Alberta Grade 5 Science Curriculum Comparison Document

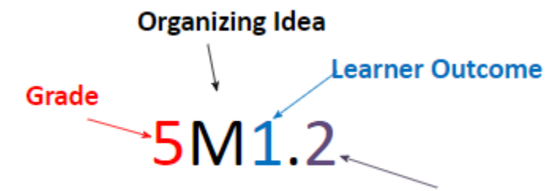
2023 - 2024

The purpose of this document is to provide you with an opportunity to review the previous curriculum (1996) and compare it with the new 2023 Science Curriculum. You will find the old curricular outcomes on the left side of your page and the new one to the right.

When reviewing for the first time, read the document through completely to familiarize yourself with the contents.

On second review, make notes along margins that help to identify familiar knowledge concepts or those which are very new.

Repeat this process for the Skill Concepts (Verbs). Consider how the verbs will inform your practice and assessment.



Grade 5 Curriculum Comparison to the New Alberta Science Curriculum

M = Matter **E= Energy** **ES = Earth Systems** **S = Space** **LS = Living Systems** **CS = Computer Science** **SM = Scientific Method.**

Outcomes from 1996 Curriculum	**Learner Outcomes**	**Understandings** from New Curriculum, **Knowledge**	**Skills and Procedures**
Possible Links to the 1996 Science Curriculum	**Matter(M) : Matter: Understandings of the physical world are deepened through investigating matter and energy.** **Guiding Question:** How can states of matter and other physical properties be explained using the particle model of matter?		

Grade 2 **Topic A: Exploring Liquids** 2–5 Describe some properties of water and other liquids, and recognize the importance of water to living and nonliving things. **Topic D: Hot and Cold Temperature** 2–9 Recognize the effects of heating and cooling, and identify methods for heating and cooling.	**LEARNER OUTCOME** 5M 1.1 Students investigate the particle model of matter in relation to the physical properties of solids, liquids, and gasses.	**UNDERSTANDING** The particle model of matter explains the behaviour of particles in matter. **KNOWLEDGE** Ideas represented by the particle model of matter include that: • all matter is made up of small particles • particles of matter are always moving • particles of matter have spaces between them In solids, the particles are close together and vibrate in place. In liquids, the particles are separated by spaces and can slide past each other. In gases, the particles are separated by large spaces and are constantly moving in all directions. Attractive forces between particles are strongest in solids and weakest in gases.	**SKILLS and PROCEDURES** Represent solids, liquids, and gases using the particle model of matter. Relate the movement and arrangement of particles to the state of matter. Describe the impact that attractive forces have on the movement and arrangement of particles in solids, liquids, and gases.
	LEARNER OUTCOME 5M 1.2 Students investigate the particle model of matter in relation to the physical properties of solids, liquids, and gasses.	**UNDERSTANDING** The movement and arrangement of particles affect the physical properties of matter. **KNOWLEDGE** Physical properties of matter include state mass volume density compressibility Mass is the amount of matter in a solid, liquid, or gas. SI units of mass include grams and kilograms. Volume is the amount of space a solid, liquid, or gas takes up. SI units of volume of a liquid include millilitres and litres.	**SKILLS and PROCEDURES** Measure the mass of solids and liquids using a balance scale and SI units. Measure the volume of liquids using appropriate instruments and SI units. Directly compare the density of solid objects that have the same volume. Directly compare the density of liquids. Relate densities of solids, liquids, and gases using the particle model of matter. Compare the compressibility of air and water. Practise safe and appropriate use of materials, tools, and equipment.

		SI units are abbreviated for convenience, including g: grams kg: kilograms mL: millilitres L: litres Density is a comparison of the mass of a solid, liquid, or gas to its volume. The greater the mass of a solid, liquid, or gas as compared to its volume, the higher its density. Density can be described comparatively using the phrases denser and less dense. Density can be directly compared by determining the relative mass of objects with the same volume if a liquid sinks or floats when added to another liquid A solid, liquid, or gas that is less dense than the fluid in which it is placed will float. Compressibility is the ability of a liquid or gas to reduce in volume when under pressure.	

