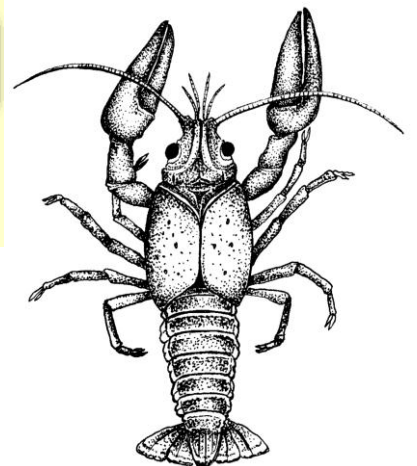
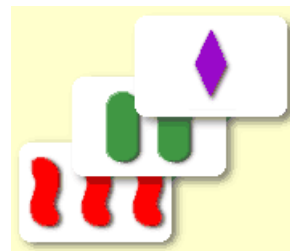


Playing Mathematically

(Games for the Mathematics Classroom)



WHY GAMES?

Article by Jenni Way

<http://nrich.maths.org/2489>

We all know that children enjoy playing games. Experience tells us that games can be very productive learning activities. But ...

- What should teachers say when asked to educationally justify the use of games in mathematics lessons?
- Are some games better than others?
- What educational benefits are there to be gained from games?

This article supplies teachers with information that may be useful in better understanding the nature of games and their role in teaching and learning mathematics.

What is a mathematical game?

When considering the use of games for teaching mathematics, educators should distinguish between an 'activity' and a 'game'. Gough (1999) states that "A 'game' needs to have two or more players, who take turns, each competing to achieve a 'winning' situation of some kind, each able to exercise some choice about how to move at any time through the playing". The key idea in this statement is that of 'choice'. In this sense, something like Snakes and Ladders is NOT a game because winning relies totally on chance. The players make no decisions, nor do that have to think further than counting. There is also no interaction between players - nothing that one player does affects other players' turns in any way.

Oldfield (1991) says that mathematical games are 'activities' which:

- involve a challenge, usually against one or more opponents; a
- are governed by a set of rules and have a clear underlying structure;
- normally have a distinct finishing point;
- have specific mathematical cognitive objectives.

Benefits of Using Games

The advantages of using games in a mathematical programme have been summarised in an article by Davies (1995) who researched the literature available at the time.

- Meaningful situations - for the application of mathematical skills are created by games
- Motivation - children freely choose to participate and enjoy playing
- Positive attitude - Games provide opportunities for building self-concept and developing positive attitudes towards mathematics, through reducing the fear of failure and error;
- Increased learning - in comparison to more formal activities, greater learning can occur through games due to the increased interaction between children, opportunities to test intuitive ideas and problem solving strategies

- Different levels - Games can allow children to operate at different levels of thinking and to learn from each other. In a group of children playing a game, one child might be encountering a concept for the first time, another may be developing his/her understanding of the concept, a third consolidating previously learned concepts
- Assessment - children's thinking often becomes apparent through the actions and decisions they make during a game, so the teacher has the opportunity to carry out diagnosis and assessment of learning in a non-threatening situation
- Home and school - Games provide 'hands-on' interactive tasks for both school and home
- Independence - Children can work independently of the teacher. The rules of the game and the children's motivation usually keep them on task.

Few *language barriers* - an additional benefit becomes evident when children from non-english-speaking backgrounds are involved. The basic structures of some games are common to many cultures, and the procedures of simple games can be quickly learned through observation. Children who are reluctant to participate in other mathematical activities because of language barriers will often join in a game, and so gain access to the mathematical learning as well as engage in structured social interaction.

Hints for Successful Classroom Games

These tips come from Aldridge & Badham (1993):

- Make sure the game matches the mathematical objective
- Use games for specific purposes, not just time-fillers
- Keep the number of players from two to four, so that turns come around quickly
- The game should have enough of an element of chance so that it allows weaker students to feel that they a chance of winning
- Keep the game completion time short
- Use five or six 'basic' game structures so the children become familiar with the rules - vary the mathematics rather than the rules
- Send an established game home with a child for homework
- Invite children to create their own board games or variations of known games.

References

Aldridge, S. & Badham, V. (1993). Beyond just a game. *Pamphlet Number 21* . Primary Mathematics Association.

Davies, B. (1995). The role of games in mathematics. *Square One* . Vol.5. No. 2

Gough, J. (1999). Playing mathematical games: When is a game not a game? *Australian Primary Mathematics Classroom*. Vol 4. No.2

Oldfield, B. (1991). Games in the learning of mathematics. *Mathematics in Schools*.

CONTENTS

#	Game	Number	Algebra	Space	Measure	Chance	Data	Logic
1	Addition War	✓					✓	
2	AFL Simulation	✓						
3	Algebra Race	✓	✓					
4	Animal Game	✓				✓	✓	
5	Battleships			✓				
6	Bears and Fish							✓
7	Best Egg Box	✓				✓		
8	Binomial War	✓	✓					
9	Block or Switch	✓						✓
10	Bulls and Cows							✓
11	Buzz	✓						
12	Cat and Mouse					✓		
13	Close to 50	✓						
14	Close to 100	✓						
15	Coin in the Square				✓	✓		
16	Connect Three	✓						
17	Conway's Army							✓
18	Decimal Connect	✓						
19	Decimal Factors	✓						
20	Decimal Jigsaw	✓						
21	Decimal Line-up	✓						✓
22	Dice Cricket	✓				✓	✓	
23	Dicey Operations	✓						✓
24	Domino Squares	✓				✓		
25	Equation War		✓					
26	Explain the Graph		✓					
27	Factor Game	✓						✓
28	Factor Grab	✓						
29	Factors and Multiples	✓						
30	Factor Triangles	✓						
31	FDP Bingo	✓						
32	First Down the Mountain					✓		
33	Fives a Crowd	✓			✓			
34	Forbidden Words							

#	Game	Number	Algebra	Space	Measure	Chance	Data	Logic
35	Four Digit Numbers	✓						
36	Fraction Wall Game	✓						
37	Great Expectation	✓						
38	Greater Than Less Than	✓						
39	Greedy Pig					✓		✓
40	Grid Fight	✓			✓			
41	Hangman	✓						
42	Higher or Lower?					✓		✓
43	Horse Racing					✓		
44	I'm Finished	✓				✓		✓
45	Keep your Car Going	✓						
46	Liars Dice	✓				✓		
47	Loop Cards	✓						
48	Make a Moke					✓		
49	Make Ten	✓						
50	Maxi-miser	✓						
51	Multiples Path	✓						
52	Multiplication Hex	✓						
53	Multiplication Toss	✓			✓			✓
54	Multo	✓						✓
55	Nim							✓
56	Number Poker	✓						✓
57	1111 - 9999	✓						
58	One Hundred or Bust	✓						
59	Operation Challenge	✓					✓	
60	Operation Golf	✓						
61	Operation Histogram	✓					✓	
62	Penta Place			✓				✓
63	Place Value Dice	✓						
64	Polygon Capture			✓				
65	Pot Luck	✓						
66	Product Game	✓						
67	Quadratic Dominoes		✓					
68	Quad Concentration			✓				
69	Quadrilateral Go Fish			✓				
70	Quadrilateral Guess Who			✓				



ADDITION WAR



1. Remove the Jacks, Queens and Kings from the Deck.
2. In Addition War, Aces count as one, the rest of the cards are equal to their face values.
3. Deal an even number of cards to each player at the table. If there are three players playing the game, discard the last card from the deck.
4. Each player flips over 2 cards, and calls out their total. The player with the highest total adds all cards to the bottom of their deck.
5. If there is a tie between the highest totals, a WAR occurs.
6. WAR: Each player places three cards face down and flips over two additional cards face up. The player with the higher face-up total wins the war, and takes all the cards.
7. If there is another tie, repeat turning over two more cards.
8. Continue playing rounds of Addition War until one player has all the cards. That player is the winner.
9. If a player has not got enough cards to go to WAR, they lose.

VARIATIONS:

Advanced Addition War

Turn up 3 (or 4) cards for each battle and add them up.

Subtraction War

Everyone turns up 2 cards and subtracts them. The greatest difference wins the battle.

Product War

Turn over 2 cards and multiply.

Advanced Product War

Turn up 3 (or 4) cards and multiply.

Fraction War

Everyone turn over 2 cards and make a fraction, using the smaller card as the numerator. The highest fraction wins the battle.

Improper Fraction War

Turn over 2 cards and make a fraction, using the larger card as the numerator. The highest fraction wins the battle.

Integer Addition War

Black cards are positive numbers; red cards are negative. The greatest sum wins. Remember that -2 are greater than -7 .

Integer Product War

Black cards are positive numbers; red cards are negative. The greatest product wins. Remember that two negative numbers make a positive product.



AFL SIMULATION



Players: 2 players

Equipment:

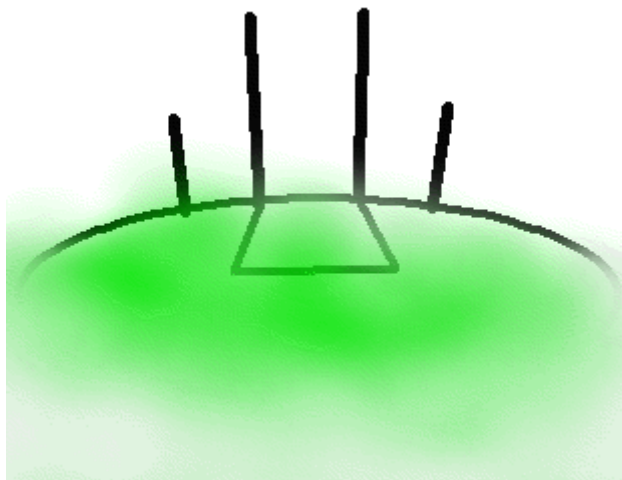
A standard 6 sided dice, scoresheet

Play:

1. Pick an AFL team to play for and write it on the scoresheet.
2. Take turns to roll the die twice. First roll shows goals for that quarter. Second roll shows behinds for that quarter. Then calculate the points, by multiplying the goals by six and adding behinds.
3. Play a total of six games.

Extensions:

1. Gather enough class data for a whole season.
2. Compare your data with the data of a real AFL season. For example use stem and leaf plots, and/or box plots.
3. Would using an 8 sided or 10 sided die give a better result?



Team:				Team:			
	Goals	Behinds	Points		Goals	Behinds	Points
1 st Qtr				1 st Qtr			
2 nd Qtr				2 nd Qtr			
3 rd Qtr				3 rd Qtr			
4 th Qtr				4 th Qtr			
Total Score				Total Score			

Team:				Team:			
	Goals	Behinds	Points		Goals	Behinds	Points
1 st Qtr				1 st Qtr			
2 nd Qtr				2 nd Qtr			
3 rd Qtr				3 rd Qtr			
4 th Qtr				4 th Qtr			
Total Score				Total Score			

Team:				Team:			
	Goals	Behinds	Points		Goals	Behinds	Points
1 st Qtr				1 st Qtr			
2 nd Qtr				2 nd Qtr			
3 rd Qtr				3 rd Qtr			
4 th Qtr				4 th Qtr			
Total Score				Total Score			

Team:				Team:			
	Goals	Behinds	Points		Goals	Behinds	Points
1 st Qtr				1 st Qtr			
2 nd Qtr				2 nd Qtr			
3 rd Qtr				3 rd Qtr			
4 th Qtr				4 th Qtr			
Total Score				Total Score			

Team:				Team:			
	Goals	Behinds	Points		Goals	Behinds	Points
1 st Qtr				1 st Qtr			
2 nd Qtr				2 nd Qtr			
3 rd Qtr				3 rd Qtr			
4 th Qtr				4 th Qtr			
Total Score				Total Score			

Team:				Team:			
	Goals	Behinds	Points		Goals	Behinds	Points
1 st Qtr				1 st Qtr			
2 nd Qtr				2 nd Qtr			
3 rd Qtr				3 rd Qtr			
4 th Qtr				4 th Qtr			
Total Score				Total Score			

ALGEBRA RACE

1. Students place their counters on the start and roll the die separately.
2. They move forward the number of spaces indicated on the die.
3. Next turn they roll the die and substitute that number into the expression to find out how many spaces to move. For example roll 5 on square " $3b + 2$ ". So move $3 \times 5 + 2 = 17$ spaces.
4. Play first to make it 10, 15 or 20 times around the board.
5. Students are expected to record their results – number rolled and evaluation of the expression.



START	2t + 2	S x S	3b + 2	Dx4 + 2	4T - 4	Miss a go	Bx3 - 2	3A	Move back 5								
Bx3 - 2									3T + 5								
Move back 15									Move forward 5								
2T + 10									Dx4 + 4								
4d + 2									Tx2 + 3								
Go to Start									Go to START								
Tx2 + 3									Miss a go	Dx4 + 6	Move forward 10	4A	Dx4 - 2	Bx3 + 7	s x s	Move back 10	3b + 5

ANIMAL GAME

The four animals in the race are the Camel, who steadily plods around the course, so either moves 2 or 3 paces at a time; the Cat who is nose-y and likes to look at the sights, so either sits still, 0 paces, or moves 1, 2, 3, 4, or 5 paces; the Lion who is confident and either snoozes, 0 paces, or runs 5 paces; and the Horse who is rather scatty and so sometimes runs backwards, -1 pace, and sometimes forwards 6 paces. Who do you think will win?

EQUIPMENT:

Animal Game Board, 4 counters, one standard die.

BASIC RULES:

Each player chooses an animal and takes it in turn to roll a die and move around the game board. Whoever crosses the finish line first is the winner. Each animal moves as follows:

Camel: If the score is even, move 2 paces. If the score is odd, move 3 paces.

Cat: Subtract 1 from the number shown on the die and move that number of paces.

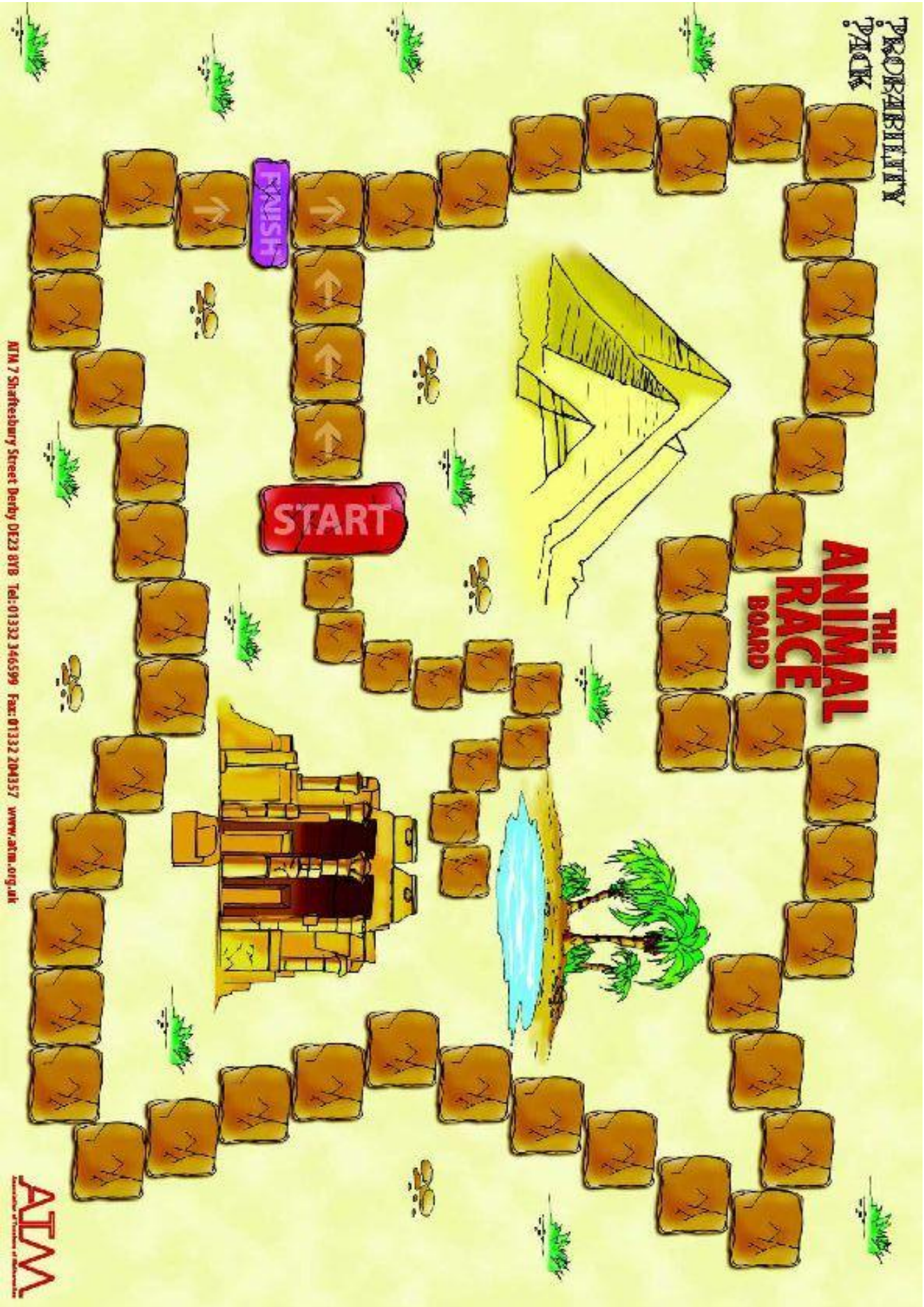
Lion: If the score is even, stay still. If the score is odd, move 5 paces.

