Manipulatives of the Month

Dice

Dice

Dice are small, throwable cubes with marked faces that can rest in multiple positions. The faces are marked with a number of dots, ranging from one to six. They are used for generating random values. There are other types of dice with numbers going beyond 6.

History:

One is called a die and two or more are called dice. Dice were first used so long ago that no one knows what they were then used for. Dice very similar to modern ones have been found in Egyptian tombs built earlier than 2000 bc. Before the invention of plastics, dice were made from wood, ivory, jade, stone, glass, amber, nutshells, and other materials.

10 ways to use dice in the maths lesson

This month we explore **10 different ways to use dice** in the maths lesson.

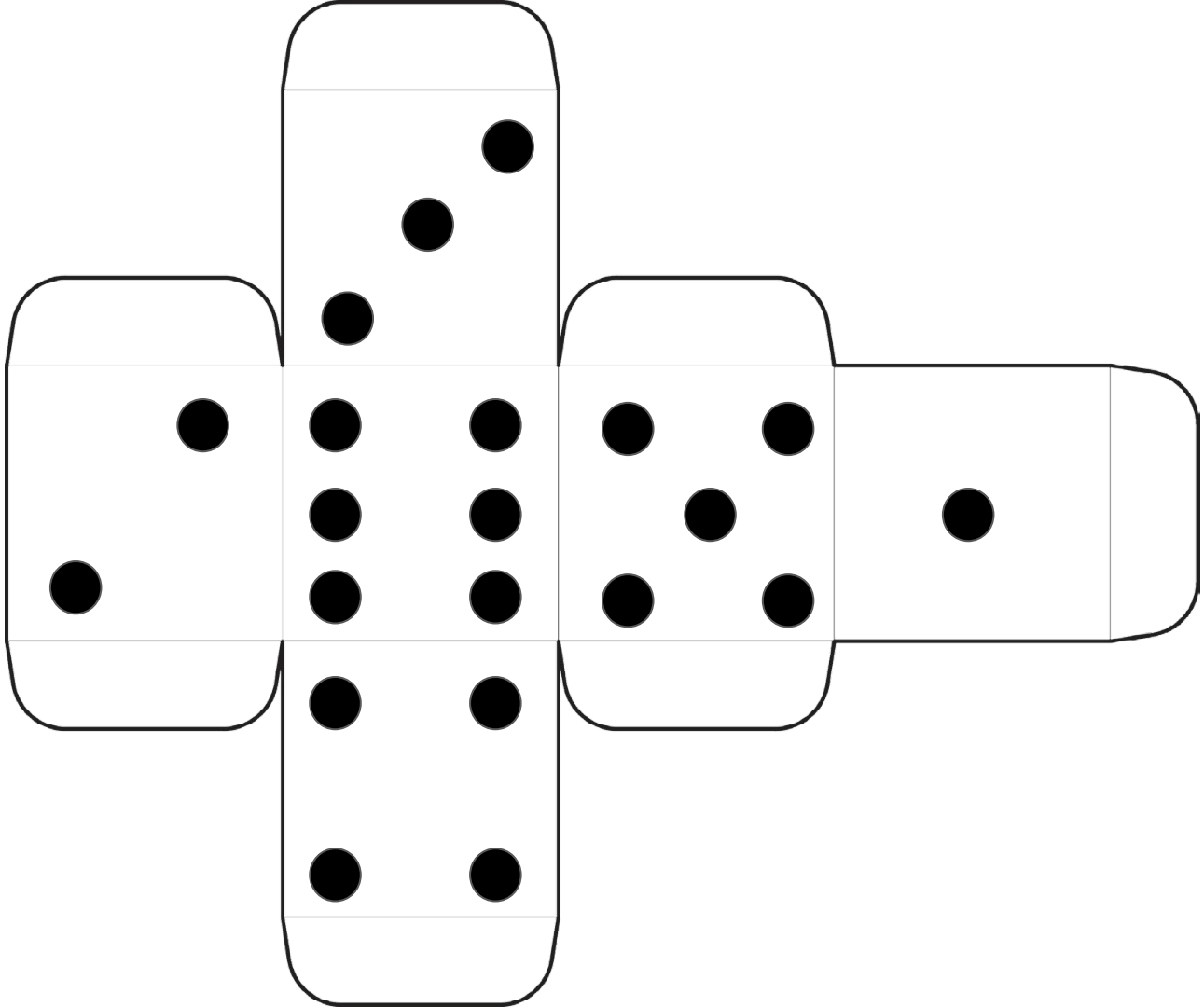
Dice are a fantastic resource for the classroom. There are lots of different types of numbered dice and they can be used in lots of different ways.

