the CEED

THE CENTER FOR ENERGY EFFICIENT DESIGN

# Title: Earth Resources

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| **Grade Level** | 2 | **Subject** | Science |
| **Objective(s): TLW investigate and understand that plants produce oxygen and food, are a source of useful products, and provide benefits in nature.** | | **SOL Addressed:**<br>K.11<br>1.8<br>2.8<br>3.10, 3.11<br>4.6 | |
| | | **Common Core Standards: K-LS1-1, K-ESS2-2, K-ESS3-1, 1-LS1-1, 1-LS3-1, 2-LS2-1, 3-LS1-1, 3-LS3-2, 5-LS1-1** | |

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| **Materials Needed Per Class of 30**<br><br>**and**<br><br>**Prior Knowledge** | **(completed in groups of 4)**<br>**2 clear cups per group**<br>**2 fresh green leaves per group**<br>**Water**<br>**Hand lenses**<br><br>**Students will have prior knowledge of basic plants and their parts.** | |
| **Ways to differentiate this lesson plan** | • **EXTENSION** for Higher Level Learner<br>Joseph Priestley's experiment using mice and plants-( This can be modified so it does not require live mice. ) see plantscafe.net<br>• **MODIFICATIONS** – You could do this experiment with a whole class at once by doing it together and only setting up 1 set of cups. | |
| **Introduction/ Anticipatory Set** | **Anticipatory Set:** How will the teacher introduce the lesson to the students?<br>Begin with a K-W-L to understand the students prior knowledge of plants.<br>**Questions to ask students:**<br>• What is a plant?<br>• Is it alive?<br>• Is it an organism?<br>• What does a plant need to survive?<br>• How are plants different from each other?<br>• Why do we need plants? | **Introduction:**<br>*Why do plants exist?<br>*Do we need plants?<br>*How do we use plants? (students will probably be able to list food sources, but one will have to prompt to get oxygen) |

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| | Groups will set up experiment to show that plants produce oxygen. Each group will get 2 cups, 2 leaves, and water. Fill both cups with water and place fresh green leaves under the water. Observe the leaves and water with hand lenses and predict what will happen to the leaves. Then place 1 cup in the sunlight and 1 | cup in the cabinet. Again predict what will happen to both leaves. |
| **Guided Practice** | Students will draw pictures and models in their science journals about the experiment. They will also write their predictions of what will happen to the leaves.<br><br>The leaves will stay in their respective places for an hour. | |
| **Independent Practice** | After an hour the cups will be given back to the groups. They will use observation and hand lens to see the difference in the leaves. Discussion of what has happened will ensue and students can write their findings in their journals.<br>(The cup placed in the sunlight will have lots of bubbles in the water and on the leaf. The bubbles were oxygen. Leaves take in carbon dioxide and through the process of photosynthesis they create food for the plant. The air we breathe contains 21% oxygen produced by plants.) | |
| **Closure (Summary of Lesson)** | The class will discuss the importance plants play in our environment. | |
| **CEED Building Application/ Sensor Data** | Go the CEED Dashboard then to “How it Works”, then “Overhangs and Green Roof.” Discuss why you would plant on a roof and the benefits of this planting. | |

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| **Assessment** | Students will write an explanation of what they have learned about plants. They will include a pictorial representation to demonstrate the importance of plants. |

## INQUIRY LEARNING RESEARCH PROCESS GUIDELINES

The following table is just one guideline to use for developing your own inquiry materials. The seven steps in the Learning Research Process include not only how people learn but also how research is conducted. The heart of the design, the three-stage learning cycle of exploration, concept invention or formation, and application is embedded in the middle. In addition to these three stages, this design takes into account that learners need to be motivated to spend the time required for understanding complex subjects and that learners need to build this new knowledge onto prior knowledge. These are similar to the 5E and 7E learning models.

### The Learning-Research Process

| Steps in the Learning-Research Process | 7E Equivalent | Component of the Activity |
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| **1. Identify a need to learn.** | Engage | An issue that excites and interests is presented. An answer to the question *Why?* is given. Learning objectives and success criteria are defined. |
| **2. Connect to prior understandings.** | Elicit | A question or issue is raised, and student explanations or predictions are sought. Prerequisite material and understanding is identified. |
| **3. Explore** | Explore | A model or task is provided, and resource material is identified. Students explore the model or task in response to critical-thinking questions. |
| **4. Concept invention, introduction, and formation** | Explain | Critical-thinking questions lead to the identification of concepts, and understanding is developed. |
| **5. Practice applying knowledge.** | | Skill exercises involved straightforward application of the knowledge. |
| **6. Apply knowledge in** | Elaborate and Extend | Problems and extended problems require synthesis |

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| **new contexts.** | | and transference of concepts. |
| **7. Reflect on the process** | Evaluate | Problem solutions and answers to questions are validated and integrated with concepts. Learning and performance are assess |

Hanson, D. (2006). POGIL Instructor's Guide to Process-Oriented Guided-Inquiry Learning. Lisle, IL: Pacific Crest