Horse: If the score is even, move 6 paces forward. If the score is odd, move 1 pace backwards.



PROPERTY
PACK

THE ANIMAL RACE BOARD



ATM 7 Shaftesbury Street Derby DE23 8TB Tel: 01332 346599 Fax: 01332 204357 www.atm.org.uk

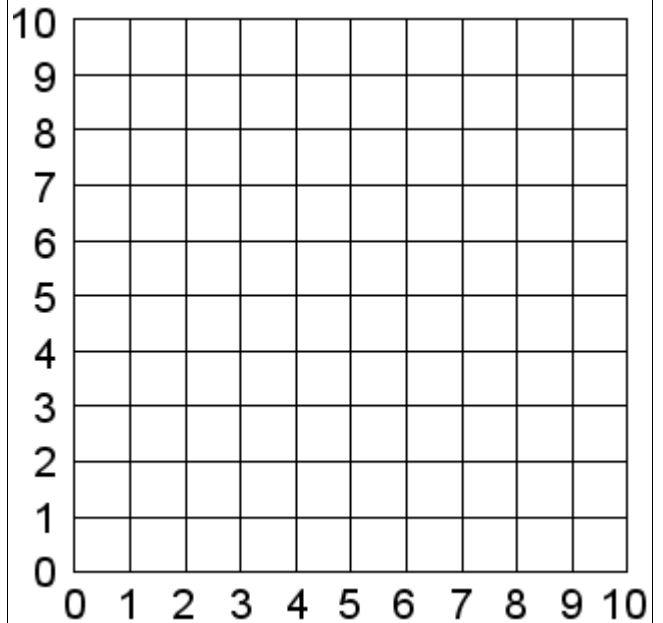


BATTLESHIPS

Draw 5 different quadrilaterals in this grid. They can be in any direction. Each quadrilateral is a battleship.

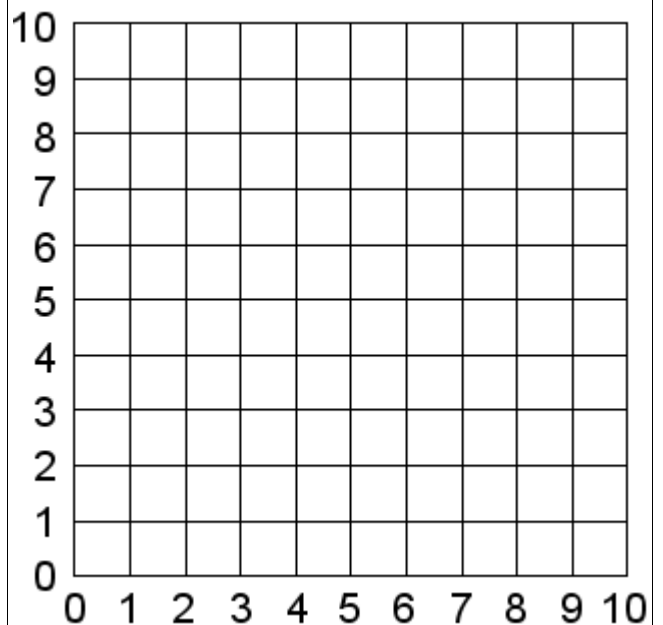
Colour each ship a different colour and label the four points of each battleship with their co-ordinates.

If your partner guesses all four points on a battleship, you must tell him what colour it is.



This grid is for you to record your hits and misses on your partner's grid. If you successfully sink a battleship, your partner will tell you what colour it is.

The first person to sink all the opposing player's battleships is the winner!





BEARS AND FISH



It is winter in the arctic. An Eskimo comes across the frozen sea and makes holes in the ice to fish through. After a few hours of fishing he decides that he has caught enough fish and departs. Slowly the polar bears emerge. Wary of each other they circle the abandoned fishing holes to explore the potential for a meal.

We roll 5 dice..... and you get to figure out how many bears and how many fish there are! **Here are some examples:**



We have 2 bears and 23 fish.



We have 6 bears and 16 fish.



We have 12 bears and 17 fish.

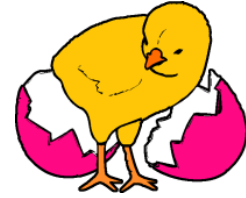


Polar Bears occur in pairs,
By holes in the ice they gather round,
How many bears can there be?
How many fish under the sea?





BEST EGG BOX



A simple probability game, that is easy to play. To analyse which is the best egg box to choose, a lattice diagram may be used.

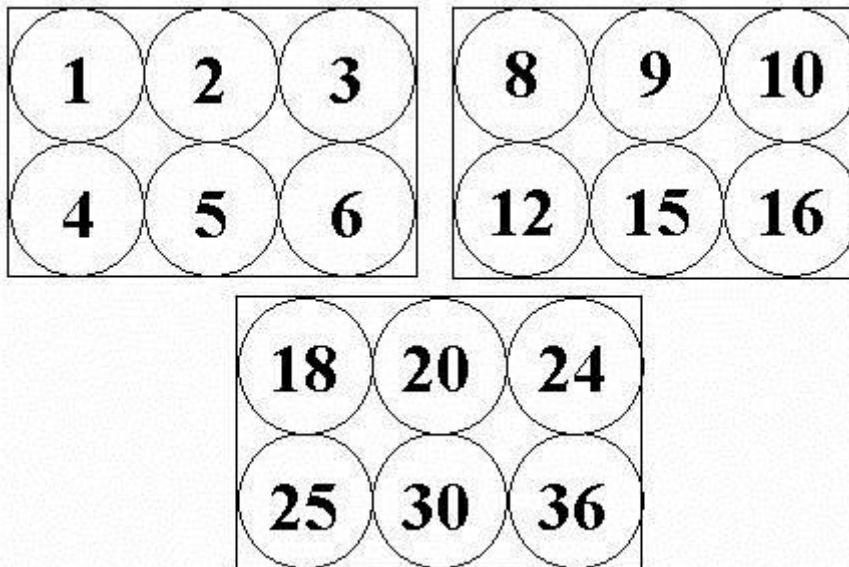
EQUIPMENT:

3 egg cartons as shown, 2 standard dice.



BASIC RULES:

Three half-dozen egg boxes are numbered as below.



Working in groups of three, each player is allocated an egg box. Two dice are rolled and their scores multiplied together. A counter is dropped into the hole with that number. The winner is the player whose egg box gets all the numbers covered first.

RESOURCES:

[Websites]

<http://www.nzmaths.co.nz/Statistics/Probability/FairGames.aspx>

BINOMIAL WAR

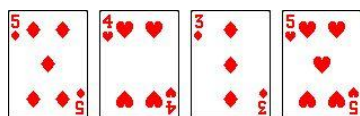
PLAYERS: 2

EQUIPMENT: Deck of cards (Ace = 1) – 10, Jack = 11, Queen = 12, King = 0, one ten sided die, paper and pen

- BASIC RULES:**
1. Each player draws four cards and places them face up.
 2. Each player forms two linear binomials from their four cards. Red cards are positive and black cards are negative.
 3. Each player calculates their sum.
 4. The die is rolled and that number is substituted into the polynomials. The largest value wins a point.
 5. Play continues for a set period of time.

EXAMPLE:

Player One



$$(5t + 4) + (3t + 5)$$

$$= 8t + 9$$

Player Two



$$(-3a - 12) + (10a - 9)$$

$$= 7a - 21$$

ROLL 8

$$= 8(8) + 9$$

$$= 64 + 9$$

$$= 73$$

$$= 7(8) - 21$$

$$= 56 - 21$$

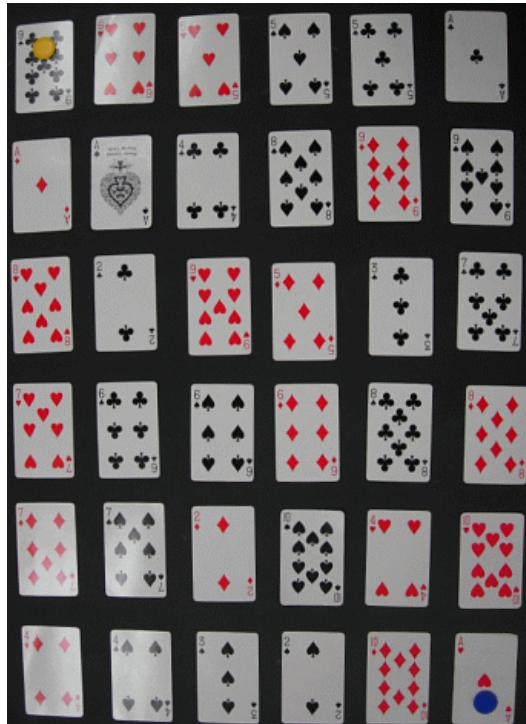
$$= 35$$

Player One wins this round

VARIATION: Multiply binomials (expand brackets) and substitute dice roll.

BLOCK OR SWITCH

1. A simple card game which is best played with two players.
2. A single pack of cards is required plus 2 markers.
3. Remove the court cards (Jacks, Queens and Kings) leaving 40 cards.
4. Players sit opposite each other.
5. Cut the pack, loser deals and winner goes first. A 6 x 6 grid of cards is dealt as shown in the picture below.

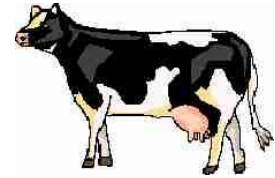


6. The yellow marker plays first. They may move to any card in the same row or column and take that card. The highest scoring card possible is the 8H which yellow decides to take.
7. Now blue plays. He/she decides to take either the 10Hearts for a 10 point score.
8. Play continues in turn, but players are NOT allowed to jump over each other in the same column or row. And so the opportunity to block your opponent arises.
9. After all cards are taken, the cards are added up. The highest total is the winner.

*** Original Game designed by Jeff Trevaskis ***



BULLS & COWS



Bulls and Cows is a great game to encourage logical thinking. It is an easy game to play with the whole class on the whiteboard or between students. Minimal equipment is needed.

BASIC RULES:

Think of a 3 digit number e.g. 419. Students try a guess – give them feedback according to how many numbers are bulls (in the correct position) or cows (in the wrong place value position). Here is a sample game:



179 1 bull, 1 cow

915 1b, 1c

791 2c

819 2b

419 3b



Modify the game for ability levels – 2 or 4 digits, repeated digits. Set targets to achieve – 6 guesses. Provide example games such as above with the last line deleted.

RESOURCES:

[Software] Bulls&Cows.xls





BUZZ



1. Sit in a circle. Choose a leader. The leader names any whole number from 3 – 9. This number is the BUZZ number. The leader may also choose a STOP number.
2. The player to the left of the leader begins by saying “one”. Play continues clockwise – each player saying either the next whole number or “BUZZ”.

A player must say “BUZZ” if the number is a multiple of the BUZZ number.

Example: The BUZZ number is 3. Play should proceed as follows:

1, 2, BUZZ, 4, 5, BUZZ, 7, 8, BUZZ, 10, 11, etc.

3. If a player makes an error, the next player must start again with 1.
4. Play continues until the STOP number is reached.
5. For the next round the player to the right of the leader becomes the new leader.



BIZZ BUZZ



Bizz-Buzz is played like Buzz_ except the leader names two numbers; a BIZZ number and a BUZZ number.

Example: The BIZZ number is 3 and the BUZZ number is 4. Play should proceed as follows:

1, 2, BIZZ, BUZZ, 5, BIZZ, 7, BUZZ, BIZZ, 10, 11, BIZZ-BUZZ, 13, etc.





CAT & MOUSE



EQUIPMENT:

Cat and Mouse Game Board, one counter, one standard die.

BASIC RULES:

Put the counter in the room where the mouse is. Roll the die. The mouse moves to the next room by the following rules:

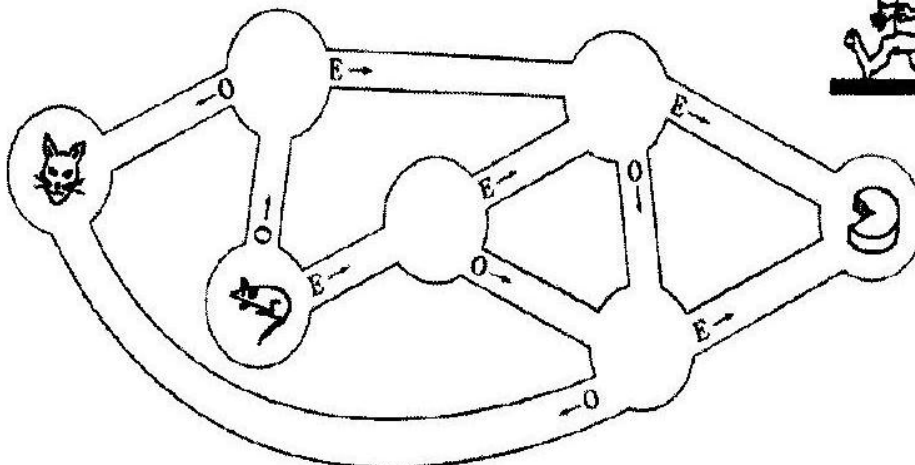
Move in the direction **O** if you roll an odd number.

Move in the direction **E** if you roll an even number.

Play 10 games and count your wins and losses. Is this a fair game?

