TI-30XB MultiView™
Matchstick Mathematics

This Unit includes:

- Teacher Notes & Lesson Overview — **T**
- Teacher PowerPoint — **PPT**
- Worksheets 1 & 2 — **W**
- Student Assessment Task — **AT**
- Solutions to Student Worksheets — **WS**
- Solutions to Assessment Task — **ATS**

– NATIONAL STATEMENTS OF LEARNING SUPPORT INITIATIVE –

To obtain the complete set of units available please
email **teacher-support@list.ti.com**

TEXAS INSTRUMENTS

Your Passion. Our Technology. Student Success.

Curriculum Links
TI-30XB MultiView™: Matchstick Mathematics

C

The task involves the formation of linear equations to describe the patterns formed. The description of recursion (add m onto the previous value) is replaced by the general rule for linear equations. The investigation pattern involves the patterns formed by the arrangement of match sticks.

Statement of Learning Opportunities

- Define variable and interpret mathematical expressions
- Identify when numbers satisfy a given equation
- Use graphical, tabular and estimation methods to solve simple equations
- Identify and continue number patterns, describing the pattern in words
- Use whole numbers to construct tables for functions and draw corresponding graphs
- Specify rules of linear functions using words and symbols from tables, and use this function to predict other values

Key Ideas

- The concept of representing a number by a variable
- Using the calculator as a learning tool
- Use of diagrams and tables to document progress
- The formation of linear models
- The use of graphical, tabular and visual models
- The prediction of values using models

Key Vocabulary

Linear models, first difference, axial intercept, constant rate of change

Lesson Overview

i)   Extension of prior pattern
ii)   Formation of table of values and the calculation of the first difference
iii) Equation of the pattern
iv)   Use the rule to predict values
v)   Use of the rule in forming a table of values and formation of graph
vi)   Comparison of results using manual substitution with the values formed by the table in the calculator
vii) Using the 'ask function' in a calculator to think – guess –check to determine the input number for a given output
viii) Formation of a line of regression

Equipment

TI-30XB MultiView™ calculator, matchsticks, work sheets, graph paper

Indicators of Success

- Extending and describing a pattern
- Stating the first order finite difference is a constant rate of change in linear patterns
- Plotting a linear pattern
- Forming a table of values
- Use a rule to predict both the output value and input values for a given equation

This Unit involves exploring patterns formed by the arrangement of matchsticks. Then linear equations to describe the patterns are formed. The description of the pattern is done both as a recursive model and general rule ($y = ax + b$)

1. Give the students 5 minutes to try and find the number of matchsticks required to make the 2009th pattern shown in slides 2-5 of the PowerPoint. Check if anyone has an answer.

   PPT

2. Now take the students through the remaining PowerPoint slides to introduce and explain the topic and concepts covered in this unit.

   PPT

3. Hand out and have students' complete worksheet 1 and review answers with the whole class before going onto worksheet 2.

   W1

4. Handout worksheet 2 and discuss answers as a class.

   W2

5. Once students appear to be confident with the content covered hand out the assessment task.

   AT

In general moving through this unit students should:

- Move from the **visual** to the **numerical** to describe a pattern
- Verbal to symbolic equations
- Replacement of the variable to solve equations
- Formation of the table of values
- Plotting of the table of values to see the pattern **graphically**
- Checking the equation using the Table Function in a calculator
- THINKING about the patterns – a think – guess – check activity using the ask function in the table of values in order to find the value of a input variable

Encourage the documentation of representative calculations in mathematics and reflection on these results in the explanation.

another pattern ➔ another model

- Looking again for the axial intercepts and first order constant difference
- Find the first order finite difference and the initial value using the statistical features of the TI-30XB calculator

What are the big questions:

- What am I trying to show and how will I know if I am successful?
- How can I get more information to assist me in solving my question?
- Can I do this another way?
- Is this a valid solution?
- How many solutions are there?
- How do I know if I have found all the solutions?
- What happens if I change one of the parameters (flat pack size)?
- Is there a general pattern that allows me to shorten the investigation and find the result of the investigation without copious calculations?