Heather Bartos

Unit Plan Part II Template

Use the table below to complete part 1 of your Unit Plan Assignment.

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| --- | --- | --- | --- |
| Objective | Possible Teaching Strategies | Final Choice | Rationale |
| Explain what ecology is | * Student directed: Students will use external resources including internet or textbooks to determine the definition of ecology * Teacher directed: Teacher will define ecology for the students * Discussion: students will share with the class their own definition of ecology | * Discussion: students will share with the class their own definition of ecology * Teacher directed: Teacher will define ecology for the students | The discussion will allow students to activate previous knowledge and initiate engagement. This discussion will also allow the teacher to assess the students and correct misconceptions by providing students with the correct definition. |
| Distinguish the difference between biotic and abiotic factors | * Exploration: 10 stations will be set up around the class. Each station will contain either an abiotic or biotic factor. Students will determine if it is “living” or “non-living” * Teacher directed: Teacher will define abiotic and biotic factors and provide examples | * Exploration: 10 stations will be set up around the class. Each station will contain either an abiotic or biotic factor. Students will determine if it is “living” or “non-living” * Teacher directed: Teacher will define abiotic and biotic factors and provide examples | Instead of simply telling students what abiotic and biotic means, I think they would learn more if they “explored” and “discovered” the definition themselves; the station activity will allow for students to do exactly that. |
| Identify the 6 levels of organization in the biosphere and their associated components | * Teacher directed via powerpoint: Teacher will explain the six different levels of the biosphere * Question and answer between teacher and students. | * Teacher directed via powerpoint: Teacher will explain the six different levels of the biosphere * Question and answer between teacher and students. | I thought that a powerpoint filled with visuals would be the best teaching strategy for this objective. The 6 levels of organization can get confusing. Directly teaching this object may result in the lowest amount of misconceptions and allow for question and answers. |
| Apply knowledge of the levels of organizations to real world situations | * Teacher directed via powerpoint: the teacher will provide students with real world examples during the presentation * Student directed: the students will find real world examples of each level of organization through external resources (database, internet, textbook) | * Student directed: the students will find real world examples of each level of organization through external resources (database, internet, textbook) | Having student research examples will help students learn effectively. This technique gets students out of their seats and breaks up the traditional routine. Additionally, this activity engages a higher level of intelligence based upon Bloom’s Taxonomy. |
| Explain how sunlight is converted into usable energy | * Teacher directed via powerpoint: the teacher will directly explain to students how solar energy is converted into usable energy through photosynthesis | * Teacher directed via powerpoint: the teacher will directly explain to students how solar energy is converted into usable energy through photosynthesis | I thought that a powerpoint filled with visuals would be the best teaching strategy for this objective. Directly teaching this object may result in the lowest amount of misconceptions and allow for question and answers. |
| Distinguish the difference between autotrophs and heterotrophs | * Cooperative learning with groups: students will work with classmates to determine which organisms are autotrophs and heterotrophs. A list of organisms and their pictures will be generate by the instructor * Lecture: the teacher will directly explain the difference between autotrophs and heterotrophs | * Cooperative learning with groups: students will work with classmates to determine which organisms are autotrophs and heterotrophs. A list of organisms and their pictures will be generate by the instructor | I feel that the best way to learn key new vocabulary is to practice, practice, practice! Working with peers makes it more fun. Additionally, cooperative learning will help support teamwork, communication, and allows for multiple perspectives and interpretations. |