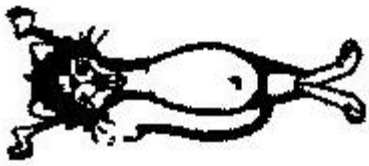
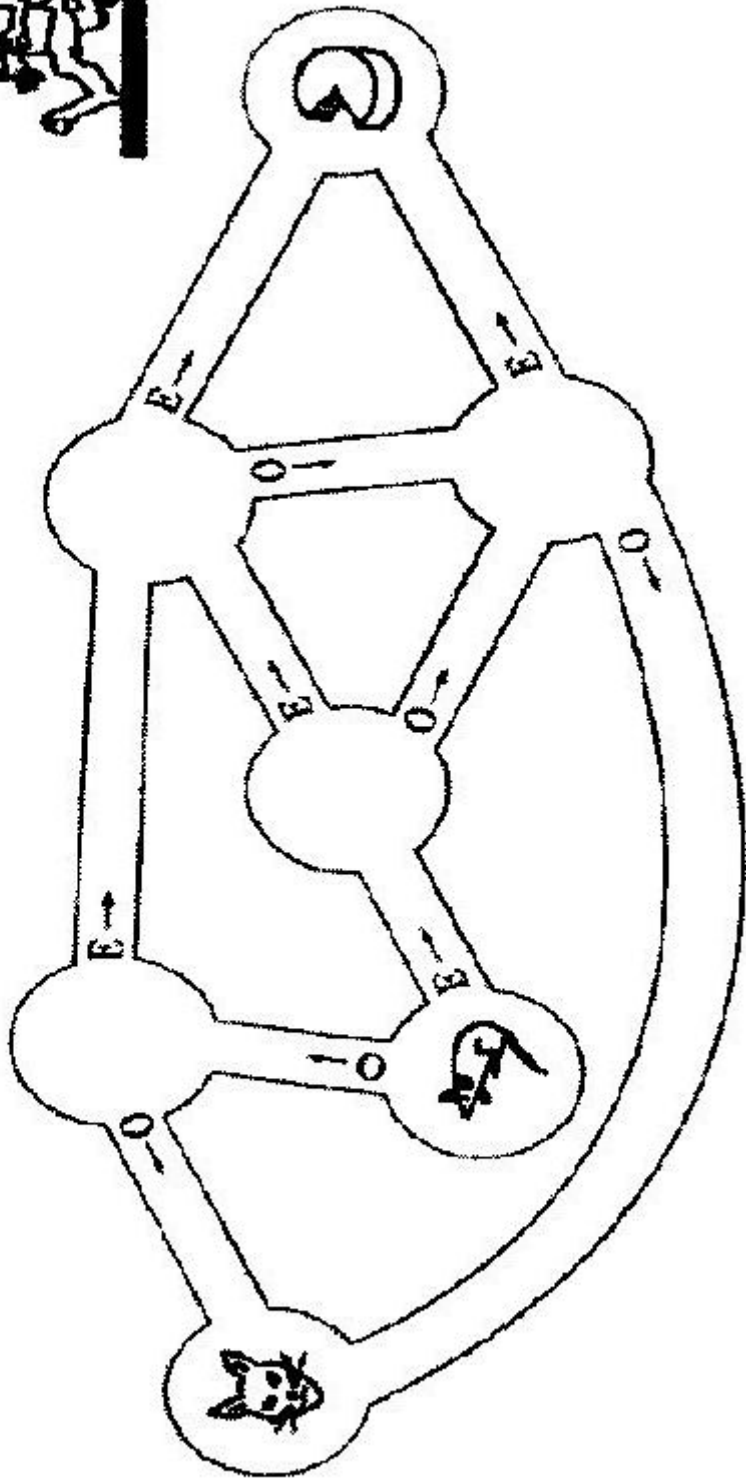


Cat and Mouse
Game Board





**Cat and Mouse
Game Board**



CLOSE TO 50

Rules of the game:

Each pair has 3 dice with the digits 0 – 9 on them (or one dice that they roll 3 times).

Player 1 goes first and rolls all three dice at the same time. Put the three dice in a row in any order you want, with a decimal point after the first. If, for example, you had a 4, 7 and a 9 you could have any of the following numbers,

4.79 9.47 4.97 9.74 7.94 7.49

Write the number down in your table, then round it to 1dp and put this number in the next column.

Player 2 then does the same in their table. Player 1 then takes another turn and adds to the answer from the previous one. Follow the table below. This could be an example:

Number	Rounded to 1 dp	Sum	Current Total
9.47	9.5	0 + 9.5	9.5
2.45	2.5	9.5 + 2.5 = 12	12
6.72	6.7	12 + 6.7 = 18.7	18.7
3.56	3.6	18.7 + 3.6 = 22.3	22.3

After both players have had 10 goes, the winner is the player whose total is closest to 50.

Note – the game can easily be adapted for rounding to 2 decimal places by rolling the dice 4 times.

CLOSE TO 50

- Playing Tables -

Turn	Dice	Rounded	Sum	Current Total
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Turn	Dice	Rounded	Sum	Current Total
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

CLOSE TO 100

- 2 or 3 Players
- Deal out six numeral cards to each player
- Use any four cards to make two numbers. For example, a 6 and 5 could make either a 56 or 65. Try to make the numbers that, when added, give you a total close to 100.
- Write these numbers and their total on the **Close to 100** score sheet. Your score is the difference between your score and 100.
- Put the cards used in discard pile. Keep unused cards and get new cards to have 6 cards in your hand. Make more cards that come close to 100.
- When you run out of cards, mix up the discard pile and use them again.
- Five rounds make one game. Total your scores for the five rounds. Lowest score wins!

CLOSE TO 100 Score Sheet

NAME _____	
Game 1	SCORE
Round 1: _____ + _____ = _____	_____
Round 2: _____ + _____ = _____	_____
Round 3: _____ + _____ = _____	_____
Round 4: _____ + _____ = _____	_____
Round 5: _____ + _____ = _____	_____
TOTAL SCORE	_____

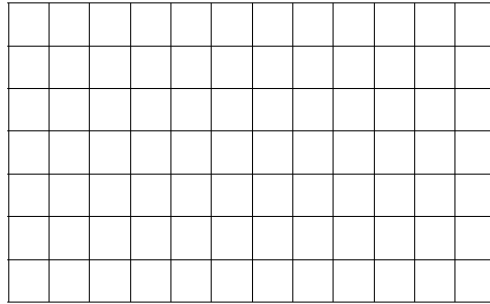
NAME _____	
Game 1	SCORE
Round 1: _____ + _____ = _____	_____
Round 2: _____ + _____ = _____	_____
Round 3: _____ + _____ = _____	_____
Round 4: _____ + _____ = _____	_____
Round 5: _____ + _____ = _____	_____
TOTAL SCORE	_____



COIN IN THE SQUARE



1. Draw 36mm squares on a large piece of paper.



2. Throw a 5¢ coin onto the grid. You win if the coin does not touch a line.
3. Predict how many times you would win out of 100 throws.
4. Throw the coin 100 times and record your results.
5. If you were a carnival operator, what is a reasonable prize to offer for each winning throw?
6. What if the coin used was 10¢, 20¢, 50¢, \$1, \$2 ?

Extension:

Calculate the exact chance of winning this game.

Hint: Where must the centre of the coin finish to be in a winning position?



CONNECT THREE

PLAYERS: 2

EQUIPMENT: Different coloured counters – one colour for each player, two six-sided dice with numbers marked as shown below.

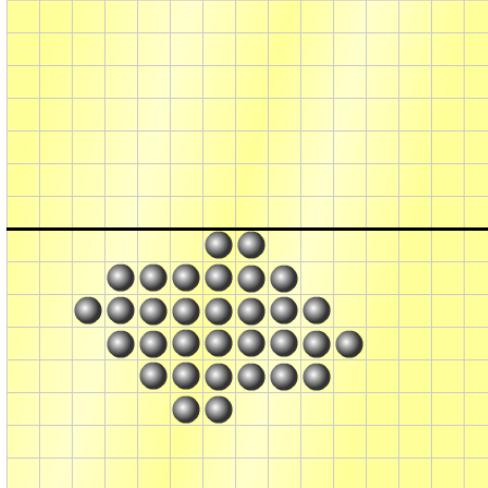
- BASIC RULES:**
1. This is a mathematical version of noughts and crosses that uses differently numbered dice (one with the numbers 1, 2, 3, -4, -5, -6 and the other with -1, -2, -3, 4, 5, 6).
 2. To place your counter, roll the dice and decide whether to add or subtract the numbers.
 3. For example, three ways of landing on 4 are:
 $5-1=4$ $2-(-2)=4$ $(-2)-(-6)=4$

- QUESTIONS:**
1. Can you work out the number of different ways of achieving each of the different totals?
 2. Can these results help you work out a strategy for improving your chances of winning the game?

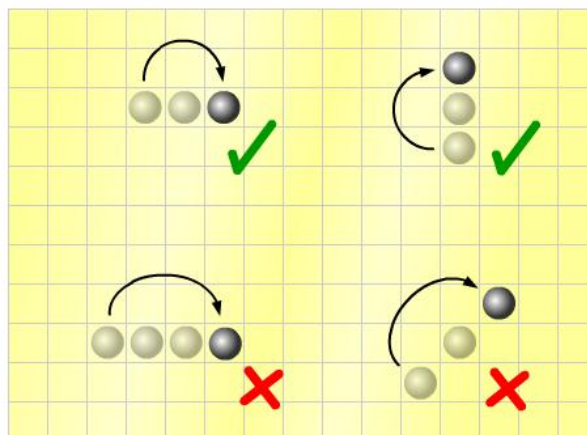
-12	-11	-10	-9	-8
-7	-6	-5	-4	-3
-2	-1	0	1	2
3	4	5	6	7
8	9	10	11	12

CONWAY'S ARMY

There are two stages to this challenge. First position some counters below a fixed horizontal line in a square grid. Here is an example:

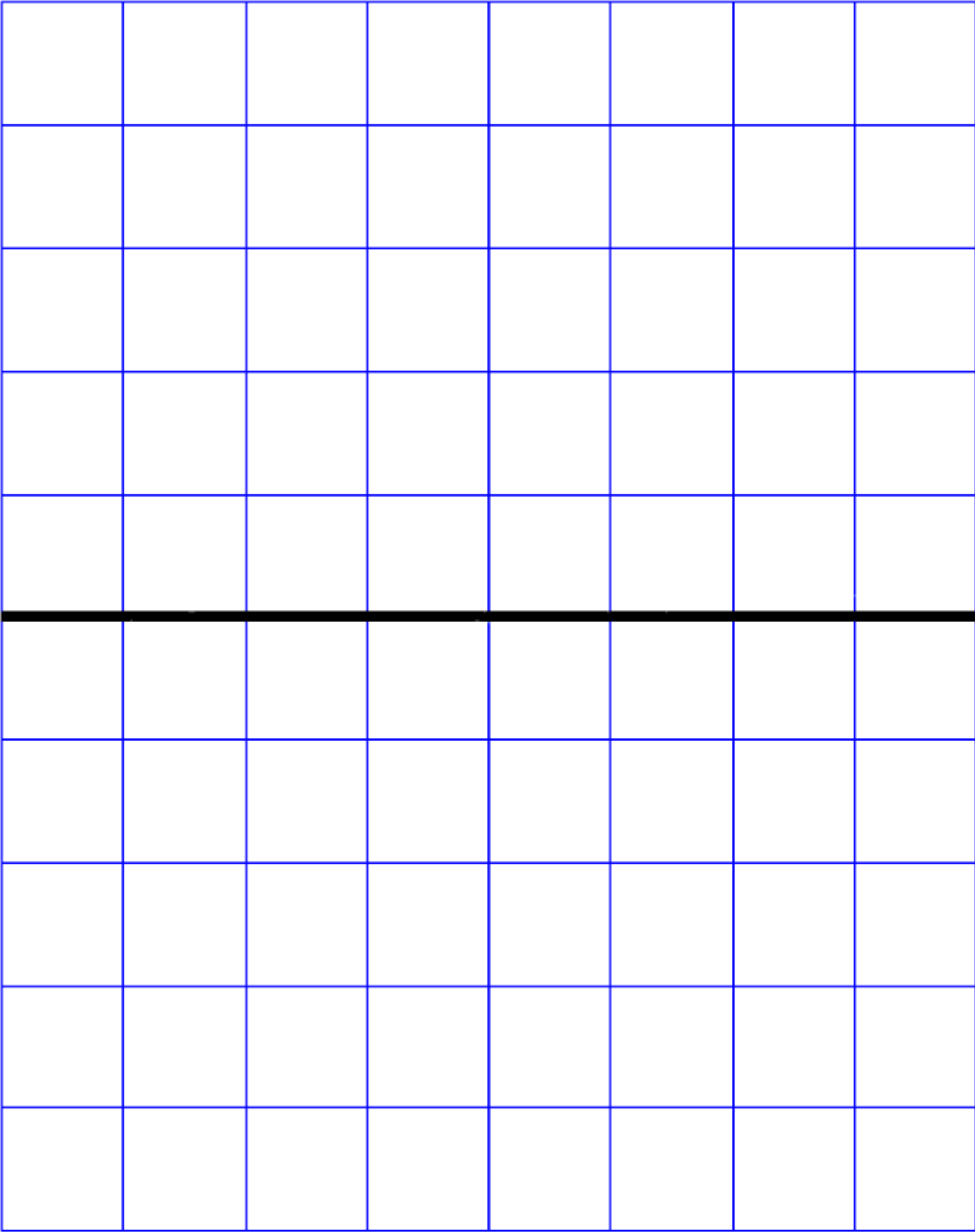


The aim of the second stage is to advance one of the counters as far as possible beyond the horizontal line. The counters are only allowed to move in a certain way. They can only move by jumping horizontally or vertically over a neighbouring counter. If one counter jumps over another, then the static counter underneath the jump is removed. Diagonal jumps are disallowed. Also, the counters cannot jump over two neighbours.



Given an unlimited supply of counters, and freedom to position the counters below the horizontal line in any way that you choose, how far beyond the horizontal line can the counters be advanced?

CONWAY'S ARMY GRID



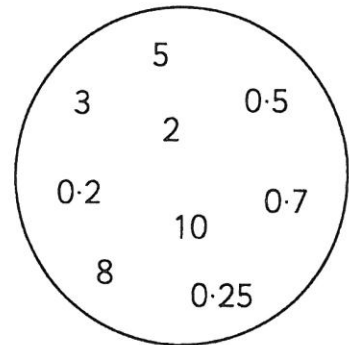
DECIMAL CONNECT

PLAYERS: 2 to 3

EQUIPMENT: Different coloured counters – one colour for each player, game-board, calculator.

- BASIC RULES:**
1. Take turns to select numbers.
 2. Choose two numbers, one from the circle and one from the rectangle and multiply them to give a number on the grid.
 3. If the calculation is accepted as correct by the other players, cover the grid number with a counter. In case of disagreement, use a calculator to check the answer.
 4. The winner is the first to get four counters in a line, horizontally, vertically or diagonally to score a point.

0.3	25	21.09	0.84	300	2
14.06	60	1.92	20	6	0.04
1	35.15	2.4	0.1	500	12
0.6	3	20	50	800	4.8
1.68	8.4	0.8	2.8	4.921	1.2
70	70.3	0.72	49.21	1	56.24



12	1.5
1.2	0.2
100	0.25
2.4	4
7.03	0.5

DECIMAL FACTORS

1. Team one picks two factors by marking them with paperclips.
2. Place an "X" on their product on the grid.
3. Team two then moves one paper clip to a new factor and circles the new product.
4. Alternate moves, one paper clip at a time, until one team has four marks in a row.

1.2	5	.88	.011	.003	.25
100	.008	.09	.005	.006	6
3.2	.24	.48	.04	.64	16
2.4	.4	2	4.4	.15	1.21
.55	.36	.18	.3	.0001	.33
11	40	.1	8	3	.66

.3 4 .5 .01 .6 .8 10 1.1

DECIMAL JIGSAW

1. Cut carefully along the thick lines.
2. Turn the pieces face down on the table.
3. Turn the pieces over one at a time and try to make the grid again.

0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0
3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0
4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9	6.0
6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9	7.0
7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9	8.0
8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9	9.0
9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	10.0

DECIMAL LINE UP

Players: 2 players OR 2 teams

Equipment:

A deck of cards with the Tens, Queens and Kings removed.

Play:

1. Each player or team makes a path with 10 spaces, with a beginning and end.
2. On your turn, flip over a card. If it's red, flip over another card. If it's black, flip over another card. But you never flip more than three. If you run out of cards, shuffle up the used cards.
3. Arrange those cards to make a decimal number. Jacks are the zeros. The smallest number you can make is .000, and the largest is .999. Say your number.
4. Fill in your decimal number somewhere on the path. But it can't go before a smaller number or after a bigger number. Your path has to start small and end big. If there's no place to fill in your number, you don't.
5. Winner is the first person to completely fill in their path, with all the numbers in order.

