**Integers Teacher Guide**

Essential Understandings

Lesson 1: Representing Integers:

Number: Integers

I-1 Because every integer is either a whole number or its opposite on a number line, integers are counted like whole numbers.

Curriculum Expectations

Number Sense: Rational Numbers

B1. 2 Read and represent integers, using a variety of tools and strategies, including horizontal and vertical number lines.

Lesson 2: Comparing Integers

Number: Integers

I-3 The size of an integer is based on both its distance and direction from 0.

Curriculum Expectations:

Number Sense: Rational Numbers

B1. 2 Read and represent integers, using a variety of tools and strategies, including horizontal and vertical number lines.

B1. 3 Compare and order integers, decimal numbers, and fractions, separately and in combination, in carious contexts.

Note: Use this Teacher Guide as a guide! Lessons may need to be adapted to fit your students, and some lessons may take more time depending on the needs of your class.

Adapted from the MathUp Integers Unit.

Highlight: Work pages to upload to OneNote

**Day 1: Diagnostic**

OneNote Needs:

1. Diagnostic Assessment
2. Modified Diagnostic – Labeled B

Minds On:

First slide:

* Where would we place 0 on this number line? At the first line.
* Where would we place 1 on this number line? On the 2nd line.
* Where would we place 5 on this number line? The 6th/middle line.
* Where would we place 10 on this number line? The 11th/last line.

Second slide:

* Where would we place 15 on this number line? The 6th middle line.
* Where would we place 20 on this number line? The 11th/last line.
* May have to explain that even though we used this number line to show up to 10 in the last slide, we can also use it to express up to 20 numbers.

Task: Assessment for Learning Task.

* In OneNote complete a quick diagnostic assessment to show what you know about using a number line and counters to compare numbers.
* Students can use <https://www.didax.com/math/virtual-manipulatives.html> to help them with both questions, especially question 1. B).

When done go to: https://www.didax.com/math/virtual-manipulatives.html - Use the Number Lines or 2-Colour Counters to practice comparing numbers.

**Day 2: Lesson 1**

Representing Integers

One Note Needs:

1. Representing Integers – Action Task Worksheet
2. Modified Representing Integers – Action Task Worksheet (Labeled B)

**Learning Goal: I can represent integers in different ways and explain how they are used.**

Success Criteria:

* I describe what an integer means.
* I represent a negative integers and its opposite.
* I think of those situations where -10 might occur.
* I can represent any integer in different ways.
* I can describe situations when integers are useful.

Minds On:



* Someone says that the temperature is below 0. How far below is it? 4 degrees
* Is the temperature far below 0? It is not that far.
* What month do you think it might be? Why? It might be November since it’s not super cold, but it’s cold. It might be February because it is cold enough for snow and in February we have snow.

Lesson:

1. Slides:
	1. Recall: What is an integer?
	* Integers: the set of numbers that includes the counting numbers, 0, and the opposites of the counting numbers on the other side of 0 on the number line. For example -4, -3, -2, -1, 0, 1, 2, 3, 4. These are all integers because they are positive or negative whole numbers.
	1. Positive & Negative Integers: Watch the following video to help explain positive and negative integers to kids: <https://www.virtualnerd.com/middle-math/integers-coordinate-plane/integers-absolute-value/positive-negative-number-definitions>
	2. Key Terms:
	3. Integers Number Line
	4. Different ways to represent integers
2. Action/Task:
	1. Show students the example image of where we see negative integers in real life. In this example we are using a hockey team and goals scored for and against when a player is on the ice. Priyanka was on the ice when her team scored a goal 9 times. She was also on the ice when her opposing team scored 2 times. This means her +/- score is +7. Kim was on the ice when her team scored 7 times, but was also on the ice when the opposing team scored 6 times. Her +/- score is only +1. Abby was on the ice when her team scored 3 times, however was on the ice when the other team scored 8 times. She has a +/- of -5.
	2. Who has the better record? Priyanka has the best record because she was on the ice more when her team scored and less when the other team scored. We can see this because her +/- score is +7.
	3. Who has the worst record? Abby has the worst record because she was on the ice more times when her opponents scored giving her a score of -5.
	4. In OneNote, have students complete the Representing Integers – Action Task Worksheet.
3. **Exit Slip: forms** – what is one thing you learned about integers? What is one example of when you might see a negative integer in real life. –Need to make own links

**Day 3: Lesson 1, Con’t**

Representing Integers

**Learning Goal: I can represent in different ways and explain how they are used.**

OneNote Needs:

1. Representing Integers – Your Turn
2. Modified Representing Integers – Your Turn (Labeled B)

Minds On: Answer both questions.