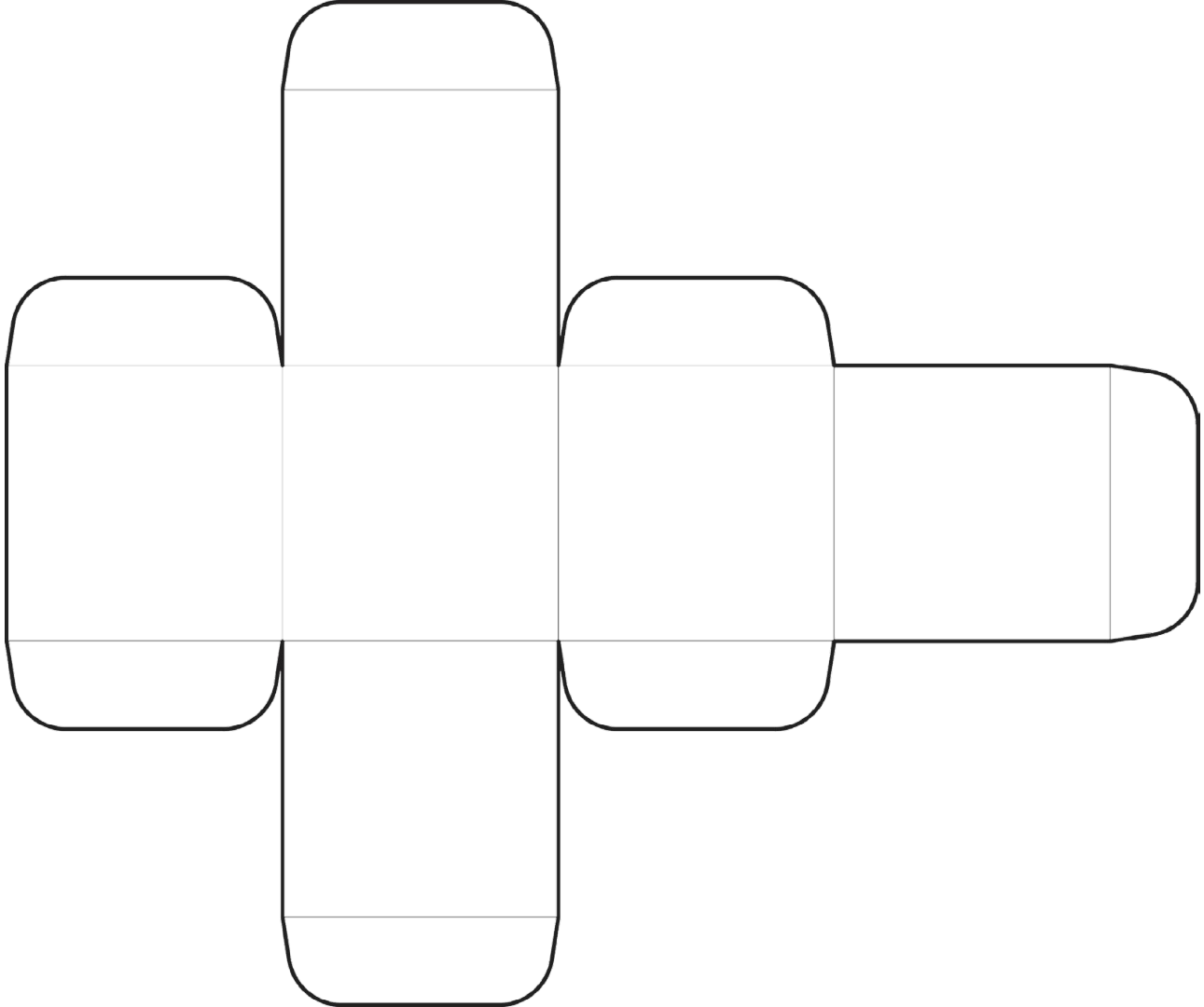
Dice games can be fun and engaging, and they can help to motivate students to participate and learn.

They often involve interaction and communication with other students, which can help to improve social skills such as cooperation, teamwork, and communication.

Dice introduce an element of randomness to classroom activities and can require strategic thinking and problem-solving skills, which can help students develop these important cognitive abilities.

So, take a chance, roll out the fun.





Activities

1. Discovering dice
   - *Looking for patterns and working systematically*
2. Take a die for a walk
   - *Looking for patterns and working systematically*
3. Dotty Six
   - *Related addition facts and strategy*
4. Block Out
   - *Mental calculations*
5. Dicey operations
   - *Investigations and Fluency practice with four operations*
6. Dice duel
   - *Fluency practice with addition*
7. Pyramids
   - *Fluency practice with addition*
8. Dicey games
   - *Collaboration and strategy*
9. Round the clock
   - *Fluency practice*
10. Drop Zone
    - *Multiplication*

1. Discovering dice

Looking for patterns and working systematically

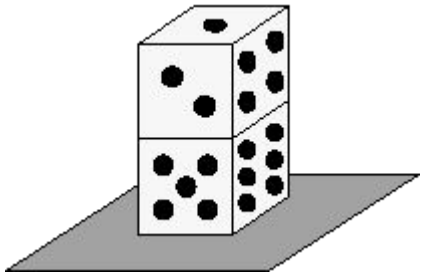
Dice for number work

Give a group of students a die each. After they have rolled it, ask

- What can you see?
- How are the dots arranged?
- Who has the most dots?
- Do any of you have the same number of dots?
- What else can you tell me about the dice?