.03
.2
.21
.4
.5
.527
.56
.7
.891
.92

Examples:

1. J ♥, 3 ♣. You can make .03 or .30.
2. 5 ♥ hearts, so you flip 2 ♦, so you flip 7 ♥ hearts. (You stop because you can't have more than three.) You can make one of .275, .275, .527, .572, .725 or .752. Which you want depends on your path.

Variations:

1. Simpler: Play where you always flip over 2 or 3 cards.
2. Play cooperatively. Two players work together to fill in one path.
3. More complex: Play with 10s, which fill in 2 places. So 10 ♦, 5 ♠ can be .105 or .510.
4. More complex: Play without the three card limit. You could hit a 10 digit long decimal or longer! (Pretty unlikely, but still...)
5. Make 12 space paths.

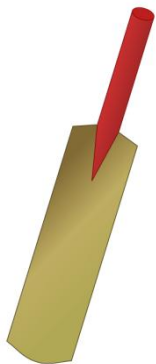


DICE CRICKET



EQUIPMENT:

2 different coloured dice, which score as follows:



BATSMAN'S DIE

- 1 = HOWZAT
- 2 = 2 Runs
- 3 = 3 Runs
- 4 = 4 Runs
- 5 = 1 Run
- 6 = RUN OUT

BOWLER'S DIE

- 1 = NO BALL
- 2 = CAUGHT
- 3 = L B W
- 4 = STUMPED
- 5 = BOWLED
- 6 = NOT OUT



BASIC RULES:

The two players will select who will bat first by tossing a coin.

The batsman rolls the Batsman's die and the Bowler, acting as scorer, notes down the result of the roll. Play continues thus until the batsman rolls **HOWZAT** or **RUN OUT**. For **HOWZAT** the Bowler rolls the Bowler's die to decide the result of the appeal.

Play continues until the agreed number of batsman, usually five, have all had an innings. The player roles are reversed with the winner being the player who scores the most runs.



DICEY OPERATIONS

Find a partner and a 0-9 dice.

Take turns to throw the dice and decide which of your cells to fill. This can be done in two ways: either fill in each cell as you throw the dice or collect all your numbers and then decide where to place them. Score 1 point for a win. The first person to reach 10 wins the game.

Game 1

Each of you uses an addition grid like this:

+				

Throw the dice nine times each until all the cells are full. Whoever has the sum closest to 1000 wins.

Game 2

-					

Throw the dice eight times each until all the cells are full. Whoever has the difference closest to 1000 wins.

Game 3

Each of you draws a multiplication grid like this:

×			

Throw the dice four times each until all the cells are full. Whoever has the product closest to 1000 wins.

Game 4

Each of you draws a multiplication grid like this:

×			

Throw the dice five times each until all the cells are full. Whoever has the product closest to 10000 wins.

Game 5

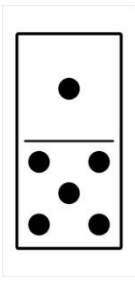
Each of you draws a division grid like this:

Throw the dice five times each until all the cells are full. Whoever has the answer closest to 1000 wins.

Game 6

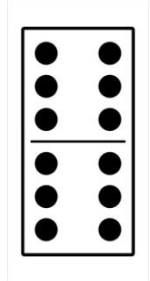
Each of you draws a division grid like this:

Throw the dice six times each until all the cells are full. Whoever has the answer closest to 100 wins.



DOMINO SQUARES

*** Original Game designed by Jeff Trevaskis ***



Rules:

1. Use a standard “double six” set of dominos.
2. The caller picks one domino at a time, randomly.
3. The players place each domino horizontally or vertically in their grid.
4. Play continues until 9 dominos are called out, giving the players one chance to discard.
5. Players calculate their total score by summing the 8 products formed in each row and column.
6. The player/s with the largest total is the winner.

Worksheet:

1. What is the product of any number times zero?
2. What is the smallest total possible?
3. What is the largest total score possible?
4. What strategies would you use to win this game?
5. How many dominos are there in a double six set?
6. What is the sum of all the dots on a double six set?

Domino Squares

After you have placed all 9 dominos:

1. Calculate the product of each row and column
2. Calculate the total of all the products.

The winner is the person with the highest total.

DISCARD			TOTAL	
---------	--	--	-------	--

Domino Squares

After you have placed all 9 dominos:

1. Calculate the product of each row and column
2. Calculate the total of all the products.

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DISCARD			TOTAL	
---------	--	--	-------	--

Domino Squares

After you have placed all 9 dominos:

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DISCARD			TOTAL	
---------	--	--	-------	--

EQUATION WAR

PLAYERS: 2 to 4

EQUIPMENT: Two, three, or four ten-sided dice, game-board, counters.

- BASIC RULES:**
1. The teacher or players choose which equation to work with.
 2. Roll the ten sided dice and create a linear equation.
 3. After solving their equations, players compare answers.
 4. The player with the largest result wins a point.
 5. Play continues for a set period of time.

EXAMPLE: Players choose game-board ⑥.

$$\square = \square x + \square$$

Player One rolls:

9, 5, 4

$$9 = 5x + 4$$

$$5 = 5x$$

$$1 = x$$

Player Two rolls:

8, 2, 4

$$8 = 2x + 4$$

$$4 = 2x$$

$$2 = x$$

Player two wins and scores one point.

EQUATION WAR GAMEBOARDS

$$\textcircled{1} \quad \square x + \square = \square$$

$$\textcircled{1} \quad \square x + \square = \square$$

$$\textcircled{2} \quad \square x = \square$$

$$\textcircled{2} \quad \square x = \square$$

$$\textcircled{3} \quad x + \square = \square$$

$$\textcircled{3} \quad x + \square = \square$$

$$\textcircled{4} \quad \square x + \square = \square x + \square$$

$$\textcircled{4} \quad \square x + \square = \square x + \square$$

$$\textcircled{5} \quad \frac{\square x}{\square} = \square$$

$$\textcircled{5} \quad \frac{\square x}{\square} = \square$$

$$\textcircled{6} \quad \square = \square x + \square$$

$$\textcircled{6} \quad \square = \square x + \square$$

$$\textcircled{7} \quad \square x + \square = \square x$$

$$\textcircled{7} \quad \square x + \square = \square x$$

EXPLAIN THE GRAPH

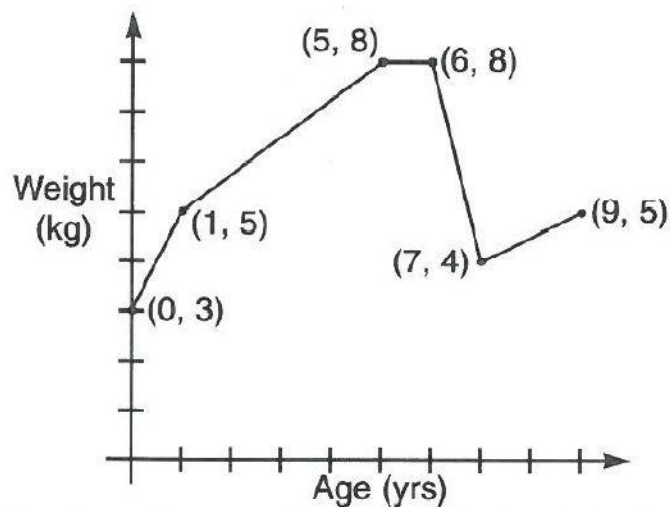
PLAYERS: 2 to 4

EQUIPMENT: Two ten-sided dice, graph paper, pencil.

- BASIC RULES:**
1. Players take turns rolling the dice for six rounds.
 2. After each roll, ordered pairs are plotted on the graph paper.
 3. The goal is to explain the graph by choosing appropriate labels for the axes as well as an explanation for the shape of the graph.

EXAMPLE: Player 1 rolls the dice six times and has the following ordered pairs:

(9, 5), (6, 8), (7, 4), (1, 5), (5, 8), (0, 3)



Player 1 chooses Age for the horizontal axis and weight for the vertical axis with the following reasoning:

“At 0 years (birth) the dog weighed 3 kg and its weight increased until it was 5 years old and it stayed at 8 kg for one year. The dog then became very ill and lost 4 kg in the next year and finally died after nine years at a weight of 5 kg.”

FACTOR GAME

Object

To be the player with the highest value of circled numbers at the completion of the game.

How to Play

1. Player 1 chooses a number (circles it) on "The Factor Game" game board.
2. Player 2 circles all the proper factors of the number player 1 circled. (Proper factors are any number that divides in the number evenly, but not the number itself.)
3. A number on the game board may only be circled once.
4. Player 2 then circles a new number on the game board and Player 1 circles its proper factors.
5. Players continue taking turns until all numbers have been circled which still have un-circled factors remaining.

Rules

1. Each player takes turns going first.
2. No number may be circled more than once.
3. If a player circles a number that has no un-circled factors, that player loses their turn and scores no points for the number they just circled.

The Factor Game

Game sheet

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25
26	27	28	29	30

The Factor Game

Game sheet

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25
26	27	28	29	30

FACTOR GAME WORKSHEET

Complete the following table with all the first moves possible.

First Move	Proper Factors	My Score	Opponent's Score
1	none	lose a turn	0
2	1	2	1
3	1	3	1
4	1,2	4	3
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			

1. Which number seems to be the best choice for your first turn?
Explain.

2. Which number (or numbers) seems to be the worst choice for your first turn? Explain.

3. Look for any patterns in your list. Describe any interesting patterns you find.

4. About how many turns did it take to end a game? _____

Is there a way to figure out the most turns possible regardless of score?

How?

5. Write a strategy for playing the factor game. Is there a way to play the game so you can win more times than you lose? (Always going first does not count)

FACTOR GRAB

Materials: One set of Factor Cards

2 Players

Directions:

1. Players spread out Factor Cards face up on the table in any order.
2. Find My Factors Cards are shuffled and kept in a pile, face down.
3. The top card in the pile is turned over.
4. The players grab any cards on the table that are factors of the card which was turned over.
5. Players may take a factor only once in a round (i.e. if the Find My Factors Card is 28, a player can grab one only of each of the following cards if available: 1,2,4,7,14 and 28)
6. Each player checks the other players chosen cards and may challenge any incorrect selections.
7. If the player is right about the other's wrong selection, that player may take any two of the opponent's cards.
8. Players put grabbed cards aside, as these are used to keep score.
9. The next Find My Factors Card is turned over and players again grab factor cards from the remaining cards on the table
10. Play continues until all Factor Cards have been grabbed
11. The player with the most cards is the winner

Alternate version:

Students take turns selecting the Factor Cards instead of racing to do it together. Once a player has found all the factors he/she can, the other player may look to see if any were missed and grab them.

Factor Card

1

Factor Card

1

Factor Card

1

Factor Card

2

Factor Card

2

Factor Card

3

Factor Card

3

Factor Card

4

Factor Card

4

Factor Card

5

Factor Card

5

Factor Card

6

Factor Card

1

Factor Card

1

Factor Card

1

Factor Card

2

Factor Card

2

Factor Card

2

Factor Card

5

Factor Card

7

Factor Card

8

Factor Card

8

Factor Card

9

Factor Card

9

Factor Card

11

Factor Card

11

Factor Card

12

Factor Card

22

Factor Card

2

Factor Card

3

Factor Card

3

Factor Card

13

Factor Card

14

Factor Card

9

Factor Card

27

Factor Card

27

Factor Card

1

Factor Card

2

Factor Card

3

Factor Card

8

Factor Card

9

Factor Card

10

Factor Card

10

Factor Card

6

Factor Card

10

Factor Card

10

Factor Card

5

Factor Card

2

Factor Card

4

Factor Card

21

Factor Card

2

Factor Card

16

Factor Card

16

Factor Card

16

Factor Card

4

Factor Card

22

Factor Card

22

Factor Card

25

Factor Card

36

Factor Card

25

Factor Card

20

Factor Card

2

Factor Card

3

Factor Card

4

Factor Card

6

Factor Card

7

Factor Card

15

Factor Card

3

Factor Card

3

Factor Card

2

Factor Card

13

Factor Card

8

Find My Factors

25

Find My Factors

36

Find My Factors

15

Find My Factors

20

Find My Factors

60

Find My Factors

24

Find My Factors

44

Find My Factors

54

Find My Factors

80

Find My Factors

16

Find My Factors

42

Find My Factors

66

Find My Factors

72

Find My Factors

27

Find My Factors

39

Find My Factors

91

Find My Factors

63

Find My Factors

12

Find My Factors

90

Find My Factors

64

Find My Factors

50

Find My Factors

35

Find My Factors

21

Find My Factors

13

FACTORS and MULTIPLES

This is a game for two players. Play on the 100 square grid below.

The first player chooses a positive even number that is less than 50, and crosses it out on the grid.

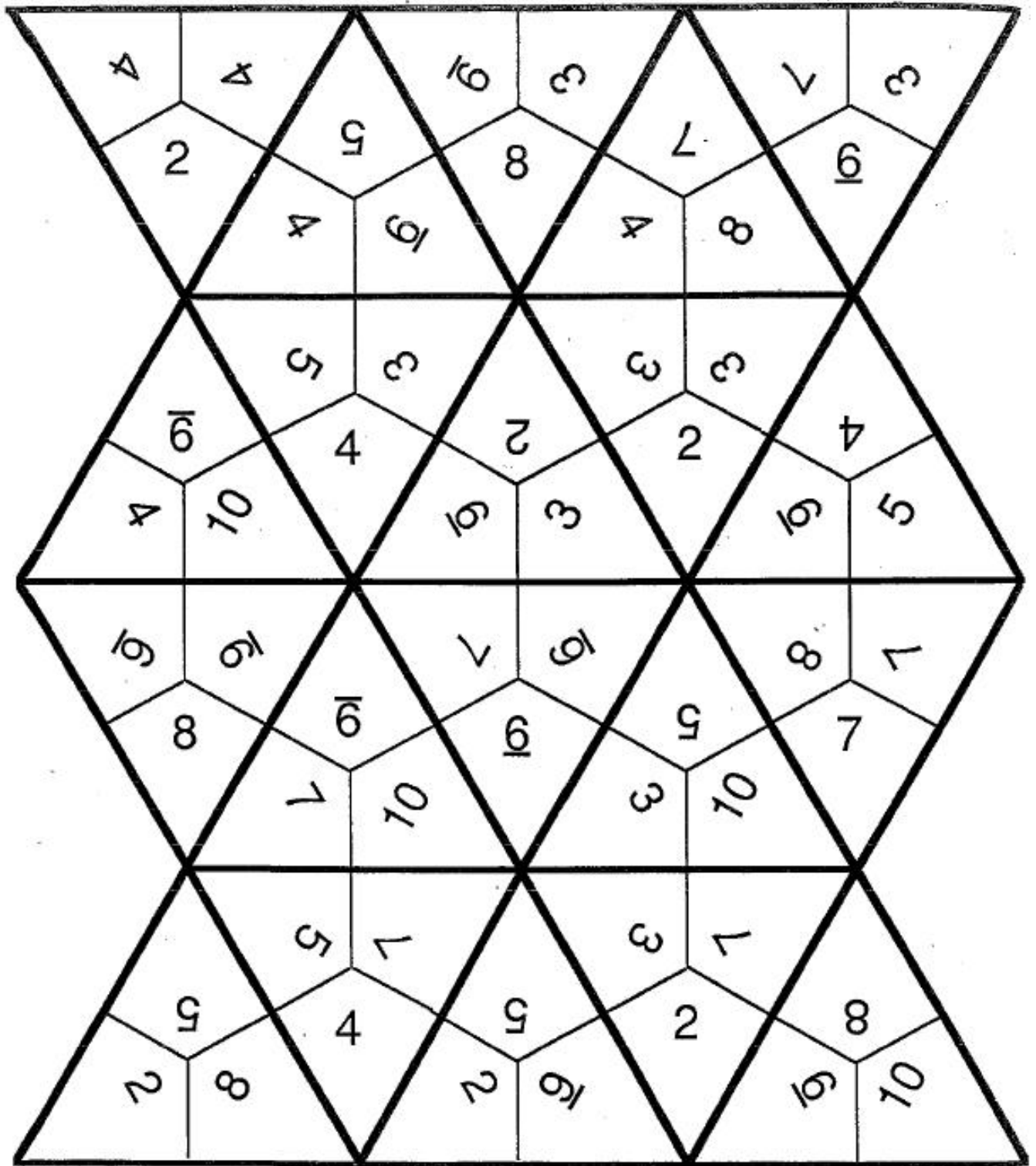
The second player chooses a number to cross out. The number must be a factor or multiple of the first number.

