NOVA SCOTIA SCIENCE 6
TEACHER'S RESOURCE

UNIT 3: SPACE

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McGraw-Hill Ryerson

UNIT 3: SPACE OVERVIEW

Space has always been a curiosity for people, and Unit 3 explores the development of knowledge built from this curiosity. Students discover how ideas about space have changed through the centuries, and how science and technology have developed in order to allow us to better understand space. Canadian contributions to space exploration are also investigated. Through a series of discussions, activities, and research, students discover the ways humans have identified the objects in the universe and the unique properties of each of these objects, learn about the solar system and beyond, and consider how knowledge of what is out in space has changed the way we view and use the universe outside of our Earth.

Chapter 5: What is Out There?

Chapter 5 starts the students' investigations of space by taking them from past beliefs about the organization of the universe to modern understanding of, and technologies used to explore space. Section 5.1 introduces students to the night sky. Through a variety of investigations and descriptions, students learn how our knowledge of the universe has developed throughout history. Students also learn of the types of objects found in our solar system, and what methods we can and will someday use to study them. Section 5.2 introduces students to some of the observable phenomena here on Earth that can be explained through knowledge of space. Day and night, seasons, tides, eclipses, and the phases of the Moon are all explained.

Chapter 6: Close, Far Away, and Really Far Away

Chapter 6 introduces students to the objects that can be found in our solar system and those that lie beyond. Students examine the planets, moons, stars, and constellations.

Section 6.1 teaches students the scale of the solar system. Students become aware of the vastness of our neighbourhood in space, and review the force of gravity and its role in maintaining our solar system. Students learn about the properties of the Sun, the planets, and their moons. Section 6.2 introduces stars and constellations. Students discover the historical significance of constellations and the ways they have been used by many past and present cultures.

Unit 3 Space: Correlation to Nova Scotia Grade 6 Science Curriculum

	NOVA SCOTIA SCIENCE 6	STUDENT TEXT PAGES
GENERAL CURRICULUM OUTCOMES		
STSE: Students will develop an understanding of the nature of science and technology, of the relationships between science and technology, and of the social and environmental contexts of science and technology	• Starting Point Activity 5-A: Exploring Your Home Province • Find Out Activity 5-E: Canadians and Space Exploration • Problem-Solving Investigation 6-C: A Visit to Venus • Conduct an Investigation 6-D: Mission to an Alien Planet • Find Out Activity 6-G: Stars and Ancient Civilizations • Ask a Program Scientist • Ask a Project Engineer • Unit 3 Project	p. 137 p. 153 p. 177 p. 178 p. 190 pp. 194–5 pp. 196–7 pp. 198–9
Skills: Students will develop the skills required for scientific and technological inquiry, for solving problems, for communicating scientific ideas and results, for working collaboratively, and for making informed decisions.	• Think & Link Investigation 5-B: Sky Report • At Home Activity 5-C: The Moving Sky • Think & Link Investigation 5-D: Space Report • Conduct an Investigation 5-G: Model Earth's Rotation • Find Out Activity 5-H: Seeing the Reasons for the Seasons • Problem-Solving Investigation 6-C: A Visit to Venus	p. 139 pp. 143–4 p. 149 p. 159 p. 161 p. 177
Knowledge: Students will construct knowledge and understandings of concepts in life science, physical science, and Earth and space science, and apply these understandings to interpret, integrate, and extend their knowledge.	• Think & Link Investigation 5-B: Sky Report • Think & Link Investigation 5-D: Space Report • Conduct an Investigation 5-G: Model Earth's Rotation • Find Out Activity 5-H: Seeing the Reasons for the Seasons • Conduct an Investigation 5-I: Modelling Moon Movement • Think & Link Investigation 5-J: Tide's In, Tide's Out • Starting Point Activity 6-A: What Happened to the Moon? • Find Out Activity 6-B: Scaling the Solar System • Conduct an Investigation 6-E: Profile the Planets • Unit 3 Project	p. 139 p. 149 p. 159 p. 161 p. 164 p. 167 p. 171 p. 173 pp. 182–3 pp. 198–9
SPECIFIC CURRICULUM OUTCOMES		
Space Exploration • describe and give examples of information and contributions that have led to new inventions and applications (106-3, 107-15, 206-4)	• Internet Connect • Find Out Activity 5-E: Canadians and Space Exploration • Ask a Project Engineer	p. 150 p. 153 pp. 196–7
• describe and compare how different societies have interpreted natural phenomena, using a variety of sources, to validate scientific knowledge (105-6, 205–8, 107-3)	• Think & Link Investigation 5-D: Space Report • Find Out Activity 6-G: Stars and Ancient Civilizations	p. 149 p. 190
• describe, based on evidence, and make conclusions about how astronauts are able to meet their basic needs in space (206-5, 301-21)	• Conduct an Investigation 5-F: Working in a Spacesuit • Unit 3 Project	p. 154 pp. 198–9
Relative Position and Motion of Earth, the Moon, and the Sun • demonstrate how Earth's rotation causes the day and night cycle and how Earth's revolution causes the yearly cycle of seasons (301-19)	• Conduct an Investigation 5-G: Model Earth's Rotation • Find Out Activity 5-H: Seeing the Reasons for the Seasons	p. 159 p. 161
• observe and explain how the relative positions of Earth, the Moon and the Sun are responsible for the moon phases, eclipses, and tides (301-20)	• Conduct an Investigation 5-I: Modelling Moon Movement • Think & Link Investigation 5-J: Tide's In, Tide's Out	p. 164 p. 167
The Solar System • gather information, describe, and display the physical characteristics of components of the solar system (205-2, 300-23, 104-8)	• Find Out Activity 6-B: Scaling the Solar System • Conduct an Investigation 6-E: Profile the Planets	p. 173 pp. 182–3
Stars and Constellations • identify constellations from diagrams, pictures, and/or representations of the night sky (302-13, 207-2)	• Internet Connect • Think & Link Investigation 6-F: Big Dipper Time • Find Out Activity 6-H: Star Light, Star Bright	p. 188 p. 189 p. 191

