

Grade 8 Science

Overview

In Unit A: Mix and Flow of Matter, students explore fluids, substances like air, water, oil and natural gas that flow and change shape. They investigate properties such as density, viscosity, buoyancy and pressure, and learn how the particle model of matter explains fluid behaviour. Students also study solutions and mixtures, discovering how temperature and other factors affect how materials dissolve and how fluids are used in everyday technologies. [See the curriculum.](#)

In Unit B: Cells and Systems, students examine the structure and function of living things at different scales, from individual cells to whole organisms. They investigate how cells, tissues, organs and systems work together to keep organisms healthy and how living things respond to their environments. The unit emphasizes pattern and diversity across all life forms. [See the curriculum.](#)

In Unit C: Light and Optical Systems, students investigate the nature of light and how it behaves when it hits different materials. They use a geometric ray model to understand reflection and refraction, and they explore how optical devices like microscopes, telescopes and lenses extend human vision. The unit traces how scientific understanding of light has developed through invention and inquiry. [See the curriculum.](#)

In Unit D: Mechanical Systems, students learn how machines transfer energy into controlled motion and how components link together to perform useful functions. They investigate simple machines, mechanical advantage, and systems like hydraulics and pneumatics, comparing past and present technologies to recognize different approaches to meeting human needs. [See the curriculum.](#)

In Unit E: Freshwater and Saltwater Systems, students explore how water, land and climate interact to shape aquatic environments. They investigate water quality, erosion and deposition, ocean basins and glaciers, and they examine how living things adapt to freshwater and saltwater habitats. The unit also addresses human impacts on water systems and the role of science and technology in protecting water resources. [See the curriculum.](#)

The year at a glance

Grade 8

Unit	General outcomes	Specific outcomes
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(Science and Technology Emphasis) Overview: The materials that we use, including natural and manufactured ones, often take the form of fluids.	Attitude Outcomes; Skill Outcomes; Outcomes for Science, Technology and Society (STS) and Knowledge	Mutual Respect Students will be encouraged to: - Appreciate that scientific understanding evolves from the interaction of ideas involving people with different views and backgrounds *(e.g., show awareness that knowledge of fluid... (see the curriculum); Stewardship Students will be encouraged to: - Demonstrate sensitivity and responsibility in pursuing a balance between the needs of humans and a sustainable environment *(e.g., recognize that the disposal of materials through drains... (see the curriculum); Collaboration Students will be encouraged to: - Work collaboratively in carrying out investigations and in generating and evaluating ideas *(e.g., assume responsibility for their share of work in preparing for investigations and in... (see the curriculum); Interest in Science Students will be encouraged to: - Show interest in science-related questions and issues, and pursue personal interests and career possibilities within science-related fields *(e.g., attempt at home to repeat or extend... (see the curriculum); Scientific Inquiry Students will be encouraged to: - Seek and apply evidence when evaluating alternative approaches to investigations, problems and issues *(e.g., regularly repeat measurements or observations to increase the precision of... (see the curriculum); Safety Students will be encouraged to: - Show concern for safety in planning, carrying out and reviewing activities *(e.g., take the time to organize their work area so that accidents can be prevented; read the labels on materials before... (see the curriculum); Skill Outcomes (focus on problem solving) Performing and Recording Students will: Conduct investigations into the relationships between and among observations, and gather and record qualitative and quantitative data - carry out... (see the curriculum); Skill Outcomes (focus on problem solving) Initiating and Planning Students will: Ask questions about the relationships between and among observable variables, and plan investigations to address those questions • define practical problems... (see the curriculum); Skill Outcomes (focus on
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problem solving) Analyzing and Interpreting Students will: Analyze qualitative and quantitative data, and develop and assess possible explanations • identify and suggest explanations for discrepancies in data... (see the curriculum); Skill Outcomes (focus on problem solving) Communication and Teamwork Students will: Work collaboratively on problems; and use appropriate language and formats to communicate ideas, procedures and results - identify and correct... (see the curriculum); Students will: Investigate and describe fluids used in technological devices and everyday materials - investigate and identify examples of fluids in household materials, technological devices, living things and natural environments -... (see the curriculum); Students will: Identify, interpret and apply technologies based on properties of fluids - describe technologies based on the solubility of materials (e.g., mining salt or potash by dissolving) - describe and interpret technologies... (see the curriculum); Students will: Investigate and describe the composition of fluids, and interpret the behaviour of materials in solution - distinguish among pure substances, mixtures and solutions, using common examples *(e.g., identify examples found in... (see the curriculum); Students will: Investigate and compare the properties of gases and liquids; and relate variations in their viscosity, density, buoyancy and compressibility to the particle model of matter - investigate and compare fluids, based on their... (see the curriculum)