Players continue to take it in turns to cross out numbers, at each stage choosing a number that is a factor or multiple of the number just crossed out by the other player.

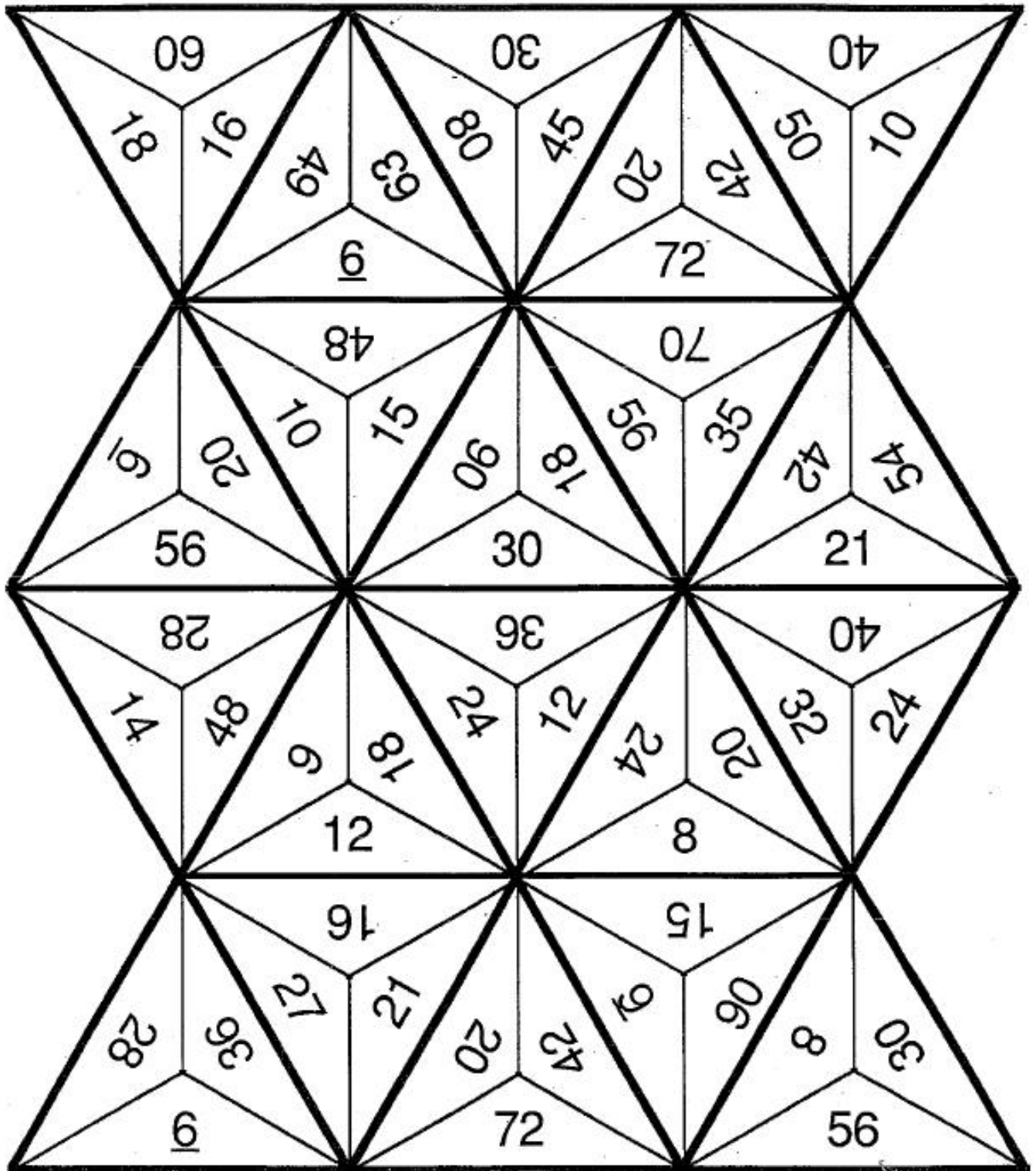
The first person who is unable to cross out a number loses.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

FACTOR TRIANGLES A



FACTOR TRIANGLES B



FDP BINGO

1. Direct students to outline a four-by-four section anywhere on the Bingo card.
2. Call out either a fraction, decimal, or percent and keep track of your calls on the Number Recording Sheet. Write down the specific number that you called in order to verify the winner or just use check marks to know how many of each value have been called.
3. Students may circle the number you called out or an equivalent fraction, decimal, or percent.
4. Students may circle a maximum of one number each time a number is called out. For example, if you call out $\frac{3}{4}$ and a student has both .75 and 75% in his section, he may only circle one.
5. The winner is the first student to get four numbers in a row (vertically, horizontally, or diagonally).
6. Have the winner verify his numbers with you. You may want to offer a prize to the winner.
7. There are 300 numbers on the game board, and only 16 required for each game, so the Bingo Card should last for many games. Have students keep it to use again at a later date.
8. You may also decide to create longer Bingo games by directing students to choose a five-by-five (or larger) game board.

FDP BINGO

Record Sheet

<u>Percents</u>	<u>Decimals</u>	<u>Fractions</u>	<u>Game 1</u>	<u>Game 2</u>	<u>Game 3</u>	<u>Game 4</u>
10%	.1	1/10				
11 1/9%	$\overline{.1}$	1/9				
12.5%	.125	1/8				
20%	.2	1/5, 2/10				
22 2/9%	$\overline{.2}$	2/9				
25%	.25	1/4, 2/8				
30%	.3	3/10				
33 1/3%	$\overline{.3}$	1/3, 3/9				
37.5%	.375	3/8				
40%	.4	2/5, 4/10				
44 4/9%	$\overline{.4}$	4/9				
50%	.5	1/2, 2/4, 4/8, 5/10				
55 5/9%	$\overline{.5}$	5/9				
60%	.6	6/10				
62.5%	.625	5/8				
66 2/3%	$\overline{.6}$	2/3, 6/9				
70%	.7	7/10				
75%	.75	3/4, 6/8				
77 7/9%	$\overline{.7}$	7/9				
80%	.8	4/5, 8/10				
87.5%	.875	7/8				
88 8/9%	$\overline{.8}$	8/9				
90%	.9	9/10				

FDP BINGO

1/4	0.125	0.5	33 1/3%	2/9	0.6	37.5%	4/5	0.625	22 2/9%	0.6	1/2	0.3	7/8	60%
77 7/9%	3/4	40%	0.25	9/10	0.3	7/8	0.5	3/10	70%	20%	8/9	90%	0.4	7/9
4/5	0.6	5/8	2/3	0.4	70%	0.7	1/10	80%	3/8	6/9	0.4	0.8	33 1/3%	0.8
0.2	0.7	3/4	60%	77 7/9%	1/4	2/3	0.875	3/4	0.2	0.5	7/10	5/8	0.3	30%
2/9	8/10	55 5/9%	0.1	75%	4/8	0.8	75%	1/9	10%	0.625	0.75	5/10	0.75	1/8
87.5%	0.9	3/4	0.8	1/2	44 4/9%	9/10	0.25	0.125	4/5	1/3	66 2/3%	0.9	20%	6/9
0.4	3/5	12.5%	4/10	60%	4/9	20%	2/10	50%	88 8/9%	0.3	37.5%	2/5	1/2	77 7/9%
1/3	0.7	25%	33 1/3%	0.3	0.375	0.4	7/8	0.3	2/3	0.5	6/8	0.1	87.5%	0.7
22 2/9%	1/5	0.6	1/8	0.625	0.8	33 1/3%	30%	7/9	0.5	22 2/9%	1/4	2/10	60%	0.8
3/8	80%	0.5	10%	0.7	70%	0.2	8/10	0.7	1/3	0.4	1/9	0.3	5/9	10%
12.5%	0.2	7/10	0.4	6/10	0.6	1/2	0.9	2/5	20%	1/10	7/8	0.5	12.5%	44 4/9%
0.375	2/5	0.3	50%	3/4	10%	7/9	0.6	33 1/3%	0.3	4/10	1/5	2/8	20%	3/9
0.25	0.1	6/9	0.125	44 4/9%	0.4	10%	7/8	0.2	1/2	75%	90%	0.9	0.375	5/8
7/10	2/4	0.6	5/9	70%	2/10	50%	0.7	25%	4/9	0.2	0.7	2/3	1/4	0.5
88 8/9%	7/8	33 1/3%	0.2	0.875	1/3	3/5	6/8	0.5	0.875	3/10	0.1	3/4	0.3	77 7/9%
4/10	0.3	9/10	2/9	3/5	1/2	66 2/3%	0.4	0.1	0.6	1/3	0.6	62.5%	2/5	0.9
0.5	1/5	62.5%	75%	12.5%	0.3	5/8	1/4	0.125	8/9	10%	1/9	0.2	0.875	4/5
0.625	0.25	0.5	0.7	11 1/9%	2/3	0.6	37.5%	90%	0.75	55 5/9%	0.25	4/8	33 1/3%	3/8
1/5	66 2/3%	1/2	87.5%	5/10	3/9	22 2/9%	0.1	6/10	25%	7/8	6/10	11 1/9%	0.7	0.75
0.7	2/8	0.125	3/10	3/4	0.4	1/5	0.4	1/8	0.2	1/2	0.125	80%	4/9	50%

FIVES A CROWD (1)

Group Names _____

State	Population	Area (square km)	Population Density Estimate	Population Density
VICTORIA				

- 5 Minutes to pick 5 States!
- NO calculators!
- Fill in first four columns *only*.

DATA TABLE				
State	Population	Area (km ²)	Population Density Estimate <i>(No calculators)</i>	Population Density Calculation <i>(Calculators)</i>



SCORING CHART		
Our List	Actual Order	Points
1.	1.	1.
2.	2.	2.
3.	3.	3.
4.	4.	4.
5.	5.	5.
Total Score		

FIVES A CROWD (2)

Group Names _____

Country	Population	Area (square km)	Population Density Estimate	Population Density
AUSTRALIA				

- 5 Minutes to pick 5 Countries!
- NO calculators!
- Fill in first four columns *only*.

DATA TABLE				
Country	Population	Area (km ²)	Population Density Estimate <i>(No calculators)</i>	Population Density Calculation <i>(Calculators)</i>



SCORING CHART		
Our List	Actual Order	Points
1.	1.	1.
2.	2.	2.
3.	3.	3.
4.	4.	4.
5.	5.	5.
Total Score		

FORBIDDEN WORDS

PLAYERS: Whole class.

EQUIPMENT: Forbidden word cards.

- BASIC RULES:**
1. A student is given a card and has to describe an object, idea or phrase without using certain forbidden words.
 2. The other students have to try and guess the word.

EXAMPLE:

Jordan: It's a shape with straight sides...

Rachel: A triangle?

Jordan: ...and it has more than three sides.

Rachel: A pentagon?

Jordan: It's a quadrilateral and...

Rachel: A square?

Jordan: ...the sides might be different lengths, but everything is parallel.

Rachel: A rectangle!

VARIATION: Supply a list of key words and ask students to make their own cards.

A1



Rectangle

oblong
four

square
right angle

A7



Octagon

polygon
eight

45

A2



Circle

round
radius

360
diameter

A8



Rhombus

four
parallel

equal
quadrilateral

A3



Triangle

three
equilateral

isosceles
scalene

A9



Trapezium

four
parallel

trapezoid
quadrilateral

A4



Square

rectangle
four

right angle
equal

A10



Kite

four
quadrilateral

triangle
fly

A5



Parallelogram

parallel
four

quadrilateral

A11



Decagon

polygon
ten

36

A6



Hexagon

polygon
six

60

A12



Pentagram

pentacle
five

pentagon
magic

B1



Cube

box
six

right angle
dice

B7



Triangular Prism

flat
straight

cross section
triangle

B2



Cuboid

box
six

cube
brick

B8



Tetrahedron

triangle
four

pyramid
vertex

B3



Sphere

ball
round

globe
circle

B9



Hexagonal Prism

cross section
six

hexagon
flat

B4



Cone

round
point

ice cream

B10



Hemisphere

sphere
half

circle
round

B5



Pyramid

straight
point

flat

B11



Torus

doughnut
hole

round

B6



Cylinder

circle
round

tube

B12



Ellipsoid

ellipse
ball

circle

FOUR DIGIT NUMBERS

1. Decide who is player A and who is player B. You each have a white box with twenty digits.
2. Decide in private how to arrange your twenty digits to make four-digit numbers that fit the targets. You may use each digit only once and need to set a time limit of 3 minutes.
3. When the 3 minutes is up, write your numbers in the white boxes beside the targets.
4. Agree on who is closest to each target. Decide who wins!

A		Targets		B	
0	0	<input type="text"/>	largest odd number	<input type="text"/>	0
1	1	<input type="text"/>	largest even number	<input type="text"/>	1
2	2	<input type="text"/>	largest multiple of 3	<input type="text"/>	2
3	3	<input type="text"/>	smallest multiple of 5	<input type="text"/>	3
4	4	<input type="text"/>	number closest to 5000	<input type="text"/>	4
5	5				5
6	6				6
7	7				7
8	8				8
9	9				9

GREAT EXPECTATION

The teacher has a set of six cards numbered 1 to 6 (or 1 to 9). They are placed face down on the teacher's desk so that the teacher can pick up one at random. Students copy the diagram (below) showing the positioning of digits in their answer. As the teacher selects a digit the students have to choose in which cell they will write it. They cannot change their mind after the next digit has been called out.

Variation: Draws may be made with or without replacement.

Game 1

The teacher draws 4 cards.

$$\square \square > \square \square$$

Students are successful if: The two digit number on the left should be greater than the two digit number on the right. If the student is successful he/she scores the two digit number on the right.

Game 2

The teacher draws 6 cards.

$$\square \square \square > \square \square \square$$

Game 3

The teacher draws 6 cards.

$$\square \square > \square \square > \square \square$$

Game 4

The cards are numbered 1 to 9.

$$\square \square + \square \square - \square \square$$

The objective is to get the largest possible value for this expression (or the smallest!)

Play online at: http://www.transum.org/Software/Great_Expectation/default.asp

GREATER THAN > LESS THAN

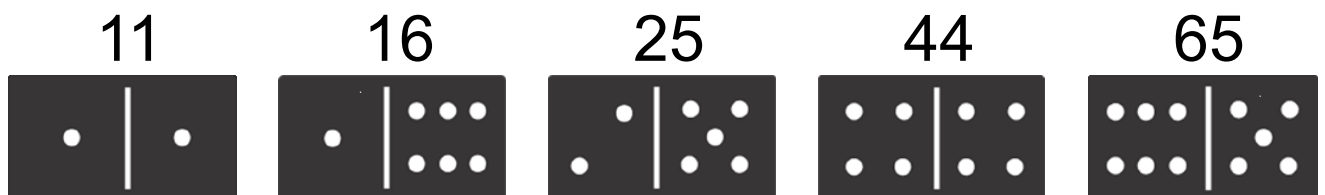
1. Dominoes may be used to represent numbers. For example the domino shown may represent 46 or 64 depending on which direction it is facing.



2. Each player is dealt three dominoes. The rest are placed face down in the centre of the table.
3. Each player selects one domino from his/her set to place on the table. The player placing the greatest number wins the round and scores one point.
4. Players replenish their sets by taking a new domino from the pile.
5. Continue playing until all dominoes are gone. The winner is the player with the most points.

Variations:

1. Aim for the smallest number, rather than the largest.
2. Turn one domino up in the middle of the table and take turns placing dominoes to the right or left of the centre domino depending on whether it is greater or smaller than the centre domino. The winner is the last player to be able to place a domino.



