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**Lesson Plan Template (Revised 2020)**

**Elementary Years**

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| **Name:** | **Sydney Borden** |

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| **Grade** | 2/3 | **Topic** | Science: STEM paper bridge building |  |
| **Date** | Nov. 30, 2020 | **Allotted Time** | 65 mins. |  |
| **STAGE 1: Desired Results****Cite sources used to develop this plan:**  |
| <https://curriculum.gov.bc.ca/curriculum/english-language-arts/3/core><https://curriculum.gov.bc.ca/curriculum/english-language-arts/2/core><http://www.fnesc.ca/wp/wp-content/uploads/2015/09/PUB-LFP-POSTER-Principles-of-Learning-First-Peoples-poster-11x17.pdf><https://mysteryscience.com/forces/mystery-2/balanced-forces-engineering/43?r=148041486> |

**Rationale**: *How is this lesson relevant at this time with these students? Why is it important?*

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| “In this Mystery, students will learn about real-life bridge design. In the activity, Paper Bridge Engineering, students will use their knowledge of forces to build a strong bridge that supports as many pennies as possible -- using only paper” (<https://mysteryscience.com>). This lesson allows students the opportunity to learn through STEM and fully engage with the learning material. This form of learning is intended to help students form deep understandings and to have fun through the use of experimentation. |

**Core Competencies:** <https://curriculum.gov.bc.ca/competencies> (refer to “profiles” for some ideas)

*Which sub-core competencies will be the focus of this lesson? Briefly describe how and why:*

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| **Communication*** Communicating
* Collaborating
 | **Thinking*** Creative Thinking
* Critical & Reflective Thinking
 | **Personal and Social*** Personal Awareness & Responsibility
* Positive Personal & Cultural Identity
* Social Awareness & Responsibility
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|  | I can ask open-ended questions, explore, and gather information. I experiment purposefully to develop options. I can contribute to and use criteria. I use observation, experience, and imagination to draw conclusions, make judgments, and ask new questions. I can describe my thinking and how it is changing. I can establish goals individually and with others. I can connect my learning with my experiences, efforts, and goals. I give and receive constructive feedback.This lesson provides students with the opportunity to engage in experiential learning and to hypothesize, test, assess, and grow their understanding. Students will need to use their critical and reflective thinking processes in order to successfully work through this learning activity and create a bridge that works to accomplish their goal. |  |

**First Peoples Principles of Learning (FPPL):**

*How will Indigenous perspectives, knowledge & ways of knowing be acknowledged, honoured or integrated into this learning experience?*

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| **FPPL to be included in this lesson:** | **How will the FPPL be embedded in lesson:** |
| Learning is holistic, reflexive, reflective, experiential,and relational | This lesson supports learning that relies on students’ use of reflexive, reflective, and experiential thinking and processes specifically. Through this form of experiential learning students have the opportunity to test their knowledge, learn from the faults in this, and deepen their understanding through experience.  |

**Curriculum Connections:** <https://curriculum.gov.bc.ca/> (Curriculum)

*What Big Ideas (Understand), Curricular Competencies (Do), Content (Know) does this lesson develop?*

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| ***Understand***Big Idea(s):* Forces influence the motion of an object

*Essential or Guiding Question(s):*What do we need to keep in mind when building our bridges?How can you improve your bridge after each trial?What part of your bridge is the weakest/where are they pennies falling from?How does your bridge support weight distribution? (balance) |
| ***Do***Curricular Competencies (Learning Standards):**Planning and conducting**-Make and record observations-Safely manipulate materials to test ideas and predictions-Make and record simple measurements using informal or non-standard methods**Applying and innovating**-Transfer and apply learning to new situations-Generate and introduce new or refined ideas when problem solving |
| ***Know***Content (Learning Standards):-types of forces |

**STAGE 2: Assessment Plan**

FORMATIVE ASSESSMENT: (Assessment as Learning; Assessment for Learning)

-Students are collaborating and communicating ideas with partner

-Experimenting with various bridge structures

-When your paper bridge failed, what did you learn? What did you do differently the next time to make your bridge stronger?

