**Sample Lesson Plan (from geometry Math unit)**

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| **TDT/Curricular Area/s** | How the world works-*math link* |
| **PLO's**<br><br>(B.C. curriculum) | C9 identify 2D shapes as parts of 3D objects in the environment |
| **Central Idea** | Investigation of transformations develops understanding of changes. |
| **Objective (TSWBAT)** | The students will be able to design and create a matching game with pairs that show the relationship between a 2-D and 3-D shape (i.e. square and a cube). |
| **IB Links**<br><br>***LP attributes, attitudes, Key concepts, ATL, Action, International Mindedness** | Key Concepts-Connection<br>Learner Profile-Thinker<br>Approaches to Learning- Planning, Synthesis<br>Action-take your game beyond the classroom and teach others! |
| **Materials** | -Markers<br>-Pencils<br>-Felt pens<br>-18 sets of 10 cards (plus more for extra if students want to make additional cards) |
| **Differentiation**<br><br>***Enrichment options**<br><br>***Adaptations**<br><br>***EAL** | Students who need a challenge can make more cards for their matching game. They will also be encouraged to try using shapes that are more unusual and harder to see in the environment (i.e. a trapezoid).<br><br>Students who require additional support will be encouraged to use the examples that they saw on the field trip. They can also refer back to examples that were made in previous lessons (i.e. shapes in the classroom). Additionally, they may choose to focus on one shape and find various examples of it in the 3-D world instead of multiple shapes (i.e. a circle and a sphere which could be a basketball, a globe, the sun etc.)<br><br>EAL students can refer back to their word bank for vocabulary or focus solely on visuals. Students can also use the anchor charts in the classroom for ideas. They can make a set in their home language to play at home and for us to keep and learn at school. |
| **Assessment** | The students will be creating a matching game which will include a)pictures b)labels c)attributes d)1-2 sentences justifying why the 2-D shape(s) and 3-D object might make a pair (for example, a 2 circles plus a rectangle will equal a cylinder. In real life, this might be seen in the form of a soda can.) The criteria will be up on the board during the working process and students will be asked to refer to them every time they start/finish a pair. A prototype will also be on display on which all criteria will be met.<br><br>Students will self-assess themselves before they turn it in for assessment by the teacher. The teacher will use this information to check in on progress and will also determine which aspects of the project are most difficult to complete.<br><br>Students will assess themselves and will use the criteria on the self-assessment when checking in orally with the teacher. If students are struggling or need more time, this should be noted by the teacher in order to clarify instructions or give students more time for completion. |

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| **Timing**<br><br>**10-15 min** | **Tuning In**<br>On the smartboard, the teacher will show students an online version of a geometry matching game. We will play the game together once. The teacher will ask students to observe what features make good matching cards (captions, pictures, 2-D and 3-D shapes etc.). By doing this, students will also be generating the criteria for their summative assessment. The students will also be asked to explain how they knew which card matched another (i.e. a cube has squares inside it so therefore, those two make a matching pair). |
| **The remainder of the lesson** | **Learning engagements (whole class, individual). *Circulate**<br>As a class, we will brainstorm 3-4 ideas for some shapes that may be more difficult to make a pair for. Students will also be given their notebooks to refer to from the previous lessons field trip if they need extra help coming up with examples.<br>Students will be given pre-made cut outs of matching cards and will need to create their own matching game. Each student will be expected to make a minimum of 5 pairs. Students will be given the remaining time of the lesson (this may take more than one period) to draw and label what each card is. The teacher should circulate during this time to ensure everybody makes enough progress to complete the project and that their examples make sense. It should also be made explicit that it may be helpful to ask a peer if their matching pair makes sense. If their peer doesn't understand the relationship, that may be an indicator that the example needs to be modified.<br><br>***How will students show their learning?***<br>Students should be using their field trip notes as a source of inspiration but should also be generating their own original ideas to demonstrate learning. Students will be prompted to use examples from their own life at home, at school or in any other community environment. |
| **5 min.** | **Closure (student generated)**<br>The students will be introduced to the final lesson where they will play the game as well as what they will be needing to look out for when playing each other's game. Based on this, students will set a goal for the next lesson.<br>Additionally, they will be asked to check in with the teacher before the end of the day on where they are with their progress and share any difficulties if they are having any.<br><br>***Celebrate successes, reflect on progress, frontload** |
| | **Teacher Reflection**<br>Most students were able to meet the success criteria. Students used resources the class had assembled together earlier in the unit as well as their own math notebook. Some students struggled to make pairings that made sense to others and needed time and feedback from more than one person in order to make appropriate adjustments. Many students were proud of their final product and eager to take it home. This assessment helped us understand students' ability to synthesize their learning from the last few weeks of learning. |
| | **School-Home Communication**<br>***How will you share student learning with parents?***<br>Students will be invited to take home one of their matching cards. They will be asked to complete it if necessary and share their connection with their family (i.e. why did they pick the shapes they did?). |