Dice used to develop spatial awareness

Place die on top of each other. Count all the visible dots to find the total.
Give the challenge to find the highest/lowest totals possible.
Can the same totals be achieved with different faces?

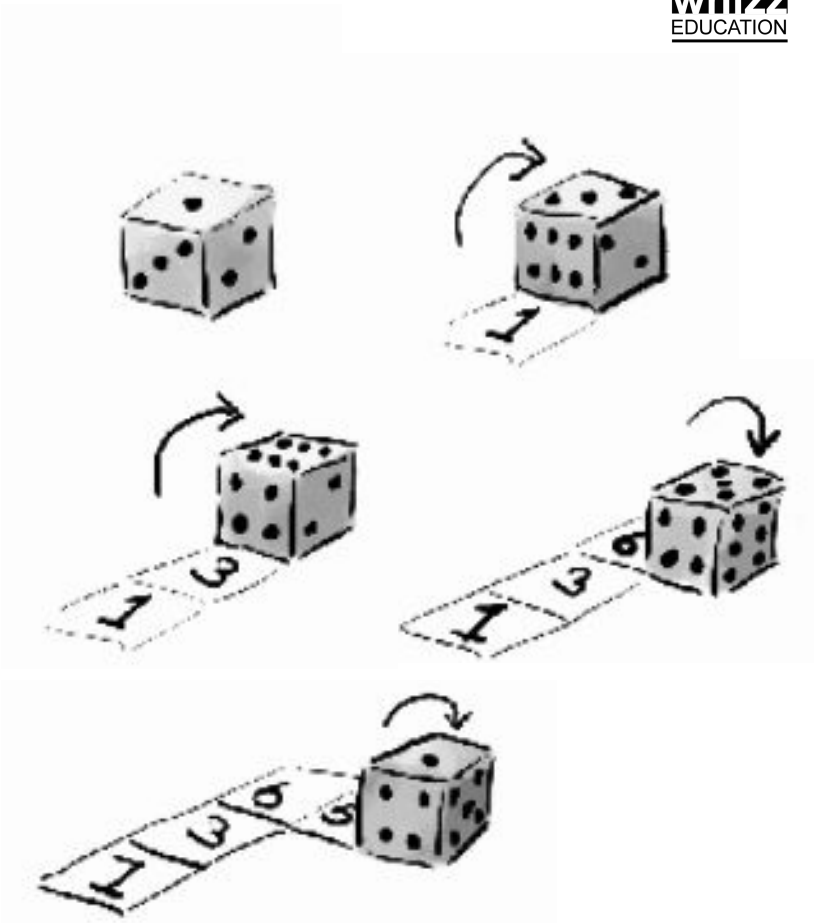


Some students might start with one die whilst others could go straight to using three or even more.

2. Take a die for a walk

Looking for patterns and working systematically

A die is often rolled to find a number from 1 to 6. We wait until the die stops and then see what number is on top.
What about if we slow it down and have the die slowly rolling along one face at a time?
We can move the die forward/backward or right/left. Think about it as North, South, East or West.



Take the die go on a journey so it never re-visits a place it has already been. So it can't cross back over its path or go back over where it has just been.

How can you record the journey? (numbers and direction)
What do you notice about the number patterns?
How many different paths can you make?
What is the same and what is different about the paths?