| Explain how energy flows throughout the ecosystem using real world examples | * Analyzing a diagram: the teacher will explain how energy flows throughout the ecosystem using a diagram * Cooperative learning with group: students will work with classmates to research real world examples of how energy flows in food chain/food web. * Students will work independently to research real world examples of food chains/food web. | * Analyzing a diagram: the teacher will explain how energy flows throughout the ecosystem using a diagram * Students will work independently to research real world examples of food chains/food web. | Having student research examples will help students learn effectively. This technique gets students out of their seats and breaks up the traditional routine. Additionally, this activity engages a higher level of intelligence based upon Bloom’s Taxonomy. |
| Analyze food chains | * Peer teaching: students will work in groups to explain to each other how their food chain (created the previous day) works | * Peer teaching: students will work in groups to explain to each other how their food chain (created the previous day) works | Analyzing is a high level of thinking; problems will inevitably arise. Working with peers allows for an opening communication for when issues arise. It also allows for problem solving and teamwork. |
| Calculate the energy transferred between trophic levels | * Teacher-directed practice problems: teacher models how to do an energy transfer problem and students then independently do additional problems * Online interactive game that involves calculating energy transfer between trophic levels | * Teacher-directed practice problems: teacher models how to do an energy transfer problem and students then independently do additional problems | Modeling the calculations helps to avoid any issues or misconceptions immediately. Practice problems will allow for the teacher to assessment the student’s progress. |
| Explain how matter flows throughout the ecosystem | * Hands-on class game: students reenact the predator-prey relationship and energy transfer by playing a class game * Discussion: students will form a circle with their desks and answer a series of questions prompted by the teacher. These questions will breakdown the purpose of the game and shed light on how matter flows throughout the ecosystem * Direct teaching: instructor will show students how matter flows throughout the ecosystem using powerpoint. | * Hands-on class game: students reenact the predator-prey relationship and energy transfer by playing a class game * Discussion: students will form a circle with their desks and answer a series of questions prompted by the teacher. These questions will breakdown the purpose of the game and shed light on how matter flows throughout the ecosystem | This technique gets students out of their seats and breaks up the traditional routine. It is fun, interactive, and educational. Students will be more likely to remember how matter flows if they have an experience to remember. |
| Identify and describe the four biogeochemical cycles: water, carbon, nitrogen, and phosphorous | * Demonstration: Instructor will use a demonstration to introduce the water cycle * Video: Teacher will show a youtube video about the biogeochemical cycles * Direct teaching through hand-drawn pictures of the cycle | * Demonstration: Instructor will use a demonstration to introduce the water cycle * Video: Teacher will show a youtube video about the biogeochemical cycles * Teacher will answer or further explain any questions students may have | The demonstration will likely grab student’s attention and engage them. Students and the teacher can then break down the demonstration and analyze the water cycle. A youtube video works best to explain the four cycles; students can see the cycles in their entirety and get the “big picture”. The classroom has its limitations. |
| Describe and explain the causes, effects, and solutions of an environmental issue affecting one of the biogeochemical cycles through experimental lab | * Problem-based learning: teacher poses an issue and students use the supplied materials to determine a solution to the issue * Discovery-based learning through lab experiment * Experimental modeling: the teacher models how the lab should go before having students do it on their own | * Problem-based learning: teacher poses an issue and students use the supplied materials to determine a solution to the issue * Discovery-based learning through lab experiment | Problem based learning helps to get students engaged. By changing their roles as students into professionals, students may be more likely to meet the high expectations. Laboratory experiments not only break up the daily routine but allow for students to practice their science literacy and laboratory skills. |

