

**CODE/MOE/UOIT Makerspaces Project—Lesson Planning Template**

**School Board: Huron Superior Catholic District School Board**

**Grade(s): 6**

**Subject(s): Science**

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| **BIG IDEAS:**  **Air has many properties that can be used for flight and for other purposes. In this lesson, students will design, create, and test their own balloon-powered car to demonstrate their understanding of cause and effect.**  **Curriculum Expectations:**  **OVERALL:**  **Matter: Air has many properties that can be used for flight and for other purposes. (Overall expectations 1, 2, and 3)**  **SPECIFIC:**  **3.2 identify common applications of the properties of air, such as its compressibility and insulating qualities (e.g., home insulation, tires, sleeping bags, layered clothing** | |
| **Learning Goals:**  “We are learning to…”  …create thrust and momentum through the creation of a car using recycled materials. | **Success Criteria:**  “We will be successful when…”  …our balloon-powered cars move in a forward motion. |
| **Lesson Overview:**  After researching inventions online, with a partner, students will harness the power of thrust from a balloon releasing air to design and create a vehicle that moves forward. The challenge will conclude with the class having a race to see which vehicle travels the greatest distance after 3 rounds. | |
| **Materials and Technology:**  -Google Chromebooks (computers)    -recycled materials from Blue Bins (ex. Boxes, lids, water bottles, etc.)  -glue guns with glue - pipe cleaners  -balloons - paint & markers  -straws  -scissors  -tape | |
| **Student Accommodations/Modifications:**  **Students are seated according to IEP plans.**  **Students with IEP may choose to work individually or with a partner to complete the activity.** | **Lesson will be differentiated by:**   * **Content, specifically: each group will design and create their own car using materials of their choice** * **Process, specifically: teacher prompting throughout to ensure time is managed well** * **Product, specifically: n/a** * **Environment, specifically: students with greater behaviour needs will be placed in close proximity to teacher** |
| **MINDS ON: Getting Started** | |
| During this phase, the teacher may:  • activate students’ prior knowledge;  • engage students by posing thought-provoking questions;  • gather diagnostic and/or formative assessment data through observation and questioning;  • discuss and clarify the task(s). | 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.**  The teacher will inflate a balloon at the front of the class without knotting the end. The students will count to three aloud and on “three,” the teacher will release the balloon to let it fly through the air.  **What key questions will you ask?**  Ask the students:   1. “What just happened to the balloon?” (It flew through the air; you let it go; all the air went out of it) 2. “When thinking about Flight, what vocabulary word describes what just happened?” (Thrust) 3. “What does thrust mean?” (The force of air released causing movement) 4. “How could we use this idea to help create a car?” (It would replace the motor and move it forward when you let the air out) 5. “Which way would the balloon need to face?” (the end toward the back)   **How will you gather diagnostic or formative data about the students’ current levels of understanding?**  I will gather diagnostic data by making anecdotal notes about our discussion and which students could explain the concept of thrust.  **How will students be grouped? How will materials be distributed?**  Prior to the actual “making” commencing, students will be partnered based on learning needs. Next, students will spend time researching various “balloon-powered cars” for inspiration using technology (computers or iPads). The group will then use the ideas generated online to design their own vehicle and create a list of necessary materials.  The teacher will provide each group with a balloon and straw (to attach to the balloon in order to inflate). | |
| **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);  • observe and assess;  • encourage students to represent their thinking concretely and/or pictorially;  • encourage students to clarify ideas and to pose questions to other students. | 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;  • explain their thinking to the teacher and their classmates;  • explore and develop strategies and concepts. |
| **Describe the task(s) in which your students will be engaged.**  Students will collect recycled materials and create a vehicle using the materials they collect and the straw and balloon that the teacher provides them with. This activity is open-ended and students will be required to test their models to make necessary modifications to their vehicle if necessary (ex. Add weight, fix balloon/straw connection, etc).  **What misconceptions or difficulties do you think they might experience?**  Students may experience difficulty with the balloon/straw connection, movement of vehicles due to wheel construction, or being able to inflate the balloon large enough to create enough thrust.  **How will they demonstrate their understanding of the concept?**  They will demonstrate their understanding by creating a vehicle that moves in a forward motion during the challenge portion of the activity.  **How will you gather your assessment data (e.g., checklist, anecdotal records)?**  I will walk around making anecdotal notes of how students are planning their final product, helping or prompting students who seem to have forgotten missing parts. Students will also conference with the teacher upon completion of the Challenge Race to discuss and reflect on their design process.  **What extension activities will you provide?**  As an extension into the Grade 6 Electricity unit, students could remove the balloon and use a basic r/c motor and battery to create a simple circuit. This would demonstrate their understanding of simple circuits. | |
| **CONSOLIDATION: Reflecting and Connecting** | |
| During this phase, the teacher may:  • bring students back together to share and analyse strategies;  • encourage students to explain a variety of learning strategies;  • ask students to defend their procedures and justify their answers;  • clarify misunderstandings;  • relate strategies and solutions to similar types of problems in order to help students generalize concepts;  • summarize the discussion and emphasize key points or concepts. | During this phase, students may:  • share their findings;  • use a variety of concrete, pictorial, and numerical representations to demonstrate their understandings;  • 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)?**  During the design process and the Challenge Race, their progress would be documented on a video. We would compile these and then watch it together as a class upon completion. After watching the video, the teacher will choose students who struggled and succeeded to share their testimonies.  The vehicle that travels the furthest distance will be kept and the teacher will display this model for all the students to look at and then explain why that specific model was successful.  **What key questions will you ask during the debriefing?**  Did you need to make any modifications during the building process of your vehicle?  Why was \_\_\_\_\_\_’s vehicle so successful?  If you could build another vehicle, what changes would you make or different materials would you incorporate? | |