Resource Quick Tours

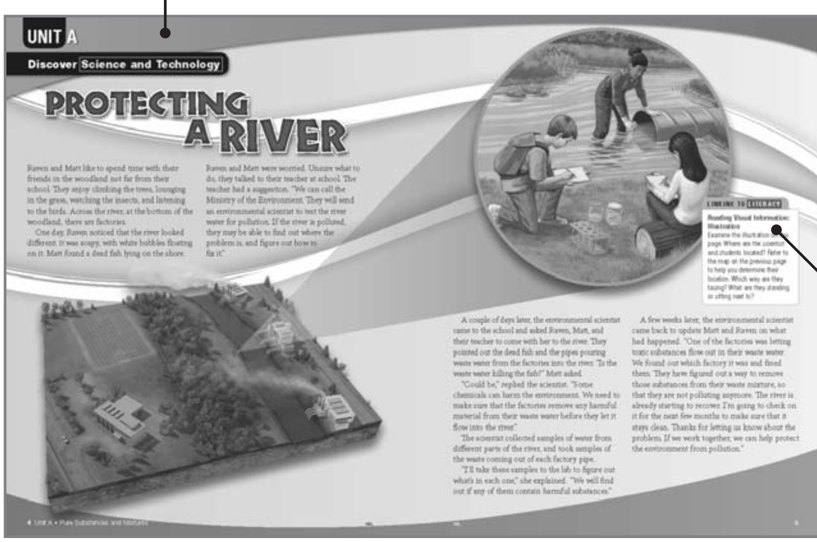
STUDENT BOOK QUICK TOUR

Unit Opening Material

Unit Preview and Big Ideas
The Unit Preview highlights the Big Ideas, provides STSE context, and connects to the students' own experiences.

Unit Opener
A purposeful, engaging photo represents the Big Ideas visually and helps students connect to the topic of the unit.

Discover Science and Technology
A short narrative reflects STSE expectations through a motivating, real-world context.



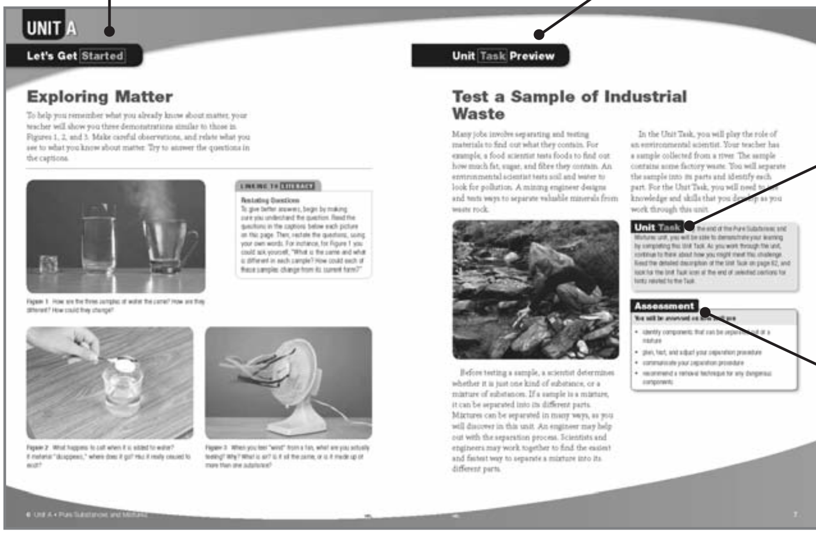
Linking to Literacy
This feature provides familiar strategies to help students use literacy skills to enhance their understanding.

Let's Get Started

This activity accesses students' prior knowledge. It can be used as a diagnostic assessment tool and is an opportunity for differentiated instruction.

Unit Task Preview

This feature previews the Unit Task—a culminating activity that provides a context for learning. Students may be offered a variety of choices of tasks to complete to support individual learning.



Unit Task Icon

Throughout each unit, these icons indicate to students when a connection can be made between their learning and their Unit Task.

Assessment Box

Students are given a clear description of the assessment criteria for the Unit Task.

Chapter Opening Material

Reading Science and Technology

A unique reading activity uses a variety of literary styles and text forms to provide a source of discussion and connect to STSE. It focuses on the importance of reading to access information.

Chapter Opener

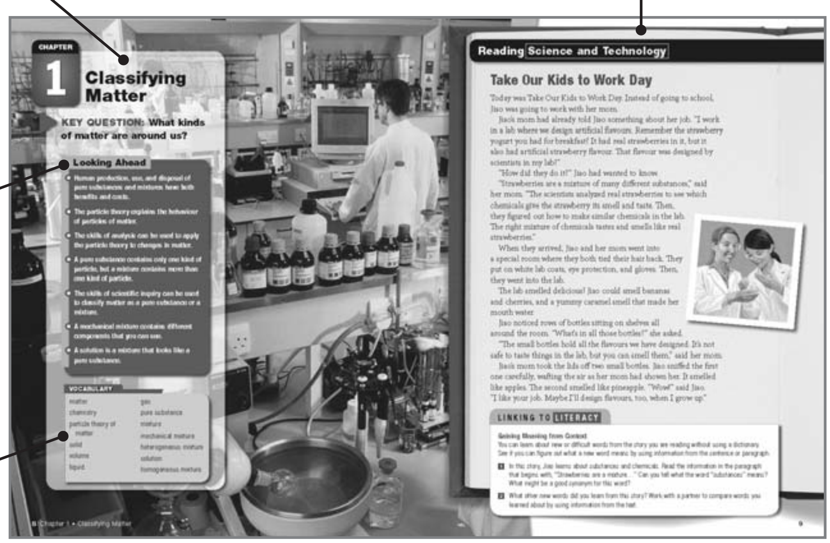
This is an advanced organizer which provides a structure for learning and questioning. An engaging image connects to the STSE-related narrative on the next page.

Looking Ahead

These statements summarize the key concepts and skills addressed in the chapter and reflect specific curriculum expectations in student-friendly language.

Vocabulary

This is a list of the key terms used in the chapter in the order in which they are introduced.

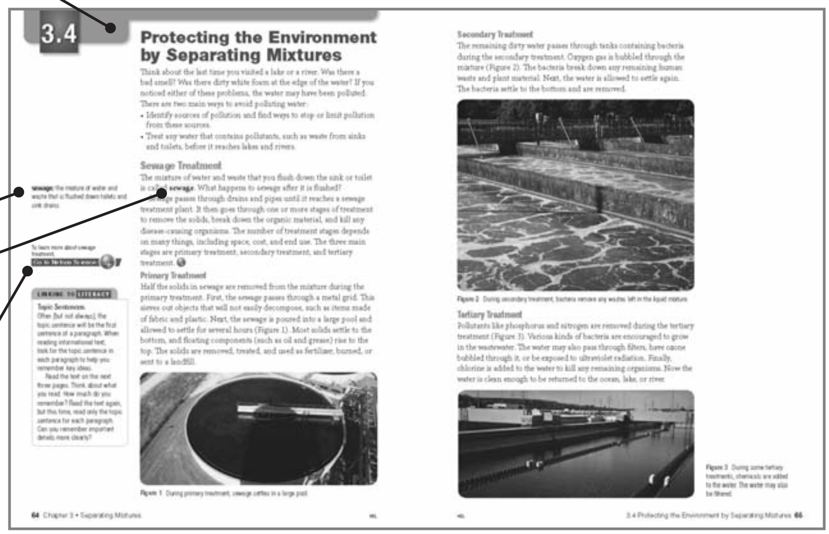


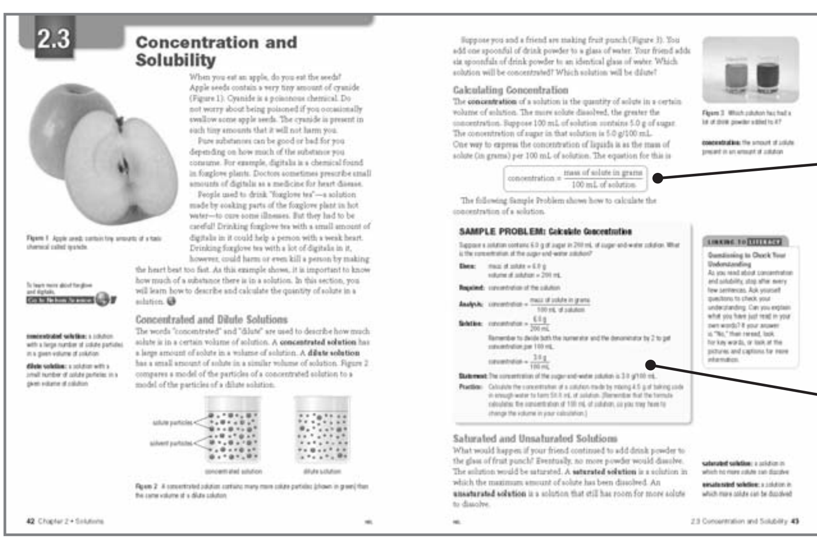
Chapter Content

Concept Development Sections
Each concept development section presents one of the basic concepts of the unit derived from a group of specific curriculum expectations. The text is divided into manageable chunks using subheadings. Learning is visually supported using diagrams, photos, and illustrations.