(Social and Environmental Emphasis) Overview: Earth is sometimes described as the water planet: over two-thirds of Earth's surface is covered by oceans and freshwater features.	Attitude Outcomes; Outcomes for Science, Technology and Society (STS) and Knowledge; Skill Outcomes	Scientific Inquiry Students will be encouraged to: - Seek and apply evidence when evaluating alternative approaches to investigations, problems and issues *(e.g., seek data that is accurate and based on appropriate methods of... (see the curriculum); Collaboration Students will be encouraged to: - Work collaboratively in carrying out investigations and in generating and evaluating ideas *(e.g., share observations and ideas with other members of a group, and consider alternative ideas... (see the curriculum); Interest in Science Students will be encouraged to: - Show interest in science-related questions and issues, and pursue personal interests and career possibilities within science-related fields *(e.g., express interest in conducting... (see the curriculum); Mutual Respect Students will be encouraged to: - Appreciate that scientific understanding evolves from the interaction of ideas involving people with different views and backgrounds *(e.g., show awareness of and respect for the... (see the curriculum); Stewardship Students will be encouraged to: - Demonstrate sensitivity and responsibility in pursuing a balance between the needs of humans and a sustainable environment *(e.g., consider immediate and long-term consequences of personal... (see the curriculum); Safety Students will be encouraged to: - Show concern for safety in planning, carrying out and reviewing activities *(e.g., select safe methods and tools for collecting evidence and solving problems; readily alter a procedure to ensure... (see the curriculum); Students will: Describe the distribution and characteristics of water in local and global environments, and identify the significance of water supply and quality to the needs of humans and other living things • describe, in general terms,... (see the curriculum); Students will: Analyze factors affecting productivity and species distribution in marine and freshwater environments - investigate life forms found in fresh water and salt water, and identify and interpret examples of adaptations to... (see the curriculum); Students will:
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Analyze human impacts on aquatic systems; and identify the roles of science and technology in addressing related questions, problems and issues - analyze human water uses, and identify the nature and scope of impacts... (see the curriculum); Students will: Investigate and interpret linkages among landforms, water and climate - describe the processes of erosion and deposition resulting from wave action and water flow, by: - identifying dissolved solids and sediment loads, and... (see the curriculum); Skill Outcomes (focus on the use of research and inquiry skills to inform the decision-making process) Analyzing and Interpreting Students will: Analyze qualitative and quantitative data, and develop and assess possible explanations •... (see the curriculum); Skill Outcomes (focus on the use of research and inquiry skills to inform the decision-making process) Initiating and Planning Students will: Ask questions about the relationships between and among observable variables, and plan... (see the curriculum); Skill Outcomes (focus on the use of research and inquiry skills to inform the decision-making process) Performing and Recording Students will: Conduct investigations into the relationships between and among observations, and gather... (see the curriculum); Skill Outcomes (focus on the use of research and inquiry skills to inform the decision-making process) Communication and Teamwork Students will: Work collaboratively on problems; and use appropriate language and formats to... (see the curriculum)