3. Dotty Six

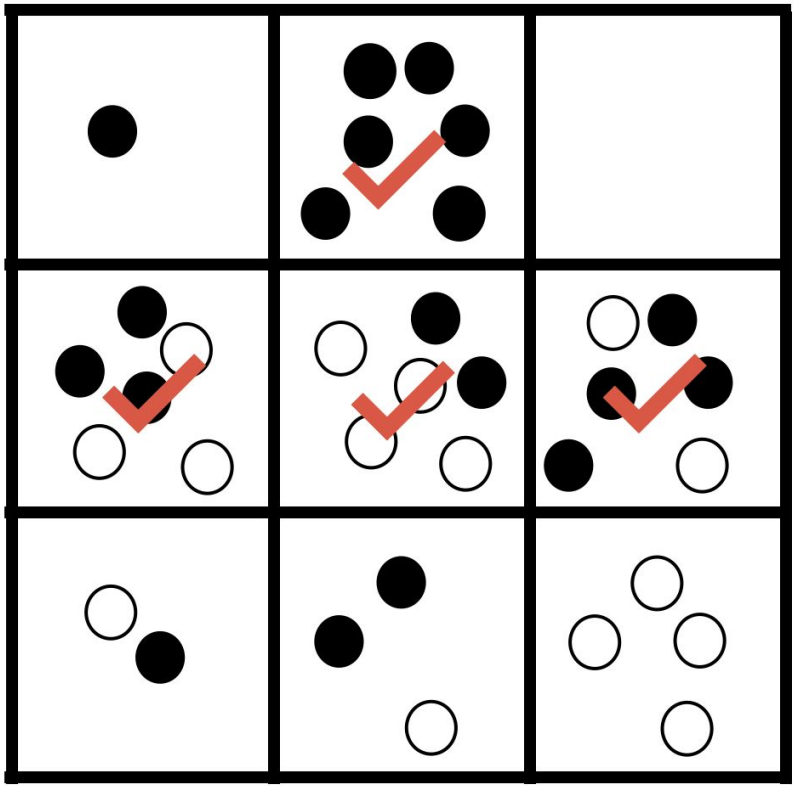
Strategy

1. Draw a 3 by 3 grid and choose one coloured pen for each player; where possible, each player should have a different colour.

2. Take turns rolling a die, drawing the number of dots you rolled into one of the spaces on the grid. You can't split them up.

3. The aim of this game is to have six dots in a square When a box is full, you could put a tick in the box. Keep going until there are three ticks in a row or column or diagonal. The winner is the person who puts the last tick.

How did you decide where to put your dots?



4. Block Out

Mental multiplication calculations

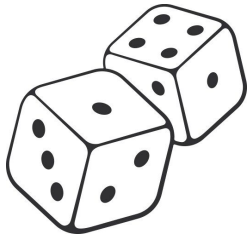
Players 2

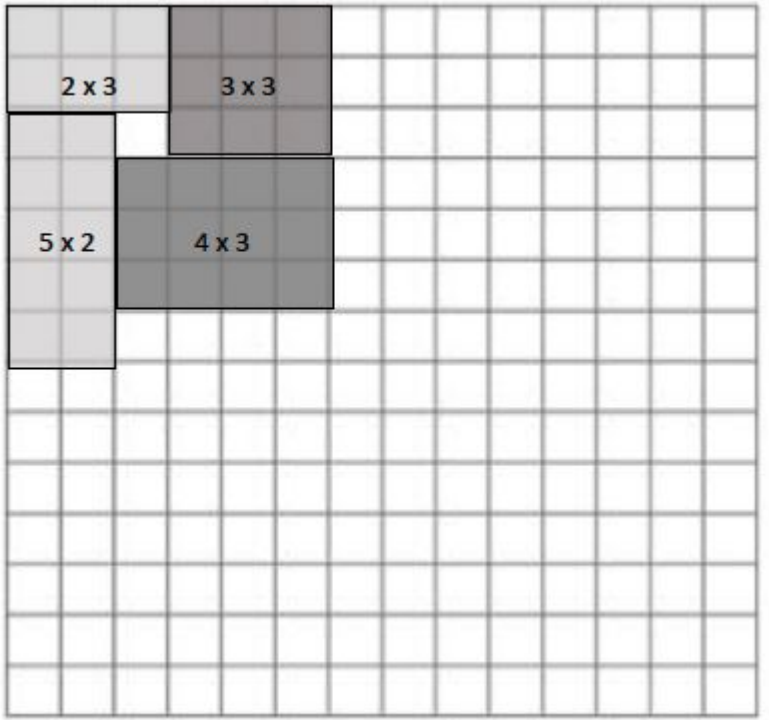
Materials: 2 dice (could use dice higher than 6), graph paper, colored pencil for each player

How to Play:

1. Roll 2 dice and draw a rectangle using the numbers rolled as the length and width on graph paper.
2. Continue until there is no room to draw any more rectangles.
3. Add the areas of all your rectangles and the highest score wins.

How do you decide where to draw the rectangle?

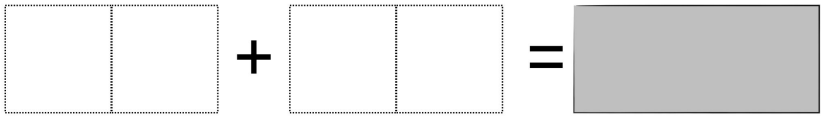




5. Dicey Operations

Fluency practice with four operations

Two players and a 1-6 or 0-9 die. Draw an addition grid like this:

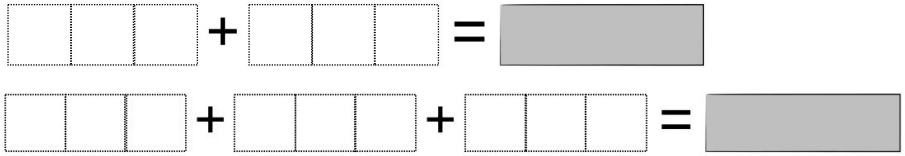


Take turns to throw the die. After each throw decide which box to put the number in. Throw the die four times until all the cells are full.
Whoever has the sum closer to 100 wins

Another version of the game is to take turns to throw the dice, until it has been thrown four times in total. After you have collected all four numbers, each player must decide where to place them on their own grid.