Use the table below to complete part 2 of your Unit Plan Assignment.

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| Objective | Possible Assessment Strategies | Final Choice | Rationale |
| Explain what ecology is | * Informal assessment; listen to student’s answers as discussion occurs. Q&A session throughout the presentation. | * Informal assessment; listen to student’s answers as discussion occurs. Q&A session throughout the presentation. | The concept of ecology will be introduced on the first day of the unit. Informal (vs. formal) assessment allows for the teacher to identify misconceptions immediately before additional knowledge is built. |
| Distinguish the difference between biotic and abiotic factors | * Observing participation in activity * Guided worksheet during living vs. nonliving activity. This assignment will be collected. | * Observing participation in activity * Guided worksheet during living vs. nonliving activity. This assignment will be collected. | Collecting the guided worksheet allows for the instructor to not only determine if the student was participating in the activity, but also allows for the instructor to evaluate each student’s “starting point” or prior knowledge. |
| Identify the 6 levels of organization in the biosphere and their associated components | * Student participation during question and answer * Students have eye contact and are not distracted * Students are taking notes | * Student participation during question and answer * Students have eye contact and are not distracted | Since this objective will be taught through a powerpoint, I felt that informal assessment during the presentation would make the most sense. |
| Apply knowledge of the levels of organizations to real world situations | * “6 levels of organization in the real world” assignment is evaluated * Student participation during informal classroom discussions | * “6 levels of organization in the real world” assignment is evaluated * Student participation during informal classroom discussions | Collecting the activity worksheet allows for the instructor to not only determine if the student was participating in the activity, but also allows for the instructor to evaluate how well the students are learning and which students are struggling. If needed, the instructor can make changes in his/her teaching strategies. |
| Explain how sunlight is converted into usable energy | * Student participation during question and answer * Students have eye contact and are not distracted * Students are taking notes | * Student participation during question and answer * Students have eye contact and are not distracted * Students are taking notes | Since this objective will be taught through a powerpoint, I felt that informal assessment during the presentation would make the most sense. |
| Distinguish the difference between autotrophs and heterotrophs | * Student participation during cooperative learning activity * Guided worksheets are evaluated | * Student participation during cooperative learning activity * Guided worksheets are evaluated | Collecting the activity worksheet allows for the instructor to not only determine if the student was participating in the activity, but also allows for the instructor to evaluate how well the students are learning and which students are struggling. If needed, the instructor can make changes in his/her teaching strategies. |
| Explain how energy flows throughout the ecosystem using real world examples | * Student participation during informal classroom discussion * Research assignment is collected and evaluated | * Student participation during informal classroom discussion * Research assignment is collected and evaluated | Collecting the activity worksheet allows for the instructor to not only determine if the student was participating in the activity, but also allows for the instructor to evaluate how well the students are learning and which students are struggling. If needed, the instructor can make changes in his/her teaching strategies. |
| Analyze food chains | * Student participation during peer teaching activity | * Student participation during peer teaching activity | At this point, I felt that that another guided worksheet during an activity would be too routine for students; a simple discussion may break things up. The teacher can walk around and observe which students on tasks and participating. Randomizing/ assigning groups may help to avoid off topic conversations with classmates. |
| Calculate the energy transferred between trophic levels | * Student participation during question and answer * Students have eye contact and are not distracted * Students are taking notes * Students must turn in one of three sample problems before leaving class | * Students must turn in one of three sample problems before leaving class | Although students make “look” like they understand how to do the calculation, the instructor cannot truly know unless he/she sees the student’s work. With that said, I feel that collecting a sample problem before the end of class is a quick and affective assessment method. |
| Explain how matter flows throughout the ecosystem | * Students participation during game and discussion * Student bring meaningful insight during Socratic seminar discussion | * Students participation during game and discussion * Student bring meaningful insight during Socratic seminar discussion * Reflection journal | Games are fun and interactive- but there often times not educational. It is important for both the instructor and the student to identify the meaning behind the game. The discussion allows for a variety of perspectives between classmates. The reflection journal may be turned in as well as a backup for those students who were unable to speak during the discussion due to time constrain and/or shyness. |
| Identify and describe the four biogeochemical cycles: water, carbon, nitrogen, and phosphorous | * Student are engaged during demonstration * Students complete a homework assignment on the cycles | * Student are engaged during demonstration * Students complete a homework assignment on the cycles | The biogeochemical cycles are a tough concept to understand. A homework assignment will not only give students more practice and exposure to the topic, but also allow for the instructor to identify the strengths and weakness in the student’s learning and/or teaching strategies. |
| Describe and explain the causes, effects, and solutions of an environmental issue affecting one of the biogeochemical cycles through experimental lab | * Prelab and postlab questions evaluated * Participation during lab investigation * Data collection * Lab skills assessment | * Prelab and postlab questions evaluated * Participation during lab investigation * Data collection * Lab skills assessment | The multiple assessments throughout the lab allows not only allows for the instructor assess student’s learning, but also allows for student’s to assess their own learning and progress throughout the lab. |

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

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| Science Laboratory Skill | Related Objective(s)? | Teaching Strategy? |
| Identify safety precautions before experimentation |  |  |
| Prepare simple solutions given measurements and measurement tools (beakers, graduated cylinders, exc) |  |  |
| Adequately measure the pH of a solution given a pH meter |  |  |

Use the table below to complete part 4 of your Unit Plan Assignment.

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| --- | --- | --- |
| Science Literacy Skill | Related Objective(s)? | Teaching Strategy? |
| Describe, explain, and predict natural phenomena |  |  |
| Record and organize data on a table or chart |  |  |
| Construct a graph with a title and labeled axis from acquire data |  |  |
| Construct solutions to a real world problem |  |  |

**Unit Plan Overview (Part 5)**

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| --- | --- | --- | --- | --- |
| **Day** | **Objective** | **Teaching Strategy** | **Assessment Strategy** | **Notes** |
| 1 |  |  |  |  |
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| 10 |  |  |  |  |

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| --- | --- | --- | --- | --- |
| **Day** | **Objective** | **Teaching Strategy** | **Assessment Strategy** | **Notes** |
| 11 |  |  |  |  |
| 12 |  |  |  |  |