

Integers - Remedial Lesson 3

Grade: Applicable Knowledge and Skills to All High School Math Courses

Subject: Remedial Math

Find More at www.bjrichardsonmath.weebly.com

Driving Question: How Do I Multiply and Divide Integers?

Purpose: Many high school students have difficulty dealing with negative numbers. Regardless of the number system, this small concept can create some very large problems and might just derail a perfectly fine attempt at a solution. The goal of this integer series, is to take a quick look at some of the basics around arithmetic with signed numbers. Although these lessons solely focus on integer values, teachers should have conversations to extrapolate to other number systems.

In this particular lesson, we are assuming that the student has a decent understanding of how of addition, subtraction, direction, what an integer is, and how to add and subtract them. The purpose of this lesson is to make connections between that prior knowledge and symbolic and pictorial representations of multiplication and division with integers.

Prior Knowledge: Students should be aware of the natural, whole, and integer number systems as well as basic arithmetic operations within the first two systems and addition/subtraction with integers. They should have basic number sense with respect to magnitude.

Screencast Link(s):

How do I Multiply Integers - https://www.youtube.com/watch?v=SB_IWM3qgu0

How do I Multiply Integers - <https://www.youtube.com/watch?v=bckpVNCSQlo>

Expected Time: The design of this lesson is to be an individualized system of instruction, thus time would depend directly on the students' progress. If attempting as an entire class the lesson would likely take one or two 75-minute period (this includes assessment tasks and time for formative feedback).

Resources:
(Tools &
Tech)

Internet Access

Lesson Procedure

Due to the nature of the lesson, the educator's role becomes addressing issues after the student has had time to work through the lesson. The Resource in that sense is a truly flipped lesson, but the resources within could easily be used within a blended model.

I do: Assess the student's current skills with basic integer concepts and operations and if required, direct the to the student instruction form.

Student Instruction Form:

If possible, find some time to go over the students assessments and show them how their difficulties with integers is directly impacting the achievement of their outcomes. Some discussion in person with regards to the different ways to represent zero might be beneficial before proceeding to the videos.

You may ask students to point out areas where they believe integers have cost them the opportunity to demonstrate the outcome. This provides the students and opportunities to find, analyze, and evaluate their skills with guidance.

find, validate - *Let the students find areas on assessments that were difficult due to integer operations.*

critically think and analyze - *Look at what skills in particular would've benefited your ability to demonstrate understanding.*

collaborate and communicate - *The teacher should direct the student to the remedial lesson and then both should trouble shoot any difficulties, technology or otherwise, the student might have in completing the lesson*

You do:

The students should begin by watching the screencasts listed above.

The videos will take students through the following topics:

Multiplication as adding in groups (positive multiplication)

Multiplication as taking-away groups (negative multiplication)

The two definitions of division

Dividing when the signs are the same

Dividing when the signs are different (special mention of dividing a + by a -)

In these videos a 'bucket 'and colored counters are used to visually represent the symbolic operations. It should be noted that there is no relevant way of explaining a positive number by a negative number in a real world, or colored counter-based approach. To explain this, inverse operations must be addressed.

Now the student needs time to assess their understanding. The following links will take the student to a variety of web activities. The activities that have been selected should provide the necessary formative feedback and practice for the student to master the skills and knowledge.

The students should attempt the activities until they feel they've reached a level of mastery...and then do a few more to be sure. The following screen shots or links show where to find the selected activities.

Activity 1: Multiplying and Dividing Integers Game (Math-Play):
<http://www.math-play.com/multiplying-and-dividing-integers-game.html>

Activity 2: Integer Multiplication (Math Goodies):
<http://www.mathgoodies.com/lessons/vol5/multiplication.html>

Activity 3: Dividing Integers (IXL):
<https://www.ixl.com/math/grade-6/divide-integers>

Activity 4: Multiplying and Dividing Negative Numbers (Khan Academy):
<https://www.khanacademy.org/math/arithmetic/absolute-value/mult-div-negatives/e/multiplying-and-dividing-negative-numbers>

remember, understand, evaluate and leverage - the students are being asked to connect the knowledge and skills remembered from the screencasts to understanding the tasks in the activities. In solving the tasks of the activities, the students are leveraging the remembered knowledge to meet the goal. If they need additional support from the provided examples or supplementary videos, they must evaluate the information being presented before leveraging it.

collaborate - the apps could easily be done in groups or with parents. The possibilities for collaboration exist. The 'challenge' idea mentioned above could easily be done in groups.

We do:

On the student instruction form, there is a section where the student must submit up to five questions the student still has concerning the topic. The student should submit these to the teacher and when possible (extra help, during a work period, etc.) the teacher should address these.

After this the student should complete a small creative piece demonstrating their understanding of the content. This piece should be something that can be shared electronically. The goal of the piece is for the student to step in the role of the educator and create something that they feel would help others who struggled as they did. If the student has completed a task like this from a previous lesson, they should be encouraged to choose a different method of presentation from there last OR combine multiple pieces into one larger resource.

The possibilities for creative piece are:

A Kahoot Quiz

A Poll Everywhere Quiz

A Video Short

	<ul style="list-style-type: none"> □ critically think, analyze, synthesize - the students need to critically analyze their understanding and skill to synthesize questions they still have. □ create - the students need to create a piece that demonstrates their understanding and can be used as a teaching tool for others. □ communicate - the piece that they develop has to communicate clearly their understanding and be accessible by those who would struggle with the topic also.
	<p><i>We share: The student should then meet with the teacher to receive feedback on it. If the piece is satisfactory, and if the student is comfortable, they should find a forum to share their piece. This could be accessible online or displayed in the classroom.</i></p>
	<ul style="list-style-type: none"> □ collaborate, communicate – the student should be able to communicate to all audiences what they have learned and how to apply the skills and knowledge. □ publish – together, the teacher and student should find a way to publish the work if the student is comfortable. □ citizenship – through sharing their work, the student is contributing to their classroom and other’s education.
<p>WRAP UP/REMINDERS: With respect to the creative piece developed by the student, the nature of this piece could easily be adapted. For example, the student may choose to demonstrate their knowledge of integer subtraction, and then extrapolate this showing applications to rational number cases in curriculum applications. In this way the student is linking the remedial knowledge directly to applicable outcomes within your specified course.</p>	
<p>Evaluation: Ideally, the teacher should see a reduction in the amount of integer related errors that the student commits while attempting to demonstrate outcomes requiring this prerequisite knowledge.</p>	
<p>Alternatives: If students are not keen on the idea of video education or would benefit from a more text based approach, the following sites are recommended for their simplicity and content.</p> <p>Integer Multiplication (Math is Fun) – https://www.mathsisfun.com/multiplying-negatives.html</p> <p>Integer Division (Math Planet) - http://www.mathplanet.com/education/pre-algebra/explore-and-understand-integers/multiplying-and-dividing-with-integers</p>	