****

**CODE/MOE/UOIT Makerspaces Project**

**Lesson Plan: Grade 7 Science:**

**Heat in the Environment– Solar Oven Project**

|  |  |
| --- | --- |
| **BIG IDEAS:**  **There are many sources of heat.**  **Heat is a form of energy that can be transformed and transferred.**  **Heat has both positive and negative effects on the environment.**  **Lesson Objectives:**   * **To allow students to build open important life skills through collaboration, creativity and innovation.** * **To allow students to be involved within inquiry and problem based learning** * **To allow students to encourage application of new and prior knowledge and skills to further develop their interests and engagement through learning**   **Science and Technology Overall Curriculum Expectations:**   * **Assess the social and environmental benefits of technologies that reduce heat loss or transfer**   **Science and Technology Specific Curriculum Expectations:**   * 1. **- Assess the environmental and economic impacts of using conventional and alternative forms of energy**   2. **- Follow established safety procedures for using heating appliances and handling hot materials** | |
| **Learning Goals:**  **Uses technological problem –Engage in the Engineering Design Process to complete a team**  **challenge building a simple solar powered**  **oven.** | **Success Criteria:**   1. **I can describe how solar heating occurs** 2. **I can describe the differences between passive solar heating and active solar heating** 3. **I can explain why my solar oven was or was not able to warm the marshmallow** 4. **I can explain what I can do to make my solar oven work better** 5. **I can explain the difference if I had use the sunlight instead of a lamp** |
| **Lesson Overview:**  **As you design and build your solar oven, you must continually investigate the stability of the structure and identify the various materials which could ensure its effectiveness.** | |
| **Materials and Technology:**  General building supplies  • Thermometer  • Timers  • Cardboard box  • Aluminum pans  • Aluminum foil  • Black construction paper  • One piece of Plexiglas large enough to cover the box  • Sunshine OR gooseneck lamp with 100-Watt bulb  • Marshmallows | |
| **Student Accommodations/Modifications:**   * **Supplied Materials** * **Assistance when necessary** * **Reminders to observe safety precautions** | **Lesson will be differentiated by:**   * **Content, specifically:** * **Process, specifically:** * **Product, specifically:** * **Environment, specifically: Outside** |
| **MINDS ON: Getting Started** | |
| Design and Planning:   * Does the design appear logical? * Aesthetics * Symmetry | During this phase, students may:  • participate in discussions;  • propose strategies;  • question the teacher and their classmates;  • make connections to and reflect on prior learning. |
| Describe how you will introduce the learning activity to your students. What key questions will you ask? How will you gather diagnostic or formative data about the students’ current levels of understanding? How will students be grouped? How will materials be distributed?   * Show videos demonstrating on how to build a solar oven * Then demonstrate how to build a solar oven * Equal distribution of materials * Assigned into groups   **Assessment may be done through observation, conversations and/or rubric/checklist for the final product.** | |
| **ACTION: Working on it** | |
| During this phase, the teacher may:  • ask probing questions;  • clarify misconceptions, as needed, by redirecting students through questioning;  • answer students’ questions (but avoid providing a solution to the problem); | During this phase, students may:  • represent their thinking (using numbers, pictures, words, manipulatives, actions, etc.);  • participate actively in whole group, small group, or independent settings; |
| Describe the task(s) in which your students will be engaged. What misconceptions or difficulties do you think they might experience? How will they demonstrate their understanding of the concept? How will you gather your assessment data (e.g., checklist, anecdotal records)? What extension activities will you provide? | |
| **CONSOLIDATION: Reflecting and Connecting** | |
| During this phase, the teacher may:  • encourage students to explain a variety of learning strategies;  • ask students to defend their procedures and justify their answers; | During this phase, students may:  • share their findings;  • justify and explain their thinking;  • reflect on their learning. |
| How will you select the individual students or groups of students who are to share their work with the class (i.e., to demonstrate a variety of strategies, to show different types of representations, to illustrate a key concept)? What key questions will you ask during the debriefing?  1. Whose oven got to the highest temperature? Answers will vary.  2. Whose oven melted the marshmallows? Answers will vary.  3. What could you have done to make your solar oven work better? Answers will vary.  4. Does it make a difference to use actual sunlight compared to light from a lamp? Why or why not?  5. What else could you cook using a solar oven? Answers will vary. | |