Vocabulary
Key terms are in bold print and highlighted in context. Students will find a reworded formal definition in the margin of the text and in the glossary. Pronunciation keys are provided in the glossary for difficult words.

Weblink Icon
This icon directs students to the Nelson Science website for an extension of learning opportunities using a variety of multimedia tools. The Nelson Science website can be found at www.nelson.com/perspectives



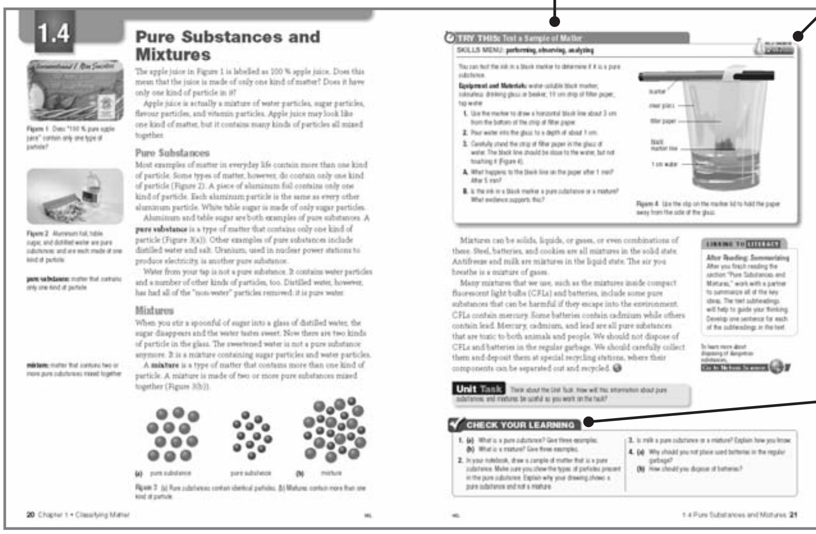


Equation Box
Important equations are highlighted in a red box.

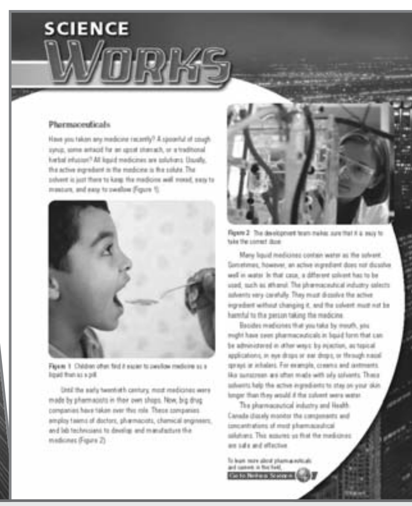
Sample Problems
This feature models how to solve numerical problems using the GRASS method. Practice problems are provided.

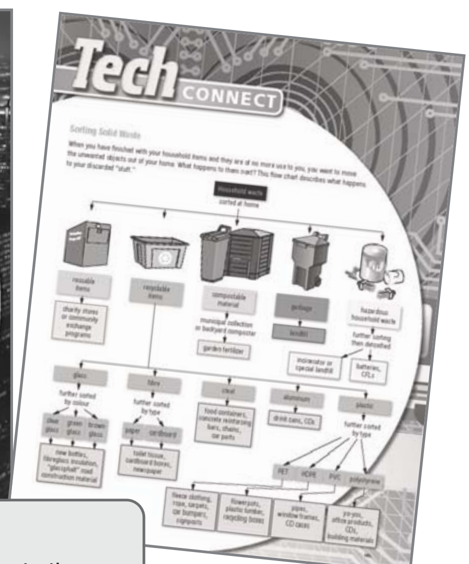
Try This Activity
These are hands-on mini-investigations that use easy-to-find materials and do not require a lab.

Skills Icon
The Skills Icon appears in Try This and other activities. It directs students to the section of the Skills Handbook that contains helpful information and tips.



Check Your Learning
Each concept section ends with a Check Your Learning box. This is a formative assessment tool with questions designed to help students construct meaning and understanding from the section content.



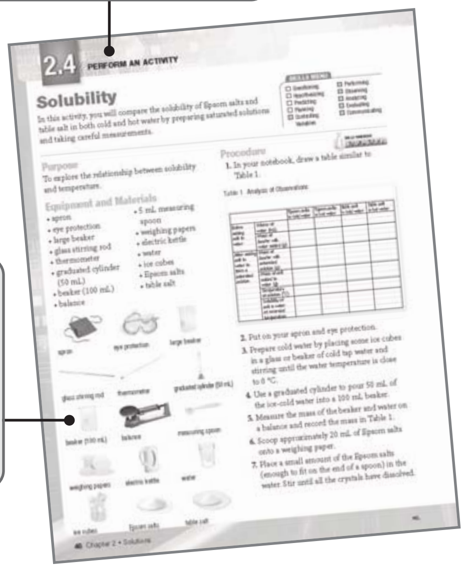


Magazine Features
Each magazine feature illustrates a real-world connection to the science and technology students are learning using non-fiction text. **Awesome Science** focuses on exciting developments in science; **Science Works** examines science in everyday life and career links; **Tech Connect** has a technology focus.

Investigations and Activities

Perform an Activity
These are hands-on activities that provide students with an opportunity to perform non-experimental investigations. Students make observations and perform field studies, but are not expected to answer a testable question or develop a prediction or hypothesis.

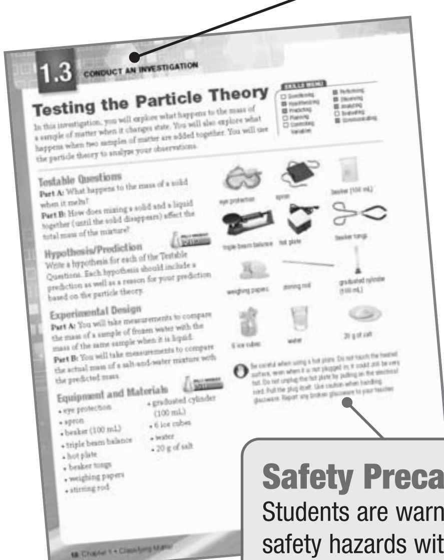
Explore an Issue Critically
These activities address STSE expectations by allowing students to examine and take action on social and environmental issues related to the content of the unit.

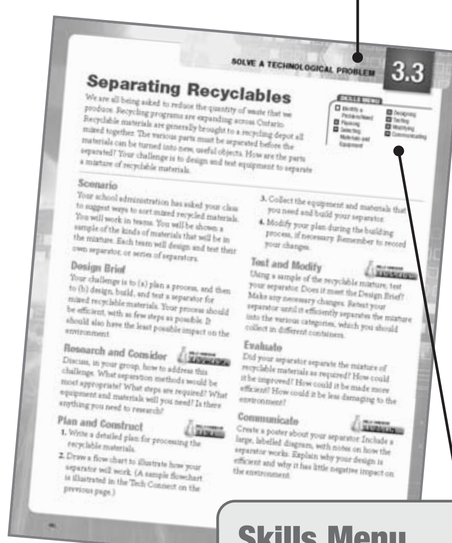


Equipment and Materials
Activities include photos of equipment and materials to support visual learners and English Language Learners.

Conduct an Investigation
Students develop science process skills through an investigation that involves predicting, hypothesizing, experimentation, controlling variables, and fair testing. Students use the results of the experiment to answer a testable question.

Solve a Technological Problem
These activities require students to develop, test, and implement a device, model, technique, or approach. Students use the technological problem-solving process to solve practical problems.





Safety Precautions
Students are warned about potential safety hazards with a STOP icon and warnings in red type.

Skills Menu
The Skills Menu identifies science process skills required for the activity. These skills are supported in the Skills Handbook.