GREEDY PIG



Players: 2 or whole class

Equipment: One standard dice and a score sheet.

Play:

1. On each turn, a player rolls a die as many times as they wish, totalling the score of the rolls until the player decides to end the turn and pass the die to his or her opponent.
2. However, if the player rolls a 1, they immediately lose all points accumulated during that turn, and the die passes to the other player.
3. The first player to reach 100 points is the winner.

Whole Class Game:

1. At the beginning of a turn, all players stand up. One player directs play and rolls a single die for everyone.
2. A player holds by sitting down.
3. At the end of each round, players call out their new scores.
4. The winner/s are the highest scores after 5 rounds.



GREEDY PIG SCORESHEET

1.	
2.	
3.	
4.	
5.	
	TOTAL

GREEDY PIG SCORESHEET

1.	
2.	
3.	
4.	
5.	
	TOTAL

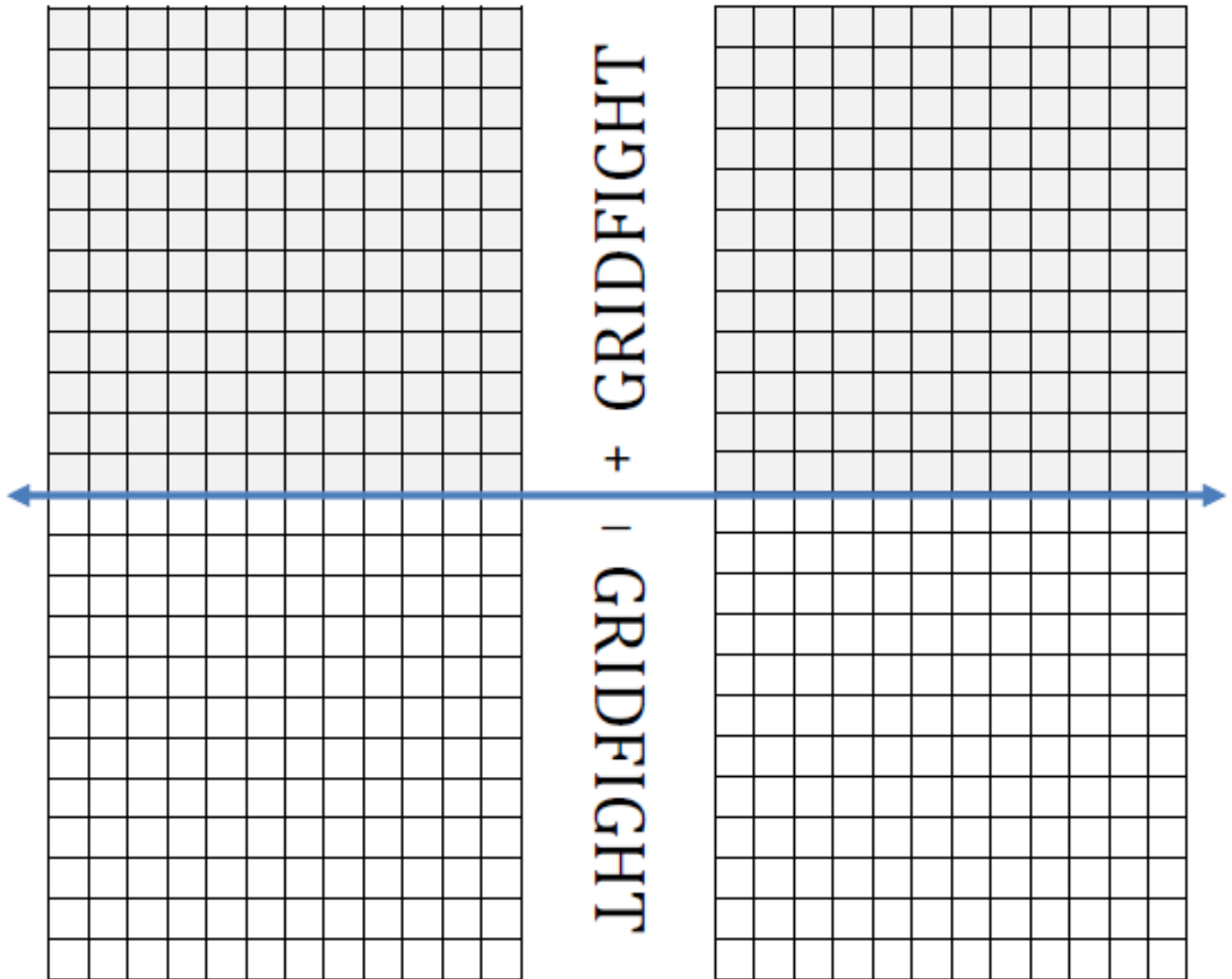
GREEDY PIG SCORESHEET

1.	
2.	
3.	
4.	
5.	
	TOTAL

GREEDY PIG SCORESHEET

1.	
2.	
3.	
4.	
5.	
	TOTAL

GRID FIGHT



A game for 2 players or teams

Objectives: multiplying integers, strategy, area of rectangles.

Materials: game sheet (see above), deck of cards with face cards removed. Red cards are negative, black cards are positive, Ace = 1.

Goal: score the most completed rows (like Tetris).

Game play: Deal each team 3 cards. They choose one card to play. They reveal their cards at the same time. If the product is positive, the positive team fills in the rectangle. (For example, black 5 and black 3, they fill in a 3 x 5 rectangle) If the product is negative, the negative team fills in the rectangle. (For example, red 7 and black 8) Each team draws a card to get back to 3. A game is 12 rounds long.

Winner is the team with the most rows filled in.

hangman

This game is played like the word version but a mathematical equation is used instead.

Draw one dash for every digit and symbol in the equation. This can be adjusted to the ability level or the students.

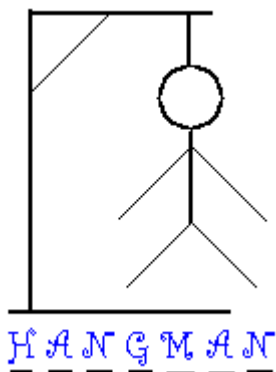
e.g. _____ (9 + 6 = 15) _____ (87 - 25 = 62)

For more complex equations, players could be permitted to use a calculator.

e.g. _____ 56 x 27 = 1512

Players take turns to say a digit or a symbol while the recorder places any correct digits or symbols in the equation.

The recorder is the winner if the Hangman is completed or the player who gives the final digit or symbol is the winner.



HIGHER OR LOWER?

EQUIPMENT:

- A standard pack of cards (only one suit used initially) OR
- Higher-Lower" flash object.

BASIC RULES:

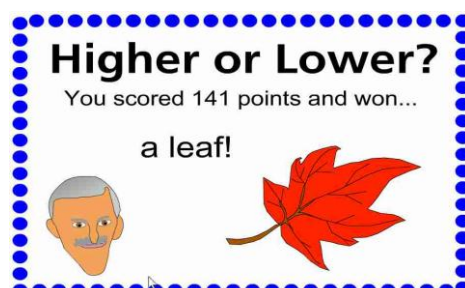
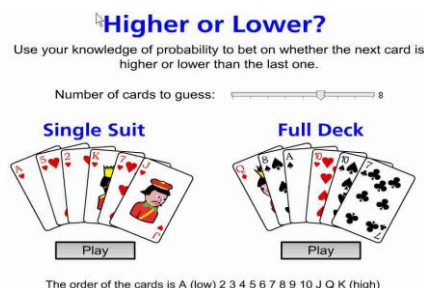
1. Each player starts with say 10 chips.
2. Turn up the first card.
3. The player may bet any number of his chips that the next card is higher or lower.
4. The next card is now turned up.
5. Repeat steps 3 and 4 until 9 cards have been turned over.
6. Repeat for other players. Most chips wins.



Variation: Play with the full deck of 52 cards.

RESOURCES:

[Software] higher-lower.swf





HORSE RACING



Whether you simulate a horse race with dice, or with computer software, there is an abundance of mathematics to be learnt!

EQUIPMENT:

Horse racing track, 2 dice, counters.

BASIC RULES:

All players place a counter on the horse of their choice (1-12). Take it in turns to roll two dice. Add the 2 numbers on the dice and move that horse one space along the track. The first horse to reach the end of the track wins!

RESOURCES:

[Software]

CyberPony_v2.0_installer.exe

hrace_v114.zip

derby.swf, hounds.swf, winners.swf



[Websites]

<http://lhsparent.org/horserace/horserace.html>

[Document]

Horse_Race.pdf



I'M FINISHED

Players: 2 to 4

Equipment:



Five standard dice and a score sheet.

Play:

1. Each player in turn, rolls the five dice and scores when none of the dice thrown show a 1 or a 4.
2. If a 1 or a 4 are not thrown, the player scores the total of the numbers rolled.
3. If a 1 or 4 is thrown, they score nothing and put to one side all the dice showing a 1 or 4.
4. These dice are *finished* and the player continues rolling without them.
5. Once the final die has turned up as a 1 or 4 the player says "I'm finished" and it is the next player's turn.
6. Write down each players score after each round on the scoresheet. The highest total after 5 rounds is the winner.

Example Turn:

Number's Thrown	Thrower's Score	Total Score
1, 2, 2, 4, 5	0	0
3, 5, 6	14	14
1, 3, 5	0	14
6, 2	8	22
3, 6	9	31
4, 4	0	31

Variations:

1. Use more or less than 5 dice.
2. Use ten sided dice.



I'M FINISHED

😊	<u>Player 1</u>	<u>Player 2</u>	<u>Player 3</u>	<u>Player 4</u>
Round 1				
Round 2				
Round 3				
Round 4				
Round 5				
TOTAL				
Winner				

SCORESHEET

😊	<u>Player 1</u>	<u>Player 2</u>	<u>Player 3</u>	<u>Player 4</u>
Round 1				
Round 2				
Round 3				
Round 4				
Round 5				
TOTAL				
Winner				

😊	<u>Player 1</u>	<u>Player 2</u>	<u>Player 3</u>	<u>Player 4</u>
Round 1				
Round 2				
Round 3				
Round 4				
Round 5				
TOTAL				
Winner				

😊	<u>Player 1</u>	<u>Player 2</u>	<u>Player 3</u>	<u>Player 4</u>
Round 1				
Round 2				
Round 3				
Round 4				
Round 5				
TOTAL				
Winner				

😊	<u>Player 1</u>	<u>Player 2</u>	<u>Player 3</u>	<u>Player 4</u>
Round 1				
Round 2				
Round 3				
Round 4				
Round 5				
TOTAL				
Winner				

😊	<u>Player 1</u>	<u>Player 2</u>	<u>Player 3</u>	<u>Player 4</u>
Round 1				
Round 2				
Round 3				
Round 4				
Round 5				
TOTAL				
Winner				

KEEP YOUR CAR GOING

Keeping your car on the road is an expensive business! Play this game to find out how expensive it could be.

PLAYERS: 2 to 4

EQUIPMENT: Two six-sided dice, game-board, counters, pen, cost sheet.

- BASIC RULES:**
1. To move: toss 2 dice. Move forward the difference between the dice.
 2. You must stop on the square marked with the STOP SIGN.
 3. Follow the directions on the board. Refer to the details given below if a space is marked with a #.
 4. Go twice around the board. Each lap corresponds to one year.
 5. Fill in your COSTS page as you go around.
 6. The winner is the player with the least costs.

COSTS:

1. You need driving lessons	\$260
3. Got your P's	\$25
5. Pay your petrol bill. Petrol is 154.9 cents per litre. Roll both dice. The number of litres you bought = sum of the numbers on the dice x 20	
9. Repairs: Replace a noisy muffler, move forward 2 spaces	\$235
10. Defect notice for a noisy muffler. Move back one space.	\$150
14. Regular service: Roll one die. Cost = \$(number on die x 100)	
16. Urgent repairs: faulty brakes, oil leak. If you had a regular service at space 14, ignore this square and move forward 3 spaces.	\$600
19. Registration due	\$450
24. Road rule violation: You get caught doing 95 km/h in a 60 km/h zone (and lose 4 points).	\$296

27. Car Insurance: You have 2 choices.

1 Take Third Party Property Insurance. **\$176**

If you are at fault in an accident, you pay all the expenses for your car + the first \$500 of any claim by the driver.

2 Take Comprehensive Insurance. **\$750**

In an accident the maximum you pay is the first \$600 of any claim.

29 & 30. Car Accident: You hit another car. Your fault.

Expenses – your car: \$2000

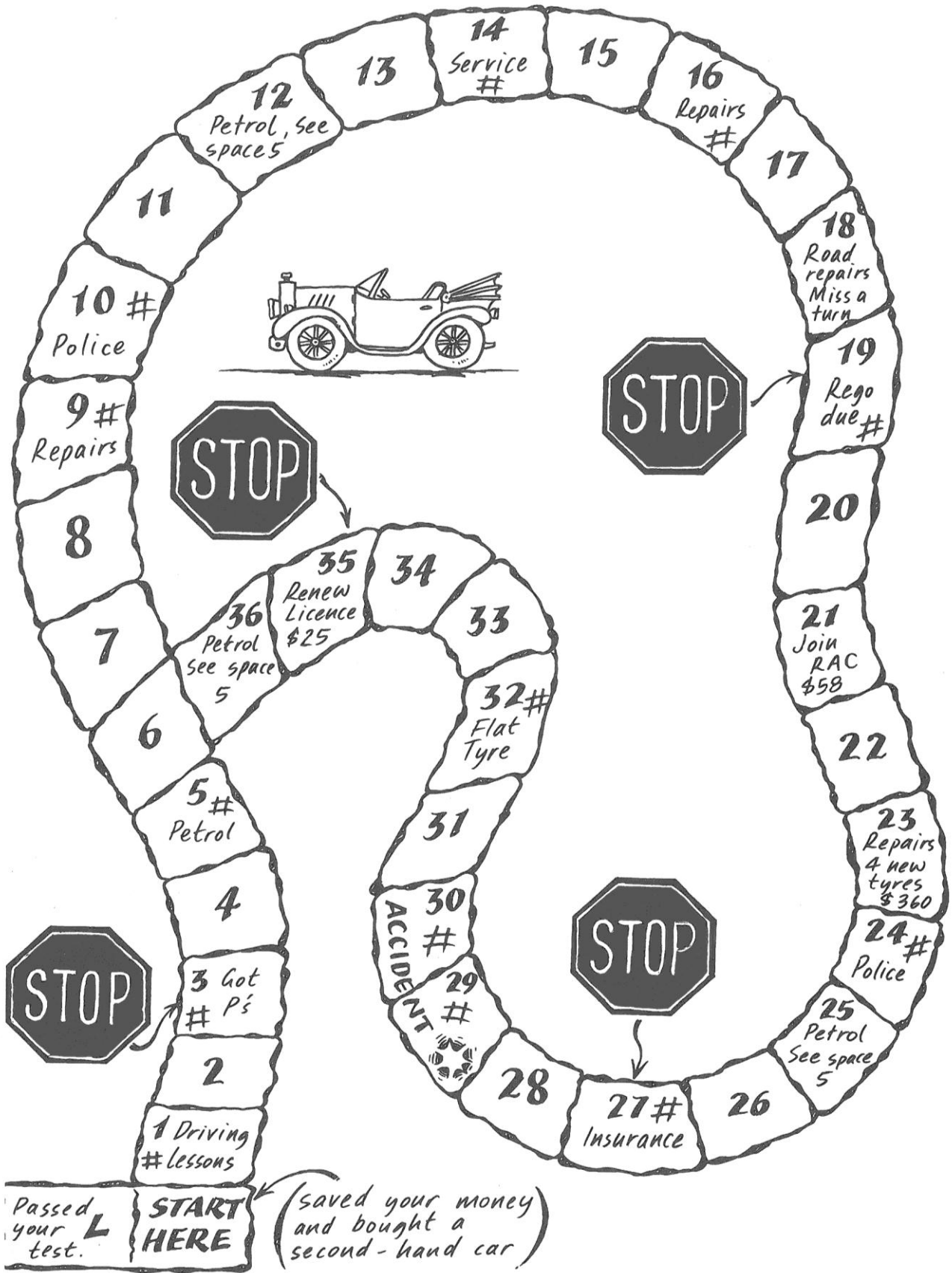
- other car \$4500

Cost depends on which type of insurance you have.

