**Science 10 Unit Plan**

**Name:** Joshua Amiel

**Subject / Grade**: Science 10 (Biology Unit)

**Class composition:**

Class 1-4 (room 338): 25% ; Class 2-4 (room 338): none.

**Science 10 PLO’s:**

B1: Explain the interaction of abiotic and biotic factors within an ecosystem;

B2: Asses the potential impacts of bioaccumulation;

B3: Explain various ways in which natural populations are altered or kept in equilibrium.

**English Language Arts PLO’s:**

A1: Interact and collaborate in pairs and groups.

A2: Express ideas and information in a variety of situations and forms.

A4: Select, adapt, and apply a range of strategies to interact and collaborate with others in pairs and groups.

A5: Select, adapt, and apply a range of strategies to prepare oral communications.

B2: Read collaboratively and independently, to comprehend a variety of information and persuasive texts.

B3: View, both collaboratively and independently, to comprehend a variety of visual texts.

**Summative Assessment**

Miscellaneous assignments (10%); Chapter quizzes (5% x 4); Oral presentation (35%); Unit Exam (35%).

**Resources:**

B.C. Science Probe 10 Textbook; Vocabulary Cards; Laboratory Materials.

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| **Date** | **Lesson Topic** | **Subject PLO’s** | **Literacy PLO’s & Specific Lesson Objectives** | **Student Activities** | **Teacher Activities** |
| Feb. 2 / Feb. 3 | Ch. 2 Interactions in Ecosystems.  2.1 Biotic and Abiotic Factors in Ecosystems. | B1: Explain the interaction of abiotic and biotic factors within an ecosystem. | * Define *abiotic, biotic, biome,* and *ecosystem*. * Identify biotic and abiotic factors in a given scenario or diagram. * Describe the relationships between abiotic and biotic elements within an ecosystem, including:   1. Air, water, soil, light, temperature (abiotic).   2. Bacteria, plants, animals (biotic). | * Co-create behavioural expectations * Add *abiotic,* *biotic* and *ecosystem* to visual vocabulary cards. * Identify various abiotic and biotic features and upload them to Padlet. * Check for understanding (provide in class time). | * Guide a student-led discussion about behavioural expectations in class. * Provide examples of different ecosystems and have students recognize *biotic* and *abiotic* features. * Lead class field trip and circulate through groups. * Introduce Google Forms homework platform. |
| Feb. 4 / Feb. 5 | Ch. 2 Interactions in Ecosystems.  2.2 Ecological Roles and Relationships. | B1: Explain the interaction of abiotic and biotic factors within an ecosystem.  B2: Assess the potential impacts of bioaccumulation. | * Explain various relationships with respect to food chains, food webs, and food pyramids, including:   1. Producer   2. Consumer   3. Predation   4. Decomposers * Define, using examples, the terms *bioaccumulation, parts per million, biodegradation,* and *trophic levels* (with reference to producers and primary, secondary and tertiary consumers). | * Complete a worksheet to identify abiotic and biotic features in a given diagram. * Add *biodegradation*, *decomposers, nutrients* and *predation* to visual vocabulary cards. * Predator-prey simulation lab in groups and individual worksheet. * Google Form check for understanding/homework (provide in class time). | * Clarify any areas of confusion identified from previous check for understanding. * Have students form groups for the predator-prey lab experiment and hand out worksheets. * Monitor lab and help students complete their worksheets. * Brief introduction to ecological relationships. * Review Google Forms and identify areas of confusion. |
| Feb. 10 / Feb. 11 | Ch. 2 Interactions in Ecosystems.  2.3 Symbiosis. | B1: Explain the interaction of abiotic and biotic factors within an ecosystem. | * Explain various relationships with respect to food chains, food webs, and food pyramids, including:   1. Symbiosis | * Add *commensalism, mutualism, parasitism* and *symbiosis* to visual vocabulary cards. * Jigsaw oral presentation activity to review and consolidate ecological relationships. * Google Form check for understanding/homework (provide in class time). | * Clarify any areas of confusion from Google Form. * Return predator-prey lab. * Number students into break-out groups and monitor jigsaw activity. * Provide rubric for oral presentations. * Grade oral presentation. * Review Google Forms to identify confusion. |
