

Unit 1 - Interactions and Ecosystems

1.0 Relationships in an Ecosystem

- Ecosystems are where biotic and abiotic factors interact
- Symbiotic relationships include: Commensalism (One benefit - other no effect), Mutualism (Both benefit), Parasitism (One benefits - one harmed)
- Basic Needs include: Water, Energy, Food, Exchange of gases, Space (Habitat), Waste disposal
- Responsible Environmental Decision-making is made with scientific information and considers the impact such decisions have on the environment

2.0 Energy Flow

- Food Webs allow energy (supplied by the Sun) to flow
- Matter continuously moves from non-living to living and back to non-living in two cycles: Water cycle and Carbon Cycle
- Changes in a food web affect all living things in that ecosystem

3.0 Environmental Monitoring

- Ecosystems provide all needs for living things
- Ecosystems change because of: Human activity, Bio-Invasion, Resource competition, Predation, Weather

4.0 Sustainability in an Ecosystem

- Pesticides can be deadly, as they enter and move through an ecosystem
- Human actions can impact the local and global communities
- Scientific information can help in decision-making, but cannot explain everything
- Local environmental problems require input from many sources before a final informed decision can be made

Unit 2 - Plants For Food And Fibre

1.0 Structures and Life Processes

- Seed plants have roots, stems, leaves and either flowers or cones
- Each structure performs a specific function
- Life processes in plants include: Photosynthesis, Transpiration, Gas exchange (cellular respiration)
- Seed plant life cycle includes three stages: Seed stage, Seedling stage, and Adult stage

2.0 Role of Plants to Meet Human Needs

- Plants supply oxygen and food
- Plants are used for food, fibre (to make things), medicine, and other products
- Natural resources vs Managed resources

- Pollination is the joining of pollen and ovary
- Seed plants can also reproduce in ways not involving seeds: Runners, rhizomes, suckers, cuttings and grafting
- Adaptations help plants get what they need from the environment
- Growing conditions varies between and among plants, and can be modified using technology

3.0 Soil

- Minerals and organic matter in different amounts make clay, sandy soil or loam
- Growing and harvesting methods can improve or degrade soil

4.0 Growing and Using Plants - Sustainability

- Selective breeding provides specific desirable traits
- New varieties may lead to environmental problems
- Resistance, loss of species or pollution can occur with long term use of herbicides and pesticides
- Sustainability - balancing out needs with the needs of the environment and the consequences (social and economic)

Unit 3 - Heat and Temperature

1.0 Technologies for Obtaining and Controlling Heat 2.0 Heat Affects Matter

- Heat technologies have evolved over time
- Culture and technology are linked
- Evolution has integrated heat-related materials and technologies
- Choices about the environment involves individuals and society
- Transferring heat to and from matter can cause a change in state
- The Particle Model of Matter explains changes in state and volume
- Conduction (in contact), Convection (circular motion) and Radiation (waves)
- Thermal energy is the total kinetic energy of the particles in a substance
- Heat is transferred from an area of high kinetic energy to an area of low kinetic energy
- Temperature is the measure of the average kinetic energy of the particles in a substance

3.0 Natural Phenomena and Technology Devices

- Thermal energy is produced by the Sun, decay, fire and geothermal

4.0 Benefits and Costs of Heat Technologies

- Non-renewable resources have a limited supply
- Fossil fuels are the major sources of heating, but

- Passive and Active solar heating systems use the sun's energy and are environmentally friendly
- Thermostats control temperature in heating systems
- Insulation helps block unwanted heat transfer (heat loss)
- degrade the environment
- Costs of using natural resources: economic, environmental and societal
- Energy Alternatives: solar, wind, geothermal, nuclear and hydro-electric (gravitational)

Unit 4 - Structures and Forces

1.0 Natural and man-made (Manufactured)

- Structural forms can be shells, frames or solids
- Each structure performs a specific function and can vary in its design
- Climate, culture, tradition, technology and economics influence the design of a structure

2.0 External and Internal Forces act on structures

- Effect of a force on a structure depends on magnitude, direction and location of the force
- External force is applied on the outside of a structure
- Stability is affected by the changes in the mass distribution and the design of its foundation
- A structure's ability to withstand a load depends on its overall strength and stability
- Performance standards are included in the overall structural design
- Internal forces include compression, tension and shear.
- Material shape and properties determine resistance to internal forces acting on them
- Structures undergo structural stress, fatigue and failure

3.0 Strength and Stability

- Natural and synthetic materials are classified by a range of properties
- Strength and flexibility of materials can be tested - deformation
- Joints - fixed or movable - friction, bonding or flexibility
- Stability, strength and function rely on the proper use of materials

4.0 Designing, Evaluating and Improving to Meet Human Needs

- Environmental factors can affect the stability and safety of a structure
- Corrugation and Lamination can strengthen materials
- Structural evaluation criteria: costs, benefits, safety and potential environmental impact

Unit 5 - Planet Earth

1.0 Changes on the Earth's Surface

- Layers: Crust, Mantle, Core (Inner and Outer)
- Earthquakes and Volcanoes can suddenly change the Earth's surface
- Scientist's use a variety of tools and technologies to investigate the Earth's forces
- Wind, water and ice change the Earth's surface slowly

3.0 Landforms change

- The Theory of Plate Tectonics describes the huge chunks of rock called plates that move on the Earth's surface
- Continents and Ocean floors are carried on the plates which are moving on the partly melted mantle
- The collisions and rubbing together of these plates forms the mountains

2.0 Rock Cycle

- Rocks are composed of minerals and have distinctive characteristics
- Three classes include: igneous, metamorphic and sedimentary
- Breaking down and transforming rock is explained in the rock cycle
- Sedimentary rocks are the most common found in Alberta

4.0 Fossils - Evidence of Earth's Changes over Time

- Fossils are living or non-living things preserved in stone
- Fossil evidence is interpreted and conclusions are based mostly on inferences because the fossil remains are incomplete
- Geological Time divides the history of the Earth into four periods, called Eras.
- Determining what animals and plants looked like from fossil records is often based on inferences