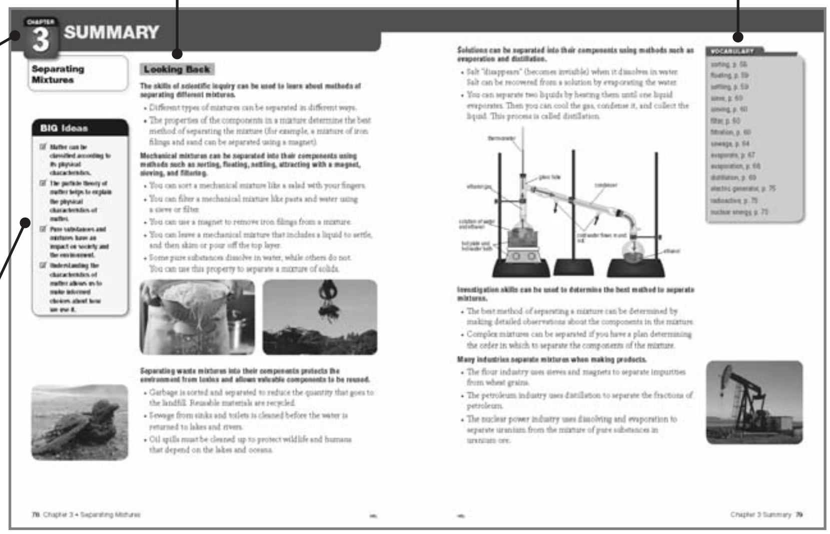
Chapter Summary and Review Material

Looking Back
These statements review the Looking Ahead key concepts and skills from the Chapter Opener and elaborate on them.

Vocabulary
This list of terms is provided as a summary with page references for quick review.

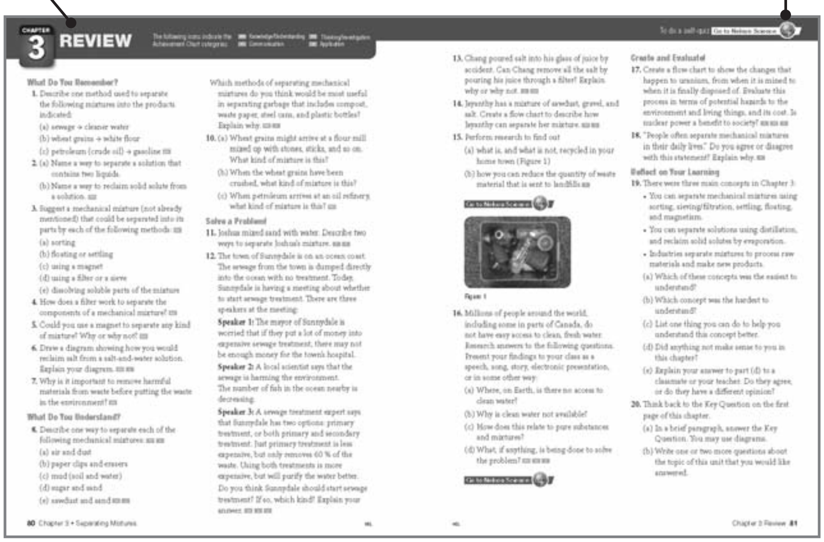
Chapter Summary
This is a student study guide that consolidates what they have just learned in the chapter. It connects to and extends from the Chapter Opener.

Big Ideas
The Big Ideas addressed in the chapter are checked off.



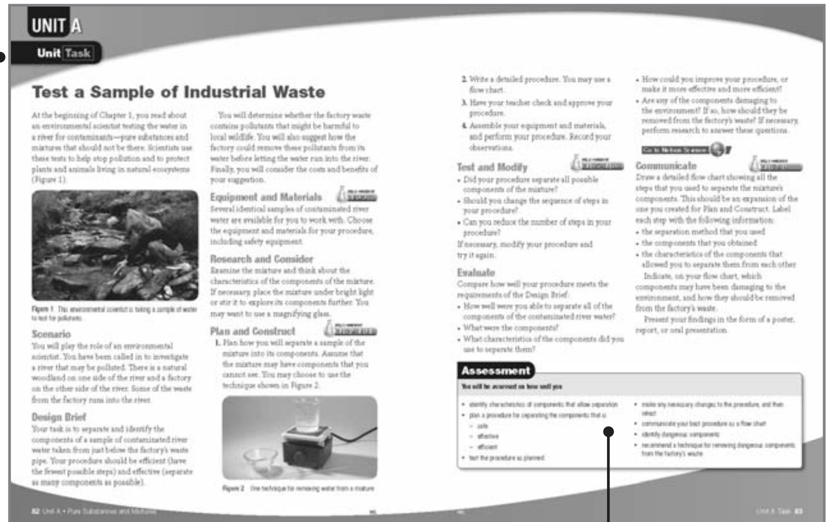
Chapter Review
Questions are organized according to Bloom's Taxonomy and tagged according to the Science and Technology Achievement Chart categories. Questions range from lower order to higher order.

Self-Quiz Icon
There is an online self-assessment tool for each chapter on the Nelson Science website. The self-quiz provides immediate feedback to the student.



Unit Task

A culminating activity engages students and provides an opportunity to apply and extend their new learning. Students can demonstrate their learning in a variety of ways by being given a choice of product or task where possible.

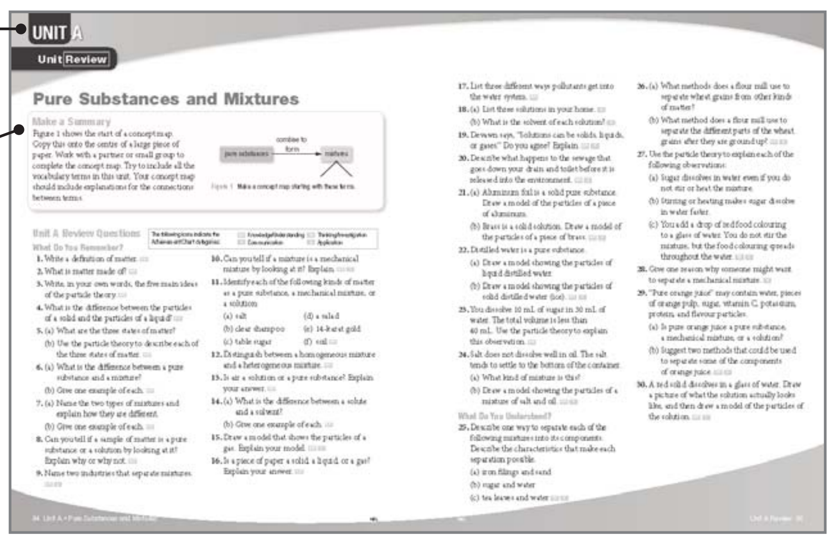


Assessment Box

The assessment criteria provided to students in the Unit Task Preview are expanded here.

Unit Review

Review questions allow students to demonstrate their understanding of and ability to apply key ideas, vocabulary, and skills. Questions are categorized according to Bloom's Taxonomy and labelled according to the Science and Technology Achievement Chart categories.



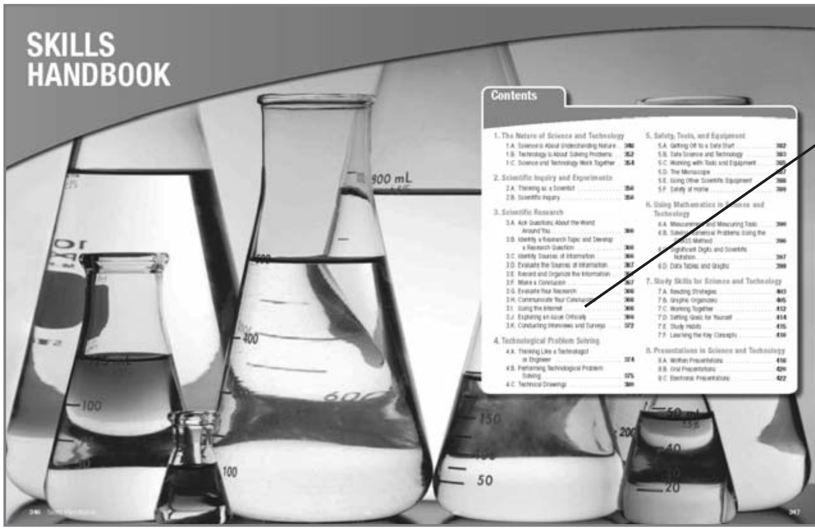
Make a Summary

A consolidation activity requires students to work together to create their own summary of their learning in the unit. This is an opportunity for both review and self-assessment.