USING ACTIVITY-BASED LEARNING TO TEACH UNIT 3: SPACE

Space science involves studying objects in the sky to discover how they are shaped, how they move, and how they relate to other objects. The concept of Earth and space is a challenge that requires extensive experiences for students to work with collecting data, models, and comparing information. In learning about space, students examine how human ability to observe and study objects in space is now helped greatly by technology. It is the inquiry using observations, inferences, and data collection in this unit that will help students develop their skills in analyzing, interpreting, communications, and teamwork.

Assessing Prior Knowledge and Introducing the Unit

From Science 1, Daily and Seasonal Changes, students have been introduced to the concept of daily and seasonal cycles. In Science 5 and in the Flight unit of Science 6, they have explored, examined, and discussed gravity. In this unit on space, students will expand their knowledge of space by studying the components of space. The focus throughout this unit is inquiry, using data and models. Students can investigate, through models, the causes of the seasons as an introduction to the unit. Finding current data and information on space, exploration, and components of the solar system will give students a wealth of information that will need to be made into their personal knowledge. That said, learning through investigation of things that are not easily seen takes time.

Exploring the Key Concepts

The key concepts in this unit include:

- ideas about Earth and space have changed over time
- the contributions of technologies developed for exploring space have helped explain phenomena on Earth
- our solar system is massive and is held together by gravity
- the solar system is made up of different types of objects in motion
- models can be used effectively to illustrate concepts in science

With at least 60 percent of the time engaged in hands-on, minds-on science, the learning experiences should include selecting appropriate materials to build models, using print or other resources to collect information, preparing and comparing information received from sources, and communicating procedures and results in simple ways that are effective for learning.

Assessing Student Learning

Assessing student learning may require many approaches. The term "authentic" is often referred to when describing measurements to assess inquiry. Although this takes time, the results are worth it. Since data collection and developing models are key skills in this unit, the assessment should reflect this.

One assessment possibility is to use a performance task where students collect information and construct a model based on the evidence collected. This task involves three steps, each of equal value. First, station-to-station experiments or structured tasks might be performed. Then, using his/her own data, the student constructs a model of the object. Then, each student writes an explanation, in the form of a written report, based on the evidence collected and about their subject. This allows students to use their knowledge, perform science skills, collect data and evidence, and make an explanation of their work. Each student might make a card that goes with their object that includes collected information on its composition, diameter, mass, orbit, and shape. Teachers might collect these cards and have students try to sort them into a type of classification system. Depending on the amount of objects (25 or so), the classifications might be the terms that have been used in the unit. Some of these may be star, moon, planet, dwarf planet, manufactured object, comet, asteroid, and galaxy. Doing this classification activity at the end of the students' work will lead to the next unit, Diversity of Life.

