|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Science 9** (Planning KDU) | | | | | |
| **CORE COMPETENCIES**  **COMMUNICATION** | | **CORE COMPETENCIES**  **THINKING (CRITICAL/CREATIVE)** | | **CORE COMPETENCIES**  **(PERSONAL/SOCIAL)** | |
| **CURRICULAR COMPETENCIES** | **BIG IDEA (Understand…)** | | **What do we want students to DO?**  **(Activities, lessons…)** | | **Content (& Elaborations)**  **(Know)** |
| **Questioning and predicting**  *(An interaction is a kind of action that occurs when two or more objects have an effect on one another.  The interaction may be direct or indirect.  In a direct interaction, A has a direct effect on B.  An example of a direct interaction is wolves preying on elk.  In an indirect interaction, A has an effect on B that affects C. For example, ladybugs have an indirect effect on plants because they eat aphids.* Key questions about interactions: How do the four spheres of the Earth interact? How can understanding the interactions of Earth’s spheres help us prepare for natural disasters?*)*   * Demonstrate a sustained intellectual curiosity about a scientific topic or problem of personal interest * Make observations aimed at identifying their own questions, including increasingly complex ones, about the natural world * Formulate multiple hypotheses and predict multiple outcomes   **Planning and conducting**   * Collaboratively and individually plan, select, and use appropriate investigation methods, including field work and lab experiments, to collect reliable data (qualitative and quantitative) * Assess risks and address ethical, cultural and/or environmental issues associated with their proposed methods and those of others * Select and use appropriate equipment, including digital technologies, to systematically and accurately collect and record data * Ensure that safety and ethical guidelines are followed in their investigations   **Processing and analyzing data and information**   * Experience and interpret the local environment * Apply First Peoples perspectives and knowledge, other ways of knowing *(Ways of knowing refers to the various beliefs about the nature of knowledge that people have; they can include, but are not limited to, Aboriginal, gender-related, subject/discipline specific, cultural, embodied and intuitive beliefs about knowledge.)*, and local knowledge as sources of information * Seek and analyze patterns, trends, and connections in data, including describing relationships between variables (dependent and independent) and identifying inconsistencies * Construct, analyze and interpret graphs (including interpolation and extrapolation), models and/or diagrams * Use knowledge of scientific concepts to draw conclusions that are consistent with evidence * Analyze cause-and-effect relationships   **Evaluating**   * Evaluate their methods and experimental conditions, including identifying sources of error or uncertainty, confounding variables, and possible alternative explanations and conclusions * Describe specific ways to improve their investigation methods and the quality of data * Evaluate the validity and limitations of a model or analogy in relation to the phenomenon modelled * Demonstrate an awareness of assumptions, question information given, and identify bias in their own work and secondary sources * Consider the changes in knowledge over time as tools and technologies have developed * Connect scientific explorations to careers in science * Exercise a healthy, informed skepticism and use scientific knowledge and findings to form their own investigations and to evaluate claims in secondary sources * Consider social, ethical, and environmental implications of the findings from their own and others’ investigations * Critically analyze the validity of information in secondary sources and evaluate the approaches used to solve problems   **Applying and innovating**   * Contribute to care for self, others, and community through individual or collaborative approaches * Transfer and apply learning to new situations * Generate and introduce new or refined ideas when problem solving * Contribute to finding solutions to problems at a local and/or global level through inquiry * Consider the role of scientists in innovation   **Communicating**   * Formulate physical or mental theoretical models to describe a phenomenon * Communicate scientific ideas, information, and perhaps a suggested course of action for a specific purpose and audience, constructing evidence-based arguments and using appropriate scientific language, conventions, and representations * Express and reflect on a variety of experiences, perspectives, and worldviews through place *(Place is any environment, locality, or context with which people interact to learn, create memory, reflect on history, connect with culture, and establish identity. The connection between people and place is foundational to First Peoples perspectives of the world. Key questions about place: How does place inform your questions and inquiries? How does place influence your ability to plan and conduct an inquiry and make predictions about outcomes? How does your understanding of place affect the ways in which you collect evidence and evaluate it? How can you demonstrate ways of knowing that your work and the work of others is valid, free of bias, and acknowledges limitations? How can your understanding of place influence project designs? How do the place-based experiences and stories of others affect the ways in which you communicate and collaborate? How can you demonstrate an understanding of place and interconnectedness by the ways in which you represent the results of your investigation?)