Teaching Mathematics in Inclusive Classrooms in Five *Fairly* Easy Steps

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Opening Activity

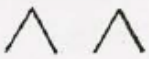
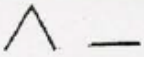
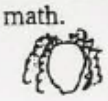
My Mathematics Glyph

A glyph is a pictograph. Using a paper plate for a face, make a face with eyes, eyebrows, ears, nose, mouth, tongue, freckles, hair, and ball cap that best describe you. Give your glyph a name.

KEY:

Eyes:	I learn math best by looking at pictures, diagrams, & symbols.	Sometimes I learn math best by looking at pictures, diagrams, & symbols.	I do not learn math best by looking at pictures, diagrams, & symbols.
			
Ears:	I learn math best by listening to the teacher.	Sometimes I learn math best by listening to the teacher.	I do not learn math best listening to the teacher.
			
Nose:	I like to do math in groups.	Sometimes I like to do math in groups.	I do not like to do math in groups.
			
Mouth:	I like math.	Sometimes I like math.	I do not like math.
			
Tongue:	I learn math best by using manipulatives.	Sometimes I learn math best by using manipulatives.	I do not learn math best by using manipulatives
			

Freckles: When I work with others, I prefer to work with

1 partner	2 or more people	only the teacher
		no freckles
Eyebrows: Math is easy.	Sometimes math is hard.	Math is hard.
		
Hair: I am nervous about math.	Sometimes I am nervous about math.	I am not nervous about math.
		
Ball cap: I work on hard problems until I finish them.	I try hard problems even if I cannot finish them.	I do not try hard problems.
		

Sample Problem

A technician tests batteries for a battery manufacturer several times each week. She determines that the number of defective batteries is proportional to the number of batteries tested. The table below shows the numbers of batteries the technician tested at two different times during week 1 and the number of defective batteries she found each time.

Battery Test Results for Week 1

Number Tested	Number Defective
160	4
600	15

Between week 1 and week 2, the battery manufacturer changed its process. The number of defective batteries is still proportional to the number of batteries tested, but the constant of proportionality is greater. The technician tested 480 batteries during week 2 and found that 18 were defective. By what percent did the constant of proportionality increase?

A. $33\frac{1}{3}\%$

B. 50%

C. $66\frac{2}{3}\%$

D. 125%

Think about what grade level this problem is targeted for_____

What specific vocabulary do you think you might need?

Describe or list the steps that are needed to solve this problem?

Assessment

- **Squaring off (4 corners)**
  - Rarely ever Sometimes Often I have it!
  - Dirt road Paved road Highway Yellow Brick Road
  - I know I know some I know a lot I know all about this!

- **Graffiti Fact**
  - Create a graffiti board
  - Post all things the class knows about the topic
  - What we knew
  - What we learned
  - What we want to learn

Formative Assessment-During Learning	**Reflection After Learning**
• **Thumb it** • **Fist of Five** 1. I am beginning to understand 2. I could use more practice 3. I need some help 4. I can do it alone 5. I know it so well. I could explain it to anyone • **Face the fact ( )**	• **Wraparounds** Circle- each person takes a turn • Something they will use • Something they will remember • A significant AHA • Something they learned • Something they hope to learn • **Grand Finale Comment** *Individual- some potential prompts* • Today I learned…tomorrow I need…. • Today I felt…because… • I hope we…..next *Group - some potential prompts* • Our group was great today when we…. • Tomorrow we are going to…..

Adjustable Assignments

- ***What*** **are they?**
  - Focus on essential skills and key concepts
  - Students explore the concepts at their own level
- ***Why*** **do we use them?**
  - Starts where the student is working on challenging and worthwhile tasks
  - Allows for reinforcement or extension of concepts
  - Increases the chances for success
- ***How*** **do we use them?**
  - Concepts, skills and content aligned with targeted standards and expectations
  - Start with pre-assessment of skills (quizzes, journal entries, class discussions and data collection techniques)
  - Decide
    - Which parts will be taught to the total class and how they will be presented
    - How to adjust assignments to meet the needs of the learners
- **Deciding questions**
  - What content does each group already know?
  - What does each group need to learn?
  - What strategies should be used to facilitate the learning of each portion?
  - What is the most effective way to group the students for each activity?
  - What assessment tools will be used so that students will be accountable?
  - Are the plans meeting the individual needs of the students?

