**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.
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| 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.
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| 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.
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| 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.
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| 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.
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| 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.
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| 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.
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| 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.
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| 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.
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| 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.
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| 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.
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| 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.
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| 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.
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| 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.
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| 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.
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| 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.
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| 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.
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| 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.
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| 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.
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| 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.
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| 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  |