Possible Links to the 1996 Science Curriculum	**Energy (E): Understandings of the physical world are deepened by investigating matter and energy.** **Guiding Question:** How are forces similar and different in water and air?		
Grade 6 **Topic A: Air and Aerodynamics** 6–5 Describe properties of air and the interactions of air with objects in flight. 6–6 Construct devices that move through air, and identify adaptations for controlling flight.	**LEARNER OUTCOME** 5E 1.1 Students investigate and compare how forces affect living things and objects in water and air.	**UNDERSTANDING** Flight of living things and objects is influenced by opposing forces. **KNOWLEDGE** Thrust and drag are opposing forces. Lift and weight are opposing forces. Thrust is a force that can act in the direction of movement. Drag is a force that can act in opposition to the direction of movement.	**SKILLS and PROCEDURES** Diagram opposing forces that act on living things or objects in flight. Explain the effects of thrust and drag on the flight of living things and objects. Explain the effects of lift and weight on the flight of living things and objects. Observe living things and objects in flight. Describe traditional or modern technologies developed by diverse cultures that reflect understanding of forces that affect

		Lift is an upward force that acts to overcome the weight of a living thing or object and hold it in the air. Weight is a force caused by gravity that acts on a living thing or object in a downward direction. Forces can affect the flight of living things and objects in various ways, including ● speed ● horizontal and vertical movement ● altitude ● straight and level flight Traditional technologies developed by diverse cultures that reflect understanding of forces that affect flight include the ● bow and arrow ● slingshot ● fishing spear	flight. Construct a device that can fly. Practise safe and appropriate use of tools, equipment, and materials while constructing a device.
Grade 2 **Topic B: Buoyancy and Boats** 2–7 Construct objects that will float on and move through water, and evaluate various designs for watercraft .	**LEARNER OUTCOME** 5E 1.2 Students investigate and compare how forces affect living things and objects in water and air.	**UNDERSTANDING** The relationship between buoyant force and gravity can be used to explain the behaviour of an object in water. **KNOWLEDGE** Buoyant force is an upward force exerted by a fluid that opposes the weight of anything placed in the fluid. When the buoyant force is greater than the weight of an object, the object will float. When the buoyant force is less than the weight of an object, the object will sink. Fluids include liquids and gases.	**SKILLS and PROCEDURES** Relate buoyant force and weight to the tendency to float or sink in water. Conduct controlled experiments to determine if various objects and materials float in different fluids. Construct a device that can float. Practise safe and appropriate use of tools, equipment, and materials while constructing a device.
	Energy (E): Understandings of the physical world are deepened by investigating matter and energy. **Guiding Question:** How are energy resources understood?		
	LEARNER OUTCOME 5E 2.1 Students investigate and analyze various energy resources.	**UNDERSTANDING** Humans rely on Earth's systems to provide resources for their energy needs. Energy resources can be used directly or transformed in useful ways for daily living. **KNOWLEDGE**	**SKILLS and PROCEDURES** Compare renewable energy resources with non-renewable energy resources. Discuss advantages and disadvantages of using renewable and non-renewable energy resources.

		Energy resources are renewable or non-renewable. Renewable energy resources are not depleted over time as they can be naturally replenished if handled responsibly. Renewable energy resources include ● solar ● wind ● biomass ● geothermal ● tidal ● water and hydro Non-renewable energy resources are depleted over time because they will not be naturally replenished for thousands or millions of years. Non-renewable energy resources include nuclear and fossil fuels. Alberta relies on both renewable and non-renewable energy resources to fulfill energy needs, including ● fossil fuels ● water and hydro ● wind ● biomass	Examine how various provinces and territories throughout Canada fulfill energy needs
Possible Links to the 1996 Science Curriculum	**Living Systems (S): Understandings of the living world, Earth, and space are deepened by investigating natural systems and their interactions.** **Guiding Question:** How are organisms supported by biological processes and systems?		
Grade 8 **Unit B: Cells and Systems (Nature of Science Emphasis)**	**LEARNER OUTCOME** 5 LS 1.1 Students investigate the internal systems of organisms and explain how they support biological processes.	**UNDERSTANDING** Humans are complex organisms with biological systems that carry out vital biological processes.. **KNOWLEDGE** Vital biological processes in complex organisms are carried out by biological systems that rely on each other. Vital biological processes of complex organisms include ● movement ● nutrition ● respiration ● growth ● reproduction	**SKILLS and PROCEDURES** Relate vital biological processes to a human or other animal's internal biological systems. Examine the function of the human digestive, respiratory, circulatory, and musculoskeletal systems. Identify the digestive, respiratory, circulatory, and musculoskeletal systems of the human body and the major body parts of each system. Investigate the relationships between body systems that are involved in moving oxygen and nutrients throughout the human body.s.