You can vary the target to make it easier or more difficult.

Other variations are:



Whoever has the sum closest to 1000 wins.

Whoever has the difference closest to 1000 wins.

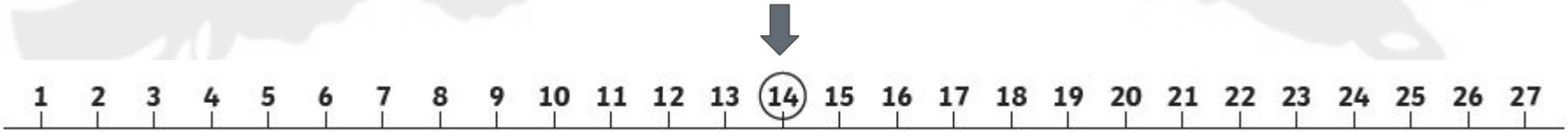
Whoever has the product closest to 1000 wins.

Whoever has the answer closest to 1000 wins.

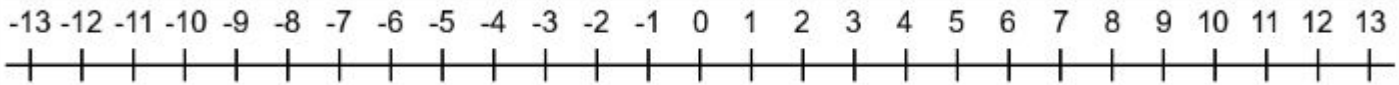
6. Dice duel

Fluency practice with addition

1. Draw a number line like the example given and circle the number 14.
2. Player 1 moves their counter to the right of number 14 and Player 2 moves their counter to the left of number 14.
3. Take it in turns to roll two dice, adding the two numbers rolled.
4. Move your counter in your direction.
5. If their counter reaches 27 first Player 1 wins the game. If their counter reaches 1 first then Player 2 wins the game.



A variation is to draw a number line from -13 to 13. Decide who is positive and who is negative. Positive moves the counter from left to right and negative moves the counter from right to left.



