

## Unit A – Interactions & Ecosystems Review Questions

### Topic 1

Interactions Within an Ecosystem - What is the Science of *Ecology*? (p. 6)

- Describe the work an *ecologist* would do. (p. 6-7)
- Describe the *basic needs* of all living organisms. (p. 8)
- Explain what an *adaptation* is and provide examples of how organisms *adapt* to their environments. (p. 10-11)
- Describe the *interdependent relationships* of organisms within a particular ecosystem. (p. 14-15)
- What impact do certain organisms have on their environment (give specific examples) (p. 16)

### Topic 2

Human Impacts on Ecosystems

- What are natural resources and how do humans use them? (p. 18-19)
- How have the interactions that people have within an environment *changed over time*? (p. 20-21)
- How do human *needs and wants* impact natural environments? (p. 22-23)
- Can we *predict what impacts* humans have within an ecosystem? (p. 24-25 )
- How can natural disasters impact the environment?

### Topic 3

Environmental Choices- What is an *ecological footprint* and how is it calculated? (p. 29-31)

- How can our understanding and knowledge of Science and Technology enable us to how we affect our environment? (p. 30-31)
- How can this assessment then be used to *reduce* our impact? (p. 33, 35)

### Topic 4

How Organisms Interact- Explain the difference between *biotic* and *abiotic* parts of the environment. (p. 38)

- What is a *niche*? (p. 38)
- Describe different *niches* within a particular environment. (p. 40)
- Explain the difference between a *food chain* and a *food web*. (p. 42-43)
- Explain how the *pyramid of numbers* can demonstrate the health of an ecosystem. (p. 43 )
- Describe the roles of the *scavengers and decomposers*. (p. 44-45)

### Topic 5

Cycles in the Environment- Describe the *Energy cycle*. (p. 42)

- Describe the *Carbon cycle*. (p. 49)
- Describe the *Water cycle*. (p. 51 )
- Define *pollution* and give specific examples. (p. 52)
- What is *bioaccumulation* (also called, *biomagnification*) and what effect does it have within the food chain?. (p. 53-54)

### Topic 6

Succession and Change in Ecosystems- Describe *primary succession* and *secondary succession*. (p. 56-57)

- How well do organisms *adapt* to human invasion in an ecosystem? (p. 60)
- Describe different ways that *pests* can be controlled in an ecosystem. (p. 61-62)
- What impact can the introduction of *exotic species*, by humans, have on an ecosystem? (p. 62-63)
- Describe the difference between *extinction* and *extirpation*? (p. 64)
- What are the main reasons why a species could be *at risk*? (p. 64)

### Topic 6

Environmental Monitoring- What are some of the techniques used to check (*monitor*) the condition of an environment? (p. 68-70)

- What is an *environmental impact assessment*? (p.74, 78)

Design a Concept Map linking the ideas introduced and reinforced in this Unit on **Interactions and Ecosystems**.

## Unit B – Plants For Food & Fibre Review Questions

### Topic 1

Plants for Food, Fibre, Medicine, Fuel,

Transportation and Construction - Describe why plants are critical to the environment and to people?

- How do plants adapt to different growing conditions?
- What variations in roots, stems and leaves, help different species of plant, survive in their own particular environment?
- Give examples of plants that are used, as a food source for people, in medicine and as raw materials in the manufacturing industry.

### Topic 2

Structural variations of plants - What is *diffusion*?

- What is *osmosis*?
- Describe the structural variations in roots, stems and leaves.
- How do structural variations help a plant adapt?

### Topic 3

Selective Breeding

Vegetative Reproduction

Seed plant Reproduction- Describe the various ways that a plant can reproduce *asexually*.

- *Sexual reproduction* in plants is complex process - describe the various components of this process and the structures that are involved.
- How are new species of plants developed?
- What is *selective breeding*? Give various examples of how this practice has been successful and what negative consequences have resulted from this practice.

### Topic 4

Agricultural practices

Crop varieties

Greenhouses and

Forestry - Describe a variety of *farming practices* past and present.

How has technology influenced these farming practices?

- Describe a variety of *forestry practices* past and present. How has technology influenced these forestry practices?
- What is meant by sustainable development?

### Topic 5

Soil profile – Fertilizers - Soil quality – Hydroponics

- Describe what makes *soil* and what determines the health of soil.
- What components are *fertilizers* made of?
- What consequences (positive and negative) does the use of this chemical additive to the soil have for the environment?
- How can plants be grown in *soil-less* environments?