		Humans and many other animals have internal biological systems that include the ● digestive system ● respiratory system ● circulatory system ● musculoskeletal system The digestive system breaks down food and absorbs nutrients, and includes the mouth, stomach, intestines, liver, and pancreas. The respiratory system exchanges oxygen and carbon dioxide, and includes the trachea, lungs, and diaphragm. The circulatory system moves blood around the body and includes the heart and blood vessels. The musculoskeletal system supports and moves the body, and includes muscles and bones. The digestive, respiratory, and circulatory systems work together to supply oxygen and nutrients to the human body.	
Grade 4 **Topic E: Plant Growth and Changes** 4–10 Demonstrate knowledge and skills for the study, interpretation, propagation and enhancement of plant growth. Grade 7 Unit B: Plants for Food and Fibre (Science and Technology Emphasis)	**LEARNER OUTCOME** 5 LS 1.2 Students investigate the internal systems of organisms and explain how they support biological processes.	**UNDERSTANDING** Plants are complex organisms with transport systems that carry out specific functions for survival. **KNOWLEDGE** Plant transport systems include xylem and phloem. Xylem and phloem in plants perform similar functions to the circulatory system in animals. Xylem transports water and nutrients from the roots to the rest of the plant. Phloem transports sugars from the leaves to the rest of the plant.	**SKILLS and PROCEDURES** Examine the transport systems of plants and describe their functions.
Possible Links to the 1996 Science Curriculum	**Earth System (ES): Understandings of the living world, Earth, and space are deepened by investigating natural systems and their interactions.** **Guiding Question:** How can climate and its effects be understood?		
Grade 5 **Topic D: Weather Watch**	**LEARNER OUTCOME**	**UNDERSTANDING**	**SKILLS and PROCEDURES**

5–8 Observe, describe and interpret weather phenomena; and relate weather to the heating and cooling of Earth's surface. 5–9 Investigate relationships between weather phenomena and human activity.	5 ES 1.1 Students analyze climate and connect it to weather conditions and agricultural practices.	The study of climates across regions helps identify historical patterns and make predictions. **KNOWLEDGE** Weather is the short-term conditions experienced in a region, including ● temperature ● wind speed and direction amount of sunlight precipitation ● humidity ● cloud cover Climate is the long-term weather patterns of a region over a period of at least 30 years. Data in maps, tables, or graphs can be used to represent key characteristics of climate, including ● temperature ● precipitation ● humidity ● wind Climates are dependent on factors that include ● geographical location ● landforms ● altitude ● proximity to bodies of water Climate zones are defined areas with distinct climates and include ● tropical ● dry ● temperate ● polar ● continental First Nations, Métis, and Inuit can provide long-term observations of climate for local context.	Distinguish climate from weather. Discuss the characteristics of local, national, and global weather conditions to determine climate. Compare key characteristics of climate zones. Interpret data about climate. Relate factors that contribute to Alberta's climate. Compare Alberta's climate to the climates of other Canadian provinces or territories.
	LEARNER OUTCOME 5 ES 1.2 Students analyze climate and connect it to weather conditions and agricultural practices.	**UNDERSTANDING** Weather conditions can be measured accurately using a variety of tools and methods. **KNOWLEDGE** Tools to measure and track weather conditions include ● thermometers ● wind vanes	**SKILLS and PROCEDURES** Examine tools used to measure and track weather conditions. Construct simple tools to measure weather. Observe and record local weather for a given time interval. Represent local weather data.

