Differentiating Instruction in Math:
It’s Not as Hard as You Think

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April, 2009
Goal

• The goal is to meet the needs of a broad range of students, but all at one time– without creating multiple lesson plans and without making students who are often labelled as strugglers feel inferior.
Two strategies

- Open tasks
- Parallel tasks
Some History

• We have been using this idea for some 5 years now and it has become increasingly popular in Grades 1-12 in all of the strands.
Underlying principles

• There should be a “big idea” that can be addressed at different developmental levels using these strategies.
• There should be choice in how a student proceeds.
The difference

• In open tasks, you pose a single question that evokes a broad range of responses at many levels.

• For parallel tasks, you pose two different questions at different levels but tied in terms of the big idea to which they relate and their context.
Open tasks
The answer is...

• You provide an answer, for example, the number 42 and ask students to create questions with that answer.
• The diversity of responses is interesting and informative.
All about percent

Make this true as many ways as you can:

• 72 is ___ % of ____.
Some ideas you might have

I expected:

• 10% of 720
• 100% of 72
• 72% of 100

Or

• 200% of 36
• 50% of 144...
Alike and different

• You can get a lot of varied responses by asking students how two items (e.g. two numbers) are alike and different.
350 and 550

• If I asked you how these numbers were alike and different, what would you suggest?
For example...

- Both are multiples of 50.
- Both are multiples of 10.
- Both are even.
- Both have 3 digits.
- Both are between 100 and 1000.
For example...

• One is more than 400 and one is less.
• One is more than 500 and one is less.
• One has two 5s in it and the other doesn’t.
• One needs 10 base ten blocks to show it and the other does not.
Integers

• You combine two integers to get -2. What integers might you have combined? How did you combine them?
Tangram house

• Use any four tangram pieces to build a shape that looks like a house. Use geometry words to describe your house.
Measuring a pumpkin

• How many different ways can you think of for measuring a pumpkin?
• It is delightful to see how creative students can be. This is only possible with an open question.
Measuring a room

• Why might it be useful to measure the length and width of a room by counting how many steps you need to get from one wall to the next?
Trapezoids

• What can you make if you put together 3 isosceles trapezoids?
Many squares

- Show how to put together squares to create shapes with 8 sides.
Continuing a pattern

• A pattern begins like this: 2, 5,....
• How could it continue?
4 and 10

• An expression involving the variable $k$ has the value of 10 when $k = 4$. What could the expression be?
100,000

- Tell everything you can about the number 100 000.
Why open questions

• Expose student thinking to know what to do next
• Make students feel like their contributions actually make a difference
• Enrich and broaden everyone’s learning
They work best if...

- they are focused on a big idea (so lots can happen).
Parallel Tasks
What are they?

• These are two or more tasks that focus on the same big idea at different developmental levels but which are quite similar.

• They are designed to suit the needs of different students, but so that the whole range of students can participate in a discussion about them.
The Race

Option 1
• Twice as many people came in ahead of David’s dad in a race.
• There were 112 runners.
• What was David’s dad’s position?

Option 2
• Twice as many people came in ahead of David’s dad in a race.
• How many people might have been in the race?
Ordering values

• Order the given values from least to greatest. Will your order be the same no matter what the value of $n$ is?
Ordering values

Option 1:
• $n/2$
• $3n$
• $n^2$
• $3n + 1$
• $10 - n$

Option 2:
• $4n$
• $3n$
• $10n$
• $3n + 1$
• $5n + 2$
• $-n$
What is 10*12?

If
• 2*3 = 12
• 2*4 = 14
• 2*5 = 16
• 3*3 = 15
• 4*3 = 18

If
• 2*3 = 7
• 2*4 = 8
• 2*5 = 9
• 3*3 = 9
• 4*3 = 11
What real life situation...

• Might 10,000 describe.

• Might 1,000 describe.
A Division

• You divide two numbers and the quotient is 2.5. What two numbers might you have divided?

• You divide two fractions or decimals and the quotient is 2.5. What two numbers might you have divided?
For more information and examples

- See this resource in the NCTM booth

Published by Teachers College Press, NCTM, & Nelson Education
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