Teaching with Intention; Focusing on What's Important

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Let’s do a problem

- 44 children from Grade 2 and Grade 3 went on a trip.
- There were LOTS more Grade 2 kids than Grade 3 kids.
- How many of each might there have been?

What do you think I might want to get out of the problem?

- Listen to some questions I might ask---
- Could there have been about 30 Grade 3 kids? Why or why not?

What do you think I might want to get out of the problem?

- Could there have been about 20 Grade 3 kids? Why or why not?

What do you think I might want to get out of the problem?

- Could there have been ABOUT 40 more Grade 2 kids than Grade 3?
- ABOUT 30 more?
- ABOUT 20 more?

What do you think I might want to get out of the problem?

- Could the number of Grade 2 kids have been odd? How?
- Could the number have been even? How?

What do you think I might want to get out of the problem?

- About how many possible answers are there?

What do you think I might want to get out of the problem?

- Would this next problem(coming in a minute) have more or fewer answers? Why?
- There were still 44 children on the trip. There were EXACTLY 8 more Grade 2 students than Grade 3. How many of each?

What expectation was I addressing?

- solve problems involving the addition and subtraction of two-digit numbers, with and without regrouping, using concrete materials (e.g., base ten materials, counters), student-generated algorithms, and standard algorithms;

But I put “meat” on the expectation

I would argue

- That just “doing” expectations will not lead to mathematical success.
- Students need to meet ideas and not just solve random problems.

Valuable work

- Would be to look at expectations and think about what ideas need to be addressed.

Let’s try one together

- What ideas are embedded in this expectation?

Grade 8

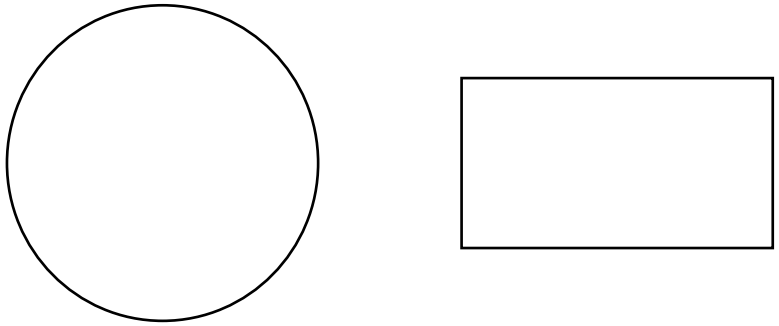
- solve problems involving the estimation and calculation of the circumference and the area of a circle;

Maybe

- Knowing any one of radius, diameter, circumference, or area tells you ALL of the others.
- The number of centimetres in the circumference might be more or less than the number of square centimetres in the area.

Maybe

- The circumference of a circle is about the same as the perimeter of a rectangle with a length being the diameter and the width being the radius.



Maybe

- The area of a circle is about the same as the area of a rectangle with a length being half the circumference and the width being the radius or ¾ of the area of a square with side length the diameter.

Grade 4

extend, describe, and create repeating, grow-
ing, and shrinking number patterns (e.g.,

Maybe

- That without a pattern rule, you can suggest extensions, but can’t be sure.
- That any pair of numbers can be part of a repeating, a growing or a shrinking pattern.

Maybe

- That if a pattern grows additively or shrinks subtractively and you know two numbers in the pattern, there are limited possibilities for how it might grow or shrink.

How does teaching intentionally play for me?

The first place is in setting learning goals for the lesson.

The second is in choosing activities to lead me to those goals.

How does it play for me when teaching?

The third is in consolidation.

The fourth is in assessment of learning.

Setting Learning Goals

Here are examples of learning goals I have set to fit the Grade 1 curriculum.

Measurement

compare two or three objects using measurable attributes (e.g., length, height, width, area, temperature, mass, capacity), and describe the objects using relative terms

Measurement

Possible Learning Goal:
When you compare the size of two objects based on one attribute, it does not always tell you how they compare on another attribute.

Position

describe the relative locations of objects or people using positional language (e.g.,

Position

Possible learning goal:
Many descriptions of relative location can be said more than one way (either in front or behind; either under or over,…)

Grade 3

represent and describe the relationships between coins and bills up to $10 (e.g.,

Grade 3

Possible learning goal:
It takes more smaller value coins than bigger value coins to show an amount.

Grade 5

represent, compare, and order fractional amounts with like denominators, including proper and improper fractions and

mixed numbers, using a variety of tools

Grade 5

Possible learning goal: Mixed numbers are more useful than improper fractions to give you a sense of size of numbers.

Grade 7

add and subtract fractions with simple like and unlike denominators, using a variety of tools (e.g., fraction circles, Cuisenaire rods, drawings, calculators) and algorithms;

Grade 7

Possible learning goal:
I can explain why the denominator of the sum or difference of two fractions is likely to be a multiple of the original denominators, but doesn’t have to be.

Choosing activities to lead to a learning goal

Once I have a goal, it should make it easier to choose an appropriate activity.