Reference Material

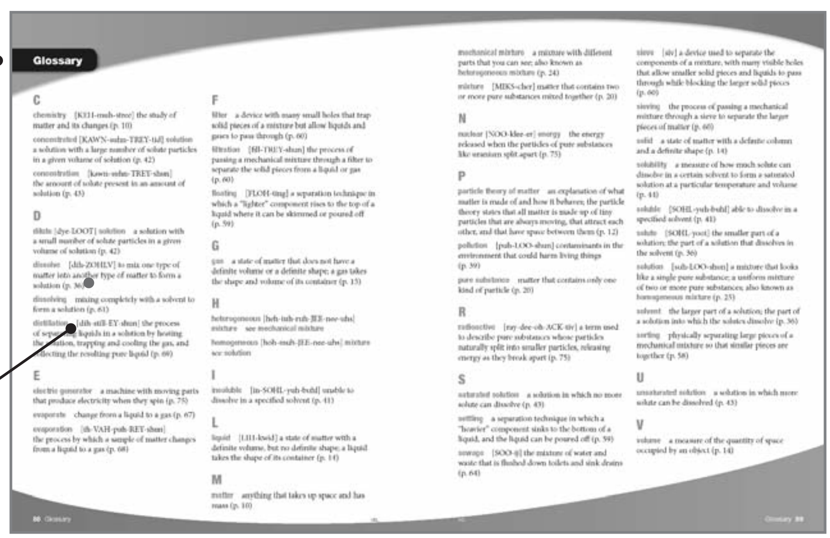
Skills Handbook

The Skills Handbook is a reference tool to help students develop skills and understanding. Short Practice activities provide students with extra practice in developing certain skills. The Skills Handbook is cross-referenced in the Student Book with an icon that lists the section of interest for students.



Glossary

This is a list of all vocabulary terms in the book in alphabetical order. The page on which the term first appears is provided at the end of each definition.



Pronunciation Key

Keys are provided for words that are difficult to read or pronounce.

TEACHER RESOURCE QUICK TOUR

Every unit will have the following features to support student learning and teacher instruction and assessment.

At the Unit Level. . .

UNIT OVERVIEW

Introductory paragraphs provide a broad overview of the unit and summarize what students will be learning. Within the Unit Overview, teachers can find the following:

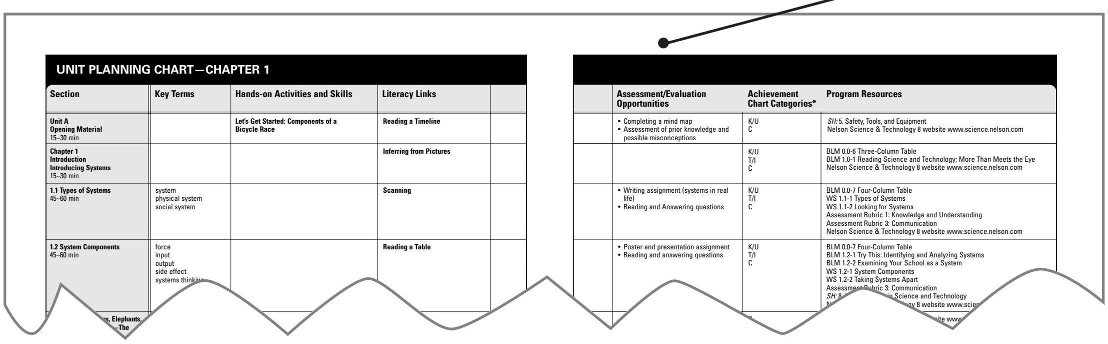
- Time expectations for completing the Unit.
- A chart summarizing the Fundamental Concepts and Big Ideas for each unit, correlated with each chapter of the Student Book.
- Curriculum Correlation charts correlating the Overall and Specific Expectations with each section of the Student Book.

The Unit Introduction follows the Equipment and Materials list and includes teaching notes and suggestions for starting the unit. Teaching Notes include suggestions for the following features:

- Unit Preview
- Discover Science and Technology (Before, During, and After Reading, as well as Literacy strategies)
- Let's Get Started
- Unit Task Preview
- Differentiated Instruction
- English Language Learners (ELL)

Unit Planning Chart

Use the Unit Planning Chart to preview important planning and assessment considerations for each section. In addition to an overview of the key terms, activities and skills, literacy links, and program resources, you will find a list of assessment and evaluation opportunities as well as the relevant Achievement Chart categories covered in each section in the unit.

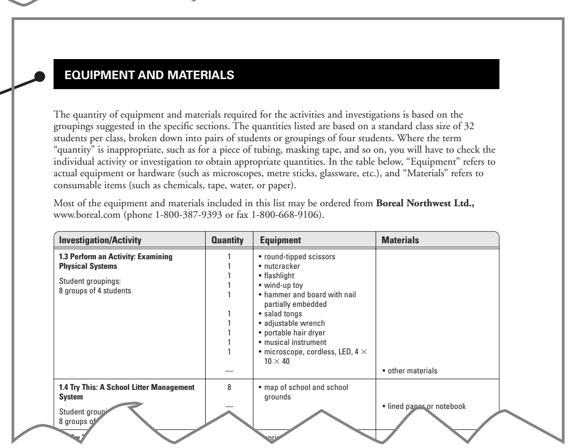


UNIT PLANNING CHART—CHAPTER 1

Section	Key Terms	Hands-on Activities and Skills	Literacy Links	Assessment/Evaluation Opportunities	Achievement Chart Categories*	Program Resources
Unit A Opening Material 15–30 min		**Let's Get Started: Components of a Bicycle Race**	**Reading a Timeline**	• Completing a mind map • Assessment of prior knowledge and possible misconceptions	K/U C	*SH:* 5. Safety, Tools, and Equipment Nelson Science & Technology 8 website www.science.nelson.com
Chapter 1 Introduction Introducing Systems 15–30 min			**Inferring from Pictures**		K/U T/I C	BLM 0.0-6 Three-Column Table BLM 1.0-1 Reading Science and Technology: More Than Meets the Eye Nelson Science & Technology 8 website www.science.nelson.com
1.1 Types of Systems 45–60 min	system physical system social system		**Scanning**	• Writing assignment (systems in real life) • Reading and Answering questions	K/U T/I C	BLM 0.0-7 Four-Column Table WS 1.1-1 Types of Systems WS 1.1-2 Looking for Systems Assessment Rubric 1: Knowledge and Understanding Assessment Rubric 3: Communication Nelson Science & Technology 8 website www.science.nelson.com
1.2 System Components 45–60 min	force input output side effect systems thinking		**Reading a Table**	• Poster and presentation assignment • Reading and answering questions	K/U T/I C	BLM 0.0-7 Four-Column Table BLM 1.2-1 Try This: Identifying and Analyzing Systems BLM 1.2-2 Examining Your School as a System WS 1.2-1 System Components WS 1.2-2 Taking Systems Apart Assessment Rubric 3: Communication *SH:* 8. ... Science and Technology

Equipment and Materials

This table lists all the activities in the Student Book and the quantities for each equipment and materials item. Quantities reflect the groupings for each activity suggested in the specific sections.



EQUIPMENT AND MATERIALS

The quantity of equipment and materials required for the activities and investigations is based on the groupings suggested in the specific sections. The quantities listed are based on a standard class size of 32 students per class, broken down into pairs of students or groupings of four students. Where the term "quantity" is inappropriate, such as for a piece of tubing, masking tape, and so on, you will have to check the individual activity or investigation to obtain appropriate quantities. In the table below, "Equipment" refers to actual equipment or hardware (such as microscopes, metre sticks, glassware, etc.), and "Materials" refers to consumable items (such as chemicals, tape, water, or paper).

Most of the equipment and materials included in this list may be ordered from **Boreal Northwest Ltd.,** www.boreal.com (phone 1-800-387-9393 or fax 1-800-668-9106).

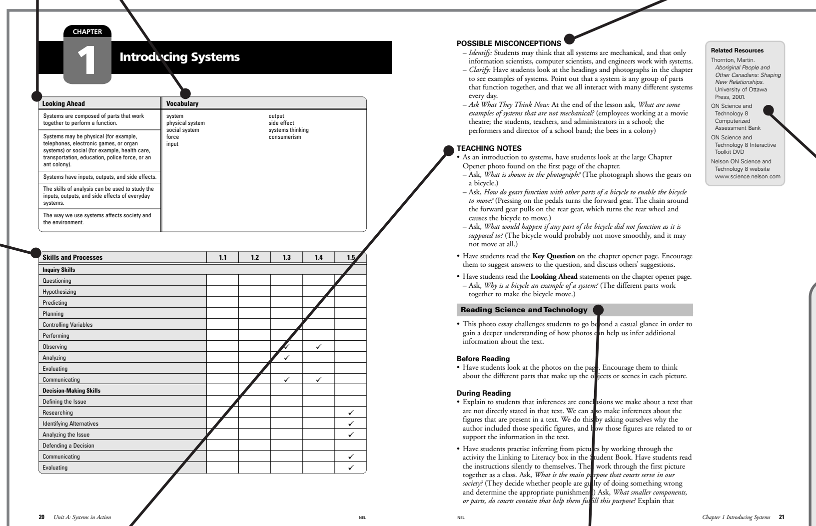
Investigation/Activity	Quantity	Equipment	Materials
1.3 Perform an Activity: Examining Physical Systems Student groupings: 8 groups of 4 students	1 1 1 1 1 1 1 1 1 1 —	• round-tipped scissors • nutcracker • flashlight • wind-up toy • hammer and board with nail partially embedded • salad tongs • adjustable wrench • portable hair dryer • musical instrument • microscope, cordless, LED, 4 × 10 × 40	• other materials
1.4 Try This: A School Litter Management System Student groupings: 8 groups of	8 —	• map of school and school grounds	• lined paper or notebook

At the Chapter Level. . .

