CLEAR AS MUD

TRYING OUR BEST TO BE TRUE TO THE INTENT OF EXPECTATIONS

Marian Small, August, 2016

Windsor, ON

Grade 7

- Make predictions about linear growing patterns, through investigation with concrete materials

- What is important?

For me….

- Maybe that they recognize how multiplication is useful in predicting future terms in patterns
- Maybe it's relating this pattern to an easier one to help predict future terms in the pattern

For me….

- Maybe it’s recognizing that prediction might be enhanced by visual representations

So…

- What useful task might incorporate many of these issues?

Task

- I created a pattern by adding the same number of items to the figure each time to get the next one.
- One figure used 35 items.
- Another used 59 items.

Task

- What could the pattern have looked like?
  What could the increase have been? NOT been?
- How could you predict the 100^{th} term?
- How could you use a picture to help you predict?

Solution

- Table of values

Term number	Term value
1	35
2	59

- Term value = 24 x Term number + 11

Solution

- Table of values

Term number	Term value
3	35
6	59

- Term value = 8 x term number + 11

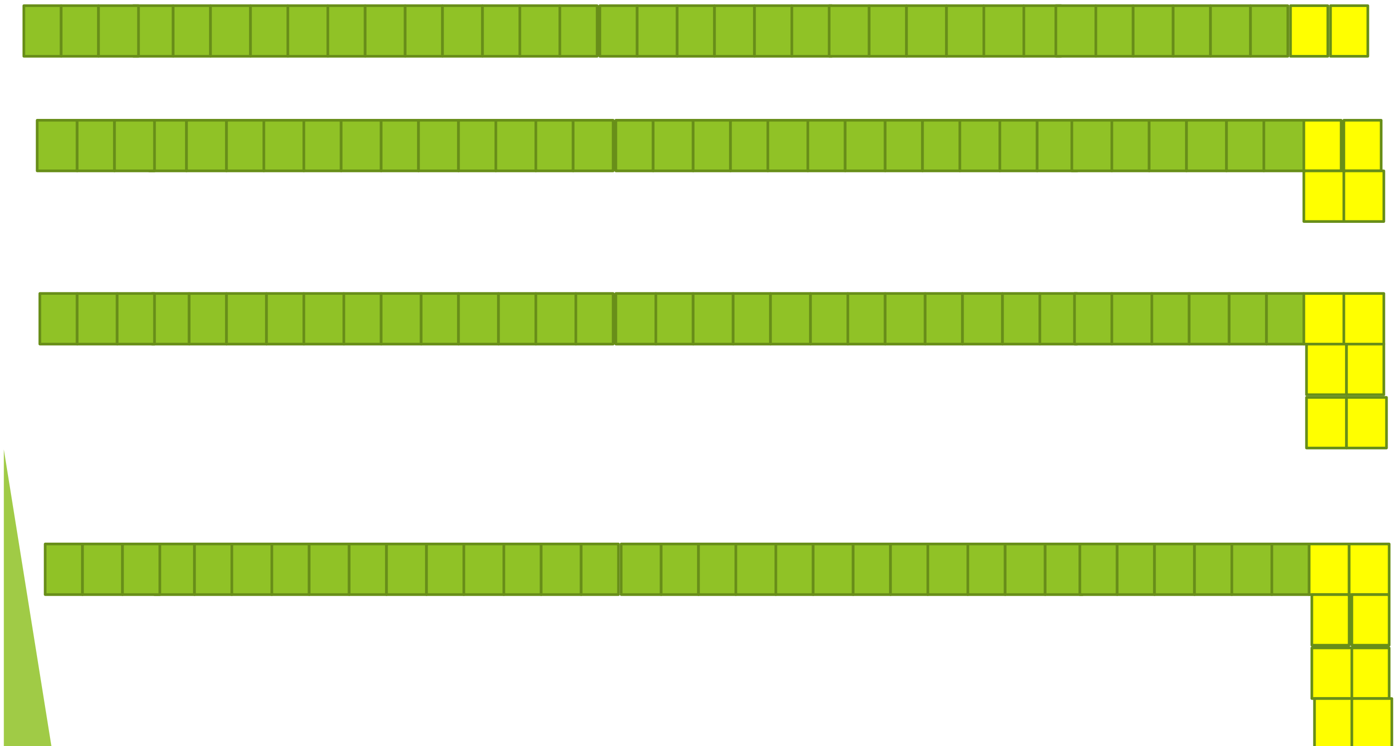
Solution

- Table of values

Term number	Term value
1	35
13	59

- Term value = 2 x Term Number + 33

Picture



Solution

- Table of values
- Term number   Term value
- 6   35
- 12   59
- Term value = 4 x Term number + 11

We have opportunities to assess

- How multiplication is useful in predicting future terms in patterns
- How prediction can be enhanced by visual representations.

