TI-30XB MultiView™
Divide & Conquer

This Unit includes:

- Teacher Notes & Lesson Overview — **T**

- Teacher PowerPoint — **PPT**

- Worksheets 1, 2 & 3 — **W**

- Student Assessment Tasks 1 & 2 — **AT**

- Solutions to Student Worksheets — **WS**

- Solutions to Assessment Task — **ATS**

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TEXAS INSTRUMENTS

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Curriculum Links
TI-30XB MultiView™: Divide & Conquer

C

Year 6-8

Statement of Learning Opportunities

- Interpret problem situations… know that multiplying a given number by a decimal number between 0 and 1 will produce a smaller number, such as $60 \times 0.3 = 18$, while dividing a given number by a decimal number between 0 and 1 will produce a larger number, such as $60 \div 0.3 = 200$.

Key Ideas

- Division of given number by a number between 0 and 1;
- Multiplication of a given number by a number between 0 and 1;
- Using the TI-30 as a learning tool;
- Reflecting on learning.

Key Vocabulary

- Division
- Multiplication / product
- Greater than / less than

Lesson Overview

- **Worksheet 1** – Learning is drawn from a game requiring students to multiply a number by another number between 0 and 1. The aim is for students to finish with the highest possible score. Each time a student completes a move they are able to reflect upon the outcome and draw appropriate conclusions for further strategies.s Students discover by playing the game that multiplication by a number such as 0.95, results in a similar but smaller number. In contrast, students learn that multiplying by a number, such as 0.2, results in a much smaller number. The multiplication game should be played before the division game due to the easier conceptual nature of multiplication.

- **Worksheet 2** – Learning is drawn once again from a game, this time requiring students to divide a number by another number between 0 and 1. The aim is for students to finish with the highest possible score. Each time a student completes a move they are able to reflect upon the outcome and draw appropriate conclusions for further strategies. Students discover by playing the game that division by a number such as 0.95, results in a similar but slightly larger number. In contrast, students learn that dividing by a number, such as 0.2, results in a much larger number. The different outcome means that the optimum path will be different for this game and therefore involve further exploration.

- **Worksheet 3** – The first two worksheets involved learning by discovery and reflection in an environment that is engaging. The calculations are repetitive to help drive familiarisation as students explore the concept. Worksheet 3 involves elaborate rehearsal. It requires students to draw upon their understanding to create a challenging game. The game has similar rules to the first two worksheets.

C 1

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- **Worksheet 2** – Learning is drawn once again from a game, this time requiring students to divide a number by another number between 0 and 1. The aim is for students to finish with the highest possible score. Each time a student completes a move they are able to reflect upon the outcome and draw appropriate conclusions for further strategies. Students discover by playing the game that division by a number such as 0.95, results in a similar but slightly larger number. In contrast, students learn that dividing by a number, such as 0.2, results in a much larger number. The different outcome means that the optimum path will be different for this game and therefore involve further exploration.

- **Worksheet 3** – The first two worksheets involved learning by discovery and reflection in an environment that is engaging. The calculations are repetitive to help drive familiarisation as students explore the concept. Worksheet 3 involves students drawing upon their understanding to create a challenging game. The game has similar rules to the first two worksheets.

Worksheet 1

1. Introduce the game to the students. The sample board (next page) can easily be photocopied onto an overhead transparency sheet and used to demonstrate the game to the class. Alternatively, use the PowerPoint presentation to show students a typical start to the game.

W1

PPT

2. Explain to students the objective of the first game: *Finish with the highest score.*

3. Explain rules to students:
   - Always progress from left to right.
   - Start the game with 100 points.
   - Choose a starting hexagon and multiply the number on the hexagon by your current point score (100pts). Record this equation.
   - Move to the next adjacent hexagon. *(Adjacent – must be touching)* Multiply the number on this hexagon by your current point score.
   - Continue this process until you reach the other side of the board. Write down your final point score.
   - Remember, the aim of the game is to finish with the highest score.

4. Simulate a game to ensure students understand the requirements and the rules. Students MUST record their moves using equations.

   Example: *Starting point score: 100. Starting hexagon 0.95*
   - $100 \times 0.95 = 95$
   - $95 \times 0.75 = 71.25$
   - $71.25 \times 0.8 = 57$
   - There will always be 12 steps to move from one side of the board to the other. (No backwards moves permitted, however this is a suitable discussion point following a couple of games).

5. Ensure each student has 12 counters each, and a calculator, before starting the game. Use the counters to record the steps. These steps can be used to check a student's calculations.

6. Games may be run as an entire class or in pairs. To run this as a class game/competition, record students' best *final points score* on a class score table. There are numerous ways to run this game in pairs:
   - Students work same as class game but compete only with one another;
   - Students start from either side of the board. (Avoids copying)
   - Students work from either side of the board but score a bonus point each time their score is higher than their opponents score. (Bonus points are added to final score)

Worksheet 2

This game is essentially the same as the first with one significant difference: *Instead of multiplying, students divide*. As a player moves from one hexagon to the next, they must divide their current score by the number contained in the hexagon. The aim is still to finish with the largest possible number.

W2

Review with students the objective of the game: *Finish with the highest score.*

Explain rules to students:
- Always progress from left to right.
- Start the game with 100 points.
- Choose a starting hexagon and divide the number on the hexagon by your current point score (100pts). Record this equation.
- Move to the next adjacent hexagon. *(Adjacent – must be touching)* Divide the number on this hexagon by your current point score.
- Continue this process until you reach the other side of the board. Write down your final point score.
- Remember, the aim of the game is to finish with the highest score.

It should not be necessary to simulate this game. Based on prior learning the 'ah ha' moment for students usually occurs very early!

Ensure each student has 12 counters each, and a calculator, before starting the game. Use the counters to record the steps. These steps can be used to check a student's calculations.

Worksheet 3

W3

Students write their own numbers on the puzzle using only numbers between 0 and 1, to two decimal places. They should try and make the game as challenging as possible and also identify the best possible score (solution).

Note the change in rules with both multiplication and division being used alternate!

0.95		0.35		0.95		0.85		0.55		0.95		0.80
	0.85		0.80		0.95		0.45		0.45		0.85	
0.60		0.25		0.85		0.45		0.90		0.75		0.70
	0.75		0.95		0.50		0.55		0.80		0.50	
0.20		0.20		0.50		0.95		0.80		0.90		0.90
	0.90		0.85		0.85		0.95		0.45		0.80	
0.80		0.95		0.75		0.60		0.55		0.65		0.95
	0.50		0.20		0.95		0.35		0.80		0.80	
0.70		0.15		0.90		0.95		0.55		0.75		0.75
	0.35		0.05		0.75		0.80		0.65		0.65	
0.65		0.65		0.40		0.55		0.85		0.80		0.80
	0.80		0.45		0.80		0.65		0.50		0.95	
0.40		0.55		0.95		0.45		0.50		0.85		0.85