Lesson:

1. Recall: What is an integer?, Representing Integers Review

Consolidating Learning Discussion Questions (With Possible Answers)

1. **What other ideas did you have for where -10 comes from?**

A – We thought of losing yards in play during a football game, weather, bank accounts,

1. **How are your representations of the negative integers like the representations of their opposites? How are they different?**

A – They’re alike because we can represent them using the same number counters. They’re different because we use red counters for negative and yellow for their opposites. OR They’re alike because each is the same distance from 0 on a number line. They’re different because they are on opposite sides of 0.

1. **Is being negative always a bad thing?**

A – No. A golf score is always negative.

Task: Complete Representing Integers – Your Turn in OneNote

 If done early play: https://www.mathplayground.com/ASB\_OrbitIntegers.html

**Day 4: Lesson 2**

Comparing Integers

OneNote Needs:

1. Comparing Integers – Action
2. Modified Comparing Integers – Action (labeled B)

**Learning Goal: I can decide which is two integers is greater and explain why.**

Success Criteria:

* I choose four integers from the list and identify which is least and which is greatest, and I can explain why.
* I put the four integers in order and explain how representations help me do that.
* I identify an integer between the two lowest values, an integer less than all of them, and an integer greater than all of them.
* I can compare integers using a number line or counters, and I can explain how these representations show which integer is greater or less than another.

Minds On:

Using Two-Colour Counters from <https://www.didax.com/math/virtual-manipulatives.html> answer the following questions:

Why might someone think that -2 is greater than 1?

Why might someone else think that -2 is less than 1?

Do you think -2 is greater than or less than 1? How do you know?

Ensure that students walk away from the MindsOn Activity with the understanding that the way we determine greater of less is based on position on the number line, with greater being farther to the right or higher up on a vertical number line, or on a combination of colour and magnitude with two colours of counters.

Lesson:

1. Recall: What is an Integer
2. Action: Go through action slides. Use Didax number lines of two-colour counters to further explain topics if necessary.
3. Action: Answer on OneNote and review an example as a class. \*\*If time is tight, just go through an example as a class:
	1. Choose 4 values from -8, -20, -7, +10, +49, 0, -32, -3
		1. As a class answer the following questions:
		2. Choose four of these integers. E.g., -8, -20, +49, 0
		3. Which integer is the least? How do you know? E.g., -20 is least since that is a temperature of -20 is below 0, and it is a lot more below 0 than -8 is.
		4. Which integer is the greatest? How do you know? E.g., The greatest is +49 since it is the only positive number I chose, and positive numbers are right of 0 on a number line.
		5. Order the 4 integers you chose on the last slide from least to greatest using counters or a number line.
		6. How did your representation of the integers, either using counters or a number line, help you decide the order? E.g., I marked the numbers on a number line and went from left to right. OR I know that more negative counters is lower and more positive counters is higher. So, I went from most red counters to fewer red counters to no counters to lots of yellow counters.
		7. Identify an integer between your least and second value. E.g., -10
		8. Identify an integer that is less than all of your numbers. E.g., -100
		9. Identify an integer that is greater than all of your numbers. E.g., +100

Consolidating Learning Discussion Questions (With Answers):

1. **Which pair of integers would you find easier to compare? Why? -3 and 6, or -17 and +142**

I would find -17 and +412 easier since it’s obvious that a negative is less than 0, and a positive is more, so the positive is greater. OR I think the first pair is easier since I can show them easily using counters.

1. **Which do you find easier to use for ordering integers, a counter model or a number-line model? Why?**

I think the number like is easier because you just look to see which number is father right, and that is the greater number.

1. **What rule or rules could you create about how to compare integers?**

A positive is always more than a negative.

A positive closer to 0 is less than a positive farther from 0.

A negative closer to 0 is greater than a negative farther from 0.

**Exit Slip: forms** – what is one thing you learned about integers? –Need to make own links

**Day 5: Lesson 2 Con’t**

Comparing Integers

OneNote Needs:

1. Comparing Integers – Your Turn
2. Modified Comparing Integers – Your Turn (Labelled B)

**Learning Goal: I can decide which is two integers is greater and explain why.**

Minds On: Answer the questions together as a class.

Task: Complete Comparing Integers – Your Turn in OneNote

**Day 6: Assessment**

OneNote Needs:

1. Final Quiz
2. Final Task – Exploring Two Integers

Have students complete the Final Quiz.

Once the quiz is complete they will begin the Final Task. Show example of final task to students and review what their work should look like, e.g., complete sentences for short answer questions, different examples for each integer.