Looking Ahead and Vocabulary
This table lists the Looking Ahead statements as well as the Vocabulary words found in the chapter of the Student Book.

Possible Misconceptions
This feature appears when concepts within the chapter or section are often misunderstood by students. Suggestions for identifying and clarifying students' understanding of these concepts are provided.

Skills and Processes
This is a checklist of the skills and processes addressed in each section of the chapter.



CHAPTER 1 **Introducing Systems**

Looking Ahead	Vocabulary
Systems are composed of parts that work together to perform a function.	system, physical system, social system, force, input, output, side effect, systems thinking, consumerism
Systems may be physical (for example, telephones, electronic games, or organ systems) or social (for example, health care, transportation, education, police force, or an ant colony).	
Systems have inputs, outputs, and side effects.	
The skills of analysis can be used to study the inputs, outputs, and side effects of everyday systems.	
The way we use systems affects society and the environment.	

Skills and Processes	1.1	1.2	1.3	1.4	1.5
Inquiry Skills					
Questioning					
Hypothesizing					
Predicting					
Planning					
Controlling Variables					
Performing					
Observing			✓	✓	
Analyzing			✓		
Evaluating					
Communicating			✓	✓	
Decision-Making Skills					
Defining the Issue					
Researching					✓
Identifying Alternatives					✓
Analyzing the Issue					✓
Defending a Decision					
Communicating					✓
Evaluating					✓

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POSSIBLE MISCONCEPTIONS
- *Identify:* Students may think that all systems are mechanical, and that only information scientists, computer scientists, and engineers work with systems.
- *Clarify:* Have students look at the headings and photographs in the chapter to see examples of systems. Point out that a system is any group of parts that function together, and that we all interact with many different systems every day.
- *Ask What They Think Now:* At the end of the lesson ask, *What are some examples of systems that are not mechanical?* (employees working at a movie theatre; the students, teachers, and administrators in a school; the performers and director of a school band; the bees in a colony)

TEACHING NOTES
- As an introduction to systems, have students look at the large Chapter Opener photo found on the first page of the chapter.
  - Ask, *What is shown in the photograph?* (The photograph shows the gears on a bicycle.)
  - Ask, *How do gears function with other parts of a bicycle to enable the bicycle to move?* (Pressing on the pedals turns the forward gear. The chain around the forward gear pulls on the rear gear, which turns the rear wheel and causes the bicycle to move.)
  - Ask, *What would happen if any part of the bicycle did not function as it is supposed to?* (The bicycle would probably not move smoothly, and it may not move at all.)
- Have students read the **Key Question** on the chapter opener page. Encourage them to suggest answers to the question, and discuss others' suggestions.
- Have students read the **Looking Ahead** statements on the chapter opener page.
  - Ask, *Why is a bicycle an example of a system?* (The different parts work together to make the bicycle move.)

Reading Science and Technology
- This photo essay challenges students to go beyond a casual glance in order to gain a deeper understanding of how photos can help us infer additional information about the text.

Before Reading
- Have students look at the photos on the page. Encourage them to think about the different parts that make up the objects or scenes in each picture.

During Reading
- Explain to students that inferences are conclusions we make about a text that are not directly stated in that text. We can also make inferences about the figures that are present in a text. We do this by asking ourselves why the author included those specific figures, and how those figures are related to or support the information in the text.
- Have students practise inferring from pictures by working through the activity the Linking to Literacy box in the Student Book. Have students read the instructions silently to themselves. Then work through the first picture together as a class. Ask, *What is the main purpose that courts serve in our society?* (They decide whether people are guilty of doing something wrong and determine the appropriate punishment.) Ask, *What smaller components, or parts, do courts contain that help them fulfill this purpose?* Explain that

Related Resources
Thornton, Martin. *Aboriginal People and Other Canadians: Shaping New Relationships.* University of Ottawa Press, 2001.
ON Science and Technology 8 Computerized Assessment Bank
ON Science and Technology 8 Interactive Toolkit DVD
Nelson ON Science and Technology 8 website www.science.nelson.com

NEL *Chapter 1 Introducing Systems* 21

Related Resources
Look for this feature in each section to find sources of additional science information, as well as related Ontario Science and Technology resources available from *Nelson*.

Teaching Notes
Provided here are suggested ways to activate students' prior knowledge, motivate thinking, and develop an understanding of the concepts in the chapter using features in the Student Book.

Reading Science and Technology
Here you will find teaching notes with Before, During, and After reading suggestions for the Reading Science and Technology feature found at the beginning of each chapter, as well as support for the Linking to Literacy activity that is part of each chapter narrative.

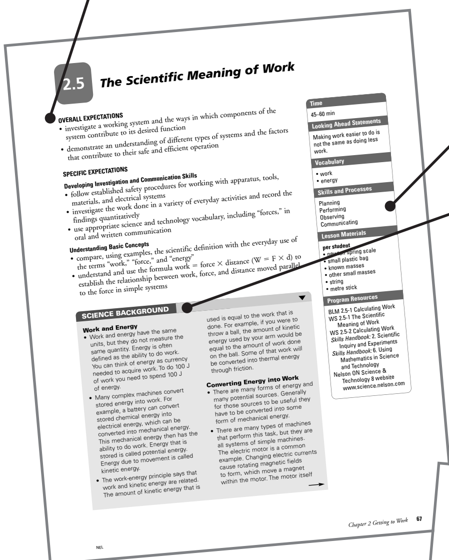
At the Section Level. . .

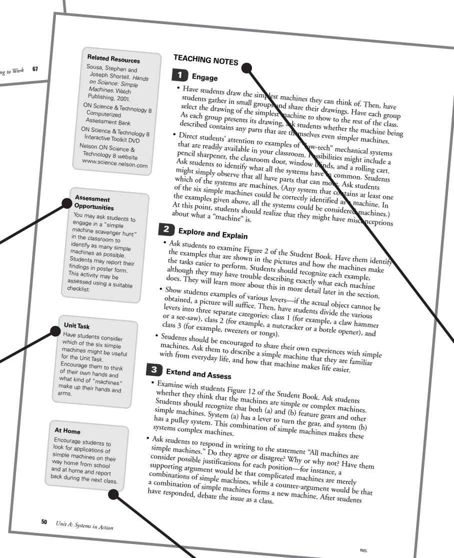
Expectations
The Overall Expectations and Specific Expectations from the curriculum document are listed here.

Section Summary
This feature includes a time estimate, a list of relevant Looking Ahead statements, Vocabulary, and the Program Resources for each section.

When the section involves investigations or activities, this feature includes relevant Skills and Processes and a list of required lesson materials.

Science Background
Here you will find background science information relevant to the topics covered in the section.





Assessment Opportunities
Includes suggestions for assessment options related to each lesson.

Teaching Notes
Information and/or ideas in this section are listed under three headings: Engage, Explore and Explain, and Extend and Assess. Answers to Try This activities and Check Your Learning Questions are provided, as well as sample data and answers for activities and investigations.

Unit Task Box
This feature provides tips for helping students apply the knowledge and skills they have learned in this section to the completion of the Unit Task. This feature will appear in every section where a Unit Task Icon appears in the Student Book.

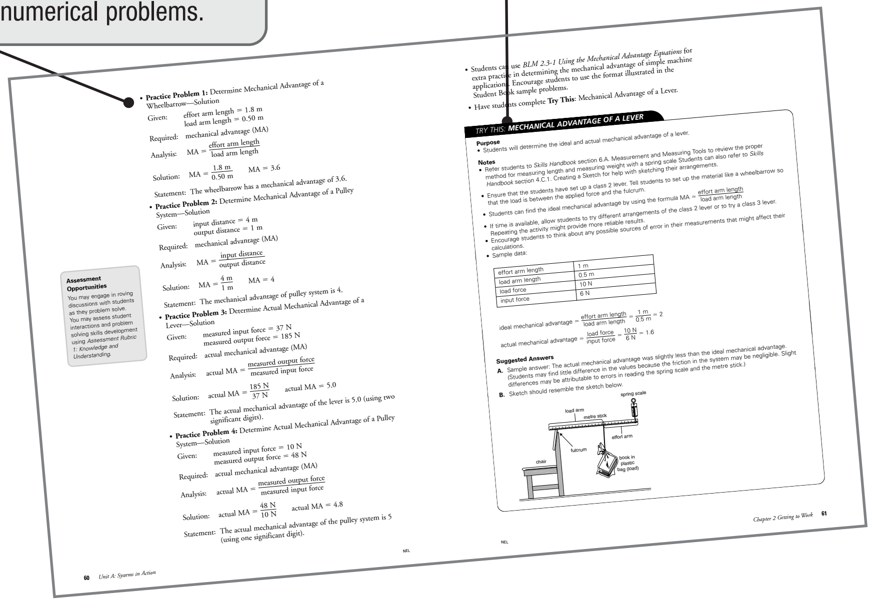
At Home
This feature suggests easy, practical activities or inquiries that students can complete at home. In addition, subject area connections that provide opportunities to integrate science and technology learning with specific expectations in other subject areas at the same grade level can be found throughout the Teacher's Resource. Subject connections include Math, Technology, Language Arts, Social Studies, Art, and Music.