### Topic 6

Types of Pests

Controlling Pests

- Chemical

- Biological

Bioaccumulation

Organic Food production - Explain, various farming practices and how technology has influenced their growth or decline.

- What effect has *monocultures* had on the agricultural community?
- How are pests controlled in Alberta?
- What is meant by the term *bioaccumulation*?
- What are some negative impacts, as a result of chemical and biological pest control techniques?
- Describe an alternative agricultural practice, such as *organic farming*?

Design a Concept Map linking the ideas introduced and reinforced in this Unit on **Plants for Food and Fibre**

## Unit C – Heat & Temperature Review Questions

### Topic 1

#### Thermal Energy usage

Measuring temperature- Can you identify how **Thermal Energy** is used?

- How is temperature measured?
- What is the relative temperature of freezing water, boiling water, normal body temperature and comfortable room temperature?

### Topic 2

Technological devices and systems using **Thermal Energy**- What is a thermocouple, a bimetallic strip, a recording thermometer and an infrared thermogram?

### Topic 3

#### The Particle Model of Matter

Compressibility of solids, liquids and gases

Properties of solids, liquids and gases

Thermal Energy, heat and temperature- What are the key points addressed in the **Particle Model of Matter**?

- Explain how gas particles can be compressed and what happens to the volume of the gas.
- What properties distinguish solids, liquids and gases?
- Define **Thermal Energy**, **Heat** and **Temperature** in terms of the **Particle Theory**.

### Topic 4

Thermal expansion and contraction

Thermometers and Thermostats. - Describe expansion and contraction of solids liquids and gases in terms of the **Particle Model**

- Why are two different metals used to make a thermocouple and a thermostat (bimetallic strip)?

### Topic 5

Changes of state: melting, freezing, vaporization, condensation and sublimation- Describe the Changes of State and the terminology when a substance undergoes a specific change.

### Topic 6

Energy transfer systems consist of an energy source; direction of energy transfer; control systems; and waste heat. - Explain, using an operational definition, the differences between conduction, convection and radiation - in terms of energy transfer.

- Describe what creates a convection current.
- How is energy transferred differently in solids than it is in gases and liquids?
- What are the five common characteristics that are involved in all energy transfer systems?

### Topic 7

#### Sources of **Thermal Energy**:

chemical, electrical, mechanical, nuclear, geothermal, solar, wind and fossil fuels.

Advantages and disadvantages of using Fossil Fuels

Thermal Pollution

Greenhouse Effect- Describe the impacts different energy sources have on the environment.

- The **Green Solution** involves using alternative energy. Why is it called the **Green Solution** and what positive impacts does it have on the environment?
- Alberta's main source of energy is Fossil Fuels. Describe this energy resource in terms of its abundance and importance to Albertans.
- Describe what happens to create the **Greenhouse Effect**.
- What is Thermal Pollution and what causes it?

### Topic 8

Conservation technologies and strategies to help us conserve fossil fuels and make their use safer. - Provide an operational definition of cogeneration.

- Describe technologies and practices that conserve fossil fuel resources
- How does a programmable thermostat work?
- What is an **ENERGUIDE**? What does this label tell the consumer?

Design a Concept Map linking the ideas introduced and reinforced in this Unit on **Heat and Temperature**

## Unit D – Structures & Forces Review Questions

### Topic 1

- Describe the differences between natural and manufactured structures.
- Can you detail examples of manufactured structures that have their design based on a natural structure?
- What modifications need to be made to certain types of frame structures to stabilize them? Give detailed examples, if you can. (p. 275)
- Similarities, in form or function, of manufactured & natural structures
- Classification of Structures according to their origin (natural or manufactured) and how they are built (mass, frame, shell)

### Topic 2

- What are some of the common functions of structures?
- What does 'aesthetically appealing' mean?
- What is a 'margin of safety'?
- What factors make building a structure more expensive?
- How do material properties determine their use?
- What are the common different types of materials?
- When choosing material for a structure, what considerations do designers need to get information about before making a decision?
- What are the two different types of joints?
- Describe the various types of fasteners - giving examples of each type.

### Topic 3

Measurement (How and units) of Mass & Weight

- Describe the difference between mass and weight.
- What instruments are use to measure mass and weight?
- Draw force diagrams that show a balanced force and an unbalanced force.

### Topic 4

External forces including live loads (changing or non-permanent) and dead loads (the weight of the structure itself) - What is deformation?

