

CLOSE TO EQUAL

Level	3 (Age group 11-14)
Resources Required	Pen or Pencil Paper (1 per pair) Die (1 per pair)
Alternate Options for the Resources	A die can be made using these instructions and the example in the Images/Illustrations section: <ol style="list-style-type: none"> 1. Drawing 4 equal sized squares horizontally. 2. Drawing 2 squares above and below the 2nd square on the horizontal line draw in step 1. 3. Cutting along the outer edge of the shape and folding along the edges to form a cube. 4. Use an adhesive on the flaps to stick the edges together. 5. On each face draw dots to represent numbers from 1-6. Use the example in the Images/Illustrations section to determine where each number should go.
Strand Covered	Numbers and Operations
Targeted Skills	Multiplying decimals
Inspired by	Julia Robinson Mathematics Festival - Gordon Hamilton
Time Required	30 mins (for game) 15 mins (setup)
Previous Learning Required	Multiplication of 2 digit numbers Knowledge of decimals
Support Required	Low supervision

Rules of the Game:

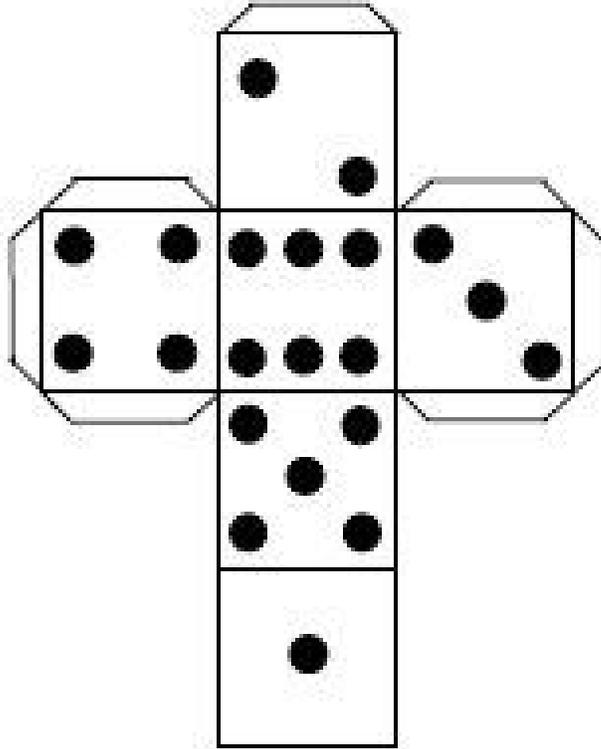
Goal	Player 1 wins if the score at the end of the game is greater than 15. Player 2 wins if the score at the end of the game is less than or equal to 15.
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Steps	<p>Step 1: The teacher groups players into pairs.</p> <p>Step 2: The teacher gives each pair a piece of paper and a dice.</p> <p>Step 3: players draw the game board as in the Images/Illustrations section.</p> <p>Step 4: players decide who will be Player 1 and who will be Player 2. There will be two products at the end of the game. Player 1 is trying to make it so that the difference between these two products is greater than 15. Player 2 is trying to make it so that the difference between these two products is less than or equal to 15.</p> <p>Step 5: players write down who is Player 1 and Player 2 on their piece of paper so that they do not forget.</p> <p>Step 6: Starting with Player 1, players take turns rolling the die and placing the number they roll into one of the empty boxes.</p> <p>Step 7: When all 8 boxes are filled, players calculate their two products. The teacher should make sure that players know that the numbers they are multiplying are decimals.</p> <p>Step 8: players calculate the difference in the two products they get by subtracting the smaller number from the larger number. This difference is the score for the game.</p> <p>Step 9: If the score is greater than 15, Player 1 wins. If the score is less than or equal to 15, Player 2 wins.</p>
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Images or
Illustrations



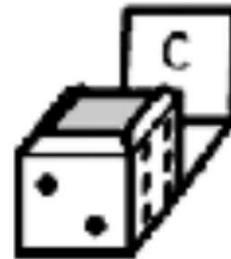
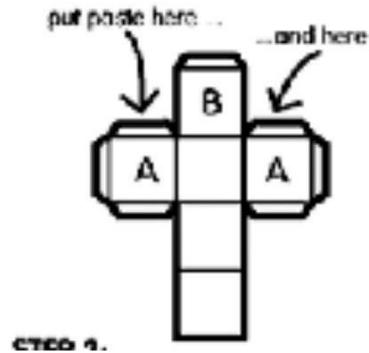


Step 1: Make creases along the lines. Flip the shape over so the decorated side is away from you.

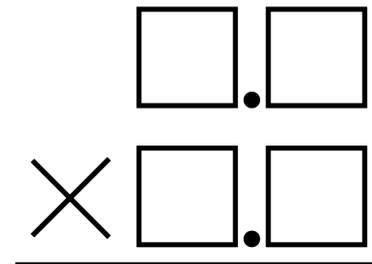
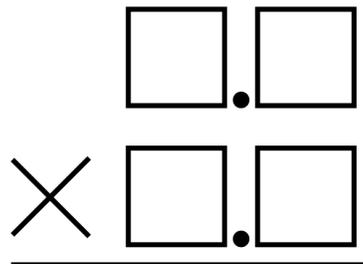
Step 2: Now bend the sides labeled "A" and apply glue on the two tabs where shown. Fold up the tab labeled "B" against the glue covered tabs.

Step 3: Put some glue on all the remaining tabs, Fold tab "C" over the top of the dice and press against the glue-covered dice.

Step 4: Now lay something not too heavy on the dice to hold them in place while they dry.



Example Game Board:





	<p>Example Game Board (Enrichment):</p> <div style="display: flex; justify-content: space-around;"><div style="text-align: center;">$\begin{array}{r} \square \square \square \\ \times \square \square \square \\ \hline \end{array}$</div><div style="text-align: center;">$\begin{array}{r} \square \square \square \\ \times \square \square \square \\ \hline \end{array}$</div></div> <p>Example Game Board (Simplification):</p> <div style="display: flex; justify-content: space-around;"><div style="text-align: center;">$\begin{array}{r} \square \square \\ \times \square \\ \hline \end{array}$</div><div style="text-align: center;">$\begin{array}{r} \square \square \\ \times \square \\ \hline \end{array}$</div></div>
Enrichment	<ul style="list-style-type: none">• Have players multiply 3 digit decimals (See Images/Illustrations).• Create dice with larger numbers e.g. from 3, 4, 5, 6, 7, 8, and 9.
Simplification	<ul style="list-style-type: none">• Have players multiply a 2 digit decimal by a whole number (See Images/Illustrations).• Create dice with smaller numbers e.g. 1, 1, 2, 2, 3, and 3.