| Feb. 12 / Feb. 13 | Ch. 2 Interactions in Ecosystems.  2.4 Trophic levels and Energy Flow. | B1: Explain the interaction of abiotic and biotic factors within an ecosystem.  B2: Assess the potential impacts of bioaccumulation. | * Explain various relationships with respect to food chains, food webs, and food pyramids, including:   1. Producer   2. Consumer   3. Predation   4. Decomposers   5. Symbiosis | * Add *food chains, food, webs* and *trophic levels* to visual vocabulary cards. * Numbered heads together to compare and contrast food chains and food webs. * Build a food web activity. * Google Form check for understanding/homework (provide in class time). | * Clarify any areas of confusion from Google Form. * Introduce trophic levels using class inquiry session. * Number and call on students in numbered heads together to review food chains and food webs. * Review Google Forms to identify confusion. |
| Feb. 16 / Feb. 17 | Ch. 2 Interactions in Ecosystems.  2.5 Ecological Pyramids. | B2: Assess the potential impacts of bioaccumulation. | * Compare the impact of bioaccumulation on consumers at different trophic levels (e.g. red tide in oysters and humans). | * Add *food pyramids* to visual vocabulary cards. * Chapter 2 group tournament review with prizes. | * Clarify any areas of confusion from Google Form. * Introduce food pyramids. * Run tournament review for quiz next class. |
| Feb. 18 / Feb. 19 | Ch. 3 Community Ecology.  3.1 The Distribution of Organisms in the Biosphere. | B1: Explain the interaction of abiotic and biotic factors within an ecosystem. | * Using examples, explain why ecosystems with similar characteristics can exist in different geographical locations (i.e. significance of abiotic factors). | * Hand in visual vocabulary cards. * Chapter 2 Quiz * Add *biomes* to visual vocabulary cards. * B.C. Biomes activity. * Google Form check for understanding/homework (provide in class time). | * Final opportunity for questions before quiz. * Proctor quiz. * Introduce Biomes Oral Presentation Project. * Review Google Forms to identify confusion. |
| Feb. 20 / Feb. 23 | Ch. 3 Community Ecology.  3.1 The Distribution of Organisms in the Biosphere. | B1: Explain the interaction of abiotic and biotic factors within an ecosystem. | * Identify factors that affect the global distribution of the following biomes: tropical rainforest, temperate rainforest, temperate deciduous forest, boreal forest, grasslands, desert, tundra, polar ice. | * Watch biomes video * Team word-webbing exercise. * In-class time to work on Biomes Oral Presentation Project. * Submit topic for Biomes. * Google Form check for understanding/homework (provide in class time). | * Clarify any areas of confusion from Google Form. * Show biomes video. * Assign groups for team word-webbing exercise. * Display word webs for reference. * Review Google Forms to identify confusion. |
| Feb. 24 / Feb. 25 | Ch. 3 Community Ecology.  3.2 Adapting to the Environment. | B2: Assess the potential impacts of bioaccumulation.  B3: Explain various ways in which natural populations are altered or kept in equilibrium. | * Explain how species adapt or fail to adapt to environmental conditions, with reference to the following:   1. Natural selection   2. Proliferation   3. Predator/prey cycle   4. Ecological succession   5. Climax community   6. Extinction   7. Adaptive Radiation * Describe the mechanisms and possible impacts of bioaccumulation (e.g. eradication of keystone species, reproductive impacts). | * Add *keystone species* and *natural selection* to visual vocabulary cards. * Complete Variation Theory worksheets. * Construct-an-animal exercise. * Participation in class inquiry session. * Google Form check form before and after lesson. | * Clarify any areas of confusion from Google Form. * Variation Theory and Conceptual Change lesson. * Video record lesson for publication. * Identify misconceptions about Darwinian evolution. * Hand-out worksheets. * Introduce construct-an-animal activity. * Review Google Forms to assess conceptual change. |