- Describe the differences between external and internal forces, giving examples of each.
- Draw force diagrams that illustrate the different internal forces that can act on a structure.
- Describe tensile strength, compressive strength, shear strength and torsion strength.
- Identify the forces acting on different parts of a bicycle and the types of strengths of each of the main parts.
- How do materials get their strength?
- Internal forces of tension, compression, shearing, buckling and bending

### Topic 5

Deformation in structures

Properties of Materials to withstand internal forces.

- Describe how a lever can generate a large force.
- Describe the types of forces which cause shear failure, buckling failure and torsion failure.
- How can knowledge about failure of materials and structures be useful?
- What is metal fatigue?
- Failure of materials under pressure from forces by snapping, buckling, bending, stretching, shearing and twisting

### Topic 6

Choices in design and materials to strengthen a structure against specific kinds of forces - Frictional Forces

- What are the three key methods used by designers to help structures withstand forces and prevent failure?
- What is corrugation?
- What are flying buttresses?
- How can the way a material is made, lower the cost of making that material, but still be strong?
- How can you strengthen a load-bearing horizontal beam that is supported only at the ends?
- How can frictional forces be used to stabilize a structure?

### Topic 7

Structural stability (ability not to tip over) - Locate center of gravity

- What is a 'thrust line'?
- What are the key strategies used in making a firm foundation?
- What scientific principle does a gyroscope demonstrate and what practical applications can you describe that show a gyroscope in action?

Design a Concept Map linking the ideas introduced and reinforced in this Unit on **Structures & Forces**

## Unit E – Planet Earth Review Questions

### Topic 1

#### Elements (pure substances)

#### Properties of minerals

- What are minerals?
- How is the hardness of a mineral determined?
- What are the 6 major crystal types?
- What properties of minerals enable us to identify them?

### Topic 2

#### The Rock Cycle

#### How rocks form

#### Identifying rocks

#### Sedimentation and soil profiles

- Describe igneous, metamorphic and sedimentary rock in terms of how they were formed and how they can be identified.
- Draw a scientific illustration of the rock cycle identifying the type of change that the rocks undergo.
- How can rocks be identified?
- What is a soil profile?

### Topic 3

#### Erosion

#### Types of weathering - biological, mechanical and chemical

#### (slowly) - Glaciers

#### (quickly) - Flash Flooding

- Explain the differences between mechanical, biological and chemical weathering, giving examples of each.
- What are some examples of incremental and sudden changes of erosion?
- Give operational definitions for erratics, moraines, striations and meandering.

### Topic 4

#### Layers of the Earth

#### Theory of Continental Drift

#### Theory of Plate Tectonics

#### Evidence for these theories

#### Convection currents and plate zones

- Draw and label a scientific illustration showing the layers of the Earth
- Explain the Theory of Continental Drift and the evidence that was collected to support this theory.
- Explain the Theory of Plate Tectonics and the technologies used to gather evidence to support this theory.
- Describe what forms convection currents in the mantle.
- Explain the difference between diverging and converging continental plates and the zones these create.

### Topic 5

#### Earthquakes

#### Measuring force and magnitude

#### Locating epicenter

#### Earthquake zones and faults

#### Tsunamis

- What causes earthquakes?
- How are earthquakes measured (intensity and magnitude)?
- Describe the three types of earthquake waves and their effects.
- Identify the steps needed to locate the 'focus' (epicenter) of an earthquake.
- Identify the different types of rock movement causing an earthquake.
- What is a tsunami?

### Topic 6

#### Volcanoes and the Ring of Fire

- Identify the main types of volcanoes and provide some examples of some current or famous volcanoes.
- What is the Ring of Fire?
- Where else in the universe can volcanoes be observed?

### Topic 7

#### Mountain formation, age and types

- How are mountains formed?
- What types of mountain formations are common in particular parts of the world?
- How is the age of a mountain range determined?

### Topic 8

#### Types of fossils

#### Moulds and casts

- Identify the different types of fossils that have been found and classified.
- Describe the formation of a fossil (mould and cast methods)

### Topic 9

#### Radiometric and radiocarbon dating

#### Geological Time Scale

- What is the principle of superposition?
- Explain the relative dating technique, used to identify the age of a fossil.
- Explain the techniques and differences, between radiometric and radiocarbon dating.
- Briefly review the geological time scale, noting how the time scale is divided into eons, eras and periods.

### Topic 10

#### Locating fossil fuels

- What is petroleum and how is it located?

Design a Concept Map linking the ideas introduced and reinforced in this Unit on **Planet Earth**