Standard, Concept or Skill: Proportional Relationships			
What skill does each group need to learn next?	✓ Analyze proportional relationships and use them to model and solve real-world	✓ Recognize and present proportional relationships between quantities ✓ Identify the constant of proportionally in tables, graphs, and equations.	✓ Explain what a point (x, y) on the graph of a proportional relationship means ✓ Represent proportional relationships by equations.
What does each group know about this topic?	✓ Recognize and present proportional relationships between quantities ✓ Identify the constant of proportionally in tables, graphs, and equations.	✓ Explain what a point (x, y) on the graph of a proportional relationship means ✓ Represent proportional relationships by equations	✓ Knows how to solve simple proportions ✓ Has heard the term proportionality
	High Degree of Mastery	**Approaching Mastery**	**Beginning Mastery**

Grouping

- **Flexible grouping is in constant use and is forever changing**

  Using *TAPS*
  - Total Group
  - Alone
  - Partner
  - Small Group

- **Cluster Grouping**
  - Knowledge of subject
  - Ability to perform a task or skill
  - Interest in specific area of the content
  - Peer-to-Peer
  - Cooperative Learning groups

- **Sharing Groups**
  - *Energizing partners (seated nearby)*
  - *Brainstorming Bash*
    - Total class
    - Adjustable assignment
  - *Community Clusters (no more than 4 in group)*
    - Share work findings
    - Prepare a side of an issue for debate
    - Process, reflect and give input to lesson
    - Share personal information
  - *Research Probes*
  - *Lab, Center, Station, or Project Groups*

- **Cooperative Group Learning**
  - ***TASK***
    - ***T****hinking is built into the process*
    - ***A****ccountability is essential. Goal achievement-group and individual.*
    - ***S****ocial skills lead to team success*
    - ***K****eep everyone on task: roles, tasks, resources, novelty, simulations, and clear expectations*

Curriculum Approaches and Instructional Strategies

Rehearsal Strategies

Rehearsal Strategies	
Rote Rehearsal	**Elaborative Rehearsal**
· **Practice** · **Recitation** · **Drill** · **Repetition**	· **Mnemonics** · **Graphic Organizers** · **Role plays/simulations** · **Rhymes/raps/songs** · **Centers and projects** · **Problems/inquiry** · **Performances** · **Exhibitions**

Curriculum Approaches

Projects

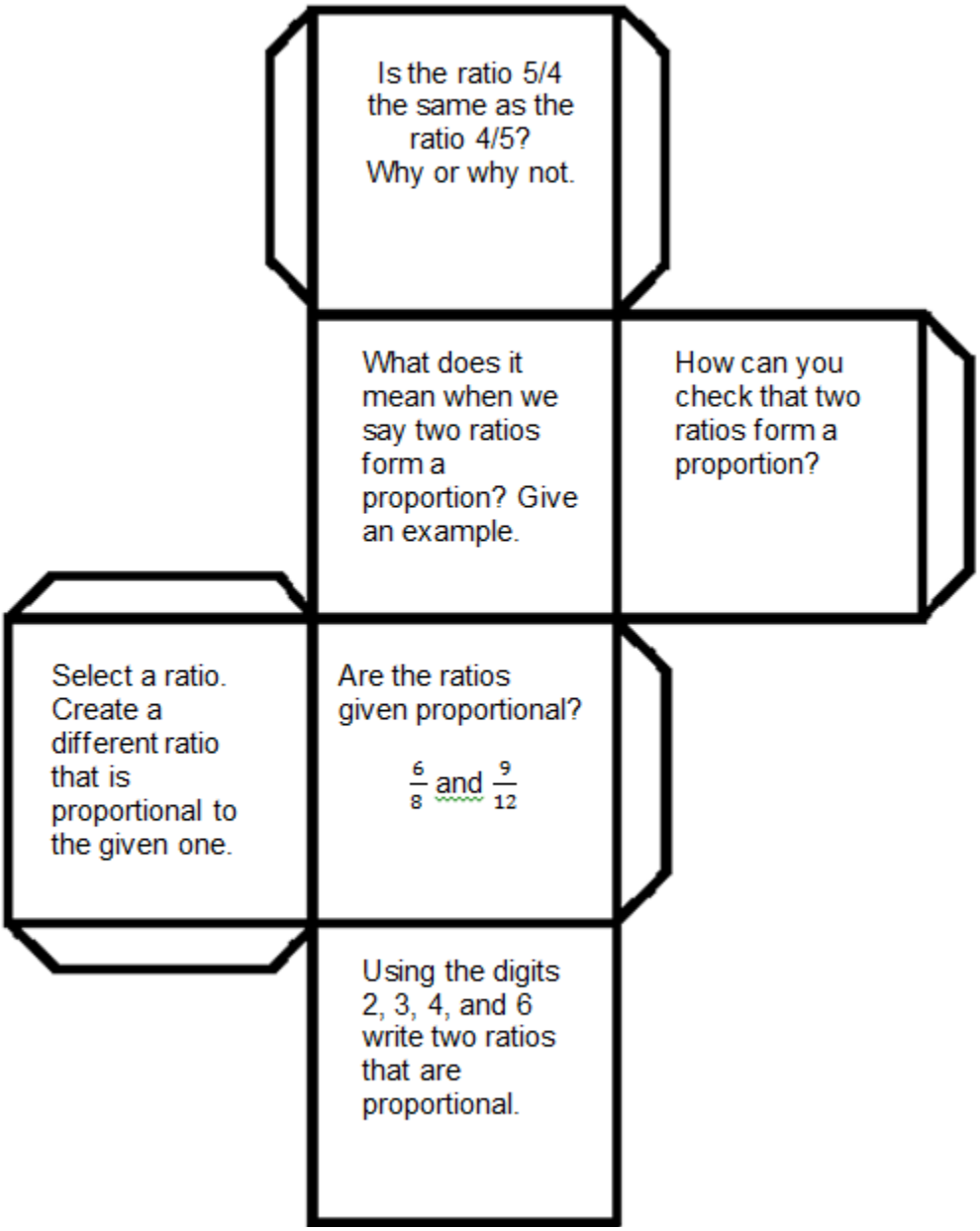
- Structured projects (build a bridge out of prescribed materials)
- Topic related
- Open-ended projects (minimal guidelines)
- Adjustable Projects
  - Range of resources and materials