32. Flat tyre - RAC member **free**
 - non-member **\$45**

CAR RUNNING & DRIVING COSTS

Initial	Get your L's	\$ 43		
Annual		YEAR 1	YEAR 2	AVERAGE
	Registration			
	Insurance			
	Service			
	Licence			
	RAC			
	Petrol			
Others				
	Repairs			
	Accidents			
	Defect Notice			
	Road Rule Violation			
	TOTAL =			



LIAR'S DICE

Players: 3 to 6

Equipment: Five standard dice per player.



Play:

1. Each round, the players roll their dice while keeping them concealed from the other players. One player begins bidding, picking a quantity and a face from 1 through 6. For example: four 3's.
2. The player may make any bid, as long as it is "higher" than the last bid. From lowest to highest the bids are: one 1, one 2, one 3, one 4, one 5, one 6, two 1's, two 2's, etc.
3. In turn, each player must either raise the bid or challenge the previous bid.
4. The loser of each challenge loses one die.
5. The last player with dice left is the winner.



LOOP CARDS (1/2)

I have 70 Who has double 0?	I have 0 Who has double 8?	I have 16 Who has double 40?	I have 80 Who has double 18?
I have 36 Who has double 1?	I have 2 Who has double 20?	I have 40 Who has half of 30?	I have 15 Who has half of 18?
I have 9 Who has double 6?	I have 12 Who has double 45?	I have 90 Who has half of 10?	I have 5 Who has double 11?
I have 22 Who has half of 14?	I have 7 Who has double 50?	I have 100 Who has half of 50?	I have 25 Who has half of 2?

LOOP CARDS (2/2)

I have 1 Who has double 30?	I have 60 Who has half of 90?	I have 45 Who has double 3?	I have 6 Who has double 13?
I have 26 Who has double 5?	I have 10 Who has half of 70?	I have 35 Who has double 9?	I have 18 Who has double 4?
I have 8 Who has half of 40?	I have 20 Who has half of 6?	I have 3 Who has double 15?	I have 30 Who has double 2?
I have 4 Who has double 25?	I have 50 Who has double 7?	I have 14 Who has double 35?	Doubling And halving 31 cards



MAKE A MOKE



EQUIPMENT:

One standard die



BASIC RULES:

Aim: Be first to complete the Moke drawing by the rules.

- You must roll a six to start. That gets you the body.
- Each time you roll one of the numbers add on that piece
- While you wait for your turn, decorate your Moke.

Is it a Beach Moke, an Army Moke, a Music Moke, a Zoo Moke, a Boat Moke, a ... ?

6 = the body to start you off

5 = one crash bar; but you need one for each end

4 = a seat; just get one for the driver

3 = one wheel; but your drawing needs two

2 = a steering wheel for the driver

1 = a rollbar to keep your head safe

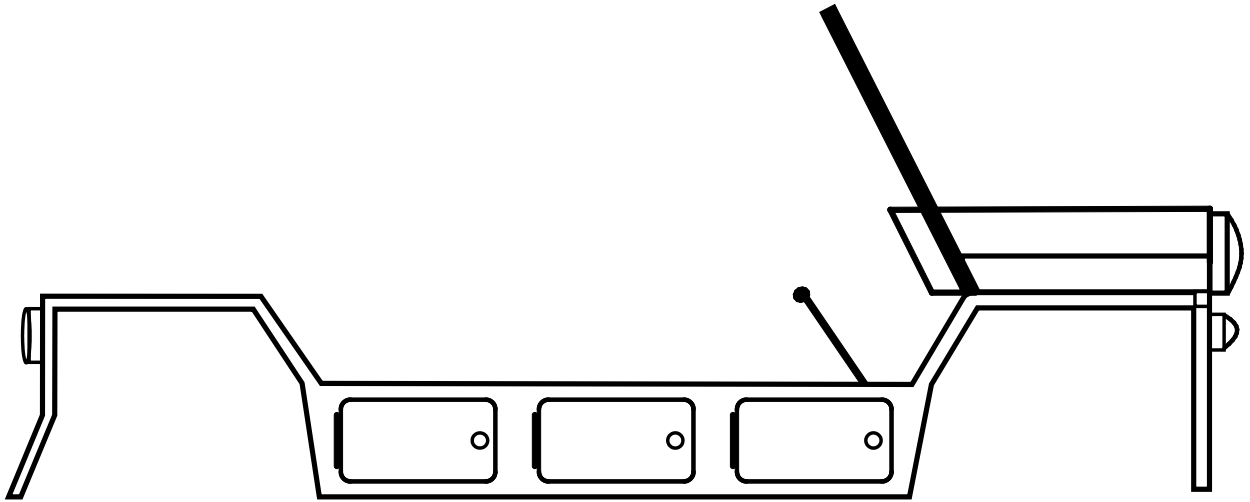


RESOURCES:

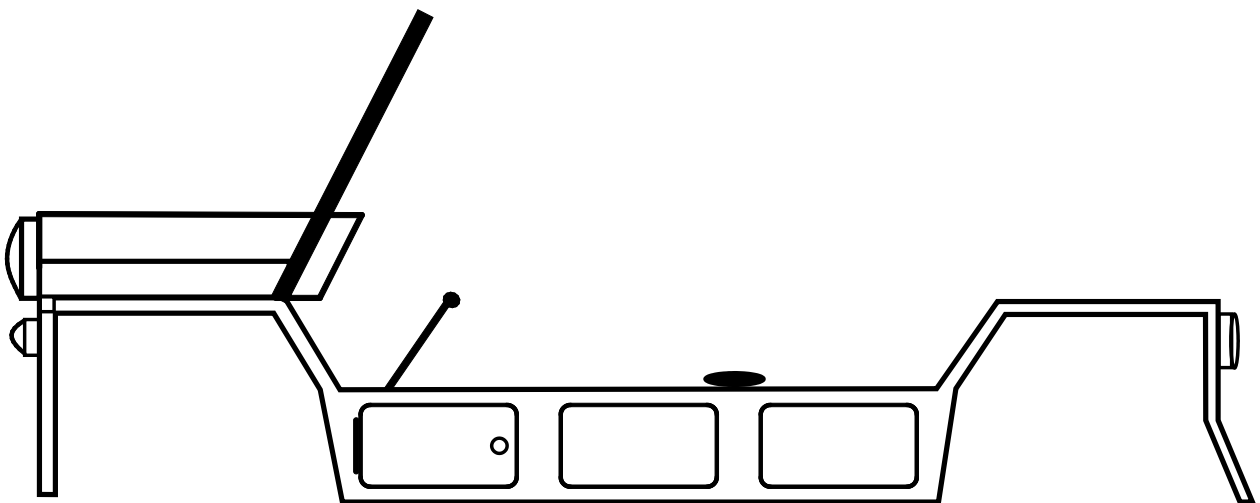
[MATHS300] Lesson 126: Make a Moke

[Website] <http://www1.curriculum.edu.au/maths300/>

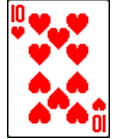
MAKE A MOKE



MAKE A MOKE



MAKE TEN

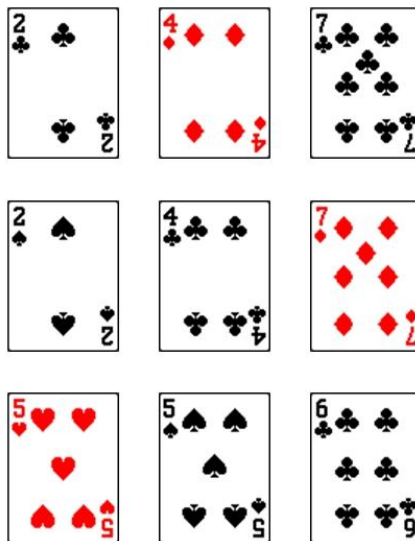


INSTRUCTIONS:

1. Remove the tens, jacks, queens and kings from a standard deck of cards.
2. Deal 9 cards face up in a square grid as shown in the example below.
3. A player may capture by calling out “ten” and taking any pair of cards that add up to 10.
4. When no more captures are available, replace spaces with cards from the deck.
5. Game continues until all cards are used. Winner is the person with the most captures.

VARIATIONS:

1. Change capture to two or three cards that add up to 15.
2. Change capture to three or more cards that add up to 21.
3. Play with 10s, Jacks (11), Queens (12) and Kings (13) with a target of 15.
4. Set your own target total.



In the layout above, possible captures are $5 + 5$ and $6 + 4$

MAXI-MISER

PLAYERS: 2

EQUIPMENT: Two 0-9 dice, game-board, pencil

- BASIC RULES:**
1. Players take turns rolling a die.
 2. They record the roll in a square on their game-board.
 3. Once each player has completed their math sentence, they solve it and compare answers.
 4. Whoever has the greatest answer, wins the point for that round.
 5. Player winning the most rounds wins overall.

VARIATION: Players take turns rolling a die but both players have to use the roll and may place the roll in ANY math sentence. When all the sentences are filled and solved, then answers are compared to see who wins each round.



MAXI-MISER GAME-BOARD

① $\square \times (\square - \square) - \square =$

② $\square + \square \times \square \div \square =$

③ $\square^2 - \square \times \square - \square =$

④ $\square + \square \div \square \times \square =$

⑤ $\square \times (\square + \square) - \square =$

⑥ $\square [\square^3 \times (\square - \square)] =$

⑦ $\square \div \square + \square \times \square =$

⑧ $\square \div \square \times \square - \square =$

MULTIPLES PATH 1

The first player colours the square in the bottom left corner. The next player colours a square beside or above this square but can only colour a square that is a multiple of the starting number. Players take turns to colour a square that joins the last square along a side. The winner is the last person who is able to colour a square.

Color multiples of 2

34	30	22	37	33	21	45
35	13	38	25	23	43	27
5	9	24	19	31	41	56
14	6	20	36	48	28	32
18	3	16	17	15	26	29
8	7	12	11	39	34	44
2	4	10	17	15	21	33

Color multiples of 3

17	15	18	14	25	17	35
23	36	34	22	19	16	26
7	21	27	18	13	20	29
11	4	13	30	16	19	32
8	6	21	15	27	28	29
2	12	5	14	24	31	29
3	9	1	10	33	12	20

Color multiples of 4

18	48	24	12	32	33	23
38	17	28	31	15	21	30
10	32	16	13	18	44	16
11	40	14	19	34	24	22
7	24	8	9	48	20	23
3	5	20	6	12	21	25
4	16	12	28	36	27	26

Color multiples of 5

23	60	38	26	22	28	24
9	45	21	14	47	16	37
13	25	35	27	55	35	25
6	7	15	40	50	29	20
20	10	30	11	19	17	15
35	34	8	42	18	36	41
5	2	32	12	36	48	43

MULTIPLES PATH 2

The first player colours the square in the bottom left corner. The next player colours a square beside or above this square but can only colour a square that is a multiple of the starting number. Players take turns to colour a square that joins the last square along a side. The winner is the last person who is able to colour a square.

Color multiples of 6

46	72	60	30	74	63	56
65	39	51	18	48	36	42
23	25	34	38	42	45	54
31	48	60	24	36	47	21
17	30	26	20	35	23	19
14	18	54	66	30	72	12
6	12	3	15	24	17	44

Color multiples of 7

57	63	52	54	42	67	43
40	28	77	21	28	41	64
25	56	47	26	30	59	70
18	35	27	46	63	35	49
35	42	21	49	70	29	62
14	23	16	36	14	34	44
7	24	31	20	56	22	45

Color multiples of 8

34	47	54	76	88	80	48
66	67	50	31	85	62	24
33	26	44	96	72	56	16
28	32	25	19	45	88	30
13	16	14	72	49	32	47
40	24	64	16	48	56	22
8	10	23	17	20	24	80

Color multiples of 9

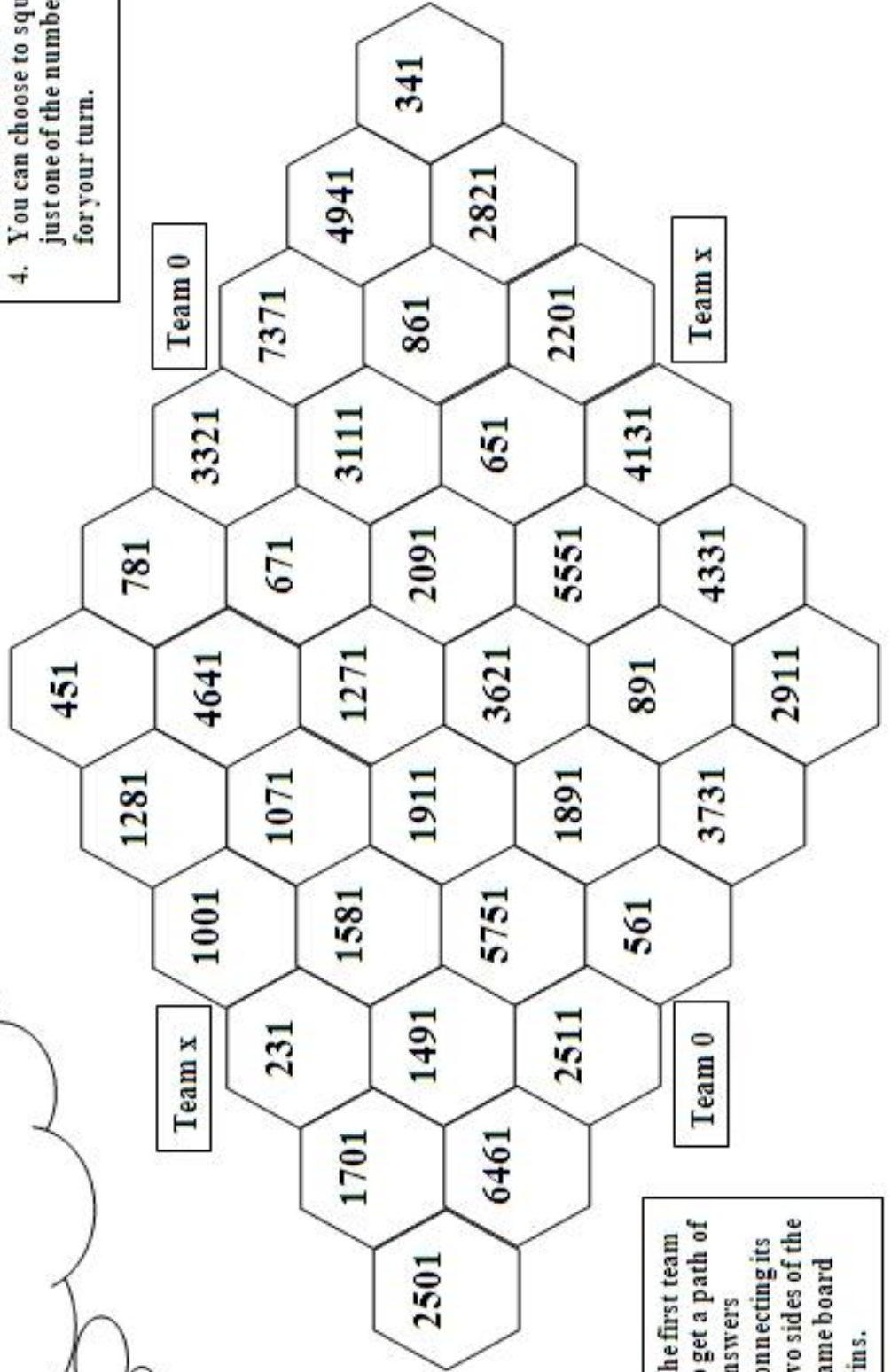
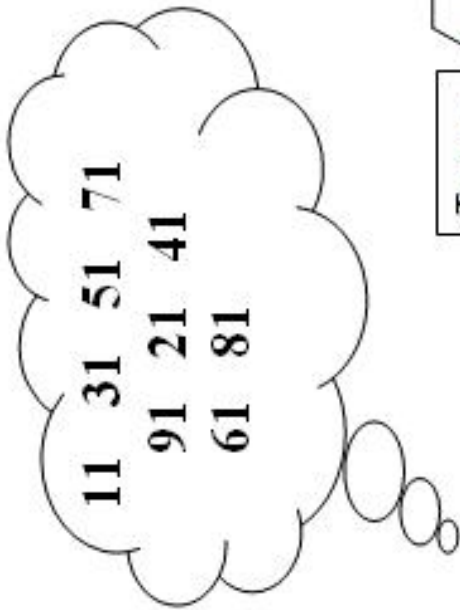
47	41	81	31	34	65	68
36	72	90	44	59	41	57
18	32	62	34	58	31	64
63	23	39	51	33	55	49
27	54	99	25	30	72	11
45	16	27	26	48	81	29
9	12	45	54	36	63	19

MULTIPLICATION HEX 11 - 91

How To Play:

1. Teams take turns. Pick any two of the numbers in the cloud.
2. Multiply the numbers you pick.
3. Find the answer on the game board. Place your team's mark on it.
4. You can choose to square just one of the numbers for your turn.

