Montessori Lesson Plan_Morgan_Reid

School: Maria Montessori Academy	Teacher: Mr. Morgan
Subject/Topic(s): Math 7 / Number / Operations / Integer Addition and Subtraction	
Grade Level: 7	Theme: Connections
Curriculum Components Included: * Lesson-Small Grp * Student engagement during lesson * Shelfwork *Self-Assessment *Interdisciplinary	
Seven Gateways for Adolescence addressed in this lesson: Meaning & Purpose	

- Standards/Objectives: (British Columbia, Canada)
  - *Operations with integers*
  - *Single Step Operations to 3 digits*
  - *By any method (Montessori, hand, calc)*
  - *Addition, Subtraction, Multiplication and Division patterns*
  - *Addition Rules*
  - *Assessment on Addition, Subtraction, Multiplication and Division*
  - *Representing integer patterns on a number line*

Materials: Teacher	Materials: Student	Time/Dates
• 30 cm rulers • Meter stick, tape measure • Tape number line -10 to 10 • Paper, • document camera/projection • Set of scrambled equation parts	• 30 cm ruler • Access to meter stick, tape measures • Integer addition and subtraction guide chart • Pencil, ruler, graph paper • Calculator • Set of scrambled equation parts	• Year A and B; cycle 1 week 1 (October), days: 3-4

Facts/Skills (some may be Prior Knowledge)	Concepts/Big Ideas
• Meaning of "Integer" • Whole number addition and subtraction • Integer addition • Integer subtraction • Both operator (+ or -) and sign of integer sets direction of change • Adding a positive number causes increase • Subtracting a positive number causes decrease • Adding a negative number causes decrease • Subtracting a negative number causes increase • Negative numbers have opposite value from positive numbers • Matching positive and negative numbers can cancel one another	• *Demonstrate and apply mental math strategies* • *extending whole-number strategies to integers* • *working toward developing fluent and flexible thinking about number* • *Use tools or technology to explore and create patterns and relationships, and test conjectures* • *Model mathematics in contextualized experiences* • *acting it out, using concrete materials (e.g., manipulatives), drawing pictures or diagrams, building, programming* • *Use mathematical vocabulary and language to contribute to mathematical discussions* • *Explain and justify mathematical ideas and decisions using mathematical arguments* • *Communicate mathematical thinking in many ways* ○ *concretely, pictorially, symbolically, and by using spoken or written language to express, describe, explain, justify, and apply mathematical ideas;* • *Represent mathematical ideas in concrete, pictorial, and symbolic forms* • *Reflect on mathematical thinking*

	○ *sharing the mathematical thinking of self and others, including evaluating strategies and solutions* ○ *Connect mathematical concepts to each other and to other areas and personal interests* ○ *to develop a sense of how mathematics helps us understand ourselves and the world around us (e.g., cross-discipline, daily activities, local and traditional practices, the environment, popular media and news events, and social justice)* • *Use mathematical arguments to support personal choices* ○ *including anticipating consequences*
Lesson Relates to Theme (Note: Not every content lesson will directly relate to the theme) **Connections** Symbols can have multiple meanings, that make sense in complementary ways. • Connect the idea that a quantity can be either positive or negative • Connect the idea that the + and – symbols can mean an operation and the sign of a number • Connect to the idea that money in is positive, and money owed or spent is negative	
Connection to Elementary Material or Lesson • Counting frames • Operations: Addition and subtraction	

Step-by-Step Procedures

1st Period Lesson – 20 minutes (Include steps and materials)

- **Counting, More or Less:** We want to learn and practice reliable methods for adding and subtracting integers, and understand the meaning of adding and subtracting integers.
  - Students share prior knowledge
  - Students share methods they already know for adding and subtracting positive and negative integers
  - Demonstrate (and/or review) the + and – symbols as operations and as signs of numbers
  - Demonstrate by drawing an arc the effect of adding and subtracting integers
  - Demonstrate walking method by walking on a number line on the floor, combining pointing for the operation (for + point to increasing direction, for - point to decreasing direction) with stepping for the sign of the number (positive numbers step forward, negative numbers step backward)
  - Demonstrate using coloured counters the effect on a number line of adding and subtracting integers, including the practice of canceling like values of opposite sign
  - Demonstrate writing sums and differences of integers
  - Demonstrate use of reference chart for determining direction of change when adding and subtracting integers

2nd Period – Recognition (Shelfwork)

- Students assemble correct operations and signs to complete laminated equations
  - Material: Set of equations with missing operators and signs, with set of moveable operators and signs
- Students practice understanding of direction of change of adding positive and subtracting positive and negative integers by pointing the direction of operation and walking on a number line on the floor
  - Material: 5m number line and set of equations

2nd Period – Recall/Practice

- Students use coloured counters and number line to practice equations
  - Material: 1m number line and counters in two colours, (red labeled + and white labeled -) and set of equations
- Students practice completing written equations
  - Material: Practice worksheet
- Students practice equations online
  - Material: Mathletics / Delta Math / Khan Academy integer operations practice pages
- Students assemble correct order of digits, operations and signs in scrambled equations
  - Material: Set of scrambled equations with moveable digits, operators and signs

3rd Period – Student Application / Assessment

- Students are given a virtual weekly allowance. Students choose how much they could save and what they could buy over a month, and how much they could save.
- Students complete equations, using number lines, coloured squares, or scrambled equations
- Alternate Assessment demonstrate assembling partial and completely scrambled equations
  - Material: Set of scrambled equations with moveable digits, operators and signs

Plan for Differentiation

Teaching	Work	Assessment
Emerging abilities: • Addition and subtraction of whole numbers • 1:1 demonstration and practice of use of number	Emerging abilities: • Students can use + and - operations with only positive numbers. • Students can stack plastic	Basic requirement: All students will demonstrate understanding of integers being positive and negative, and of addition of single-digit integers Most students will demonstrate understanding of addition and

lines, counters, scrambled, and written equations Enrichment/extension: • Hand arithmetic operations with 3-digit and higher integers, abstract use of operators and signs • Impressionistic description of positive and negative feedback in dynamic systems • Mention of coding applications of positive and negative feedback	counters or draw stacks of coloured shapes to represent quantities and operations Enrichment: Students can: • Explore the concepts of positive and negative feedback loops in dynamic systems • Design a demonstration of positive and negative feedback loops in dynamic systems	subtraction of positive and negative integers. Demonstration can be written equations, use of scrambled equations, explanation / dictating to scribe Choice of modes of assessment: • On paper • Using scrambled equations • Verbal • Using counters • Using an online quiz
Outside Support: Who, What, How Classroom Assistants will help observe and assist students who get stuck		
Formal Assessments		
Formative Assessments Students will show or advise teacher of completion of their 2nd period shelfwork and recall work by the end of day 2		
Summative Assessment (Differentiated: 1) is minimum requirement) Students produce and submit: 1) A written or alternate assessment of understanding integers being positive and negative, and of addition of single-digit integers 2) 1) and A written or alternate assessment of addition and subtraction of positive and negative integers. 3) (Enrichment) an written or alternate explanation or demonstration of positive feedback in dynamic systems		