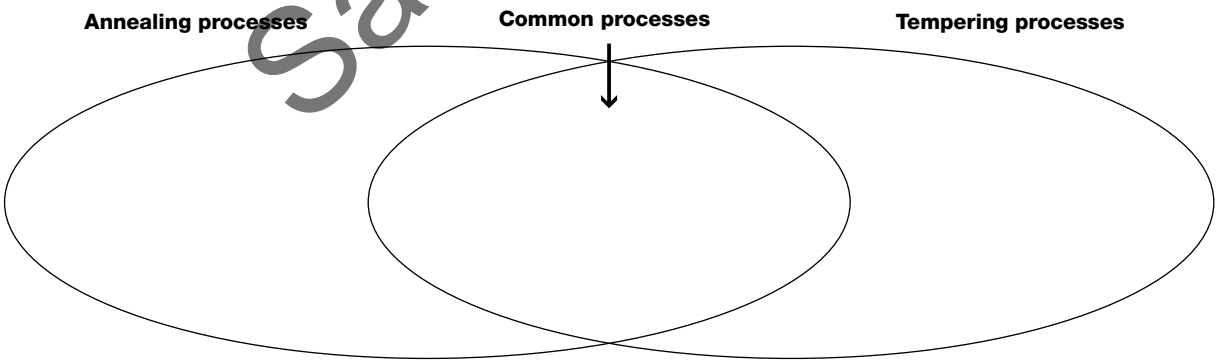
(b) tempered glass. _____

2 Define quenching.

_____

_____

3 Compare the processes of annealing and tempering using the Venn diagram.



4 Compare annealed glass with normal glass.

_____

_____

_____

_____

blacksmith (*n*) someone who makes things from iron and steel

droop (*v*) to bend downwards

initial (*adj*) first

toughen (*adj*) to make something stronger

withstood (*v*) survived a force or injury

5 Propose a use for:

(a) tempered glass

(b) tempered steel.

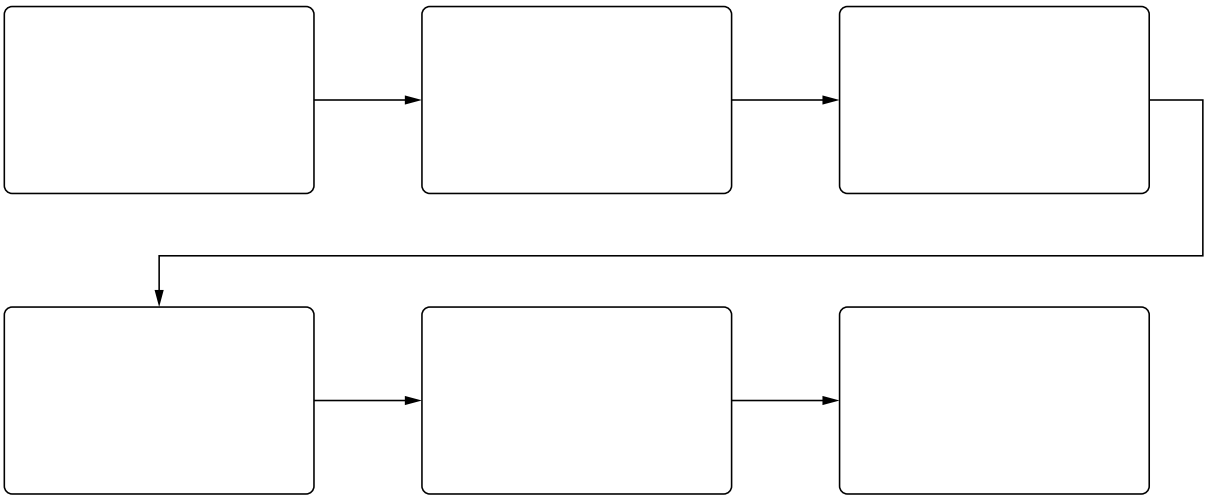
Heat can also cause disaster. When it is hot, steel acts like plastic, and stretches and bends if force is applied to it. Steel structures tend to droop and collapse in an extreme fire. This often happens in factory fires.

The steel structures drooped, causing them to collapse on 11 September 2001, after the Twin Towers of the World Trade Center in New York, United States of America, were struck by aircraft piloted by terrorists. Both towers withstood the initial collisions, but exploding aircraft fuel ignited fires in the buildings. This intense heat caused the steel structures holding up the upper floors to sag and pull in the outer walls of both towers. The weakened walls could not hold the weight of the floors above them and so they collapsed. The impact of the collapsing upper floors then caused the lower walls to collapse again and again until both towers had collapsed.

Figure 2.5.2 Debris of one of the collapsed Twin Towers, New York City, USA.

6 Compare the behaviour of steel at room temperature with steel at extremely high temperature.

7 Aircraft colliding with the World Trade Center towers in New York caused a chain of events that ended in the towers collapsing. Outline how the collision changed the materials in the towers enough to cause them to collapse. Show the changes on the flow diagram.



