

Grade 8 Science: Year at a Glance

Overview

Grade 8 Science moves through five units, each taking a different look at matter, energy and living things. Mix and Flow of Matter opens the year by studying fluids such as water, air and oil, using properties like density, viscosity and pressure to explain how these materials behave and how they show up in everyday technology. Freshwater and Saltwater Systems then widens the view to lakes, rivers, oceans and glaciers, looking at how water, landforms and climate interact and how human activity affects water quality and aquatic life. Light and Optical Systems examines how light travels, reflects and refracts, and how devices such as microscopes, telescopes, eyeglasses and digital cameras put that behaviour to work. Mechanical Systems turns to machines, tracing how force and motion move through linked components and comparing how simple machines have changed over time. The year closes with Cells and Systems, where students zoom in on the structures inside living things, from single cells to organs, and see how these parts work together to keep an organism healthy. [See the curriculum: 1, 2, 3, 4, 5, 6.](#)

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

- The idea of a system with connected parts runs through every unit: fluid systems in Mix and Flow of Matter, aquatic systems in Freshwater and Saltwater Systems, optical systems in Light and Optical Systems, mechanical systems in Mechanical Systems, and cell and organ systems in Cells and Systems. [See the curriculum: 1, 2, 3, 4, 5.](#)
- The same inquiry skills carry across units: students ask questions and plan an investigation, collect and record data, analyze results, and communicate findings as a team, whether they are testing a fluid's viscosity, mapping a stream table, measuring how a beam of light refracts, or troubleshooting a model system. [See the curriculum: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12.](#)
- Safety, collaboration, mutual respect, stewardship and interest in science are built into every unit, reminding students that how they work together matters as much as what they discover. [See the curriculum: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16.](#)
- The microscopes and telescopes students study as light technologies are the same kinds of tools they later use to observe the cells and structures covered in Cells and Systems. [See the curriculum: 1, 2, 3.](#)
- Water threads through two units in different ways: Mix and Flow of Matter treats it as a solvent and fluid with measurable properties, while Freshwater and Saltwater Systems studies it as part of Earth's landforms, climate and ecosystems. [See the curriculum: 1, 2.](#)