IMPLEMENTATION GUIDE FOR UNIT 3 ACTIVITIES AND INVESTIGATIONS

The implementation planning chart below is intended to help you use Nova Scotia Science 6 to cover the curriculum by highlighting the activities, investigations, and some suggested assessment options. (See the Assessment section of this Teacher's Resource for more information.) Page numbers in the student textbook are indicated in [ ].

WEEK #	ACTIVITIES [STUDENT TEXT PAGE]	ASSESSMENT OPTIONS
	Unit 3 Opener [134-5]	• Getting Ready answers
	Chapter 5: What is Out There? [136-69]	• Rubric 2, Science Logbook • Checklist 7, Concept Map • Vocabulary BLMs, Science Portfolio (if using) • one-on-one interviews • Chapter Summary assessment
	Starting Point Activity 5-A: Exploring Your Home Province [137]	• What Did You Find Out? Answers
	Section 5.1: Observing the Sky [138-57]	
	Think & Link Investigation 5-B: Sky Report [139]	• Checklist 3, Oral Presentation • Rubric 5, Research Project
	At Home Activity 5-C: The Moving Sky [143-4]	• BLM 5.3 The Moving Sky • Checklist 15, Making Observations and Inferences
	Think & Link Investigation 5-D: Space Report [149]	• Rubric 3, Co-operative Group Work • Rubric 5, Research Project
	Find Out Activity 5-E: Canadians and Space Exploration [153]	• Checklist 3, Oral Presentation • Rubric 5, Research Project
	Conduct an Investigation 5-F: Working in a Spacesuit [154-5]	• BLM 5.4 Working in a Spacesuit • Rubric 19, Conduct an Investigation
	Section 5.2: Events on Earth and Events in the Sky [158-68]	
	Conduct an Investigation 5-G: Model Earth's Rotation [159]	• Rubric 8, Developing Models • Rubric 19, Conduct an Investigation
	Find Out Investigation 5-H: Seeing the Reasons for the Seasons [161]	• Rubric 8, Developing Models
	Conduct an Investigation 5-I: Modelling Moon Movement [164]	• Rubric 19, Conduct an Investigation
	Think & Link Investigation 5-J: Tide's In, Tide's Out [167]	• BLM 5.6 Tide's In, Tide's Out • Rubric 15, Interpreting Data • Rubric 17, Measuring and Reporting
	Chapter 6: Close, Far Away, and Really Far Away [170-93]	• Rubric 2, Science Logbook • Checklist 7, Concept Map • Vocabulary BLMs, Science Portfolio (if using) • student interviews • Chapter Summary assessment
	Starting Point Activity 6-A: What Happened to the Moon? [171]	• What Did You Find Out? answers
	Section 6.1: Inside the Solar System [172-186]	
	Find Out Activity 6-B: Scaling the Solar System [173]	• Rubric 8, Developing Models
	Problem-Solving Investigation 6-C: A Visit to Venus [177]	• Rubric 8, Developing Models • Rubric 11, Problem Solving
	Conduct an Investigation 6-D: Mission to an Alien Planet [178-9]	• BLM 6.2 Mission to an Alien Planet • Rubric 19, Conduct an Investigation
	Conduct an Investigation 6-E: Profile the Planets [182-3]	• Rubric 19, Conduct an Investigation
	Section 6.2: Stars and Constellations [187-92]	
	Think & Link Investigation 6-F: Big Dipper Time [189]	• BLM 6.5 Big Dipper Time Circles • Rubric 17, Measuring and Reporting • Rubric 22, Using Tools, Equipment, and Materials
	Find Out Activity 6-G: Stars and Ancient Civilizations [190]	• Rubric 3, Co-operative Group Work • Rubric 6, Communications
	Find Out Activity 6-H: Star Light, Star Bright [191]	• Rubric 6, Communications
	Ask a Program Scientist: Dr. Victoria Hipkin [194-5]	• Rubric 5, Research Project • Rubric 6, Communication
	Ask a Project Engineer: Daniel Rey [196-7]	• Checklist 3, Oral Presentation • Rubric 6, Communication
	Unit 3 Project: Wanted: A Junior Astronaut [198-9]	• Checklist 11, Project Self-Assessment • Rubric 6, Communication or 7, Multimedia Presentation

MULTIPLE INTELLIGENCES CORRELATIONS FOR UNIT 3 ACTIVITIES AND INVESTIGATIONS

The table below shows the multiple intelligences engaged in the activities and investigations for this unit, in order to help you plan for differentiated instruction in your science lessons. For more information concerning differentiated instruction and multiple intelligences see the Introduction and Implementation section in this Teacher's Resource.

