**Unit Plan Template (Part 1)**

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Part 1: Textbook Concept list

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| Concept | Definitely, Maybe, or Don’t Include? |
| To understand the various relationships within the biosphere, ecologists ask questions about events and organisms that range in complexity from a single individual to a population, community, ecosystem, biome, or to the entire biosphere | Definitely |
| Scientists conduct modern ecological research according to three basic approaches: observing, experiment, and modeling. All of these approaches rely on the application of scientific methods to guide ecological inquiry. | Don’t Include |
| Sunlight is the main energy source for life on Earth. In a few ecosystems, some organisms rely on the energy stored in inorganic chemical compounds. | Maybe |
| Energy flows through the ecosystem in one direction, from the sun or inorganic compounds to autotrophs (producers) and then to various heterotrophs (consumers). | Definitely |
| Only about 10% of the energy available within one trophic level is transferred to organisms at the next tropic level. | Definitely |
| Unlike the one-way flow of energy, matter is recycled within and between ecosystems. | Definitely |
| Every living organisms need nutrients to grow and carry out essential life functions. Like water, nutrients are passed between organisms and the environment through biogeochemical cycles. | Definitely |

Part 2: Illinois Learning Standards Concept List

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| Concept | Descriptor | Definitely, Maybe, or Don’t Include? |
| **12.B.4a** | Compare physical, ecological and behavioral factors that influence interactions and interdependence of organisms. | Definitely |
| **12.B.4b** | Simulate and analyze factors that influence the size and stability of populations within ecosystems (e.g., birth rate, death rate, predation, migration patterns). | Don’t include |
| **12.B.3a** | Identify and classify biotic and abiotic factors in an environment that affect population density, habitat and placement of organisms in an energy pyramid. | Maybe |
| **12.B.3b** | Compare and assess features of organisms for their adaptive, competitive and survival potential (e.g., appendages, reproductive rates, camouflage, defensive structures). | Don’t include |
| **12.C.3a** | Explain interactions of energy with matter including changes of state and con­servation of mass and energy. | Definitely |
| **13.A.3c** | Explain what is similar and different about observational and experimental investigations. | Don’t include |

Use the table below to complete part 3 of your Unit Plan Assignment

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| --- | --- | --- | --- |
| Concept | This Unit, Another Unit, or Leave Out? | Rationale | Related ILS |
| To understand the various relationships within the biosphere, ecologists ask questions about events and organisms that range in complexity from a single individual to a population, community, ecosystem, biome, or to the entire biosphere | This unit | Understand the complexity of interactions between organisms and their biotic and abiotic factors in the biosphere factors can be overwhelming. Grouping and structurally organizing these interactions into levels will help students to understand the significance of the biosphere. | **12.B.4a**, **12.B.3a** |
| Scientists conduct modern ecological research according to three basic approaches: observing, experiment, and modeling. All of these approaches rely on the application of scientific methods to guide ecological inquiry. | Another Unit | I do not feel that observing, experimenting, and modeling are specific to ecology research; these approaches are relevant in nearly all aspects of science. Therefore, I feel that this would fit better in an opening uniting cover the fundamental principles of science. | **13.A.3c** |
| Sunlight is the main energy source for life on Earth. In a few ecosystems, some organisms rely on the energy stored in inorganic chemical compounds. | Another unit | I feel that this concept is vital to understand biology- so crucial in fact, that I believe it should be moved to an earlier unit. More specifically, I feel that this concept would be more appropriate for a unit on plants and photosynthesis. | **12.B.4a**, **12.C.3a** |
| Energy flows through the ecosystem in one direction, from the sun or inorganic compounds to autotrophs (producers) and then to various heterotrophs (consumers). | This unit | Once students understand the source of energy, they need to learn how this energy is converted for practical use. By introducing the idea of autotrophs and heterotrophs, students can begin to build a connection between energy and living things. | **12.B.4a**, **12.B.3a** , **12.C.3a** |
| Only about 10% of the energy available within one trophic level is transferred to organisms at the next tropic level. | This unit | After students understand the relationship between energy and living organisms, they need to understand how the energy flows. This concept builds upon the other’s and is therefore mentioned last in the energy section. | **12.C.3a**, **12.B.4a**, **12.B.3a**, **12.C.3a** |
| Unlike the one-way flow of energy, matter is recycled within and between ecosystems. | This unit | I feel that the placement for this concept is a great because it transitions smoothly from energy to matter. | **12.C.3a**, **12.B.4a, 12.B.3a** , **12.C.3a** |
| Every living organisms need nutrients to grow and carry out essential life functions. Like water, nutrients are passed between organisms and the environment through biogeochemical cycles. | This unit | This concept is important because it ties up the key ideas. By now, students will have been exposed to the idea of organism and environment interaction through the flow of energy and matter. This idea takes those specific ideas and broadens them. In other words, students get the big picture of how the biosphere works. | **12.C.3a** , **12.B.4a, 12.B.3a**, **12.C.3a** |

Use the table below to complete parts 4 & 5 of your Unit Plan Assignment.

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| Concept | Objective(s) |
| To understand the various relationships within the biosphere, ecologists ask questions about events and organisms that range in complexity from a single individual to a population, community, ecosystem, biome, or to the entire biosphere | * Students will be able to distinguish the six organizational levels in ecology: individual, population, community, ecosystem, biome, and biosphere * Students will list at least two characteristics per organizational level * Students will identify key abiotic and biotic factors |
| Energy flows through the ecosystem in one direction, from the sun or inorganic compounds to autotrophs (producers) and then to various heterotrophs (consumers). | * Students will demonstrate their understanding of energy flow by creating a food web * Students will select organisms to represent producers and consumers (including heterotrophs, carnivores, and omnivores) * Students will define the following terms in their food web: autotroph, heterotroph, producer, consumer, herbivore, omnivore, and carnivore. |
| Only about 10% of the energy available within one trophic level is transferred to organisms at the next tropic level. | * Students will calculate the energy transferred from organism to organism given tropic levels in an energy pyramid word problem. |
| Unlike the one-way flow of energy, matter is recycled within and between ecosystems. | * Students will explore the water cycle and at least one of the four nutrient cycles given an interactive website. |
| Every living organisms need nutrients to grow and carry out essential life functions. Like water, nutrients are passed between organisms and the environment through biogeochemical cycles. | * Given an assigned cycle, groups of 3-4 students will create a “plain English” video on their assigned topic * Students will research their assigned cycle given computers and textbooks * Students will present their video to the class and answer their classmates questions * All students will indentify key terms and concepts related to the carbon, nitrogen, phosphorous, and water cycle by completing a guided worksheet based upon classmates presentations |

Use the table below to complete part 6 of your Unit Plan Assignment.

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| --- | --- | --- | --- |
| Units Preceding This One | Reasoning | Unit Following This One | Reasoning |
| Plants | I feel that a unit on plants provides a great transition into the biosphere unit. In the plants unit, students will build a basic understanding of photosynthesis. This is important because it introduced to the idea of sunlight and energy; in other words, its builds a strong conceptual foundation that will be later built upon in the biosphere unit. | Environmental Issues | Although this may be considered a non-traditional unit to most, I believe this unit can have significant impact in the classroom. All throughout biology we teach students the fundamentals; macromolecules, DNA, cells, animals, exc- but we rarely take the time to tie it all together. The biosphere unit is the first time student’s get to see the overall picture. I think that the final concluding unit to a biology course is now to take the summative information learned and put it in real-world context; this unit does just that. |