SUMMATIVE ASSESSMENT: (Assessment of Learning)

-Builder’s Notebook (point form): demonstrates group’s thinking, experimenting, and understanding of how to reflect and redesign their bridges

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| **The Learning Intention:** *What will students learn in this lesson? (i.e. Learning Standards)* | -Students will learn about various bridge designs-Students will learn about how compression and tension forces act on a bridge-Students will learn about how materials can be altered to build a successful bridge-Students will develop skills in creative problem solving, learning from outcomes, reevaluating ideas and making adaptations to address a goal |
| **Evidence of Learning:** *How will students demonstrate their learning? What does it look like?* | -Communicate with partner(s) about their observations-Recreate bridge model based on testing and developing ideas-Take in information to help construct stronger bridge |
| Criteria:*What do students need to do to meet or achieve the learning intention?* | -Work collaboratively with partner/small group-Create bridge model, test this, notice where it needs to be altered, recreate, test again |

**Planning for Diversity:**

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| **Learning Target:** *In what ways does the lesson meet the needs of diverse learners?* *How will you plan for students who have learning/behaviour difficulties or require enrichment?* |
| Students need to/must doBuild a bridge using 2 pieces of paper, make some adaptations that enhances strength, simple design, write minimally in builder’s notebookAccess/All | Students can doBuild a bridge using 2 pieces of paper, test bridge and make adaptations based on findings, bridge strength progresses, write some notes in builder’s notebook that demonstrates thinking processes, bridge design shows some creative problem solvingMost | Students could do/try toBuild a bridge using 2 pieces of paper, test bridge and make adaptations based on weaknesses, strength increases from testing/redesigning, detailed notes demonstrating thinking processes and steps taken, bridge design is more elaborate and uses creative thinkingFew/Challenge |

**STAGE 3: Learning Plan**

**Resources, Material and Preparation:** *What resources, materials and preparation are required?*

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| -Overhead projector to show videos-Sheets of paper (each bridge can use 2 pieces)-Ruler (for measuring distance)-Desks-Books (large/heavy)-Pennies-Builder’s Notebook (worksheet) – to record findings |

**Organizational/Management Strategies:** *(anything special to consider?)*

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| -Have website with videos up and ready before starting lesson-Have students choose partner(s) – purposefully ask students that may usually be too shy to ask someone initially to pick partner at beginning-Space students out around the room-Have cups of pennies for students to use set out beforehand  |

**Lesson Development:**

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| **Connect:** *How will you introduce this lesson in a manner that engages students and activates their thinking? Activate or build background knowledge, capture interest, share learning intention.* | Pacing |
| **Teacher will** -Explain to students that today we will be doing a science-centered building experiment with Mystery Doug!-Explain that we will be testing our building skills of bridges!-Ask students to sit quietly at desks while I begin Mystery Doug’s video that will teach us a bit about bridges first | **Students will** -Understand that they will be taking part in a science building experiment of a bridge-Listen as teacher explains that first they will be watching a video with Mystery Doug to learn more about bridges first | 5 min. |