		• windsocks • anemometers barometers • rain or snow gauges • hygrometers Websites, weather maps, and weather apps provide access to weather information. First Nations, Métis, and Inuit communities rely on traditional knowledge, in addition to modern tools and methods, to interpret and predict weather patterns. Methods used to predict weather include • computer modelling • historical data • satellite imaging • First Nations, Métis, and Inuit traditional knowledge	Construct a sample weather map of a local region for a given time. Explain the importance of weather forecasts. Investigate methods used to predict the weather. Discuss First Nations, Métis, and Inuit methods of predicting weather.
Grade 5 **Topic D: Weather Watch** 5–9 Investigate relationships between weather phenomena and human activity.	**LEARNER OUTCOME** 5 ES 1.3 Students analyze climate and connect it to weather conditions and agricultural practices.	**UNDERSTANDING** Climate affects human and other animal activity.. **KNOWLEDGE** Climate affects various aspects of human activity, including • agriculture • infrastructure • clothing • transportation • recreation Climate affects various aspects of animal activity, including • migration patterns • accessing food • timing of reproduction	**SKILLS and PROCEDURES** Explain how climate can affect human and other animal activity.
Possible Links to the 1996 Science Curriculum	**Space (S): Understandings of the living world, Earth, and space are deepened by investigating natural systems and their interactions.** **Guiding Question:** How are astronomical phenomena observed and interpreted?		
Grade 6 **Topic C: Sky Science** 6–7 Observe, describe and interpret the movement of objects in the sky; and identify pattern and order in these movements.	**LEARNER OUTCOME** 5 S 1.1 Students investigate and interpret astronomical phenomena.	**UNDERSTANDING** Observations and interpretations of astronomical phenomena can inform daily living. **KNOWLEDGE** Astronomical phenomena are observable events that	**SKILLS and PROCEDURES** Connect the direction of Earth's tilt in relation to the Sun to the length of day and night in each season. Describe personal observations related to cyclical changes

		happen among objects in space. Astronomical phenomena include ● seasons ● Moon phases ● lunar and solar eclipses ● equinoxes and solstices ● length of day and night ● auroras Astronomical phenomena, such as Moon phases, can have predictable patterns and cycles. Seasons are experienced during different times of the year in the northern and southern hemispheres of Earth because these regions are tilted toward the Sun at different times of the year. Longer and shorter days are experienced during different times of the year in the northern and southern hemispheres of Earth because these regions are tilted toward the Sun at different times of the year. In the northern hemisphere, auroras are referred to as the northern lights (aurora borealis). First Nations, Métis, and Inuit ways of living and significant events are connected to many astronomical phenomena, such as the association of seasons to ceremonies. Astronomical phenomena can be represented in various ways that connect to daily life, including ● calendars ● cycles ● stories and legends ● artifacts ● models and digital simulations Observations and interpretations of astronomical phenomena can be applied in various contexts, including ● planting and harvesting crops ● hunting	in the Moon's appearance. Discuss observable features of lunar and solar eclipses and auroras. Identify astronomical phenomena that occur cyclically. Explore First Nations, Métis, and Inuit understandings of phases and cycles within astronomical phenomena that inform ways of living and community activities. Explore Inuit, northern First Nations', or Métis' stories related to the midnight sun, the polar night, or the northern lights. Represent astronomical phenomena in a variety of ways. Explore Indigenous representations of astronomical phenomena, past and present. Identify how observation of astronomical phenomena can determine agricultural and hunting practices.

Possible Links to the 1996 Science Curriculum	**Computer Science (CS): Problem solving and scientific inquiry are developed through the knowledgeable application of creativity, design, and computational thinking.** **Guiding Question**:In what ways can design be used to help achieve desired outcomes or purposes?		
	LEARNER OUTCOME 5 CS 1.1 Students apply design processes when creating artifacts that can be used by a human or machine to address a need.	**UNDERSTANDING** Design can be used by humans or machines to meet needs. **KNOWLEDGE** A computational artifact is anything created by a human using a computer, such as • computer programs and code • images • audio • video • presentations • web pages Design can be used to create algorithms and translate them into code. Code is any language that can be understood by and run on a computer. There are many ways to code, including using visual block-based languages. Visual block-based languages are a form of code in which prepared chunks of instructions are in drag- and-drop blocks that fit together like puzzle pieces to design a program. A computer cannot think for itself and must rely on code for all that it does. A loop is a repetition of instructions used in an algorithm.	**SKILLS and PROCEDURES** Engage in the design process to create computational artifacts. Relate a block of code to an outcome or a behaviour. Explain what will happen when single or multiple blocks of code are executed. Translate a given algorithm to code using a visual block-based language. Design an algorithm that includes a loop and translate it into code..
	LEARNER OUTCOME 5 CS 1.2 Students apply design processes when creating artifacts that can be used by a human or machine to address a need.	**UNDERSTANDING** Design can better meet needs through the development of multiple iterations. **KNOWLEDGE** I Design process can be influenced by various factors, including • safety	**SKILLS and PROCEDURES** Discuss examples of designs that have been enhanced or refined to better meet needs. Evaluate an artifact based on various factors. Design an artifact to meet a need. Propose enhancements and refinements to an artifact