| Feb. 26 / Feb 27 | Ch. 3 Community Ecology.  3.3 Community Interactions. | B3: Explain various ways in which natural populations are altered or kept in equilibrium. | * Explain how species adapt or fail to adapt to environmental conditions, with reference to the following:   1. Natural selection   2. Proliferation   3. Predator/prey cycle   4. Ecological succession   5. Climax community   6. Extinction   Adaptive Radiation | * Add *adaptive radiation, climax community, ecological succession* and *proliferation* to visual vocabulary cards. * Community interactions worksheet to hand in. * Watch time-lapse succession video. * Chapter 3 inside-outside circle review exercise outside. | * Clarify any areas of confusion from Google Form. * Introduce intra- and interspecific competition. * Demonstrate internet resources to identify foreign species in B.C. * Play succession video. * Lead inside-outside circle review activity. |
| Mar. 2 / Mar. 3 | Ch. 4 Nature’s Recycling Programs.  4.1 Cycling of Organic and Inorganic Matter. | B1: Explain the interaction of abiotic and biotic factors within an ecosystem. | * Illustrate the cycling of matter through abiotic and biotic components of an ecosystem by tracking nutrient cycles. | * Hand in visual vocabulary cards. * Chapter 3 Quiz. * Add *aeration, cellular respiration*, *photosynthesis* and *potassium* to visual vocabulary cards. * Construct a visual representation of photosynthesis and cellular respiration. * Google Form check for understanding/homework (provide in class time). | * Final opportunity for questions before quiz. * Proctor quiz. * Set-up craft tables for students to make visual representations of photosynthesis and cellular respiration. * Review Google Forms to assess conceptual change. |
| Mar. 4 / Mar. 5 | Ch. 4 Nature’s Recycling Programs.  4.2 The Carbon Cycle. | B1: Explain the interaction of abiotic and biotic factors within an ecosystem. | * Illustrate the cycling of matter through abiotic and biotic components of an ecosystem by tracking carbon (with reference to CO2, CO32-, O2, photosynthesis, respiration, decomposition, volcanic activity, carbonate formation, greenhouse gases from human activity, combustion). | * Add *carbonate* to visual vocabulary cards. * Play “The Carbon Cycle Game” and complete the worksheet. * Google Form check for understanding/homework (provide in class time). | * Clarify any areas of confusion from Google Form. * Show Carbon Cycle video on Youtube. * Review Google Forms to assess conceptual change. |
| Mar. 6 / Mar. 23 | Ch. 4 Nature’s Recycling Programs.  4.3 The Nitrogen Cycle. | B1: Explain the interaction of abiotic and biotic factors within an ecosystem. | Illustrate the cycling of matter through abiotic and biotic components of an ecosystem by tracking nitrogen (with reference to NO3-, NO2-, NH4+, N2, nitrogen fixation, bacteria, lightning, nitrification, denitrification, decomposition). | * Add *nitrification* and *denitrification* to visual vocabulary cards. * Prepare a live group presentation (song, poem, play, etc.) about the Nitrogen Cycle. * Google Form check for understanding/homework (provide in class time). | * Clarify any areas of confusion from Google Form. * Show Nitrogen Cycle video on Youtube. * Introduce the creative presentation activity. * Review Google Forms to assess conceptual change. |
| Mar. 24 / Mar. 25 | Ch. 4 Nature’s Recycling Programs.  4.5 The Phosphorus Cycle. | B1: Explain the interaction of abiotic and biotic factors within an ecosystem. | Illustrate the cycling of matter through abiotic and biotic components of an ecosystem by tracking phosphorus (with reference to PO43-, weathering, sedimentation, geological uplift). | * Add *phosphorus* to visual vocabulary cards. * Explore the issue of commercial chemical fertilizers and debate for or against their use. * Thinking Aloud Problem Solving (TAPS) Review. | * Clarify any areas of confusion from Google Form. * Show Phosphorus Cycle video on Youtube. * Introduce the debate and act as the mediator. |