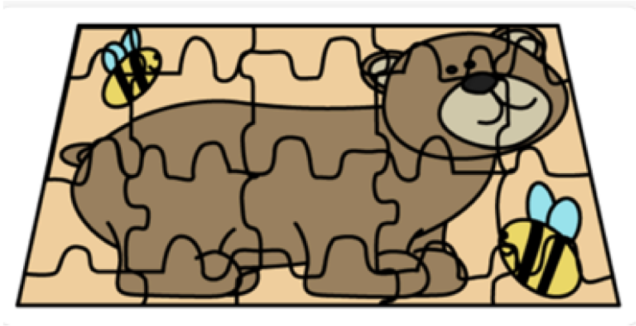
For example…

My learning goal in Grade 6 or 7 might be that the child can relate the numbers, variables and operation signs in an equation to what is going on in a real situation.

For example…

Here might be my task:

For example…



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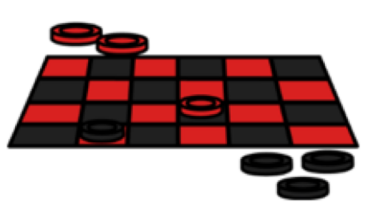
$9

$6



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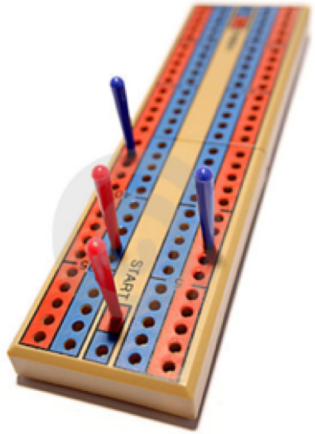


$10

For example…

The task:

- Choose one, two or three items from the flyer. Decide how many of each item you want to buy and calculate the total cost.

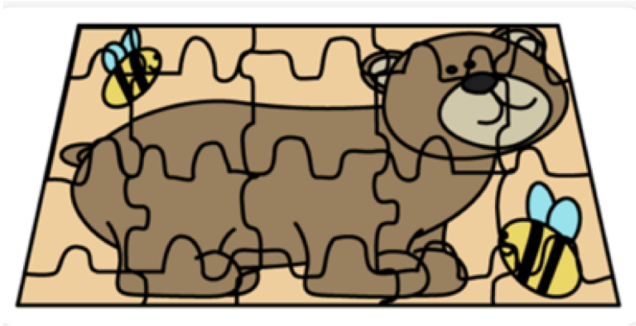
- Write an equation to describe what you just did. Use a different variable for the price of each type of item you choose to buy.

For example…

The task:

- Have a classmate figure out which items you had in mind based on your equation.

For example…



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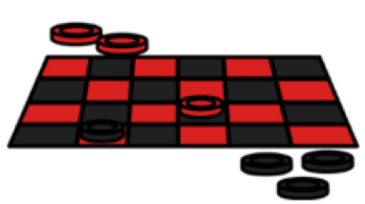

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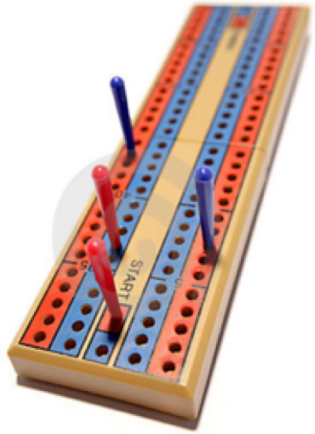

$10

Consolidation

So how would I consolidate?

It would NOT be about just sharing strategies.
It would be about asking questions to lead DIRECTLY to my learning goal.

Consolidation

My questions:

- After posting some of the equations students created:
- Look at some of the equations your classmates wrote. How could you tell how many different types of items they bought?

Consolidation

My questions:

- How could you tell how many of each type they bought?
- What part of the equation told you how much they spent?
- What operation signs were in your equations? Why those?

A Primary example

My learning goal:
I can figure out which numbers do or don’t meet various place value rules and why.

My task

- Create three numbers to meet the rule.
- Create three that do not.

My task

- You can represent the number with EXACTLY three more one-cubes than ten sticks.

My consolidation

- Who thinks they have one of the smallest numbers that satisfy the rule? Why?
- The greatest? Why?
- If a number works, how can you easily get another number?

My consolidation

- Why might one person think a number works (e.g. 91) and another person says no?

Assessment

Assessment needs to match instruction.

Teaching with intention means assessing with intention.

Assessment

If your goal in math is just “doing it”, you will have mostly knowledge items with some application thrown in.

Assessment

But if your goal is to build math thinkers, you will focus much more on understanding and thinking questions.

Knowledge vs understanding

Knowledge: Write number pairs that add to 10.

Understanding: How do you know that 6 + 7 has to be more than 10 WITHOUT figuring out what it is.

Knowledge vs understanding

Knowledge: Represent 412 with base ten blocks.

Understanding: How do you know that you can represent both small numbers and big ones with 8 base ten blocks?

Knowledge vs understanding

Knowledge: Represent 412 with base ten blocks.

Understanding: How do you know that you can represent any 3-digit number in LOTS of ways using base ten blocks?

Knowledge vs understanding

Knowledge: Order from least to greatest:
3/5 7/9 1/8 5/3 4/7

Understanding: Is it easier to tell which fraction is greater when you compare 1/7 and 5/10 OR when you compare 1/3 and 3/8?

Understanding questions…

derive from the ideas you were going after in your lessons.

In summary…

Every time I set a learning goal, create an activity, or ask a consolidation or assessment question, there should be intention in terms of the choices I have made.
Hopefully, my main goal is about developing thinkers and not just doers.

Your questions….

Are there questions you would like to raise?

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