**Sample Lesson Plan (from geometry Math unit)**

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| **TDT/Curricular Area/s** | How the world works-*math link* |
| **PLO's**<br><br>(from B.C. curriculum) | C6 sort 2D shapes and 3D objects using two attributes and explain the sorting rule |
| **Central Idea** | Investigation of transformations develops understanding of changes. |
| **Objective**<br>**(TSWBAT)** | The students will be able to create their own sorting rule for a variety of 2-D shapes and show the rule through sorting shapes by their attributes. |
| **IB Links**<br><br>***LP attributes, attitudes, Key concepts, ATL, Action, International mindedness** | Learner Profile-Thinker, Knowledgeable<br>Key Concepts- Form (what is it like?)<br>Approaches to Learning- Research skills (observing, organizing data, interpreting data) |
| **Materials** | Smartboard<br>9 sets of envelopes with shapes (circle, square, rectangle, triangle, diamond, hexagon, pentagon, star, trapezoid)<br>9 sets of envelopes with 3 sorting rules<br>9 poster boards with pre-drawn Venn diagrams<br>18 glue sticks<br>Pencils/markers |
| **Differentiation**<br><br>***Enrichment options**<br>***Adaptations**<br>***EAL** | If students need an extra challenge, they will be provided with extra shapes or can additionally draw in shapes that haven't been mentioned in class. They can also be challenged with shapes that are composed of multiple parts.<br><br>Students who need help can be given simpler sorting rules to have more practice before they create the formative assessment (the poster). Students who require additional support could be intentionally paired with a student who feels more confident with the concepts and can help explain the process to them.<br><br>EAL students will be encouraged to label in their home language and can refer to their word bank with translations. Students can also make digital posters on canva or Seesaw and use the translator tool to help get vocabulary. |
| **Assessment** | Students will be asked to turn in their completed posters to the teacher at the end of the lesson. The final copy should have a clearly written sorting rule as well as labels for both sides of the Venn diagram. Additionally, all the shapes should be glued on to the poster according to the rule that is written. Both partners' names should be written on the poster. This will act as a formative assessment for the unit.<br>The information gathered from these posters will show the teacher if and how the students are able to apply a rule to a group of shapes. It will also show how complex of a rule students can make when asked to create their own rule. Their understanding of their own rule will also be seen in how the shapes are arranged within the Venn diagram.<br>The final product can go up on display on our grade board for the community to see. |

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| **Timing**<br><br>**10-15 min** | **Tuning In**<br>As a class, we will sort various 2-D shapes into a Venn diagram on the smart board. For the first example, the instructor will have a Venn diagram with pre-sorted shapes on the board and the students will need to describe which attributes they see and what the sorting rule may be. Next, students will be called up and asked to sort the shapes according to a different rule that we will have come up with as a group. |
| **25-30 min** | **Learning engagements ( small group). *Circulate**<br>In small groups, students will be given 1 poster paper with a Venn diagram, an envelope with shapes and an envelope with sorting rules. Students will pick one of the three sorting rules from the envelope and will have to sort the shape according to the rule (i.e. Sort the shapes based on the number of sides). Students will need to sort the shapes based on the 3 given sorting rules. Once these have been completed and checked by another pair, students will move on to creating a poster with their own sorting rule. Students will sort the same shapes based on their own rule and will glue the shapes onto the poster with a labelled sorting rule.<br><br>***How will students show their learning?***<br>Students will be creating a poster which displays their understanding of sorting shapes according to any given attribute. |
| **5 min** | **Closure (student generated)**<br>If time permits, we will do a gallery walk of the different sorting rules pairs came up with. We will share some observations about our peers' posters out loud (were there any new attributes we discovered in the process?)<br><br>***Celebrate successes, reflect on progress, frontload** |
| | **Teacher Reflection**<br>Students demonstrated their knowledge and creativity by coming up with some sorting rules that we (teachers) hadn't thought of! Most students could follow the instructions and understand the sorting rule with the help of their partner. One pair needed more support and could have benefited if the sorting rules had an example or visual alongside it. |
| | **School-Home Communication**<br>***How will you share student learning with parents?***<br>Encourage students to search for new shapes at home and think about how they might be categorized. |

