

# #7-Gruzynski-Differentiate in the Math Classroom and Have Students Think Deeply



In a math classroom of diverse learners, how can we effectively teach and reach all students?



## Whole Group Instruction

- Introduce skill
  - Literature
  - Bell ringer/anchor activity
  - Video clip
  - Movement
- Create common language
  - Model
  - Teacher think aloud
- Introduce vocabulary
  - Word wall
  - Graphic organizers
- Synthesize learning at end of lesson



## Small Group Instruction

- Group students based on learner readiness
- Focus instruction on specific skill or concept
- Vary the type of instruction
- Increase student participation
- Provide immediate feedback



**Math Differentiation in a Nutshell**

How do you know what your students already know?

below target	ON TARGET	above target
Use whole group instruction to introduce skill, create common language, and introduce vocabulary.		

Have students come back together as a whole group and bring closure to the lesson with a synthesis of key learnings.

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# Math Vocabulary: Graphic Organizers & Movement

Math vocabulary should be taught **explicitly** through direct instruction and taught **implicitly** through exposure and opportunities for use over time.

Math vocabulary can be viewed through different lenses.



multiple meaning words

math specific words

math phrases

math verbs

Frayer Model with Different Versions for Differentiated Learning

definition	essential characteristics
examples	non-examples

definition	examples	non-examples
visual/numeric representation	word problem	

\*math

\*application

## Graphic Organizers

When introducing math vocabulary, try using a graphic organizer. The Frayer model lends itself to differentiated math instruction. It also helps to represent words in more than one way.

## Movement

Memory for learning can be enhanced by utilizing movement for instructional purposes. The movement increases sensory input to the brain. (Wolfe 2001) Try adding movement activities to teach and review math vocabulary.

Make My Day	Vocabulary Charades	Are You With Me?
<ul style="list-style-type: none"> <li>↳ Each student is given a card with a vocab word, number, equation, picture, etc.</li> <li>↳ Teacher gives clues.</li> <li>↳ Students listen for clues from the teacher.</li> <li>↳ If card matches clues, student steps forward to "make the teacher's day."</li> </ul> <p>"If you are a <b>factor</b> of 36, <b>Make My Day.</b>"</p> <p>(Sammons 2011)</p>	<ul style="list-style-type: none"> <li>↳ <b>parallel lines</b>: hold arms out parallel to each other</li> <li>↳ <b>right angle</b>: hold one arm up at elbow and the other arm horizontal with fingers touching elbow</li> <li>↳ <b>circumference</b>: move arm in a circle</li> <li>↳ <b>absolute value graph</b>: palms together to make a V.</li> </ul>	<ul style="list-style-type: none"> <li>↳ Each student is given a card with a vocab word, number, equation, picture, etc.</li> <li>↳ Students walk around and ask "Are you with me?" to find other students who they can connect to or create a category with.</li> <li>↳ After a signal is given have students explain what their words have in common.</li> <li>↳ Play some quiet music and have students do <b>Silent Pass</b>. That means have students walk around the room exchanging their cards with other students as they "pass by."</li> <li>↳ When the music stops, students look at their new words and regroup themselves.</li> </ul> <p>(Sammons 2011)</p>

# Extension Menus

## Geometry Gems



name \_\_\_\_\_ date \_\_\_\_\_ room # \_\_\_\_\_

ANGLES ANGLES ANGLES	Snapshot Gallery of Shapes	MISSING IN ACTION
<p>Create an acrostic poem that shows what you know.</p> <p>Include: types of angles, parts of angles, and where you can find angles</p> <p>Be sure to use at least <b>6</b> words per line.</p>	<p>Using a digital camera, find examples of different shapes at school. Take an adult on tour with you and snap your pictures. Design a collage and label.</p> <p>Be sure to include at least two different examples of each: sphere, rectangular prism, cylinder, triangle, rectangle</p>	<p>Imagine a day when all quadrilaterals went missing. What would it be like? What happened to them? What problems would be created?</p> <p>Create a 1-2 minute news bulletin explaining the above. Be sure to include voice and urgency in your dialogue. Share with the class.</p>
<p><b>Fact or Fiction?</b></p> <p>Using a minibook, design a fact or fiction book focusing on three polygons that you find most interesting or challenging.</p> <p>Polygons to consider are quadrilaterals, squares, rectangles, rhombuses, triangles, pentagons, hexagons, or octagons.</p>	<p><b>I'm Like You...No You're Not!</b></p> <p>How is a square like a rectangle? How is a hexagon like an octagon? How is a right triangle like an acute triangle?</p> <p>Create a dialogue between two shapes and share their similarities and differences. You need at least four exchanges.</p>	<p><b>Measure Up!</b></p> <p>Develop a <i>How-to Manual</i> for measuring angles.</p> <p>Remember to include the following words: protractor, degrees, angles, vertex, ray</p>

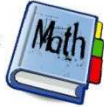
## HOW TO...