* | Cells are derived from cells. | | *Questions to support inquiry with students:*   * How do cells multiply? * What are the advantages and disadvantages of sexual and asexual reproduction? | | **Core Focus: BIOLOGY**   * asexual reproduction:   + mitosis *(process through which pre-existing cells make two identical copies of themselves)*   + different forms *(fission, budding, cloning, spores, grafting)* * sexual reproduction:   + meiosis *(process through which sex cells (eggs and sperm) are formed by the dividing of a parent cell twice, resulting in four daughter cells)*   + human sexual reproduction *(result of humans having two parents is that offspring are not genetically identical to either parent)* |
| **Evidence of Experience (Show)** | | | | |
| **BIG IDEA (Understand…)** | | **What do we want students to DO?**  **(Activities, lessons…)** | | **Content (& Elaborations)**  **(Know)** |
| The electron arrangement of atoms impacts their chemical nature. | | *Questions to support inquiry with students:*   * Which patterns are shown on the periodic table? * How can the periodic table be represented in a different form? | | **Core Focus: CHEMISTRY**   * Element properties as organized in the periodic table *(groups elements according to their atomic number and properties (e.g., atomic size, metals/non-metals/semi-metals, chemical families, diatomic elements).)* * Arrangement of electrons determines the compounds *(ionic and covalent; names and formulas)* formed by elements |
| **Evidence of Experience (Show)** | | | | |
| **BIG IDEA (Understand…)** | | **What do we want students to DO?**  **(Activities, lessons…)** | | **Content (& Elaborations)**  **(Know)** |
| Electric current is the flow of electric charge. | | *Questions to support inquiry with students:*   * Why do electrons flow in a circuit? * How does increasing current impact your personal safety with electricity? | | **Core Focus: PHYSICS**   * circuits *(basic components include power source, load/resistor (lightbulbs, etc.), conductor and switch; types of circuits include series, parallel, short circuits; current flow in a circuit: alternating current (AC) and direct current (DC);* must be complete for electrons to flow * voltage, current, and resistance *(voltage, current, and resistance are related: Ohm’s Law (V=IR); relative dangers of current and voltage)* |
| **Evidence of Experience (Show)** | | | | |
| **BIG IDEA (Understand…)** | | **What do we want students to DO?**  **(Activities, lessons…)** | | **Content (& Elaborations)**  **(Know)** |
| The biosphere, geosphere, hydrosphere, and atmosphere are interconnected, as matter cycles and energy flows through them. | | *Questions to support inquiry with students:*   * How do Earth’s major spheres interact? * How do matter and energy move through ecosystems? * How do First Peoples view the cycling of matter and energy?   *Key questions about interactions:*   * How do the four spheres of the Earth interact? * How can understanding the interactions of Earth’s spheres help us prepare for natural disasters? | | **Core Focus: EARTH/SPACE**   * effects of solar radiation *(solar radiation provides the energy required for most life on Earth, and is the root cause of wind and ocean currents, which distribute energy and nutrients around the planet, as well as the energy sources for the water cycle)* on the cycling of matter and energy * matter cycles *(e.g., water, nitrogen, carbon, phosphorous, etc.; human impacts on sources and sinks (e.g., climate change, deforestation, agriculture, etc.); bioaccumulation and biomagnification)* within biotic and abiotic components of ecosystems * sustainability of systems *(a systems approach to sustainability sees all matter and energy as interconnected and existing in dynamic equilibrium (e.g., carbon as a key factor in climate change, greenhouse effect, water cycle, etc.))* * First Peoples knowledge of interconnectedness *(everything is connected, from local to global; First Peoples perspectives on interconnectedness)* and sustainability *(First Peoples perspectives on sustainability of systems)*    + **plate tectonic movement (** * climate change over |
| **Evidence of Experience (Show)** | | | | |