Solved Practice Problems

Solutions to the Practice Problems found in the Student Book are provided within the Explore and Explain subhead of the Teaching Notes. The solutions follow the GRASS method that students should be using to solve numerical problems.

Try This

Support for any Try This activities that appear in the Student Book is provided within the Explore and Explain subhead of the Teaching Notes.

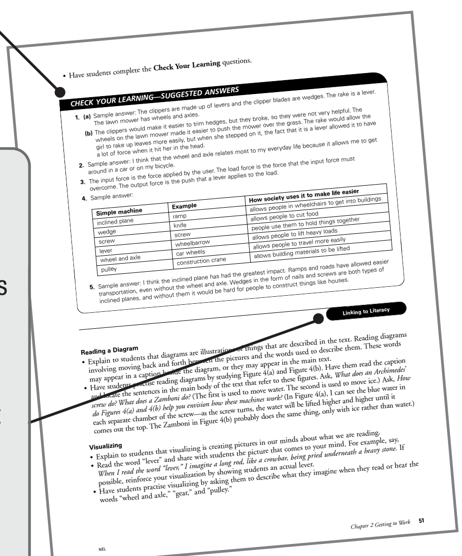


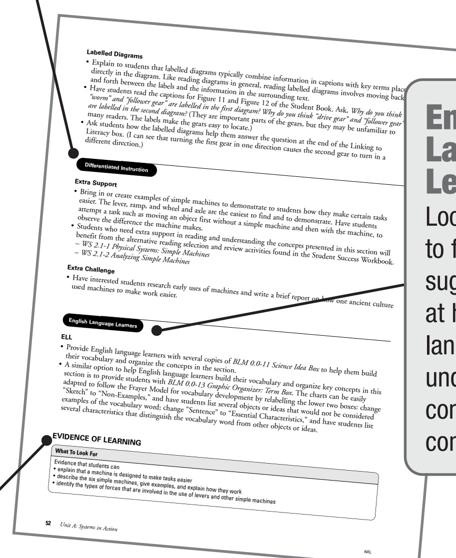
Check Your Learning

Suggested answers to the Check Your Learning questions are provided for each section.

Differentiated Instruction

Found throughout this Teacher Resource, this feature includes practical suggestions that are specific to the needs of students who require extra support in understanding concepts, or of students who require extra challenge. These include suggestions for alternative ways to record evidence of learning and extension of material covered in the section. You will also find a reference to relevant material in the Student Success Workbook.





Linking to Literacy

This feature suggests ways in which teachers can encourage students to use the Linking to Literacy features in the Student Book to better access information in a particular section. This feature appears in sections where a Linking to Literacy strategy is found in the Student Book.

English Language Learners

Look for this feature to find teaching suggestions aimed at helping English language learners understand concepts or complete activities.

Evidence of Learning

This feature tells teachers what students should know and be able to do after completing the section.

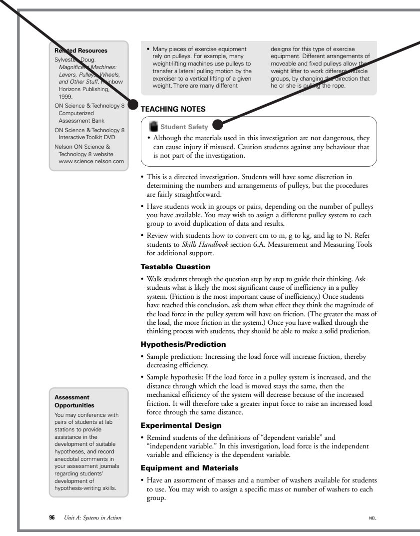
Investigations and Activities. . .

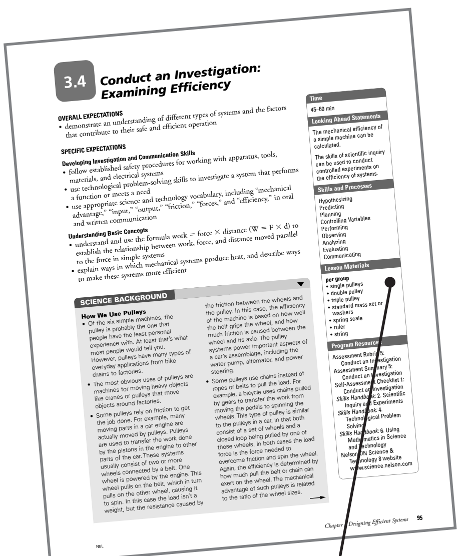
Teaching Notes

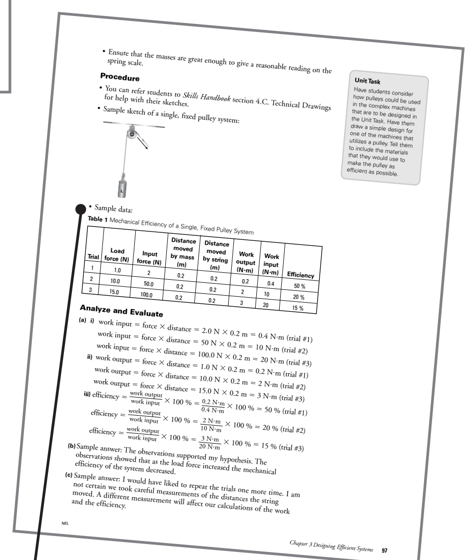
Teaching Notes for investigations and activities include information about things that can go wrong, tips, alternate equipment, and tasks that students may need help with. Subheadings correspond to those found in the Student Book, and they focus on the science of the activity and the results that students should observe.

Student Safety

Student Safety boxes highlight safety concerns and cautions that both the teacher and student should be aware of.







Investigation Summary

A margin box summarizes the time needed to complete the investigation, as well as the skills and processes that are addressed in the investigation. Lesson materials and program resources are also included.

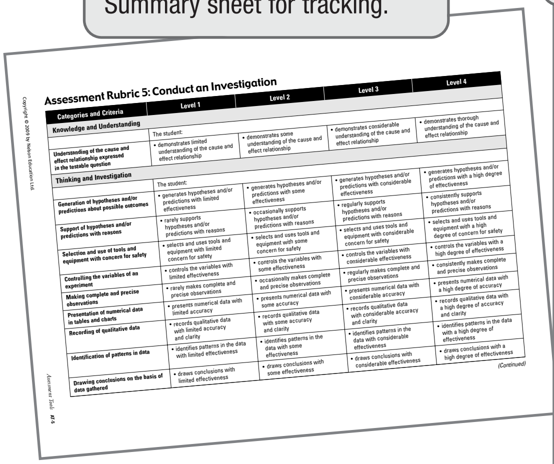
Sample Data and Suggested Answers

Sample sketches and sample data are provided for all activities where applicable. Suggested answers to Analyze and Evaluate and Apply and Extend questions are also included.

Assessment Tools. . .

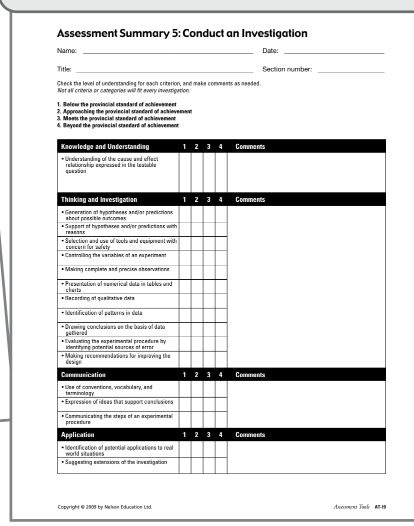
Assessment Rubrics

Assessment Rubrics are provided as a tool for teachers to assess student achievement. Each Assessment Rubric has an accompanying Assessment Summary sheet for tracking.