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| **Process:** *What steps and activities are you going to use to help students interact with new ideas, build understanding, acquire and practice knowledge, skills* *and/or attitudes? In what ways have you built in guided practice?*  | Pacing |
| **Teacher will** -Play the Mystery Doug video that helps to teach students about bridges-During question periods in video, pause and have students discuss question-Continue video-Once informational videos on bridges are over ask students if they have any remaining questions before we start the fun part?-Explain again what their task is: students and their partner(s) will have to build a bridge using only 2 pieces of paper max. across a 6-inch (15.25 cm) gap. Their bridge needs to be at least 3-inch (7.62 cm) wide. Their bridge’s strength will be tested by the weight of pennies. Everyone’s goal is to build the strongest bridge. Everyone will have time to build and test their bridges and then as a class we will test each bridge separately and record the number of pennies each holds.-Invite students that are sitting politely to choose their partners first-Remind students that when we’re in class like this when someone asks us to be their partner we say yes – it’s not like we have to marry the person, we’re just working and learning with them for a short time (being mindful of everyone’s feelings)-After all students have chosen a partner(s) disperse students to various areas of the room (space out)-Hand out papers to groups and help to arrange desks so they are 6 inches apart for gap-Hand out books to groups as well – can use these in constructing of bridge if they want (cannot be the bridge)-Circulate the room providing help/guidance where needed-Instruct students to write down their bridge building and findings and a quick drawing of their bridge (after testing it) in their Builder’s Notebook (can be point form, done together)-When there is roughly 15 min. left of class time instruct students to stop their experimenting and setup their final bridge to be tested by class-Class gathers around one bridge/group and watch/count pennies it can hold-Continue this with all groups-Announce bridge that held the most pennies-Instruct students to return to their bridge and clean up their area, move desks back, paper into recycling, pennies back into container-Ask students to all return to desks (countdown) | **Students will** -Watch the Mystery Doug video and learn more about bridges-Engage in class discussion on questions asked in video-Continue watching video-Ask any remaining questions before beginning experimental/building part of lesson-Understand their task: with partner build a bridge using only 2 pieces of paper max. across a 6-inch (15.25 cm) gap. Their bridge’s strength will be tested by the weight of pennies. Their goal is to build the strongest bridge. They will have time to build and test their bridges and then as a class we will test each bridge separately and record the number of pennies each holds.-Choose partner when invited by teacher-Know that when they are in class and someone asks to be their partner we say yes (mindful of everyone’s feelings)-Disperse around room as guided by teacher-Take papers from teacher and help set up workspace (2 desks)-Understand they can use the books when creating bridge but they cannot be the bridge-Ask for help/guidance when needed-Collaborate and communicate with partner(s) to construct bridge and make adjustments-Record findings and thoughts in Builder’s Notebook (can be in point form) – showing thinking-Wrap up their experiment and set up bridge to be tested-Go around as class to each bridge and watch as teacher places pennies on it to test strength-Return to work area and tidy up (desks back, paper in recycling, books away, etc.)-Sit at desk as asked-Wait for next instructions | 50 min.*20 for vids. + 5-10 min. for discuss-ing**30 for building* |

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| **Transform:** *How will students apply or practice their learning? Can they show or represent their learning in personalized ways? What are the choices for student task?* | Pacing |
| **Teacher will** -Provide students opportunity to work and collaborate in small group-Provide students opportunity to engage with learning material through experimenting (STEM) – interacting with learning, reflecting, redesigning, adapting | **Students will** -Have opportunity to work with a partner(s), collaborate in learning, communicate/share ideas-Have opportunity to engage in experiential learning -Use creative thinking to help create bridge, use critical thinking to make adaptations and theorize |  |

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| **Closure:** *How will you solidify the learning that has taken place and deepen the learning process?* *Refer back to the learning intention, connect to next learning.* | Pacing |
| **Teacher will** -Ask students what they learned about bridges today?-What bridges seemed to be the strongest? Why?-Ask students what their favourite part about the learning/lesson was | **Students will** -Explain what they learned about bridges today -Discuss what bridges they thought were the strongest and why they think this is-Discuss how they could’ve made their bridge better-Discuss what they’d do next time-Discuss their favourite part of learning/lesson | 10 min. |

**Reflection** *What was successful in this lesson? If taught again, what would you change to make this lesson even more successful and inclusive for diverse and exceptional students?*

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Lesson Planning Guide (adapted from Thompson Rivers University)

*The lesson plan template is designed as a guide for students to use when planning lessons. The plan may be adapted to specific subject areas and modified as students gain experience or to suit their presentation style. The template is a basic outline that can be used directly as printed or expanded from the electronic version. It is important that the lesson plan be sufficiently clear and detailed so that another teacher could use the plan to teach the lesson.*

