

## EDTE 523

### Content Lesson Plan with Academic and Linguistic Supports for English Language Learners

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Subject	Science	Topic	Reflection
Level	4	Allotted Time	60 Minutes
<p><b>Cite sources used to develop this plan:</b>            Lesson plan adapted from VIU Template and SIOP Lesson Template 4 (Pearson Education, 2008); <i>SIOP Model</i> (Echevarria, Vogt, &amp; Short, 2014); <i>Language and Learning in Multilingual Classrooms: A Practical Approach</i> (Coelho, 2012)</p>			
<p><b>Rationale:</b>            While Science is generally internationally consistent in terms of concepts, the scientific vocabulary and the ability to follow written instructions can be daunting for English Language Learners. By scaffolding in vocabulary practice and visuals that make the process easier to follow, ELLs have a higher chance of comprehension and success.</p>			
<p><b>Provincial Learning Outcome(s):</b></p> <p><b>Big Ideas:</b> Different kinds of matter have different particles and therefore different properties.</p> <p><b>Curricular Competencies:</b></p> <p style="padding-left: 20px;"><b>Questioning and predicting:</b></p> <ul style="list-style-type: none"> <li>- Demonstrate curiosity about the natural world</li> <li>- Make predictions based on prior knowledge</li> </ul> <p style="padding-left: 20px;"><b>Planning and conducting:</b></p> <ul style="list-style-type: none"> <li>- Collect simple data</li> <li>- Safely use appropriate tools to make observations and measurements, using formal measurements and digital technology as appropriate</li> </ul> <p style="padding-left: 20px;"><b>Processing and analyzing data and information:</b></p> <ul style="list-style-type: none"> <li>- Sort and classify data and information using methods such as drawings or provided tables</li> <li>- Compare results with predictions, suggesting possible reasons for findings</li> </ul> <p><b>Concepts and Content:</b></p> <ul style="list-style-type: none"> <li>- The properties of materials are related to the particles they consist of</li> </ul> <p><b>PLOs</b></p> <ul style="list-style-type: none"> <li>- Explain properties of light (e.g., travels in a straight path, can be reflected)               <ul style="list-style-type: none"> <li>o predict, demonstrate, and report on how light travels in a straight path and through different materials (e.g., reflects, refracts; is transparent, translucent, opaque)</li> </ul> </li> </ul>			
<p><b>Key Vocabulary:</b>            Content words: angle, bend, refraction, direction, medium, substance, density, reappearing, normal, convex, concave</p>			

<p><b>Content Objective(s):</b></p> <ul style="list-style-type: none"> <li>• a) Investigate how light travels affects our ability to see things in water.</li> <li>• b) Hypothesize how the image of an object changes (moves) depending on the amount of water light needs to travel through.</li> <li>• c) Hypothesize how the image of an object changes (grows or shrinks) when light travels through a curved body of water by building a magnifying lens.</li> <li>• d) How does the thickness or number of materials of different density affect refraction and what we see?</li> </ul>	<p><b>Language Objective(s):</b></p> <ul style="list-style-type: none"> <li>• a) Use correct terminology to describe how light changes direction.</li> <li>• b) Be able to describe the meaning of density.</li> <li>• c) Be able to explain orally how a magnifying lens works using correct terminology (refraction, density, direction)</li> </ul>	
<p><b>Building Background</b></p>		<p><b>Assessment</b></p>
<ul style="list-style-type: none"> <li>• <b>Broken Pencil (5-7 Minutes)</b>  Begin lesson by having a glass of water and a chopstick. Tell students you are going to break the chopstick by putting it in the water at an angle. As students are watching, place chopstick in water and show student cup at eye level. Repeat the process while moving around the students so they all get a chance to see.  “Is it really broken?” Why not? “What is happening here?” “What if I put it in straight up?”  Group discussion as students try to guess why the chopstick looks broken when put into the water.</li> <li>• <b>Explain the word <u>refraction</u>. (2-3 Minutes)</b>  Refraction is when light changes direction. Ask students what they know about how light travels. (straight line) “If it always travels in a straight line, how does it change direction?”</li> <li>• <b>Show Bill Nye video clip and discuss (10~15 Miunutes)</b>  Ask students what they saw in the video. <ul style="list-style-type: none"> <li>- Did they see light changing directions?</li> <li>- Can they guess what might have happened to the chopstick at the beginning of the class?</li> </ul> <p>Explain how refraction works – When light goes from one <b>medium</b> through another with a different density, it changes direction. A <b>medium</b> is something like air, water, or glass. Density like crowdedness. If there are two people to run between, you only need to slow down a little. If there are ten people to run through, you need to slow down and go around a few people. If there are 100 people to run through, you have to slow down a lot and go around many people. Let’s look at an example. (Show apple slides of ppt.)</p> <p>Can they relate this to the chopstick experiment now?</p> </li> </ul>		<p><b>CO=Content Objective</b> <b>LO=Language Objective</b></p> <p>CO(a)- Group discussion - Thumbs up/down</p> <p>CO(a) – Group discussion - Student response</p> <p>LO(a,b) – Group discussion - Student response</p> <p>CO – Completion of worksheet</p>