- Determine the standards/ objectives you are targeting
- Utilize Bloom's taxonomy and multiple intelligences
- Plan activities that develop and extend learning
- Focus on process and deeper learnings
- Keep the NCTM Process Standards in mind when planning:
  - problem solving
  - reasoning and proof
  - communication
  - connections
  - representations

name \_\_\_\_\_ date \_\_\_\_\_ room # \_\_\_\_\_



More Adding and Subtracting ~ Differentiated Learning  
Grade 3 ~ Unit 6



Must Dos:

Lesson	Name	Problems to Complete
Lesson 3	Adding with Base-Ten Pieces	Page: 70 -Pick one: #7 or #8-#9, #10
Lesson 4	Subtracting with Base-Ten Pieces	Pages: 74-75 -#6-14 (Remember labels!)
Lesson 5	Close Enough!	Pages 79-80 -#2-6 (evens only)

Choice Options:

Task	Date Completed	Checked by the Teacher
Fill in the Missing Digits Addition		
Fill in the Missing Digits Subtraction		
Making Change		
<i>The Case of the Hatcher Hotel Heist</i>		
<i>The Big Carnival Caper</i>		



Learning Conditions:

- I will work quietly and use my time wisely in class.
- I will ask for help when I need clarification.
- I will rejoin the group if I continue to have difficulty with a concept.
- I will demonstrate my personal best when completing each task.

Student name: \_\_\_\_\_ date \_\_\_\_\_

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Name \_\_\_\_\_ Period \_\_\_\_\_



*What Do You Expect?* ~ Probability



Inv	Skill	Practice Questions	Application Questions	Extension Questions
1	<ul style="list-style-type: none"> <li>• Compare and contrast experimental and theoretical probability</li> <li>• List and tree diagram possible outcomes of probability</li> <li>• Determine the fairness of a game based on probability</li> </ul>	p. 11-13 <b>#4, 10a-b, 11a-b, 12, 13</b>	p. 14-18 <b>#14a-i, 19a-d, 22, 23, 28a-f, 30, 31, 32, 33</b>	EQ1
2	<ul style="list-style-type: none"> <li>• Simulate and analyze theoretical probability for 2 stage outcomes</li> <li>• Use an area model to analyze theoretical probability for 2 stage outcomes</li> <li>• Analyze equally likely and non-equally likely outcomes of experimentally collected probability data</li> <li>• <b>CCSS 7.SP.8</b></li> </ul>	p. 27-35 <b>#2a-d, 3a-b, 6, 7, 24</b>	p. 33-34 <b>#15-19, 20F-J, 21, 25, 26</b>	EQ2
3	<ul style="list-style-type: none"> <li>• Understand the difference between the probability of an outcome and the long-term average of many trials in a situation with a payoff</li> <li>• Determine the expected value in a probability situation</li> <li>• Use probability to make decisions</li> </ul>	p. 43-44 <b>#1, 3a-b, 4a-b, 8a-c, 15a-c</b>	p. 45-48 <b>#21, 25, 27a-b, 28a-b</b>	EQ3
4	<ul style="list-style-type: none"> <li>• Analyze a binomial situation</li> <li>• Practice finding expected values in a multiple-stage binomial probability situation</li> </ul>	p. 54-58 <b>#3a-b, 4, 6, 10, 13a-c, 17d-e</b>	p. 57-59 <b>#15, 18, 19, 20, 21, 22</b>	EQ4

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Learner Agreements

\*Benjamin, Amy. (2011). *Math in Plain English*. Larchmont: Eye on Education.

\*Clipart: Power Point Station. pppst.com, Thistlegirlsgirlsdesigns.com, Clip Art by Carrie/www.ccteachfirst.blogspot.com

\*Sammon, Laney. (2011). *Building Mathematical Understanding*. Huntington Beach: Shell Educational Publishing, Inc.

\*Winebrenner, Susan. (2001). *Teaching Gifted Kids in the Regular Classroom: Strategies and Techniques Every Teacher Can Use to Meet the Academic Needs of the Gifted and Talented*. Minneapolis: Free Spirit Publishing Inc.

\*Wolfe, Patricia. (2001). *Brain Matters: Translating Research into Classroom Practice*. Alexandria: Association for Supervision & Curriculum Development.