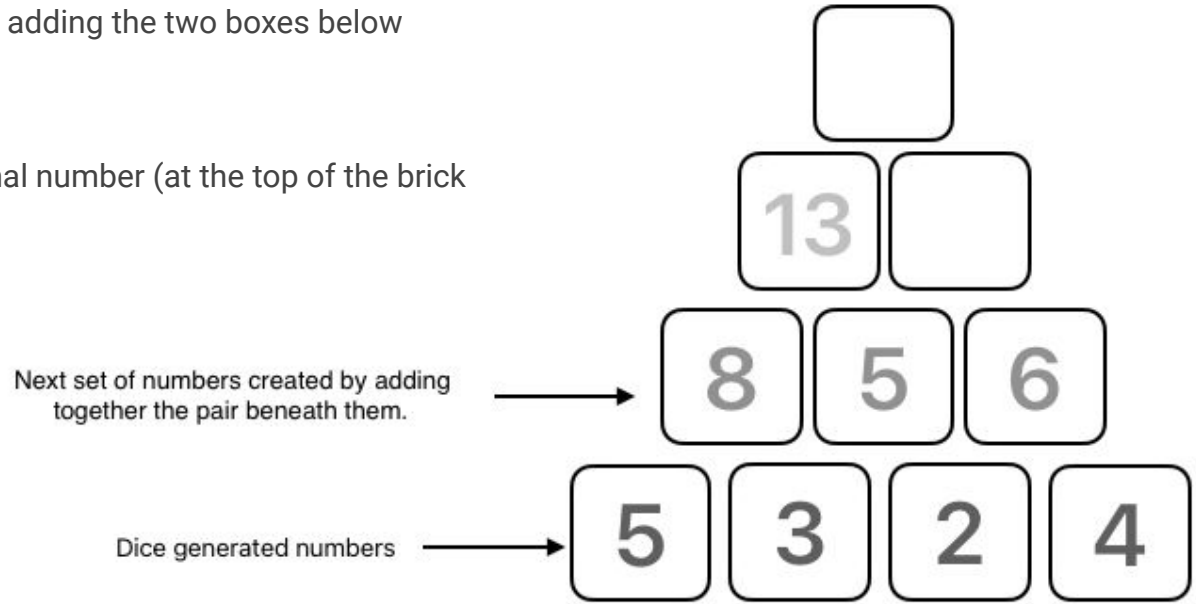
7. Pyramids

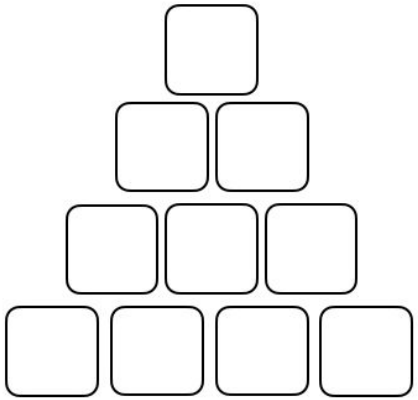
Fluency practice with addition

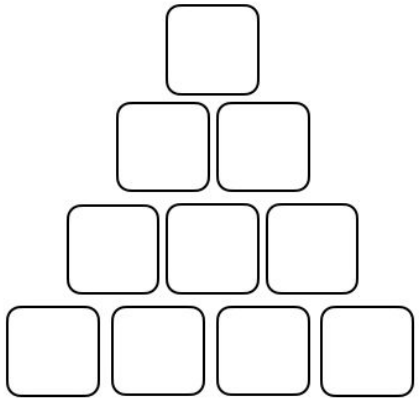
Each student will need a copy of the bricks sheet and a dice.
They throw a 1-6 dice 4 times and fill in the bottom row of the brick pattern. Then complete the next row by adding the two boxes below each brick and so on.

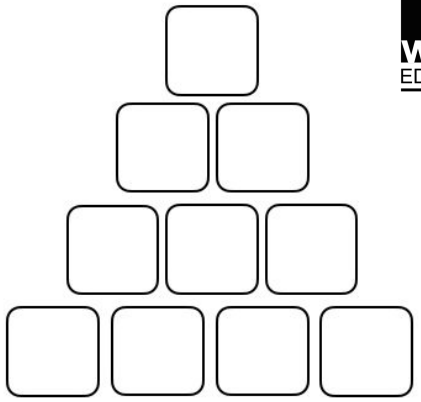
The player who achieves the highest final number (at the top of the brick pattern) is the winner.

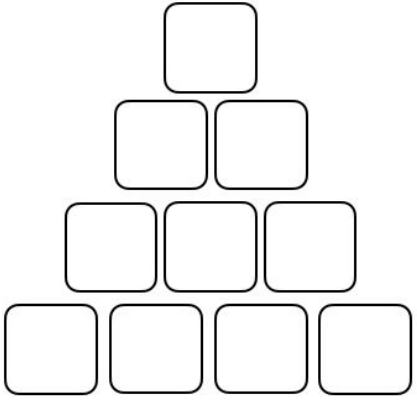
Challenge the students to reorder their starting numbers, can they arrange them so that they get a different final total?

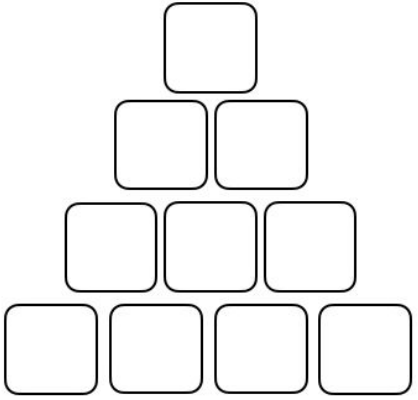


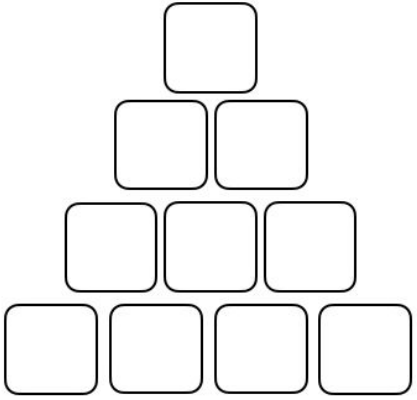












8. Dicey games

21

You will need access to 5 dice but you may not need to use them all in each turn.

1. Roll the first three dice and add up your score so far.
2. Make a decision: Stick or twist? If you stick, your partner has to beat your score.
3. If you twist, roll another die and add your total.
4. Decide again whether to stick or twist, before your partner tries to beat your score.
5. At the end of each turn, the player whose score is closest to 21 wins.

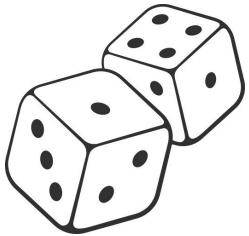
Beat That!

1. Each Player takes turns rolling two dice.
2. When a player has rolled the dice, they should place the dice in the order that will produce the largest number possible. For example, if a player rolled a 2 and a 5, they may choose 52 as their number to beat as that is a larger number than 25.
3. After each throw, player one challenges player two to 'Beat That'.
4. Play this game in rounds, assigning a winner of each round.