**Name: Ashley Dobroszek**
**Unit: Mathematics-Geometry**
**Grade: 2**
**Concept/s: Form (what is it like?), Function (what is its purpose?) Connection (how is it connected to other things?)**
**PLO's from B.C. curriculum:** C6 sort 2D shapes and 3D objects using two attributes and explain the sorting rule
C7 describe, compare, and construct 3 D objects, including cubes spheres cones cylinders pyramids [C, CN, R, V]
C8 describe, compare, and construct 2 D shapes, including triangles squares rectangles circles [C, CN, R, V]
C9 identify 2D shapes as parts of 3D objects in the environment [C, CN, R, V]

**IB Links :**
*Related Concept*: Transformation
*Learner Profile*: Thinker
*Attitude*: Creativity
*Self-management skills*: Fine motor skills, Spatial awareness
*Thinking skills*: Synthesis
*Research skills*: Planning

| Lesson Title | Objectives (TSWBAT) | Learning Engagements | Materials | Assessment |
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| Provocation | The students will be able to create and identify 2-D and 3-D shapes within their own structures. | Hook/Learning engagement: Students will be given sets of toothpicks and playdough/plasticine. Students will be given time to explore and build at first. Later, students will be asked to observe their creations and identify any shapes they have made. For each shape they see, they will be asked to document it in their math notebook and write down 1-2 attributes for each.<br>Conclusion: We will do a gallery walk to see what everyone has built and identify shapes in others' creations. A few observations will be shared as a class. | -Toothpicks<br>-Plasticine<br>-Math notebook | Students will be asked to turn in their math notebook which will serve as a formative assessment to check what prior knowledge exists. |
| Sorting by Attributes | The students will be able to describe attributes of 2-D shapes and apply a sorting rule to a set of shapes. | Hook: As a class, we will sort various 2-D shapes into a Venn diagram on the smart board. Together we will come up with a descriptive sentence that explains the sorting rule we used to categorize the shapes.<br>Learning engagement: Students will paired up and each pair will be given sets of shapes. They will sort the shapes based on their attributes into a Venn diagram.<br>Conclusion: Students will turn in a poster of their own sorting | -Smartboard<br>-9 sets of envelopes with shapes<br>-9 sets of envelopes with 3 sorting rules<br>-9 poster boards with pre-drawn Venn diagrams<br>-18 glue sticks<br>-Pencils/markers | Students will be observed during the sorting process to see what reasoning is being used to categorize the shapes. The poster will also be turned in for a formative. |

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| | | rule with a Venn diagram and will also share their sorting rule with the group. | | |
| Attributes of 3-D shapes | The students will be able to describe 3-D shapes using terminology such as faces, sides, vertices etc. | Hook: To begin we will watch a brainpopjr. video on solid shapes and take a group quiz online.<br>Learning engagement: In the style of the quiz on brainpopjr., students will be asked to write a quiz for the teacher (we will brainstorm one sample question together first). The quiz will need to include questions using terminology used in the video and can include drawings. It should focus primarily on attributes of solid shapes. Students can choose to work individually or in pairs.<br>Conclusion: Students can test each other with their quizzes. | -link: https://jr.brainpop.com /math/geometry/<br>-Smartboard<br>-Paper<br>-Pencils/crayons | Students will hand in their quiz to the teacher along with an answer key for their problem set. |
| Constructing 3-D shapes | The students will be able to design the blueprint for a 3-D shape and construct it. | Hook: The instructor will bring in various mystery bags full of 3-D shapes. Students will have to guess what they are based on 3 clues (attributes)that the instructor will give.<br>Learning engagement: Students will be given building blocks to experiment with and build a cube. Once a student discovers a new “net”, they will document it and then continue to find as many solutions as possible.<br>Conclusion: As a class, we will regroup and see if we’ve found all the possible solutions. | -Mystery bags<br>-3-D shapes (cubes, spheres etc.)<br>-Building blocks<br>-Pencils<br>-Paper<br>-Resource: http://www.k-5mathteachingresources.com/support-files/nets-for-a-cube.pdf | The students will turn in their investigation sheets to the teacher as a formative assessment. |