Grade 8

- Solve problems involving proportions, using concrete materials, drawings and variables
- What matters to you?

For me…

- That a proportion means you want to describe the same multiplicative relationship two ways
- That looking at the relationship between two terms helps you estimate the equivalent ratio
- That visual tools can be useful to estimate and determine an equal ratio

Task

- Draw a picture that helps you solve this problem:
- In a certain recipe, you use 2/3 cup of sugar for every 1 ½ cups of flour.
- If you used 3 1/3 cups of sugar, how much flour should you use?
- Solve the problem, but also tell how the picture helps.

We have opportunities to assess…

- That a proportion means you want to describe the same multiplicative relationship two ways
- That looking at the relationship between two terms helps you estimate the equivalent ratio
- That visual tools can be useful to estimate and determine an equal ratio

Double number line

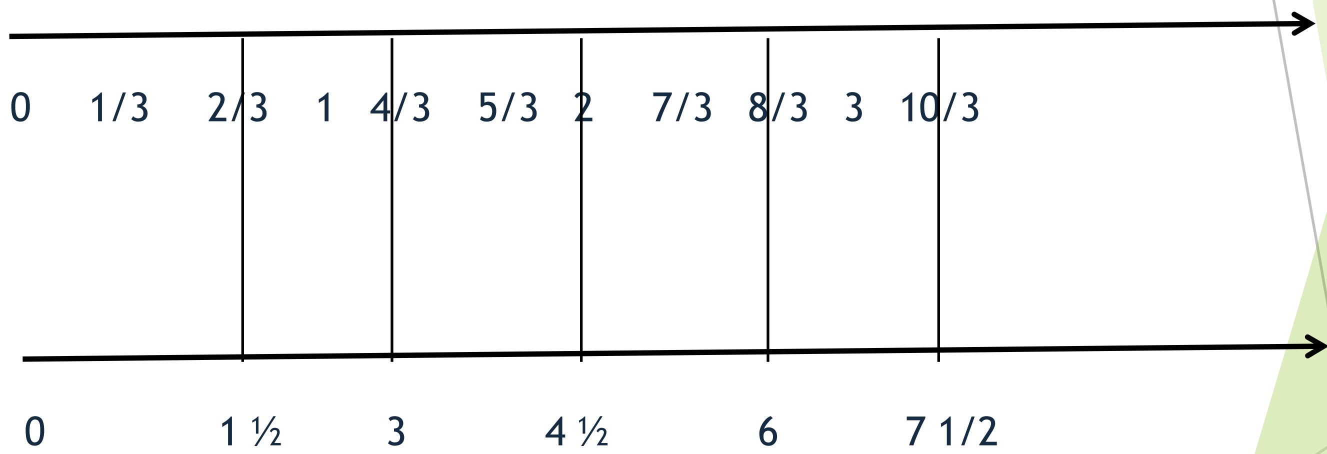
sugar

0 1/3 2/3 1 4/3 5/3 2 7/3 8/3 3 10/3

flour

0 1 ½ ?

Double number line

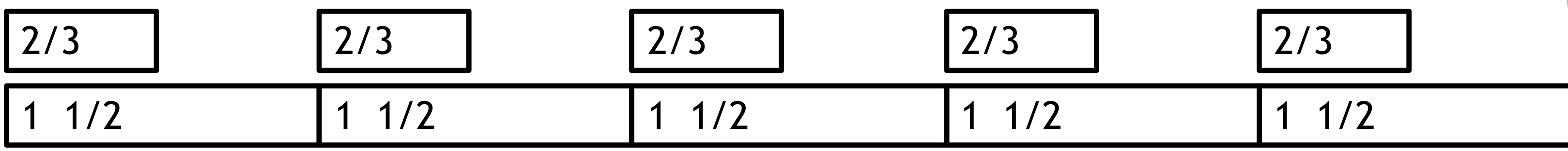


Tape diagram

2/3	2/3	2/3	2/3	2/3

1 1/2	1 1/2	1 1/2	1 1/2	1 1/2

Tape diagram



Tape diagram

2/3	2/3	2/3	2/3	2/3

1 1/2	1 1/2	1 1/2	1 1/2	1 1/2

Ratio table

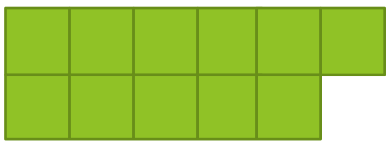
2/3	1/3	10/3			
1 1/2	3/4	30/4			

Ratio table

2/3	8/3	10/3			
1 1/2	6	7 1/2			

Alternate Task

- A mixture uses 42 mL of Chemical A for every 35 mL of Chemical B.
- If you make a big batch that uses 2.2 L of Chemical A, about how much Chemical B do you need?
- Use a picture to determine your estimate.
- Use number relationships to tell why your answer makes sense.



