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| **Title**  Conservation of Energy  Last lesson in energy unit | **Curriculum Area and Grade**  Physics 11th and 12 Grade | **Date**  2/13/14 |

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| **CA Content Standard(s) Addressed**  Content Standard:   * 2. a. Students know how to calculate kinetic energy by using the formula. E = −1/2 mv2. * 2. b. Students know how to calculate changes in gravitational potential energy near Earth by using the formula (change in potential energy) = mgh (h is the change in the elevation). * 2. c. Students know how to solve problems involving conservation of energy in simple systems, such as falling objects. | **CA ELD Standards Addressed**  ELD Standard: English Language Development grades 11-12: Supporting opinions and persuading others   * Emerging: Negotiate or persuade others in conversations. * Expanding; Negotiate or persuade others using a growing number of learner phrases * Bridging: Negotiate or persuade others using a variety of learned phrases. |
| **Big Ideas/Enduring Understandings**  Students will know that work is related to energy and that energy can be transferred but is never lost in a closed system. Students must understand that in these systems, energy is conserved.  This meets the standards by highlighting potential, kinetic, and (the conservation of) mechanical energy.  The assessment for today will be an informal way to check the student learning after having done a mini lecture on the topic. This will be valid and reliable because with a strong discussion and upon seeing their work with practice problems I will be able to see student understanding. | **Essential Questions**  What is energy?  How does energy relate to work?  How is energy transferred?  When, if ever, is energy lost? |
| **Objectives or Learning Goals**  (cognitive) After listening to the lecture, students will be able to perform practice problems by using the conservation of energy. | **Assessments**  Informal, Diagnostic- Warm up  Informal, Formative- Practice Problems  Homework |

**Predictions of likely difficulties:**

It is important that students understand the connection between work and energy. This is building upon from last week when we discussed that Work=Force x Distance. This is going to be important later when we talk about the Work- Kinetic Energy Theorem. It these questions are met now, it will be easier to address more complicated concerns last next chapter.

**Instructional Strategies: Student Activities:**

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| Intro- Introduce warm up problem. This problem will reinforce ideas from the previous day. This problem will involve finding potential and kinetic energy.  Teacher will go over homework from previous day on the same subject.  Through- Teacher will lecture on conservation of energy.  Teacher will show simulation of rollercoaster which demonstrates the transfer of energy from potential to kinetic and back.  Teacher will show physics video about snowboarding in a half-pipe. Teacher will explain how kinetic energy is transferred into potential energy and back again in this Olympic event.  Beyond- Teacher will transfer to the work that we are doing with the Olympic service project and will then instruct students to get in groups and work on their events.  Teacher will prepare students and instruct them on what is taking place tomorrow for their service project. | Students will do warm up problem.  Students will correct their incorrect answers for their homework.  Students will take notes from lecture.  Students will work on practice problems.  Students will get in groups to continue working on their class Olympics. |

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| **Information About English Language Learners**  Erika- CELDT Level 3- Erika can communicate very well but is not a strong reader or writer. She scored beginning levels on her CELDT test. She needs help with vocabulary specifically. Erika has a strong connection to her brother who is also in the school. One on one help is very effective for Erika. | **Information About Special Needs Students**  Allen- Autistic- Allen is diligent and works hard in class. He will often work ahead and confuse directions. He can be socially awkward and sometimes has difficulty in expressing himself. Allen likes science and is very enthusiastic. It is important to keep him involved. Providing outlines of the unit to be studied helps Allen visualize what is happening later on in the unit. |
| **Differentiation for English Language Learners**  Content- I will speak clearly and slowly when going over the new vocabulary from the chapter and I will use different colored dry erase pens to activate the visual aspect of the brain. | **Differentiation for Special Needs Students**  Content- I will give Allen written directions for the Olympic project. The effectiveness will be assessed by asking Allen his general level of understanding of the assignment. |
| **Resources**  Whiteboard/dry erase markers, snowboarding video on transfer of energy, rollercoaster simulation, physics books for students practice problems | **Reflection**  This lesson went very well. I was able to convey all the points on conservation of energy and keep the students attention throughout the class period. The videos and simulation were a great way for students to visualize what is happening when energy is transferred. Students were engaged and active in this lesson. |

**Name Paul Coleman\_\_\_\_\_ Lesson Title \_Conservation of Energy\_ Date \_2/13**

See Lesson Design Resources Website for more details:<https://sites.google.com/site/lessondesignresources/home>

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| **Design Component**  **& Criteria** | **Approaching** | **Meets**  (includes the criteria for Approaching) | **Exceeds**  (includes the criteria for Approaching & Meets) | **Peer comments or self-assessment** |
| **Title, Curriculum Area, Grade Level & Date** | Provides a title that is related to the lesson activity | & addresses the unit it belongs to and in what curriculum area and grade | & describes where it fits within a unit plan, i.e. Third lesson in a 4-week unit on Colonization. |  |
| **Rationale: Big Idea & Essential Questions** | Describes the rationale for teaching this lesson (*big ideas, enduring understandings, essential questions*) … | & addresses how the instructional strategies and the student activities are suited to meet the standard and objective of the lesson… | & explains how the assessment is a valid (authentic) and reliable (consistent) way to assess student learning. |  |
| **Standards, Objectives & Assessment** | Both CA Content and ELD Standards are identified and each is addressed in an objective that contains a condition, verb, and criteria and is assessed | & each objective is labeled by the type (*cognitive, affective, psychomotor or language*) and the number of the standard it addresses and the type of assessment is labeled (*diagnostic, formative or summative*) | & expectations are clearly communicated to students |  |
| **Predication of Likely Difficulties** | Possible misconceptions or assumption are identified | & the misconception or assumptions are identified as being in the content, process or product of the lesson | & the instructional strategies, student activities &/or the differentiation strategies work to avoid these misconceptions or assumptions |  |
| **Instructional Strategies** | Provides an *into*, *through* and a *beyond* activity for lesson… | & describes in detail the steps the teacher will take to implement the lesson and instructional materials (i.e. graphic organizer, ppt, model, rubric)… | & provides a written script for teacher and times for each activity. |  |
| **Student Activities** | Describes what the students will do during the *into*, *through* and *beyond* activity of the lesson… | & each activity is student centered with multiple opportunities for the instructor to check for understanding… | & all materials listed for the unit are listed and provided, such as power point, graphic organizer, sample student work, assignment rubric, quiz… |  |
| **Student Information** | Identify the names of the students that need differentiation (both ELL & Students w/ Sp Ed needs) | & describe each of the students readiness level, learning profile and interests | & includes prior successful differentiation strategies for each student. |  |
| **Differentiation** | Describes the differentiation strategy for the ELL and the students with special education needs … | & labels the strategy (*content, process or product*) and the way it addresses the students identity and developmental needs (*readiness, interest or learning profile*)… | & provides how the strategy will be assessed for effectiveness and altered if needed. |  |
| **Resources** | All instructional materials needed to implement the lesson are listed. | All instructional materials that are needed to implement the lesson listed and described. | & all materials listed for the unit are listed and provided, such as power point, graphic organizer, sample student work, assignment rubric, quiz… |  |
| **Reflection**  **Not taught yet** | Reflection is provided on the strengths, limitations, assessment and differentiation plan. | The reflection addresses all prompts and identifies what would be done next based on this reflection. | Reflection is complete and a new lesson is provided to address the concerns in the reflection. | Not taught yet |
| **Self-Evaluation**  (10% will be deducted  if not included) | Provides a copy of the rubric with the lesson plan… | & highlights or circles the evaluated criteria for each lesson component… | & provides evidence for each criteria marked. |  |