

Bachelor of Education (Elementary) & Bachelor of Education (Secondary) STEM Lesson Plan

Lesson Title: _____ Crooked Paths Lesson # _____ 7 Date: _____ April 25, 25
 Name: _____ Kristie McComb Subject: _____ Math Grade(s): _____ 2/3

Rationale:

In this lesson, students will have further opportunity to practice their estimating and measuring skills. Students measure crooked paths in this lesson to learn that they need to consider more than the start and end points of a line when determining its length. Up to this point, students have only measured straight lines in this unit.

Core Competencies:

Communication	Thinking	Personal & Social
Profile 2: I can initiate actions that bring me joy and satisfaction and recognize that I play a role in my well-being. I can seek out experiences that make me feel happy and proud. I can express my wants and needs and celebrate my efforts and accomplishments. I have some strategies that help me recognize and manage my feelings and emotions. I recognize and can explain my role in learning activities and explorations, and I can give some evidence of my learning. I can describe how some specific choices can affect my well-being and participate in activities that support my well-being.	Profile 2: I can use evidence to make simple judgments. I can ask questions, make predictions, and use my senses to gather information. I can explore with a purpose in mind and use what I learn. I can tell or show others something about my thinking. I can contribute to and use simple criteria. I can find some evidence and make judgments. I can reflect on my work and experiences and tell others about something I learned.	Profile 2: In familiar settings, I can interact with others and my surroundings respectfully. I can build relationships and work and play cooperatively. I can participate in activities to care for and improve my social and physical surroundings. I use materials respectfully. I can solve some problems myself and ask for help when I need it. I listen to others' ideas and concerns. I can be part of a group and invite others to join. I can identify when something is unfair to me or to others.

Big Ideas (Understand)

Standard units are used to describe, measure and compare attributes of objects' shapes.

Learning Standards

(DO)	(KNOW)
Learning Standards - Curricular Competencies <ul style="list-style-type: none"> • Estimate reasonably. • visualize to explore mathematical concepts 	Learning Standards - Content <ul style="list-style-type: none"> • direct linear measurement: centimeters and meters, estimating length, measuring and recording length using standard units

Instructional Objectives & Assessment

Instructional Objectives (students will be able to...)	Assessment
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<ul style="list-style-type: none"> • Students will be able to use observation, experience and imagination to draw conclusions, make judgments, and ask new questions. • Students will be able to estimate reasonably to decide which string is longer • Students will be able to accurately measure the lengths of the strings. 	<ul style="list-style-type: none"> • Formative: Observations of and conversations with students (recorded on a rating scale) • Formative: Students can self-assess by checking their answers on the crooked paths activity. • Formative: observe (with a checklist) students' approaches to determining the lengths of the crooked paths - are they using previous knowledge and experience to help them problem solve? • Summative: Mark students' worksheets.
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Prerequisite Concepts and Skills:

Ability to measure the length of straight lines.

Indigenous Connections/ First Peoples Principles of Learning:

Learning is holistic, reflexive, reflective, experiential, and relational (focused on connectedness, on reciprocal relationships, and a sense of place).

- In this lesson, students estimate the length of crooked paths to determine which one is longer. They then measure the two paths to compare their actual lengths – providing students an opportunity to reflect on whether their estimations were correct and, if not, why they might have been incorrect.

Universal Design for Learning (UDL):

- Multiple means of engagement: students can use visual cues to estimate which line might be longer or, because the “lines” are yarn taped to bristle board, they can trace the lines with their fingers using their sense of touch to help them estimate the length of the lines.
- Students work in small groups so that stronger students can support their classmates’ learning.

Differentiate Instruction (DI):

Materials and Resources

- Prepare 7 boards with 2-3 crooked paths (yarn) on them (each a different length - although some could be the same).
- Prepare 7 envelopes with strings the same length as the ones on each board to use during the answer reveal.
- Student worksheets - one per student
- Pencils - one per student
- Measurement tapes (one per group of 3 students)
- Observation checklist (1 copy)
- Observation rating scale (1 copy)

Lesson Activities:

Teacher Activities	Student Activities	Time
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<p>Introduction (anticipatory set – “HOOK”): Demo the activity – ask student helper if they want to be in my group for the demo and pick someone else to join us, or the student helper can pick two people to be in my demo group. In advance have two lines drawn on the board in different colour – one line is straight and the other is not, both lines start at the same place and the straight line ends a bit further ahead of where the wavy line ends but the wavy line is still longer. Draw a rectangle around the lines to represent the bristle board and write station zero in the corner. Also have drawn the table from the worksheet on the board so that I can fill it out during the demo. As a group, discuss which of the two lines is longer. I will select the shorter one and argue that it’s longer because it has the same starting point as the other line but the end point is further from the start point. I will point out that I don’t have to agree with my group members – we’ll discuss it but write our own estimate and reasons on our own sheets. Model filling out the worksheet table on the board. Next we measure the lines to determine which one is actually longer – model recording these measurements (including units) on the board. Point out that they decide whether it’s most appropriate to measure in mm, cm, or m but units must be included. Once the demo has been completed and students’ questions answered, divide students into groups and assign them to stations.</p>	<p>Students sit at their desks.</p>	<p>10 min</p>
<p>Body: Students in groups of 3 – use prepared list to assign groups. Each group of 3 will go to a station where there are two lines on the bristle board. Students must estimate which is longer – write down which one they think is longer and why. Then they measure both lines and record their measurements. When the bell rings, students rotate one station to the right (similar to how we did last week). Approximately 4-5min per station depending on how quickly students are taking to complete their work at the stations. There will be 7 stations so that we can have 3 students per group (with one possible group of 4) but there is no need for students to visit all 7 stations.</p>	<p>Students rotate through the stations, completing the estimation and measurements at each station.</p>	<p>20 min</p>
<p>Closure: Answer reveal: go through each station – ask the students who visited that station which string they thought was longer and why. Which</p>	<p>Students return to their desks for class discussion.</p>	<p>10 min.</p>

<p>one did they find is longer when they measured them? Hold up the strings that match the ones on the board to reveal which one is actually longer. Repeat for all 7 stations. Students hand in their worksheets and return the measuring tapes before returning to their desks.</p>		
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Organizational Strategies:

- Prepare “crooked paths” in advance as well as the envelopes to reveal the answers.

Proactive, Positive Classroom Learning Environment Strategies:

- Incorporate movement by having group work where students move between stations which are in different parts of the classroom.
- ‘if you can hear me, do this ...’ to gain attention

Extensions:

If students are completing the work quickly, then have them move through the stations more quickly and actually visit all 7 stations.

Reflections (if necessary, continue on separate sheet):

Overall, this lesson went well. Students were engaged in determining which string was longer. On their worksheets they reported using various estimating strategies as they had been instructed to do. One hitch was that I had planned for 7 stations with the idea that students would all finish and be ready to move to the next station at approximately the same time. This was not the case. A better design for next time would be to have an extra station or two so that students can all move on to the next station when they have finished the previous one. Luckily there were always 2-3 groups finishing at approximately the same time, so I had them switch stations while other groups kept working at their current stations. Students seemed to enjoy the reveals at the end with them adding in drum rolls before each reveal.

Name: _____

Crooked Paths: Which Path is Longer?

Station number.	Which string do I think is longer? (estimate)	Why do I think that string is the longer one?	How long is each string? (measure)