Choice Boards

- Cubing
- Think-tac-toe

- **Problem Based learning**

Cubing Activity



Creating a Cubing Exercise

- ✓ Start by deciding which part of your unit lends itself to optional activities. Is it possible to make 3 different cubes for 3 different levels or interests?
- ✓ <u>First Step</u> (use one of the cubes)
  - Write six questions that ask for information on the selected task.
  - Use your 6 levels of Bloom or other intelligence levels to design the tasks.
  - Keep one question opinion based.
- ✓ <u>Second Step</u> (use other cubes
  - Use the first cube as your "average" cube, create 2 more cubes one higher and one lower level.
  - Remember all cubes need to cover the same types of questions.
  - Label/Color code your cubes so you know the level of readiness you are addressing
- ✓ <u>Third Step</u>
  - Always remember to have an easy problem as well as a challenging one regardless of the level.
  - Switch colors among the groups each time you do a different cubing activity
  - Decide on the rules: Will students be able to pass/roll again but they must answer 4 sides.
- ✓ Where to get questions:
  - Old quizzes, worksheets, textbooks, students generated questions

Think-Tac-Toe

Proportional Reasoning
Think-Tac-Toe

☐ Create a word problem that requires proportional reasoning. Solve the problem and explain why it requires proportional reasoning.	☐ Find a word problem from the text that requires proportional reasoning. Solve the problem and explain why it was proportional.	☐ Think of a way that you use proportional reasoning in your life. Describe the situation, explain why it is proportional and how you use it.
☐ Create a story about a proportion in the world. You can write it, act it, video tape it, or another story form.	☐ How do you recognize a proportional situation? Find a way to think about and explain proportionality.	☐ Make a list of all the proportional situations in the world today.
☐ Create a pict-o-gram, poem or anagram of how to solve proportional problems	☐ Write a list of steps for solving any proportional problem.	☐ Write a list of questions to ask yourself, from encountering a problem that may be proportional through solving it.

Knowledge list, define, tell, describe, identify, show, label, collect, examine, quote, name, who, when, where	**Comprehension** summarize, describe, interpret, contrast, predict, associate, distinguish, estimate, discuss, extend	**Application** apply, demonstrate, calculate, complete, illustrate, show, solve, examine, modify, relate, change, classify, experiment,
Analysis analyze, separate, order, explain, connect, classify, arrange, divide, compare, select, explain, infer	**Synthesis** combine, integrate, modify, rearrange, substitute, plan, create, design, invent, what if?, compose, formulate, prepare, generalize, rewrite	**Evaluation** assess, decide, rank, grade, test, measure, recommend, convince, select, judge, explain, discriminate, support, conclude, compare
Comprehension or Evaluation	Application or Evaluation	Knowledge or Analysis

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