The multiple intelligence codes are as follows: VL = Verbal-Linguistic; LM = Logical-Mathematical; N = Naturalist; VS = Visual-Spatial; BK = Body-Kinesthetic; IE = Interpersonal; IA = Intra-Personal; MR = Musical-Rhythmic; E = Existential.

MULTIPLE INTELLIGENCES:	VL	LM	N	VS	BK	IE	IA	MR	E
UNIT 3: SPACE [page #]									
Chapter 5: What is Out There? [xx–xx]									
Starting Point Activity 5-A: Exploring Your Home Province [137]	■	●				●			
Think & Link Investigation 5-B: Sky Report [139]	■		●	●		●			
At Home Activity 5-C: The Moving Sky [143-4]	●	●	■	■	●				
Think & Link Investigation 5-D: Space Report [149]	■	●				●			
Find Out Activity 5-E: Canadians and Space Exploration [153]	■					●			
Conduct an Investigation 5-F: Working in a Spacesuit [154-5]	●	■			■	●			
Conduct an Investigation 5-G: Model Earth's Rotation [159]	●	■	●	●	●	●			
Find Out Activity 5-H: Seeing the Reasons for the Seasons [161]	●	■		●	●	●			
Conduct an Investigation 5-I: Modelling Moon Movement [164]	●	■		●	●	●			
Think & Link Investigation 5-J: Tide's In, Tide's Out [167]	■	■	●	●	●	●			
Chapter 6: Close, Far Away, and Really Far Away [xx–xx]									
Starting Point Activity 6-A: What Happened to the Moon? [171]	●	●		■	●				
Find Out Activity 6-B: Scaling the Solar System [173]	●	■		●	●	●			
Problem-Solving Investigation 6-C: A Visit to Venus [177]	●	●		■	●	■			
Conduct an Investigation 6-D: Mission to an Alien Planet [178-9]	●	●		■	●	●			
Conduct an Investigation 6-E: Profile the Planets [182-3]	●	■		●	●	●			
Think & Link Investigation 6-F: Big Dipper Time [189]	●	●	●	■	●				
Find Out Activity 6-G: Stars and Ancient Civilizations [190]	■					●			●
Find Out Activity 6-H: Star Light, Star Bright [191]	■	●			●	●			●
Ask a Program Scientist: Dr. Victoria Hipkin [194-5]	■								●
Ask a Project Engineer: Daniel Rey [196-7]	■								●
Unit 3 Project: Wanted: A Junior Astronaut [198–9]	■					●	●		

■ indicates the primary intelligences involved in the activity or investigation

● indicates the secondary intelligences. For instance, for a hands-on experiment, students use mostly body-kinesthetic (the tactile skills) and visual-spatial (for observation) intelligence. However, if the activity includes a follow-up discussion or a written recording, there is a verbal-linguistic component. If the activity is done in groups, there is an interpersonal component.

Advance Planning Chart for Activities and Investigations for Unit 3: Space

ACTIVITY/ INVESTIGATION (student textbook page number)	ADVANCE PREPARATION	MATERIALS	TIME REQUIRED	OTHER CONSIDERATIONS
CHAPTER 5: WHAT IS OUT THERE?				
Starting Point Activity 5-A: Exploring Your Home Province (p. 137)	• None	• pencil and paper	• 30 min	• None
Think & Link Investigation 5-B: Sky Report (p. 139)	• 1 week before: Discuss the activity with students and have them begin to look at the sky and formulate questions.	• Internet and/or text resources about space	• 10 min for introduction • 30+ min for student observations and data analysis • 20 min for presentation preparation • 30 min to present and discuss class discoveries	• Some of the activity can be completed at home and some will be completed in the classroom. • If possible, organize a sky-watch night with your class in which you can look to the sky and answer your questions together. • Advise students to find safe viewing areas for their sky watch. • Review safe Internet practices with the class.
At Home Activity 5-C: The Moving Sky (pp. 143–4)	• 1 week before: Use the Internet, a star chart, or other source to identify some unique objects that the students may see in the sky when they complete the activity. • Distribute BLM 5.3 The Moving Sky or have students prepare their own chart to record their observations.	• journals • compass • clock	• 20 min for activity overview • 3 nights x 2 h of sky viewing • 20 min for classroom review and discussion	• This activity is easier to complete in the winter when nights are short. • Advise students to be careful when viewing the sky outside and to wear warm, visible clothing.
Think & Link Investigation 5-D: Space Report (p. 149)	• 1 week before: Collect resources.	• computers • resource materials • craft supplies	• 40 min for steps 1–3 • 40–60 min for steps 4–6 • 40 min for step 7 • additional presentation time	• None
Find Out Activity 5-E: Canadians and Space Exploration (p. 153)	• 1 week before: Collect resources and reserve work rooms for the activity.	• poster boards • craft supplies	• 10 min for introduction • 40 min for research • 40 min for presentation preparation • 30 min for classroom presentations	• None