<ul style="list-style-type: none"> <li> <b>Vocabulary review worksheet (5~7 Minutes)</b>            Students complete a worksheet with the key vocabulary.            Side 1 – Students are to match the vocabulary word with a visual representation.            Side 2 – Students are to fill in the blanks of sentences with key vocabulary chosen from a word bank.         </li> </ul>	LO(a) – Correct placement or association of key vocabulary words.
<b>Meaningful Activities</b>	<b>Assessment</b>
<p><b>Reappearing Coin (10 Minutes)</b>          In groups of 3 or 4 students will do the reappearing coin experiment. Each group gets one cup, one coin, and another cup of water. They each get a turn to see the coin “move”. Explain that the cup should be held at about a 45-degree angle and the student should back up far enough so they can’t see the coin. Another student adds water slowly while the observing student sees the coin come into view. Remind students to pour slowly and try to spill as little water as possible.</p>	<p>CO(a) – Experiment          - Ability to complete experiment successfully.</p> <p>CO(b) – Guess what will happen when water is poured into the cup and check their answers.</p> <p>LO (a,b) – Explain why the coin appeared to move using key terms (density, refraction).</p>
<p><b>Building a Magnifying Glass (Lens) (10-15 Minutes)</b>          Hand out refraction worksheet to students.          Does anyone remember how a magnifying glass works? We saw it with Bill Nye. (If needed and as time permits, show clip again)          Students get a chance to make their own magnifying lens as per worksheet.</p>	<p>CO(a) – Experiment          - Ability to complete experiment successfully.</p> <p>CO(b) – Guess what will happen to the image of the objects when water is poured onto the plastic wrap over the cup and check their answers. Record findings on worksheet.</p> <p>LO (a,b) – Explain how the amount of water and depth of the bowl created changed the image of the objects using correct terminology (refraction, angle, convex, density).</p> <p>LO (c)- Explain how a magnifying glass works by demonstrating with their experiment.</p>
<b>Wrap-up:</b>	
<p><b>How Will Light Refract Through Multiple Mediums? (5 Minutes)</b>          Students complete a diagram showing how light will react (approximately) when traveling through a combination of air-glass-water-glass-air. (Like a fish tank)          Discuss what might happen if the glass were thicker or the distance through the water longer.</p>	<p>CO(d) – Be able to complete diagram showing changes in direction.</p> <p>LO(a) – Explain why the light changed direction multiple times.</p>

**What visuals, resources, and supplementary materials will you use during this unit to make course concepts as clear as possible for ELLs?**

- Use of a PowerPoint presentation with visuals to reinforce the vocabulary and concepts.
- Youtube clip of Bill Nye the Science Guy: Light Optics
- Data worksheet
- Materials to make a magnifying glass. (cup, plastic wrap, coin, elastic, water)
- Show refraction with pencil in water in cup.

**What scaffolding supports will you provide during this lesson/unit?**

- Teach new vocabulary as it arises in a lesson, focusing on words that will be useful in various academic contexts (experiment, observation, recording).
- Provide word banks for students to choose from in order to label pictures or to complete sentences.
- Encourage interaction through the use of structured co-operative learning activities.
- Guide students step-by-step through projects.
- Provide alternate resource material that is comprehensible to the learners (video aids, visual worksheets)

**How will you differentiate assessment for students at different levels of English proficiency?**

- Students may elect to show their learning in the form of pictures.
- Students will be given time necessary to complete tasks and respond.
- Partner ELL students with subject-strong native speakers.