If the top line is 2.2 L, then each section is about 0.36 L, so the second line is about 1.6 L.

Grade 9

- Solve problems that can be modelled with first-degree equations, and compare algebraic methods to other solution methods

- What do you think matters?

For me…

- What is it that makes a problem solvable by a linear equation?
- What methods are there to solve besides algebra?
- When would you choose each method and why?

Possible task

- Part 1:
- Can this problem be solved using a linear equation? Why? Would you solve it that way?

- Jennifer had some $2 coins. Lia had some $5 bills. Between them, they had $120.
- How many of each might they have had?

Possible task

- Part 2:
- What similar problem might you solve using a graph? Why that solution method?
- What similar problem might you solve numerically? Why that solution method?
- What similar problem might you solve by solving an equation? Why that solution method?

We will have opportunities to assess..

- Whether they know what a linear equation is
- Whether they make good choices about what solution methods to use in different situations

Grade 10

- Solve problems involving the measures of sides and angles in right triangles in real-life applications

- What do you think matters?

For me…

- I can’t solve many problems unless I know at least one side length.
- I realize there is always a choice of which trig function to use in a situation, but one choice might be better than another.

For me…

- That I need two pieces of information (beyond knowing that it is a right triangle) to solve problems involving side measures.
- Whether a student knows how to set up an appropriate equation or proportion and solve it for a particular situation

Task…

- You are solving a problem about angle of elevation.

Sample angle of elevation problems

-
- John wants to measure the height of a tree. He walks exactly 100 feet from the base of the tree and looks up. The angle from the ground to the top of the tree is 33° . How tall is the tree?
- **Question #2**
- A building is 50 feet high. At a distance away from the building, an observer notices that the angle of elevation to the top of the building is 41°. How far is the observer from the base of the building?

Task…

- You use the cosine to help you solve.
- Create such a problem and solve it.
- How many pieces of information did you have to give?
- What would you change about the problem if you had decided to use sine instead? Tangent instead?
- Could you give 2 pieces of information and still not be able to solve such a problem?

We have opportunities to assess…

- What information leads you to use which function
- What information is required
- Whether students can set up appropriate equations or proportions and solve them

Grade 11

- Factor quadratic expressions in one variable, including those for which $a \neq 1$, differences of squares, and perfect square trinomials by selecting and applying an appropriate strategy

- What do you think matters?

For me…

- That factoring is about multiplicative decomposition, i.e. relates to multiplying and dividing and not adding and subtracting
- That we factor differently in different situations
- How factoring relates to area
- How factoring polynomials is like factoring numbers

Task

- Part 1:
- Create a rectangle with your algebra tiles with area $6x^2 + 7x + 2$. What are the side lengths?
- How does what you just did relate to factoring?
- How might this table of values have helped you to factor $6x^2 + 7x + 2$?

Task

x	$6x^2 + 7x + 2$
1	$15 = 3 \times 5$
2	$40 = 5 \times 8$
3	$77 = 7 \times 11$

Task

- Part 2
- Give a situation where you would factor:
- Using algebra tiles
- Using numbers
- By recognizing a “format”

We have opportunities to assess…

- That we factor differently in different situations
- How factoring relates to area
- How factoring polynomials is like factoring numbers

- What would you add to focus on the idea of factoring as multiplicative and additive decomposition?

Grade 12

- Represent a sinusoidal function with an equation, given its graph or its properties, with angles expressed in radians

- What do you think matters?

For me…

- That the curve wiggles in a predictable way if it's a sine or cosine curve
- That the curve could be a sine function or cosine function if it is one or the other
- That tangent curves have a different look than sine and cosine and why

For me…

- How the amplitude affects the equation
- How the period affects the equation

Task

- Create a curve that wiggles really fast and is very tall that might represent a sine function. Tell what sine function it has to represent and how you could tell from the graph.
- Now rename the function using cosines instead.
- Now draw a sinusoidal function that could not be a sine graph and tell why it could not.

We have opportunities to assess:

- Recognition that the curve wiggles in a predictable way if it's a sine or cosine curve
- Recognition that the curve could be a sine function or cosine function if it is one or the other
- Recognition that tangent curves have a different look than sine and cosine and why
- Recognition of the effect of period and amplitude on the equation

Your turn

- Choose two more expectations.
- Play the same game as I have.

Download

- www.onetwoinfinity.ca
- Recent presentations
- Windsor7to12