

# Differentiation and Assessment in Mathematics: Handout

---

Workshop: Clara Desousa

Contact: clara.desousa@mail.utoronto.ca

(416) 803- 1289

## Guiding Questions

How do we know how to differentiate math instruction when there isn't as much research or as many resources as other subjects?

How can we challenge high achieving students, and meet the needs of students who struggle while still assessing the same math concepts?

What does the research tell us about "best practices" for differentiating and assessing math?

Differentiation



- Meeting students at their level and then extending and expanding their growth
- Changing the content, process and/or product of student learning
- Respectful tasks: engaging, challenging and interesting for all students

---

## Differentiation in Math

- Same concepts; different developmental levels
- Rationale: in the curriculum as one of underlying principles of math, reality of schools today
- Marian Small: 3 components of a differentiated math program
  - Big Ideas: understanding of math is based on cohesive big ideas, framework
  - Choice: content, process, product
  - Assessment: know the students (readiness, strengths, needs)
- Classroom community: math talk and discussion
- Strategies for Differentiation: Open Questions and Parallel Tasks



### Parallel Tasks

- 2-3 questions, based on the same big idea
- Similar enough that they can both be discussed at the same time
- Different enough to accommodate for developmental ranges e.g operations, numbers

### Open Questions

- Question is open to different levels/strategies, multiple answers are encouraged
- Strategies
  - Turn it around
  - Similarities and Differences
  - Leave a blank for a number
  - Number Sentence
  - Change the question

1. Know the students: assessment, readiness, strength, needs, interests
2. Define the main idea
3. Create task using strategies

## Steps for Differentiation

### Examples

#### Open Questions

- The square root of a number is easy to figure out. What might the number be?
  - How many ways can you measure a pumpkin?
  - Make this true as many ways as you can: 72 is \_\_\_ % of \_\_\_
  - A triangle is drawn on a coordinate grid. One of the vertices is at (4, 5) what might the other vertices be? What kind of triangle is it?
  - What makes 5 a special number?
- 
- Choice 1: Make up a story problem you could solve by adding 14 and 3. What makes it an addition problem?
  - Choice 2: Make up a story problem you could solve by subtracting 3 from 14. What makes it a subtraction problem?
  - Choice 1: What real life situation would 10 000 describe?
  - Choice 2: What real life situation might 1000 describe?

#### Parallel Tasks

Sample RAFT			
ROLE	AUDIENCE	FORMAT	TOPIC
Number line	A group of kids, each wearing a number tag	Poster	Get organized. I can help.
A set of base ten blocks	Principal in a school	Advertisement	Why you should buy us for your students
Square	A Grade 2 student	Instruction manual	How to draw me
Bar graph	Journalist	Email	Why you need me in your article

### Research and Resources

- Marian Small, "Great Ways to Differentiate Mathematics Instruction" <https://books.google.ca/books?id=ZCDX0SolMNOc&printsec=frontcover#v=onepage&q&f=false>
- Iris Module on Differentiated Instruction: <https://iris.peabody.vanderbilt.edu/module/di/>
- Learning Trajectories: <https://www.learningtrajectories.org/>
- Capacity Building Series: [http://www.edu.gov.on.ca/eng/literacynumeracy/inspire/research/different\\_math.pdf](http://www.edu.gov.on.ca/eng/literacynumeracy/inspire/research/different_math.pdf)
- Nelson Math: <http://www.nelson.com/bigideas/documents/Marian%20Small%20April%202009%20DI%20-%20final.pdf>