ACTIVITY/ INVESTIGATION (student textbook page number)	ADVANCE PREPARATION	MATERIALS	TIME REQUIRED	OTHER CONSIDERATIONS
Conduct an Investigation 5-F: Working in a Spacesuit (p. 154)	• 2 weeks before: Ask students to bring in clean 2 L cartons. • 1 week before: Obtain oven mitts or hockey gloves for each group.	• clock or stopwatch • scissors • pair of hockey gloves or oven mitts • school bag or backpack with zipper • CD or DVD • screw-top jar filled with dry macaroni • pen or pencil • wool socks • pull-on boots or shoes • pen or pencil • 2 L juice or milk cartons • duct tape • 3 sheets of 8 ½ x 11 paper • brown paper bag • resealable bag	• 20 min for Making a Space Helmet and Making Spacesuit Arms • 40 min for Preparing the Challenge and Taking the Challenge	• This activity is an entertaining challenge that may be shared with other classes. • Remind students to be careful when using scissors.
Conduct an Investigation 5-G: Model Earth's Rotation (p. 159)	• 1 week before: Collect materials.	• high-powered flashlight • globes • compasses • toothpicks • modelling clay	• 15 min for Part 1 • 15 min for Part 2 • 10 min for discussion and questions	• Try to complete the investigation on a sunny day and close to noon. • A bright flashlight with a wide beam best models the Sun for Part 2 of the activity.
Find Out Activity 5-H: Seeing the Reasons for the Seasons (p. 161)	• 1 week before: Collect materials.	• flashlights • globes • lamps • coloured tape • paper • coloured pens • toothpicks • modelling clay • large place cards (4 per group)	• 15 min for Part 1 • 15 min for Part 2 • 10 min for What Did You Find Out? questions	• Groups will be required to be spread out in the classroom. • Advise students not to shine bright flashlights in each other's eyes. • Make the room as dark as possible in order to complete this activity.
Conduct an Investigation 5-I: Modelling Moon Movement (p. 164)	• 1 week before: Reserve or obtain a projector for the activity.	• overhead projector • volleyball • baseball • black marker • white chart paper	• 30 min for discussion and completion of activity • 15 min for completion and discussion of Analyze and Conclude and Apply answers	• A darkened classroom will assist with the activity. • Advise students not to look directly into the light from the projector.
Think & Link Investigation 5-J: Tide's In, Tide's Out (p. 167)	• 1 week before: Reserve research space for students.	• tide charts • Internet resources	• 5 min per day for 7 days for local data collection • 5 min per day for 7 days for comparison data collection • 20 min for comparison of results and wrap-up activity	• This activity will be completed over the course of a week.