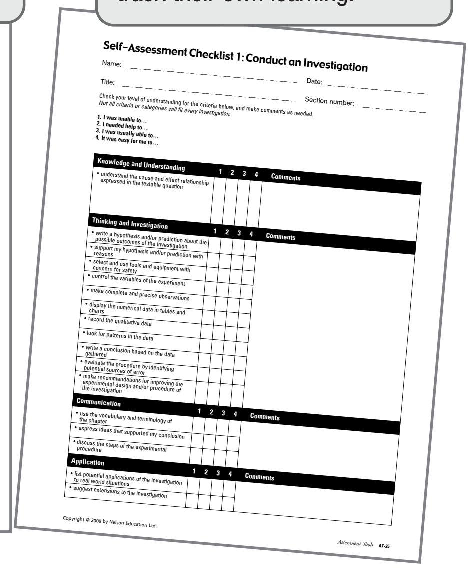
Assessment Summary Sheets

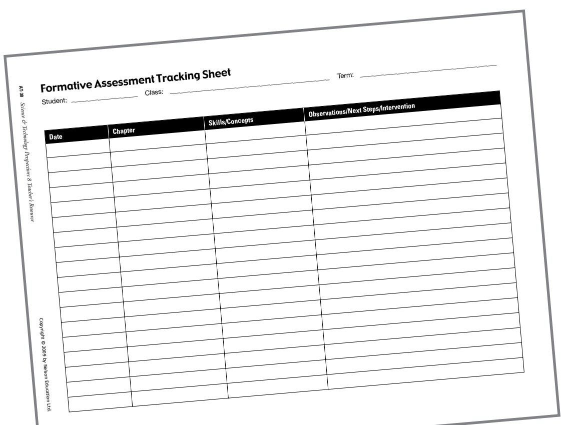
Assessment Summary sheets are provided for tracking assessment for individual students.



Self-Assessment Checklists

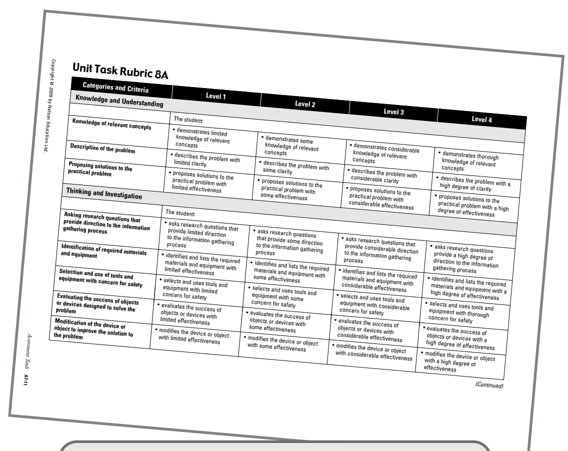
Self-Assessment Checklists allow students to assess and track their own learning.





Formative Assessment Tracking Sheet

The Formative Tracking Sheet is a tool for teachers to track and record the skills, concepts, observations, and next steps of students.



Unit Task Rubrics

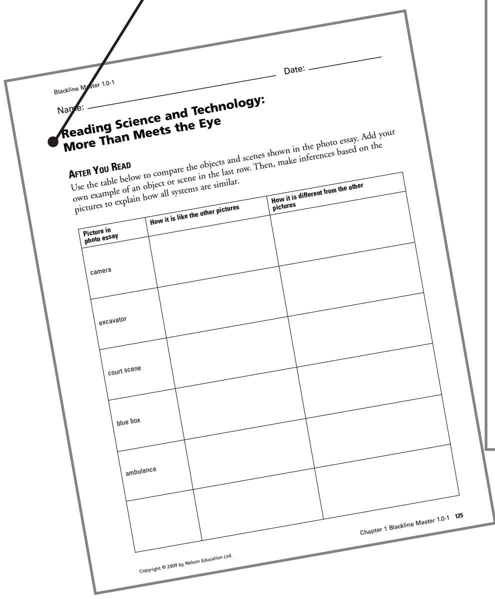
Each unit ends with a Unit Task. The Unit Task Rubric can be used to assess students' performance.

Blackline Masters. . .

Reading Science BLMs
Reading Science blackline masters are provided for each of the Reading Science and Technology features in the Student Book.

Try This BLMs
Additional Try This activities are provided, where suitable, as blackline masters to supplement the content in the Student Book.

Chapter Quiz BLMs
A chapter quiz blackline master is provided for each chapter. The chapter quiz consists of questions and activities to assess students' understanding of the key ideas.


Blackline Master 1.0-1

Name: Date:

Reading Science and Technology: More Than Meets the Eye

After You Read

Use the table below to compare the objects and scenes shown in the photo essay. Add your own example of an object or scene in the last row. Then, make inferences based on the pictures to explain how all systems are similar.

Picture in photo essay	How it is like the other pictures	How it is different from the other pictures
camera		
excavator		
court scene		
blue box		
ambulance		

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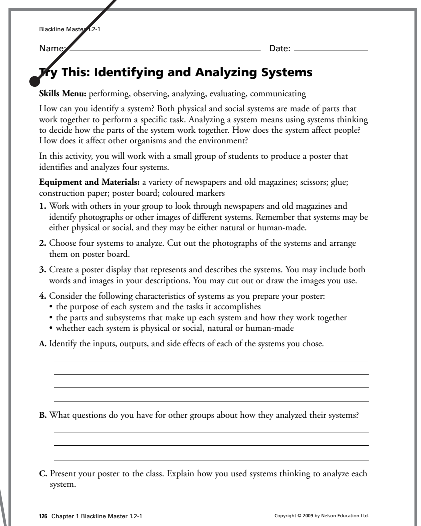
Blackline Master 1.2-1

Name: Date:

Try This: Identifying and Analyzing Systems

Skills Menu: performing, observing, analyzing, evaluating, communicating

How can you identify a system? Both physical and social systems are made of parts that work together to perform a specific task. Analyzing a system means using systems thinking to decide how the parts of the system work together. How does the system affect people? How does it affect other organisms and the environment?

In this activity, you will work with a small group of students to produce a poster that identifies and analyzes four systems.

Equipment and Materials: a variety of newspapers and old magazines; scissors; glue; construction paper; poster board; coloured markers

1. Work with others in your group to look through newspapers and old magazines and identify photographs or other images of different systems. Remember that systems may be either physical or social, and they may be either natural or human-made.
2. Choose four systems to analyze. Cut out the photographs of the systems and arrange them on poster board.
3. Create a poster display that represents and describes the systems. You may include both words and images in your descriptions. You may cut out or draw the images you use.
4. Consider the following characteristics of systems as you prepare your poster:
   - the purpose of each system and the tasks it accomplishes
   - the parts and subsystems that make up each system and how they work together
   - whether each system is physical or social, natural or human-made

A. Identify the inputs, outputs, and side effects of each of the systems you chose.

B. What questions do you have for other groups about how they analyzed their systems?

C. Present your poster to the class. Explain how you used systems thinking to analyze each system.

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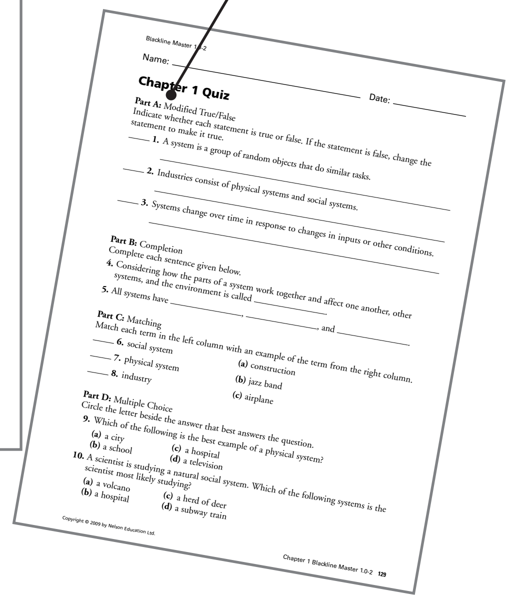
Blackline Master 1.0-2

Name: Date:

Chapter 1 Quiz

Part A: Modified True/False

Indicate whether each statement is true or false. If the statement is false, change the statement to make it true.

____ 1. A system is a group of random objects that do similar tasks.

____ 2. Industries consist of physical systems and social systems.

____ 3. Systems change over time in response to changes in inputs or other conditions.

Part B: Completion

Complete each sentence given below.

4. Considering how the parts of a system work together and affect one another, other systems, and the environment is called ________.

5. All systems have ________, ________, and ________.

Part C: Matching

Match each term in the left column with an example of the term from the right column.