RATE MY UNDERSTANDING
Shade the face that shows your rating

2.6 pH and indicators

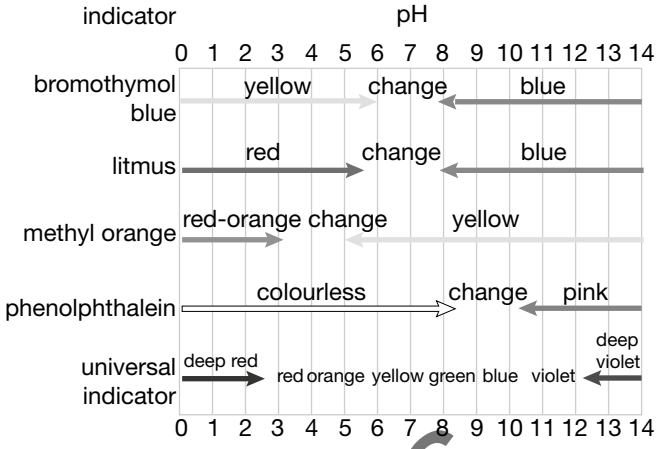
Science inquiry skills

FOUNDATION | **STANDARD** | ADVANCED

Communicating

1 Different indicators turn different colours at different pH values.

Predict what colour each material would give if tested with the indicators shown. Use your answers to complete the table below.



pH indicators

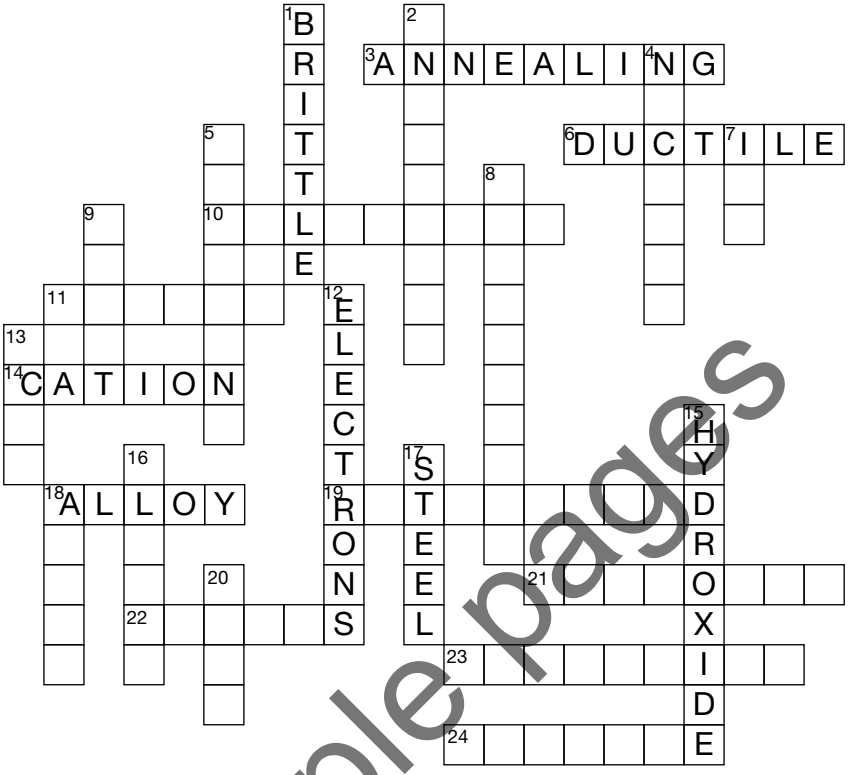
Substance and pH		litmus	bromothymol blue	methyl orange	phenol-phthalein	universal indicator
floor cleaner	10.0					
ammonia solution	11.0					
brass polish	9.5					
calcium hydroxide solution	11.9					
carpet shampoo	5.9					
cream cleanser	8.8					
dilute caustic soda	13.0					
dilute nitric acid	1.0					
dishwashing liquid	5.5					
kitchen cleaner	11.0					
lemon juice	2.5					
milk	6.8					
oranges	3.2					
oven spray	12.5					
tea	5.2					
toothpaste	6.8					
vinegar	2.9					
wine	3.8					

2.7 Literacy review

Science understanding

FOUNDATION | STANDARD | ADVANCED

1 Recall your knowledge of materials to complete this crossword puzzle and the clues. Where clues are provided, write the correct word onto the crossword puzzle. Where words are provided on the crossword puzzle, write the clue for that word.



Across

3 _____

6 _____

10 Able to be hammered into new shapes

11 A positively charged particle in an atom

14 _____

18 _____

19 Name of the scientist who used gold foil to prove the atom to be largely empty space

21 The table that lists all known elements

22 Turns red in the presence of acid, blue in a base

23 A process of rapidly cooling heated metal by dropping it in water

24 A grid-like structure of atoms or ions

Down

1 _____

2 A substance that shows whether another substance is acidic, neutral or basic

4 Core of the atom

5 A pure substance made of two or more different types of atoms that are chemically joined

7 An atom that has gained or lost an electron

8 Different forms of carbon

9 The purity of gold is measured this way

12 _____

13 A substance that releases hydrogen ions

15 _____

16 A base that dissolves in water

17 _____

18 A negative ion

20 Fundamental building block of all materials

RATE MY UNDERSTANDING
Shade the face that shows your rating

2.8 Thinking about my learning

Think back over your learning for this chapter on materials. Your task is to write a report about the work you have done in this topic.

Name:

Class Date

I have been learning about

I have learned how to

When working in groups I am particularly good at

I have helped others with their learning by

My most outstanding piece of work in this topic was

I need to work on improving