Odds or sixes?

Decide who is player 1 and 2.
Roll the dice. If the number is odd, Player 1 wins that round.
If the number is a six, Player 2 wins.
(It doesn't matter who throws the die.)

Who is more likely to win the game? Why? How could you make the game fair?



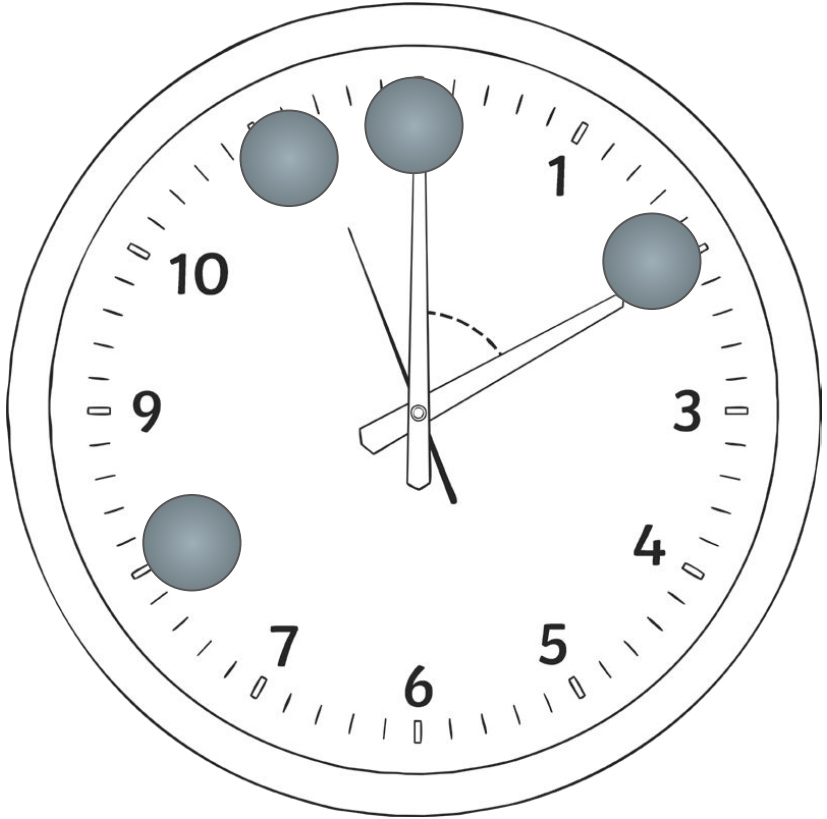
9. Round the clock

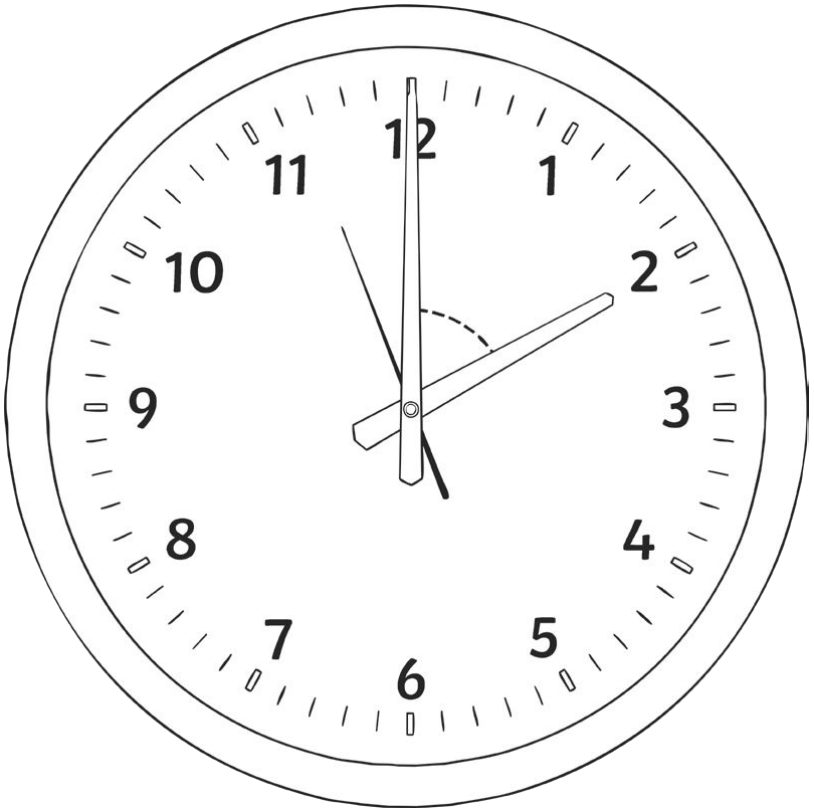
Fluency practice

1. Each player needs a clock face or list of numbers 1 - 12.
2. Start by taking it in turns to roll two dice.
3. Use addition or subtraction to make the numbers 1 - 12. Cover the hours on the clock face with counters.