____ 6. social system (a) construction

____ 7. physical system (b) jazz band

____ 8. industry (c) airplane

Part D: Multiple Choice

Circle the letter beside the answer that best answers the question.

9. Which of the following is the best example of a physical system?
(a) a city (b) a school (c) a hospital (d) a television

10. A scientist is studying a natural social system. Which of the following systems is the scientist most likely studying?
(a) a volcano (b) a hospital (c) a herd of deer (d) a subway train

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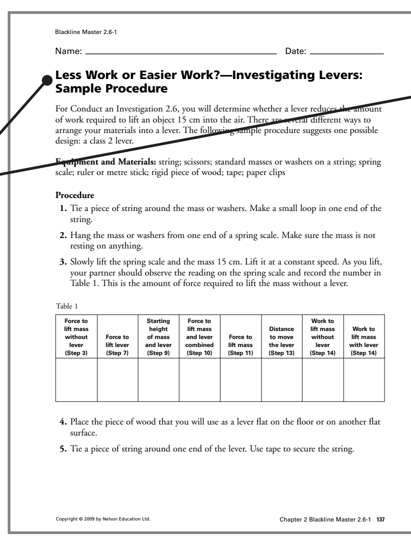
Sample Procedure BLMs
Sample Procedure blackline masters are provided for each of the student-directed activities and investigations in the Student Book.


Blackline Master 2.6-1

Name: Date:

Less Work or Easier Work?—Investigating Levers: Sample Procedure

For Conduct an Investigation 2.6, you will determine whether a lever reduces the amount of work required to lift an object 15 cm into the air. There are several different ways to arrange your materials into a lever. The following sample procedure suggests one possible design: a class 2 lever.

Equipment and Materials: string; scissors; standard masses or washers on a string; spring scale; ruler or metre stick; rigid piece of wood; tape; paper clips

Procedure

1. Tie a piece of string around the mass or washers. Make a small loop in one end of the string.
2. Hang the mass or washers from one end of a spring scale. Make sure the mass is not resting on anything.
3. Slowly lift the spring scale and the mass 15 cm. Lift it at a constant speed. As you lift, your partner should observe the reading on the spring scale and record the number in Table 1. This is the amount of force required to lift the mass without a lever.

Table 1

Force to lift mass without lever (Step 3)	Force to lift lever (Step 7)	Starting height of mass and lever (Step 9)	Force to lift mass and lever combined (Step 10)	Force to lift mass (Step 11)	Distance to move the lever (Step 13)	Work to lift mass without lever (Step 14)	Work to lift mass with lever (Step 14)

4. Place the piece of wood that you will use as a lever flat on the floor or on another flat surface.
5. Tie a piece of string around one end of the lever. Use tape to secure the string.

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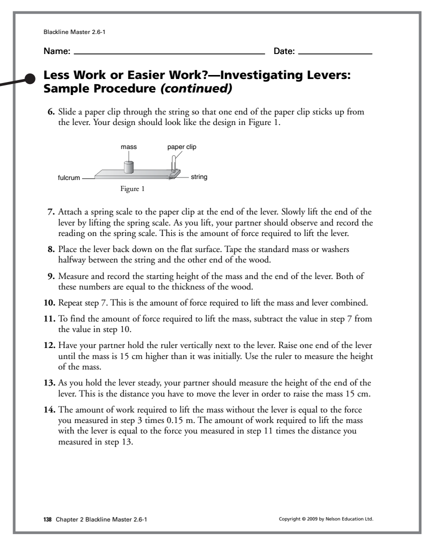
Blackline Master 2.6-1

Name: Date:

Less Work or Easier Work?—Investigating Levers: Sample Procedure *(continued)*

6. Slide a paper clip through the string so that one end of the paper clip sticks up from the lever. Your design should look like the design in Figure 1.

mass paper clip fulcrum string

Figure 1

7. Attach a spring scale to the paper clip at the end of the lever. Slowly lift the end of the lever by lifting the spring scale. As you lift, your partner should observe and record the reading on the spring scale. This is the amount of force required to lift the lever.
8. Place the lever back down on the flat surface. Tape the standard mass or washers halfway between the string and the other end of the wood.
9. Measure and record the starting height of the mass and the end of the lever. Both of these numbers are equal to the thickness of the wood.
10. Repeat step 7. This is the amount of force required to lift the mass and lever combined.
11. To find the amount of force required to lift the mass, subtract the value in step 7 from the value in step 10.
12. Have your partner hold the ruler vertically next to the lever. Raise one end of the lever until the mass is 15 cm higher than it was initially. Use the ruler to measure the height of the mass.
13. As you hold the lever steady, your partner should measure the height of the end of the lever. This is the distance you have to move the lever in order to raise the mass 15 cm.
14. The amount of work required to lift the mass without the lever is equal to the force you measured in step 3 times 0.15 m. The amount of work required to lift the mass with the lever is equal to the force you measured in step 11 times the distance you measured in step 13.

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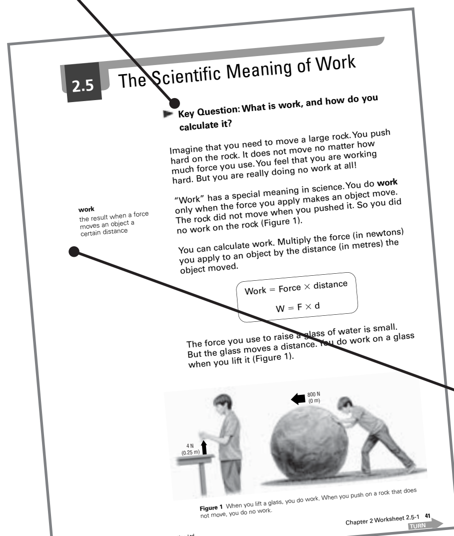
Student Success Workbook Quick Tour

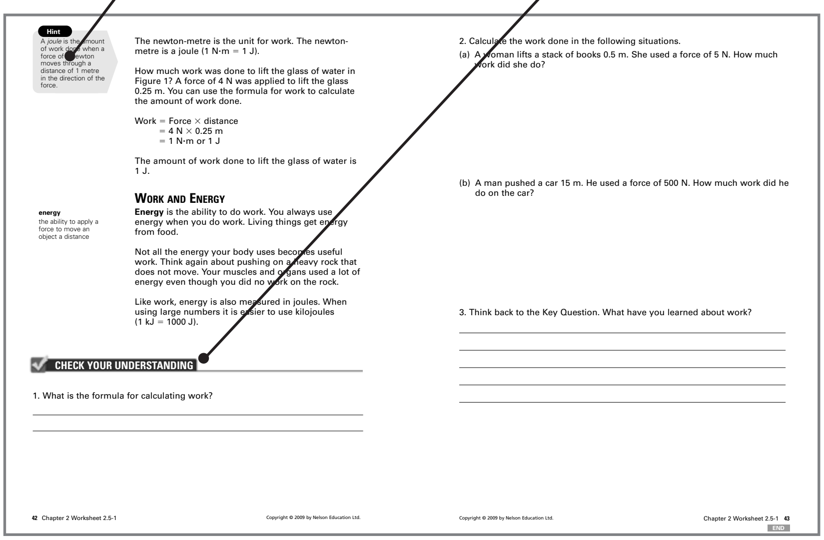
Key Question
Key Questions are provided at the start of each section in the Student Success Workbook.

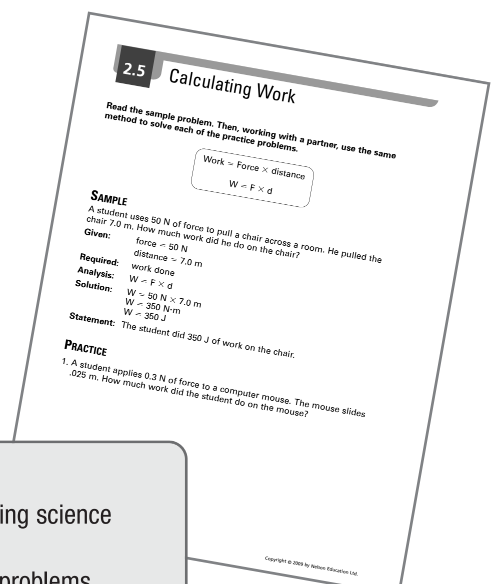


Margin Definitions
Margin Definitions from the Student Book are included in the Student Success Workbook.

Hint Boxes
Hint Boxes provide tips or reminders to help student learning.

Check Your Understanding
Check Your Understanding questions are provided at the end of each section in the Student Success Workbook.





Activity Worksheets
Activity worksheets provide extra support for understanding science concepts, and can include:

- Worked sample problems and supplemental practice problems
- Drawing and/or labeling diagrams activities
- Vocabulary definition and matching
- Crossword puzzles and other vocabulary reinforcement activities