ACTIVITY/ INVESTIGATION (student textbook page number)	ADVANCE PREPARATION	MATERIALS	TIME REQUIRED	OTHER CONSIDERATIONS
CHAPTER 6: CLOSE, FAR AWAY, AND REALLY FAR AWAY				
Starting Point Activity 6-A: What Happened to the Moon? (p. 171)	• 1 week before: Begin collecting newspapers. • 1 day before: Sort supplies for each group.	Per group: • aluminum pan • ball bearing • golf ball • flour • dry tempera paint or powdered drink mix • newspaper	• 5 min for discussion of activity and distribution of activity kits • 15 min for completion of activity • 10 min for completion and discussion of What Did You Find Out? questions	• Students should be advised to wear eye protection to prevent paint from getting in their eyes. • Advise students to not inhale powders.
Find Out Activity 6-B: Scaling the Solar System (pp. 173-4)	• 3 days before: Collect supplies.	• scissors • calculator • metre sticks • chart paper • markers • tape	• 30 min for discussion and completion of activity • 10 min for completion of activity wrap-up and What Did You Find Out? questions	• Remind students to be careful when using scissors.
Problem-Solving Investigation 6-C: A Visit to Venus (p. 177)	• 1 week before: Collect resources and have students begin to bring in materials.	• Internet access • books and other resources • paper and art supplies • recycled materials	• 30 min for planning and designing model • 30 min for model construction • 20 min for class presentations	• All student models should be approved before constructed. • Remind students to be careful when using scissors.
Conduct an Investigation 6-D: Mission to an Alien Planet (p. 178)	• 1 week before: Prepare Planet X and reserve gymnasium or other area with a lot of space. • 3 days before: Collect required materials.	• large sphere for Planet X • telescope (optional) • binoculars (optional) • digital camera (optional) • ruler • paper • markers/paints/pens/crayons • Styrofoam™ balls or other spheres	• 10 min for organization and discussion of activity • 30 min for completion of activity • 15 min for completion of optional activities • 20 min for group completion of Analyze and Conclude and Apply • 10 min for wrap-up discussion	• A large space is required to complete this activity. • Advise students to spread out when they are approaching or circling the planet. • Review safe handling and operation of cameras, telescopes and binoculars. • Advise students not to point the equipment at the Sun.
Conduct an Investigation 6-E: Profile the Planets (pp. 182-3)	• 1 week before: Collect supplies and discuss activity with other teachers.	• 1 small marble • 1 Ping-Pong™ ball • 2 tennis balls • 2 baseballs • 1 soccer ball • 1 basketball • metre stick, tape measure or trundle wheel • paper • masking tape	• 30 min for discussion and completion of activity • 10 min for completion of Analyze and Conclude and Apply sections in groups	• A large space is required to complete this activity.

ACTIVITY/ INVESTIGATION (student textbook page number)	ADVANCE PREPARATION	MATERIALS	TIME REQUIRED	OTHER CONSIDERATIONS
Think & Link Investigation 6-F: Big Dipper Time (p. 189)	• 3 days before: Monitor the weather forecast for clear skies. • 1 day before: Print off copies of BLM 6.5 Big Dipper Time Circles	Per student: • brass fastener • scissors • BLM 6.5 Big Dipper Time Circles	• 20 min for explanation of activity and construction of the Big Dipper Time Clock • 2 hours at home for recording observations • 20 min for class discussion and completion of Analyze questions	• Much of this activity will be completed at home. • Advise students to be careful when using scissors. • Explain to students that their viewing areas should be safe and well away from roadways.
Find Out Activity 6-G: Stars and Ancient Civilizations (p. 190)	• 1 week before: Reserve room for research activities. • 3 days before: Collect books for the activity.	• poster boards • art supplies	• 5 min for introduction of activity and arrangement of students into groups • 40 min for student research • 20 min for preparation of presentations • 20 min for class presentations and completion of questions	• None
Find Out Activity 6-H: Star Light, Star Bright (p. 191)	• 1 week before: Reserve room for research activities. • 3 days before: Ask students to bring in cylindrical boxes or cans. • 1 day before: Collect supplies.	• flashlights • scissors • compass • cylindrical box or can • elastic bands • chalk • black construction paper	• 10 min for explanation of activity and organization of groups • 20 min for completion of Internet and/or text research • 20 min for completion of constellation models • 10 min for sharing constellations with the class • 10 min for completion of What Did You Find Out? questions	• Remind students to be careful when using scissors. • If the classroom has no blinds, the activity should be completed in a different room of the school.
Ask a Program Scientist: Exploring Further (pp. 194–5)	• 1 week before: Identify resources.	• None	• 20 min for research and preparation of Mars statements • 30 min for presentation and defending of statements	• The Canadian Space Agency web site has a lot of information about Phoenix.

ACTIVITY/ INVESTIGATION (student textbook page number)	ADVANCE PREPARATION	MATERIALS	TIME REQUIRED	OTHER CONSIDERATIONS
Ask a Project Engineer: Exploring Further (pp. 196–7)	• 1 week before: Identify resources.	• None	• 20 min for research and preparation of Dextre proposals • 20 min for presentation of proposals to classmates	• The Canadian Space Agency web site has a lot of Dextre information.
Unit 3 Project: Wanted: A Junior Astronaut (pp. 198–9)	• 1 week before: Reserve video camera. • 2 days before: Review resume structure with students.	• video camera • paper, pencils, markers, coloured pencils	• 5 min for explanation and discussion of project as a class. • 30 min for research and completion of Design Criteria • 30 min for completion of Plan and Construct section • 30 min for presentation of applications to the class • 15 min for completion and discussion of Evaluate questions	• None