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| Constructing buildings with 3-D shapes | The students will be able to design their own building using 3-D shapes and justify their choices with the attributes of the shapes. | Hook: As a class, we will play the “Guess my shape!” game. As an example, the instructor will put on a hat which will have a shape card pinned onto it. The class must work together to give clues so that the instructor can guess the shape. We will play 3-4 rounds of this game with students in the hot seat.<br>Learning engagement: Using the shapes we have built so far, students will need to create a blueprint of their own building (they will be shown examples of buildings with various shapes i.e. the Vancouver lookout, Tower of Pisa, Spaceneedle etc.). They will need to identify what shapes are in their building and why they are choosing to build with the shapes they use.<br>Conclusion: The class will share and do a mini-report in groups on key features of their design. | -Hat<br>-Pin or tape<br>-Shape cards<br>-Paper<br>-Pencils<br>-Images of buildings (the Vancouver lookout, Tower of Pisa, Spaceneedle etc.) | The final blueprint design will be collected and possibly be displayed within the classroom or hallway. |
| Comparing 3-D shapes | The students will be able to compare two 3-D shapes orally and through labeled diagrams. | Hook: To begin, we will read “ Captain Invincible and the Space Shapes” by Stuart J. Murphy. Before the reading, the teacher should cover key words such as “cone”, “cube” etc. During the reading, students must pay attention to the shapes as they will guess the name of the shape at each covered up word.<br>Learning engagement: Students will be given a 2 part problem to solve independently. First, the student will draw and write similarities (if any) and differences between the 2 shapes chosen. After this, students will create a model of at least one of their shapes using modelling clay and label it using small post its/paper and toothpicks (an example will be shown beforehand).<br>Conclusion: Class debrief on challenges and successes in the comparisons. | - Resource: http://www.k-5mathteachingresources.com/support-files/comparing-3d-shapes.pdf<br>-Book: “ Captain Invincible and the Space Shapes”<br>-Paper<br>-Modelling clay<br>-Pencils<br>-Toothpicks | Evidence of thinking from problem solving will be collected and models will be displayed within the classroom. |

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| Investigation into Attributes and their Function | The students will be able to explain how a certain shape fulfills a function thanks to its attributes. | Hook: The teacher will read a story of “how the bike came to be” which introduces the idea of why certain shapes’ attributes are needed to serve a specific function.<br>Learning engagement: Students will collect information about which shapes are most common and brainstorm what attributes may be the reason for this. Next, students will work in groups to write a story of how an object of their choice came to be. Each group will be given a different shape. The story will need to include an element of transformation within it.<br>Conclusion: We will do a read-aloud for students who wish to share their story. | -Paper<br>-Pencils | The teacher will give students a checklist to complete before turning in their story. It will contain all the criteria the students believe are needed for a good story. |
| Exploring shapes in our environment | The students will be able to identify 2-D shapes within 3-D solids in their everyday environment. | Hook: As a class, we’ll play a quick 10 minute geometry bingo game. On a 4 by 4 sheet, students will need to tour the classroom and find objects that match each of the descriptions of various 2-D and 3-D shapes.<br>Learning engagement: As a class, we will go on a tour of our building and the outside environment (field and playground). Each student will be given a clipboard, paper and a pencil to document shapes that they see in the environment. We will make a few stops to allow students to sketch and label what they see. As a challenge, students will be asked to search for new geometric shapes that we may not have discussed in class.<br>Conclusion: The class will complete a self-reflection on the success of the field trip. | -Bingo sheet (18)<br>-Clipboards (18)<br>-Paper(18)<br>-Pencils (18) | Students will perform a self-reflection on how successful they were on the field trip (on behavior and their successes with finding shapes). |

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| Creating 2-D and 3-D pairs | The students will be able to design and create a matching game with pairs that show the relationship between a 2-D and 3-D shape (i.e. square and cube). | Hook: On the smartboard, the instructor will show students an online version of a geometry matching game. The instructor will make explicit what features are on the card (captions, pictures, 2-D and 3-D shapes etc.) so that students know the criteria for their version.<br>Learning engagement: Students will be given pre-made cut outs of matching card and will need to create their own matching game. Each student should make a minimum of 5 pairs.<br>Conclusion: Students will turn in the progress they have made so far and set a goal for the next lesson. | -18 sets of 10 cards<br>-Pencils/crayons/markers | Students will do a quick check-in with the teacher to ensure they are on track with the completion of the assignment. |
| Summative | The students will be able to identify the 2-D shapes within 3-D objects in their own examples. | Hook: Students will be introduced to the round robin game format for playing each other's matching games.<br>Learning engagement: Students will be paired up and will have the opportunity to play each other's matching game. At the end of each round, each student must document what new pairs they saw and explain why 1 of their peers cards was a match (prompts will be given).<br>Conclusion: As a class, we will share 1 star and 1 wish for our projects. We will also share general comments about what we saw in other peers work as well as any new learning. | -Matching game cards<br>-Math notebook<br>-Pencils | Students will turn in their matching game with a minimum of 5 pair along with a self-assessment checklist on how they think they met the criteria. |