		• functionality • usability • reliability • efficiency • aesthetics Functionality is the quality of being useful to do the job for which something was designed. Usability is the degree of ease with which something can be used to achieve an outcome. Design processes that support the development of multiple iterations include • enhancing • refining Design can be improved through collaboration.	in collaboration with others. Develop multiple iterations of an artifact.
Possible Links to the 1996 Science Curriculum	**Scientific Method (SM)**: **Investigation of the physical world is enhanced through the use of scientific methods that attempt to remove human biases and increase objectivity.** : **Guiding Question:** How does evidence lead to understanding?		
	LEARNER OUTCOME 5 SM 1.1 Students investigate how evidence is gathered and explain the importance of ethics in science.	**UNDERSTANDING** Investigations can be conducted to better understand phenomena. **KNOWLEDGE** Phenomena are facts or events that can be observed. Some phenomena can be directly observed using the human senses. Phenomena that cannot be directly observed using the human senses can be observed and measured using technologies such as telescopes, microscopes, and X-rays. Natural phenomena occur without human input, such as lightning and auroras.	**SKILLS and PROCEDURES** Discuss technologies that provide scientists with evidence that cannot be directly observed using the human senses.
Grade 5 Skills	**LEARNER OUTCOME** 5 SM 1.2 Students investigate how evidence is	**UNDERSTANDING** Evidence is more reliable and valid when	**SKILLS and PROCEDURES** Identify biases that could influence an investigation.

5–2 Recognize the importance of accuracy in observation and measurement; and, with guidance, apply suitable methods to record, compile, interpret and evaluate observations and measurements.	gathered and explain the importance of ethics in science.	investigations are conducted in a way that limits bias. **KNOWLEDGE** Bias is any personal thoughts, feelings, or expectations that influence an investigation. Humans are not usually aware of their personal biases.	
Grade 5 Skills 5–1 Design and carry out an investigation, using procedures that provide a fair test of the question being investigated. Grade 6 Skill - Science Inquiry 6–1 Design and carry out an investigation in which variables are identified and controlled, and that provides a fair test of the question being investigated. 6–2 Recognize the importance of accuracy in observation and measurement; and apply suitable methods to record, compile, interpret and evaluate observations and measurements	**LEARNER OUTCOME** 5 SM 1.3 Students investigate how evidence is gathered and explain the importance of ethics in science.	**UNDERSTANDING** Evidence from a controlled experiment can be used to make conclusions about cause-and-effect relationships between variables. **KNOWLEDGE** A variable is a condition or factor that can influence the outcome of an experiment. A manipulated or independent variable is changed to determine what effect the change will have on the responding variable in a controlled experiment. A responding or dependent variable changes as a result of changes to the manipulated variable in a controlled experiment. A controlled variable is kept the same in a controlled experiment. A controlled experiment is an investigation in which one variable is changed and all other variables are kept the same.	**SKILLS and PROCEDURES** Plan and conduct a controlled experiment. Identify the variables in a controlled experiment. Apply vocabulary for variables correctly in science contexts. Evaluate the effect of the manipulated variable on the responding variable in a controlled experiment. Defend a conclusion about cause and effect based on evidence produced in a controlled experiment.
	LEARNER OUTCOME 5 SM 1.4 Students investigate how evidence is gathered and explain the importance of ethics in science.	**UNDERSTANDING** Evidence must be communicated clearly and accurately. **KNOWLEDGE** Representations of data can include all or some of the data. Diverse representations of data can communicate evidence differently. Evidence that is communicated clearly and accurately	**SKILLS and PROCEDURES** Discuss the use of diverse representations of data in communicating evidence. Compare the clarity and accuracy of evidence communicated by diverse representations of data. Discuss potential impacts of evidence that is not communicated clearly and accurately.

		• uses correct vocabulary includes • all relevant data • is free from personal bias • can be understood by the intended audience Evidence that is not communicated clearly and accurately can influence the validity and reliability of the investigation.	
	LEARNER OUTCOME 5 SM 1.5 Students investigate how evidence is gathered and explain the importance of ethics in science.	**UNDERSTANDING** Evidence needs to be produced, handled, and shared ethically. **KNOWLEDGE** Scientific ethics are principles and rules that guide behaviour when conducting scientific investigations. Scientific ethics are demonstrated during investigations in ways such as • not changing data in an experiment • minimizing harm to environments, humans, and other animals • respecting the privacy of participants • limiting personal bias	**SKILLS and PROCEDURES** Examine the importance of scientific ethics in investigations. Demonstrate scientific ethics during investigations.