   For example, if a 6 and a 4 are rolled, 10 or 2 could be covered on the clock face. You can only cover 1 number each turn. If the number is already covered then you miss a turn.

4. The first person to cover the hours 1-12 wins.

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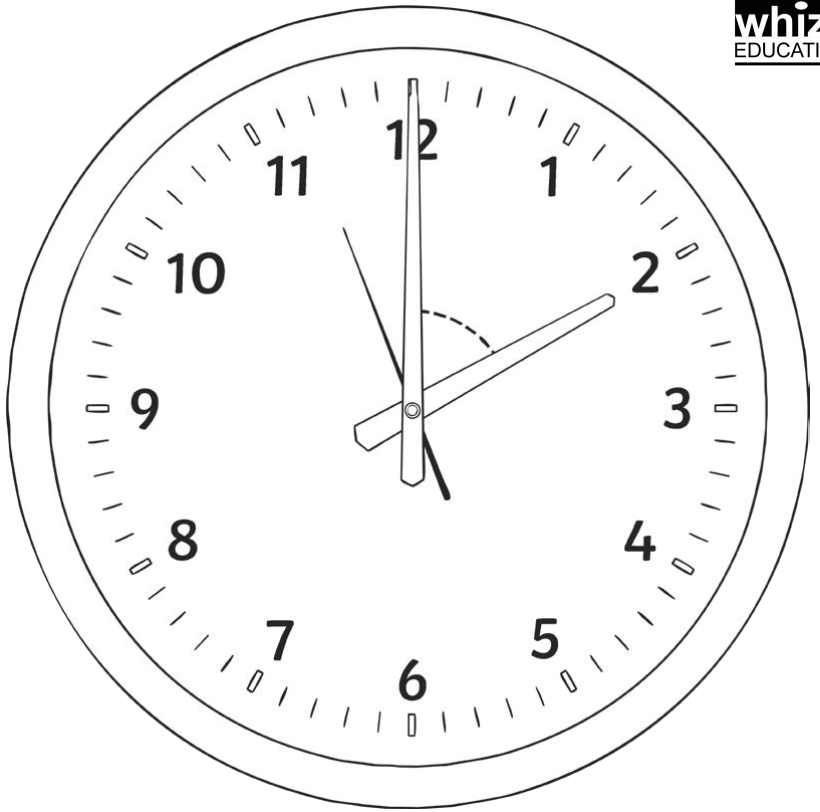
12
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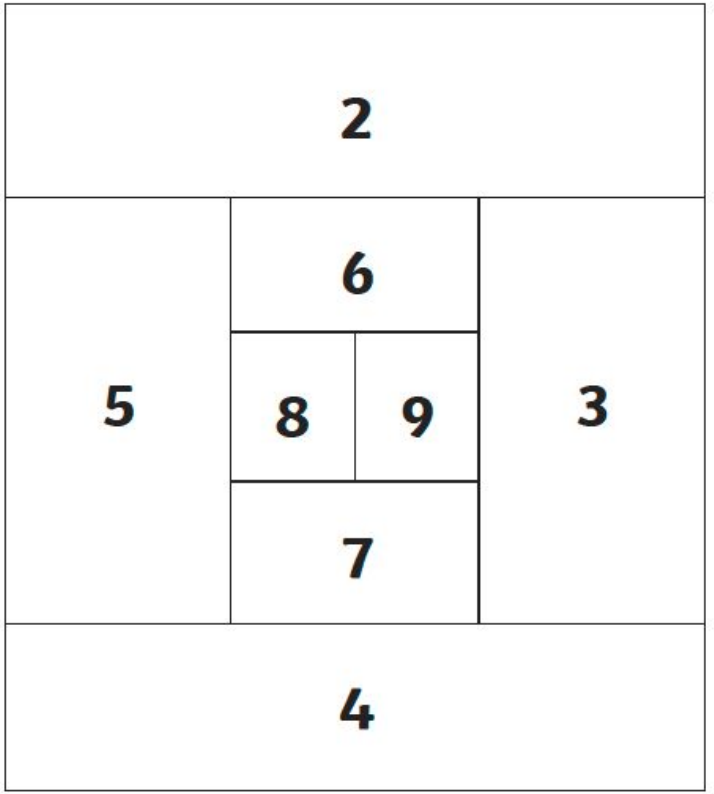
11

10. Drop zone

1. Take turns rolling a die onto the Drop Zone board.
2. When the die settles, players must multiply the number shown on the die by the number it landed on the board.
3. The larger the total, the more points you gain.
4. Players add up their total scores after five turns.
5. The player with the highest score wins.

Variation: Change the numbers in the drop zone or the numbered die.



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