| Mar. 26 / Mar. 27 | Ch. 5 Changing the Balance in Ecosystems.  5.1 Natural Phenomena and Ecosystems. | B1: Explain the interaction of abiotic and biotic factors within an ecosystem.  B3: Explain various ways in which natural populations are altered or kept in equilibrium. | * Identify the effects on living things within an ecosystem resulting from changes in abiotic factors, including:   1. Climate change   2. Water contamination   3. Soil degradation and deforestation * Describe the impact of natural phenomena (e.g. drought, fire, temperature change, flooding, tsunamis, infestations—pine beetle, volcanic eruptions) on ecosystems. | * Hand in visual vocabulary cards. * Chapter 4 Quiz * Add *lightning* to visual vocabulary cards. * Silent reading (20 min) and then numbered heads together for the effects of natural events. * Read Chapter 5.2 in preparation for trivia game (provide in class time). | * Final opportunity for questions before quiz. * Proctor quiz. * Introduce the Systems Ecology Biology Conference. * Provide the rubric for the oral presentations and discuss criteria. |
| Mar. 30 / Mar. 31 | Ch. 5 Changing the Balance in Ecosystems.  5.2 Pollutants in Ecosystems. | B1: Explain the interaction of abiotic and biotic factors within an ecosystem. | * Identify the effects on living things within an ecosystem resulting from changes in abiotic factors, including:   1. Climate change   2. Water contamination   3. Soil degradation and deforestation | * “Earn-a-Square” team trivia game based on Chapter 5.2. * Identify sources of waste in our lives and how we can reduce our environmental impact. * Class time to work on presentations. * Google Form check for understanding/homework (provide in class time). | * Presentation: Where does our plastic waste go? * Record all individual topics for Biology Conference. * Review Google Forms to assess conceptual change. |
| Apr. 1 / Apr. 2 | Ch. 5 Changing the Balance in Ecosystems.  5.3 Bioaccumulation and Biomagnification. | B2: Assess the potential impacts of bioaccumulation. | * Define, using examples, the terms *bioaccumulation, parts per million, biodegradation,* and *trophic levels* (with reference to producers and primary, secondary and tertiary consumers). * Identify a variety of contaminants that can bioaccumulate (e.g. pesticides, heavy metals, PCB’s). | * Add *bioaccumulation, heavy metals, PCB’s* and *pesticides* to visual vocabulary cards. * Bioaccumulation activity. * Class time to work on presentations. * Google Form check for understanding/homework (provide in class time). | * Clarify any areas of confusion from Google Form. * Presentation: How does bioaccumulation of PCB’s affect people? * Review Google Forms to assess conceptual change. |
| Apr. 7 / Apr. 8 | Ch. 5 Changing the Balance in Ecosystems.  5.3 Bioaccumulation and Biomagnification. | B2: Assess the potential impacts of bioaccumulation. | * Describe the mechanisms and possible impacts of bioaccumulation (e.g. eradication of keystone species, reproductive impacts). * Compare the impact of bioaccumulation on consumers at different trophic levels (e.g. red tide in oysters and humans). | * Jigsaw activity for agriculture, forestry, fisheries and TEK. * Class time to work on presentations. * Google Form check for understanding/homework (provide in class time). | * Clarify any areas of confusion from Google Form. |
| Apr. 9 / Apr. 10 | Ch. 5 Changing the Balance in Ecosystems.  5.4 The Impacts of Human Industry on Ecosystems. | B3: Explain various ways in which natural populations are altered or kept in equilibrium. | * Illustrate the cycling of matter through abiotic and biotic components of an ecosystem by tracking:   1. Carbon   2. Nitrogen   3. Phosphorus * Give examples of how traditional ecological knowledge (TEK) can affect biodiversity (e.g. spring burning by Cree in northern Alberta). | * Chapter 5 Quiz. * Class time to finish presentations for the Biology Conference. | * Assist students with finishing their oral presentations. |
| Apr. 13 / Apr. 14 | Cane Toads: The Conquest | B3: Explain various ways in which natural populations are altered or kept in equilibrium. | * Give examples of how foreign species can affect an ecosystem. | * Prepare questions for Professor Shine. | * Presentation: Bullfrogs in Canada. |
| Apr. 15 / Apr. 16 | Skype interview with biologist, Rick Shine. | B3: Explain various ways in which natural populations are altered or kept in equilibrium. | * Give examples of how foreign species can affect an ecosystem. | * Unit review tournament. |  |
| Apr. 17 / Apr. 20 | Unit Exam | Unit Exam | Unit Exam | Unit Exam | Unit Exam |
| Apr. 21 / Apr. 22 | Biology Conference | Biology Conference | Biology Conference | Biology Conference | Biology Conference |
| Apr. 23 / Apr. 24 | Biology Conference | Biology Conference | Biology Conference | Biology Conference | Biology Conference |