***Rationale****: Why are you teaching this particular lesson at this time? One consideration is the context for the lesson (e.g. this introductory lesson determines what students know and want to know about the topic, this lesson relates to previous and future learning by . . .) Another consideration is student motivation (e.g. what are some reasons the learner might care about the content/concepts/ skills for future learning, careers, or interests?).*

***Curricular Connections:***

The curriculum asks you to plan what the students will DO, what they will KNOW, and then what they will UNDERSTAND. ***Big ideas*** *capture the “big picture” or general area of learning (e.g. interdependence of living things with the environment, stories are a source of creativity and joy) and will be what students come to UNDERSTAND.* ***Curricular competencies*** *are what students will DO in their learning activities (e.g. using comprehension strategies, sorting and classifying data, making ethical judgments) that are related to each discipline. The* ***learning standards for content or concepts*** *are a more specific consideration of what students will come to KNOW. Many of the standards are written in broad, general terms to allow flexibility. You can, using the intention of the standard, make it clearer and more specific (e.g. learners will be able to describe the main idea in a paragraph or story, learners will be able to classify leaves based on properties they identify). The lesson should make a connection to both types of learning standards – curricular competencies as well as content. A reminder that the direction of new curriculum has identified core competencies of thinking, communication, and personal / social development as a foundation for all curricula.*

***Learning Intentions:*** *How can you make clear and share with your learners what they are going to learn or have learned or accomplished? Statements like: “I can add two fractions” help frame their learning in positive student language.*

***Prerequisite Concepts and Skills:***  *What concepts and skills are needed for students to be successful? This communication helps connect lessons together in a logical sequence by building/scaffolding new knowledge onto previous learning. For example, if students are going to be engaged in debate did you build or scaffold group work strategies, communication skills, expected etiquette, criteria beforehand?*

***Materials and Resources /References*** *List all materials and resources that you and the students will need. What things do you need to do before the lesson begins? (e.g. prepare a word chart.) What things do the students need to do? (e.g.read a chapter in the novel.) Have you honoured the sources of ideas or resources? Disorganized materials can ruin a great lesson.*

***Differentiated Instruction (DI): (accommodations):*** *How will you accommodate for diverse learners in your class? How will you allow for some variety in expression of learning? How can you modify the learning activities for success? How can you provide engaging extra challenges for those that are ready? How might you alter the learning environment if needed? Have you considered Aboriginal and cultural influences? IEP’s?*

***Assessment and Evaluation:*** *Did the students learn what you taught them? What tools might you use for assessment (e.g. check list, rubric, anecdotal record). How will you provide formative feedback to students about their learning? The results of the assessment should be directly connected to what your students were able to write say or do related to the learning intentions and or curriculum. Strive for accuracy and build assessment into teaching and learning and not as an “add on” at the end.*

***Organizational/Management Strategies:*** *Have you thought-out organizational management strategies to facilitate a proactive positive classroom environment? Some examples are: organizing for movement, distributing and collecting materials, grouping strategies, blended grade classroom logistics.*

***Aboriginal Connections / First Peoples Principles of Learning:***  *Are there any connections to Aboriginal or other cultural knowledge, worldviews, or principles of learning?*

###### Lesson Activities/Structure:

***Connect****: How will you get students interested/motivated/ hooked into learning? How will you connect this lesson to past and future lessons? How can you share the learning intentions in student friendly language? How will you provide a lesson overview?*

***Process****: What sequence of activities will the student’s experience? What will you do? What will they do? Estimate how much time will each activity take (pacing)? What are grouping/materials strategies? There are many ways to describe the body (step by step, two columns dividing student and teacher activities, visual flow chart of activities and connections, others?)*

***Transform****: How will students apply and personalize the learning? What will they do or create to show you that they have learned?*

***Closure:*** *How will the lesson end? (e.g. connecting back to learning intentions, summarizing learning, sharing of accomplishments, connecting to next lessons). Google “40 ways to close a lesson.”*

***Reflections****: Complete the reflections section as soon as possible after teaching the lesson. What went well? What revisions would you make to the lesson? Anything else***?**