(Nature of Science Emphasis) Overview: Our understanding of the world is based largely on what we see, both directly, and aided by optical devices that improve and extend our vision.	Outcomes for Science, Technology and Society (STS) and Knowledge; Skill Outcomes; Attitude Outcomes	Students will: Investigate the nature of light and vision; and describe the role of invention, explanation and inquiry in developing our current knowledge - identify challenges in explaining the nature of light and vision *(e.g.,... (see the curriculum); Students will: Investigate and explain the science of image formation and vision, and interpret related technologies - demonstrate the formation of real images, using a double convex lens, and predict the effects of changes in the lens... (see the curriculum); Students will: Investigate the transmission of light, and describe its behaviour using a geometric ray model - investigate how light is reflected, transmitted and absorbed by different materials; and describe differences in the optical... (see the curriculum); Skill Outcomes (focus on scientific inquiry) Communication and Teamwork Students will: Work collaboratively on problems; and use appropriate language and formats to communicate ideas, procedures and results - receive, understand and... (see the curriculum); Skill Outcomes (focus on scientific inquiry) Initiating and Planning Students will: Ask questions about the relationships between and among observable variables, and plan investigations to address those questions • identify questions to... (see the curriculum); Skill Outcomes (focus on scientific inquiry) Performing and Recording Students will: Conduct investigations into the relationships between and among observations, and gather and record qualitative and quantitative data • carry out... (see the curriculum); Skill Outcomes (focus on scientific inquiry) Analyzing and Interpreting Students will: Analyze qualitative and quantitative data, and develop and assess possible explanations - predict the value of a variable by interpolating or... (see the curriculum); Mutual Respect Students will be encouraged to: - Appreciate that scientific understanding evolves from the interaction of ideas involving people with different views and backgrounds *(e.g., show awareness of and respect for the research,... (see the curriculum); Collaboration Students will be encouraged to: - Work
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collaboratively in carrying out investigations and in generating and evaluating ideas *(e.g., choose a variety of strategies, such as active listening, paraphrasing and questioning, in... (see the curriculum); Interest in Science Students will be encouraged to: - Show interest in science-related questions and issues, and pursue personal interests and career possibilities within science-related fields *(e.g., choose to investigate challenging... (see the curriculum); Scientific Inquiry Students will be encouraged to: - Seek and apply evidence when evaluating alternative approaches to investigations, problems and issues *(e.g., ask questions to clarify meaning or confirm their understanding; take the... (see the curriculum)

(Science and Technology Emphasis) Overview: Machines are used for many purposes in our daily lives when we need to transfer energy into motion or move materials in a controlled way.	Outcomes for Science, Technology and Society (STS) and Knowledge; Skill Outcomes; Attitude Outcomes	(none in the selection)
(Nature of Science Emphasis) Overview: Living things take a variety of forms as reflected in their structures, internal processes and ways of responding to their environments.	Skill Outcomes; Attitude Outcomes; Outcomes for Science, Technology and Society (STS) and Knowledge	(none in the selection)

Across the year

- Students apply the particle model of matter to explain the behaviour of fluids in Unit A and the structure of cells and living systems in Unit B, building a consistent framework for understanding how matter is organized at different scales. [See the curriculum: 1, 2.](#)
- Investigations of water properties and solutions in Unit A connect directly to the study of aquatic ecosystems in Unit E, where students examine water quality, dissolved materials and how water characteristics affect living things. [See the curriculum: 1, 2.](#)
- Students use optical devices and the geometric ray model in Unit C to extend their ability to observe living cells in Unit B and to study small organisms in aquatic environments in Unit E. [See the curriculum: 1, 2, 3.](#)
- Mechanical systems in Unit D apply principles of force, motion and energy transfer that students encounter when studying how organisms move and how fluids flow through pipes and channels in Units A and B. [See the curriculum: 1, 2, 3.](#)
- Across all units, students develop skills in planning investigations, controlling variables, recording data, interpreting patterns and communicating findings, practices that prepare them to ask evidence-based questions about the natural and technological world. [See the curriculum: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11.](#)