Multiplication Hex



The first team to get a path of answers connecting its two sides of the game board wins.

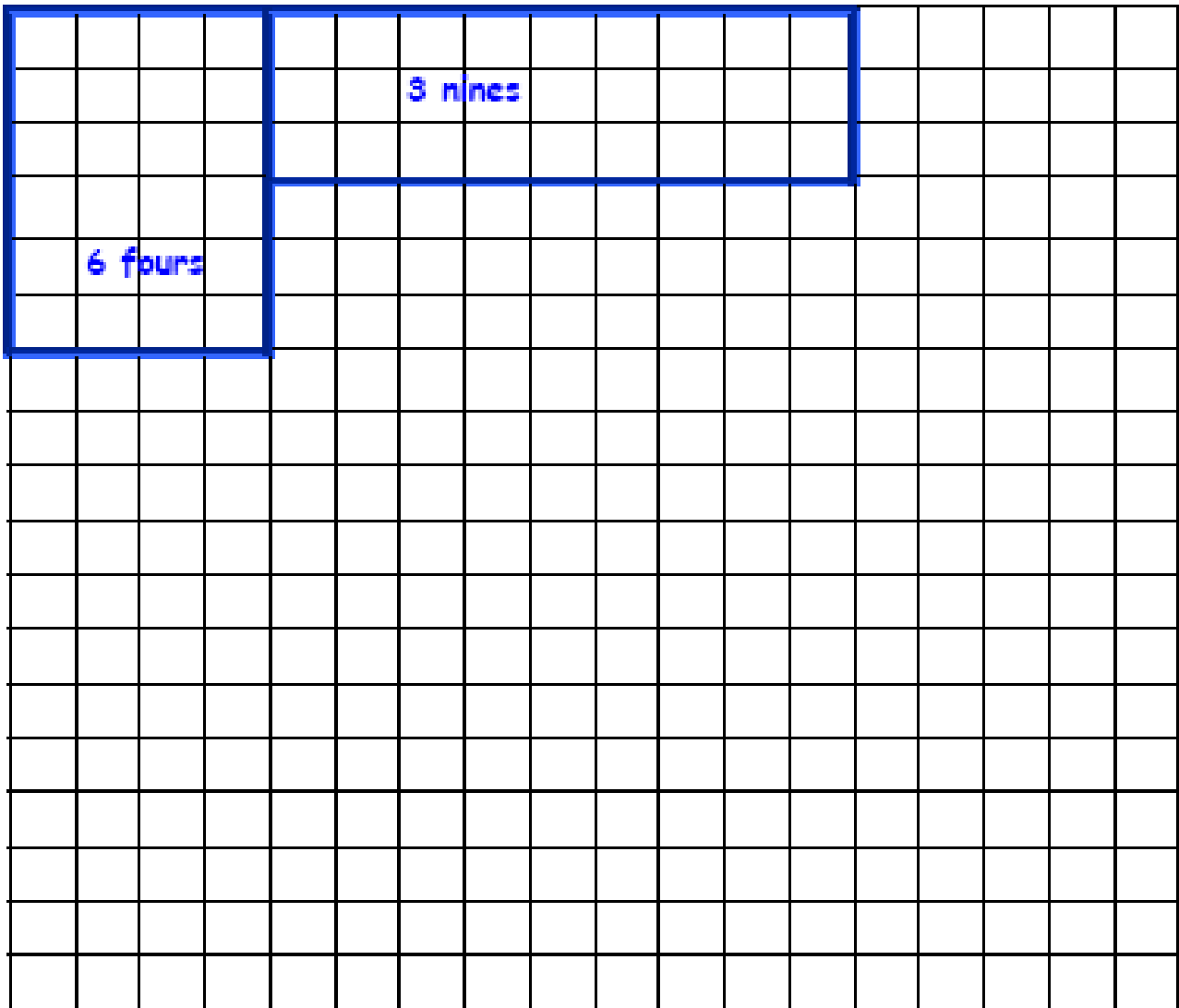
MULTIPLICATION TOSS

Two or more players take turns to toss 2 ten-sided dice (2 six-sided dice could be used initially).

The result of the toss determines the region to be marked. For example, a 6 and a 4 could be recorded as 6 fours (6 rows of 4) or 4 sixes (4 rows of 6).

A border is drawn around the region and the relevant fact is recorded in the region. The object of the game is to cover as much of the grid as possible without overlapping.

At any time in the game a player can decide to partition or split the region. For example, instead of 6 eights, a player may decide to enclose two separate regions such as 5 eights and 3 eights or 4 eights and 4 eights.



MULTO

The game involves plenty of times tables practice, but this is soon subservient to the greater challenge of finding the best Multo grid to choose. Software aids the search. The linked assessment sheet provides teachers with considerable assessment information.

EQUIPMENT:

100 cards marked from 0x0 to 9x9, 4x4 square grids.

BASIC RULES:

The students draw up a 4row/4column grid and enter 16 numbers which would be answers to these cards. No repeats. The teacher draws cards one at a time and at a regular pace announces each random times table in turn. If they have the answer on their grid, students mark it off. Multo is either:

4 in a row horizontally

- 4 in a row vertically
- 4 in a row diagonally
- all four corners

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

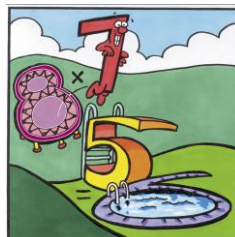
RESOURCES:

[MATHS300]

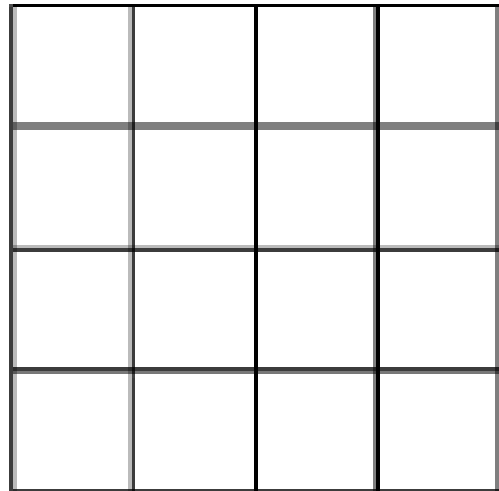
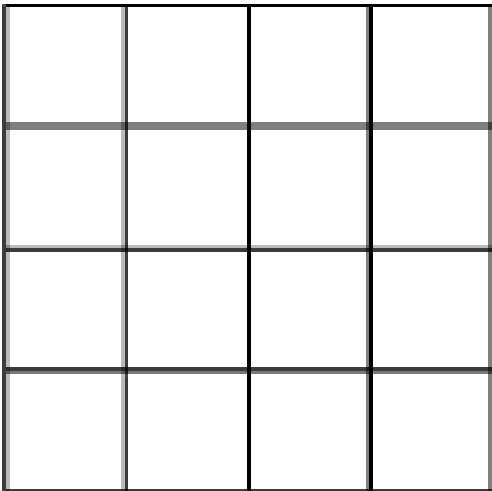
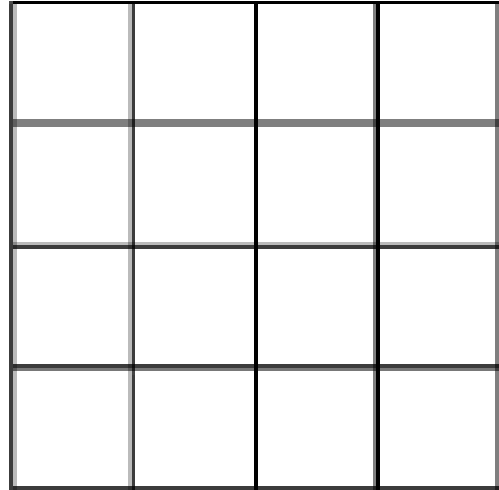
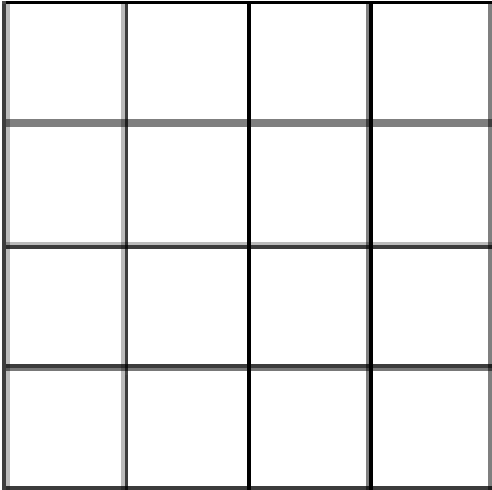
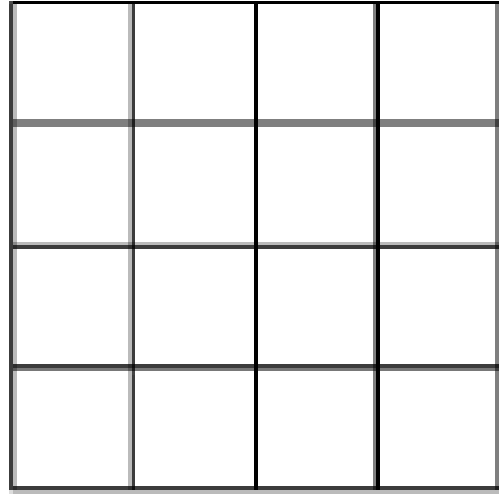
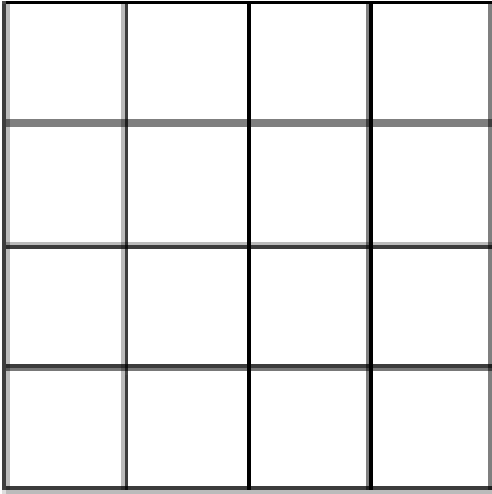
Lesson 52: Multo (cards, software & assessment)

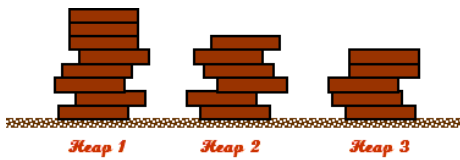
[Website]

<http://www1.curriculum.edu.au/maths300/>

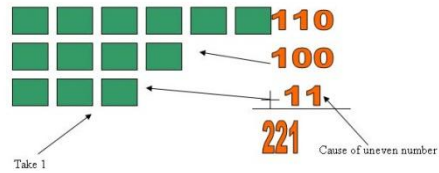


MULTO GRIDS





NIM



Playing Nim encourages problem solving strategies such as looking ahead, reasoning (what if?), and working backwards. This is only one version of the famous two person strategy game.

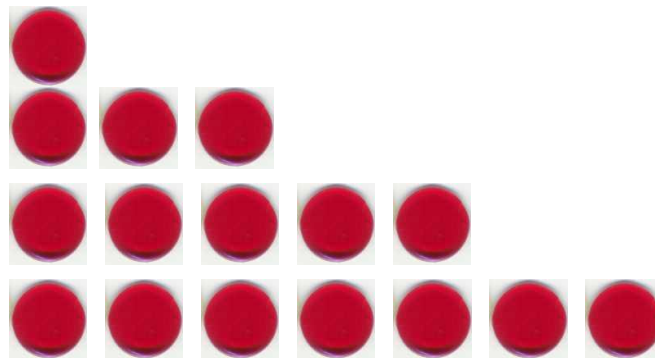
EQUIPMENT:

Plastic counters or similar.



BASIC RULES:

Place counters in rows as follows:



On your turn, you may take any number of counters from one row. The person who takes the last counter loses.

RESOURCES:

[Software] pearls3.swf

[Website] <http://www1.curriculum.edu.au/maths300/>



NUMBER POKER



A great whole class game that helps develop thinking skills. Students love this game – you may give an incentive for highest scores or beating the teacher!

EQUIPMENT:

One standard pack of cards
(Remove all Kings, Queens and Jacks to simplify the game).

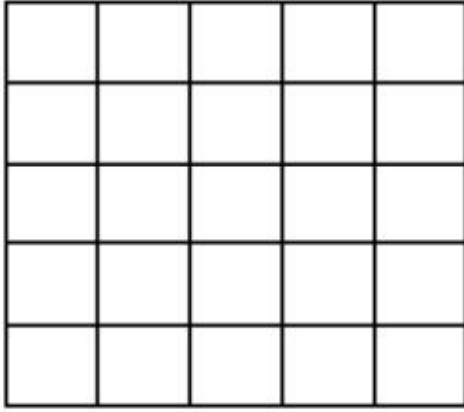
5 x 5 square grid

BASIC RULES:

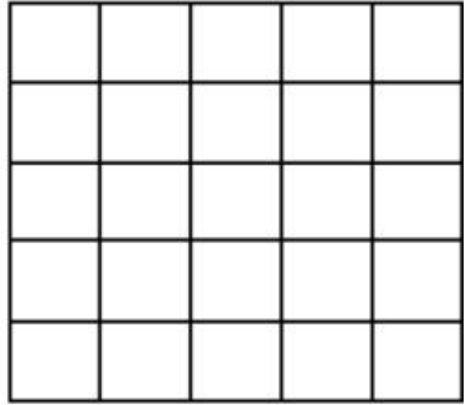
1. Get students to draw up a 5 x 5 grid (or photocopy).
2. Turn over the first 25 cards calling out the **numbers** clearly (Ace = 1).
3. Score each row and column (not diagonals) as follows:

1 pair	=	10 points
2 pair	=	20 points
3 alike	=	40 points
5 in a row	=	50 points
3 alike, pair	=	80 points
4 alike	=	160 points

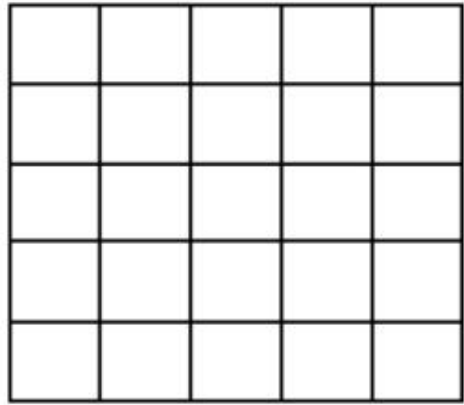
4. Add the 8 row and column scores and the highest total is the winner.



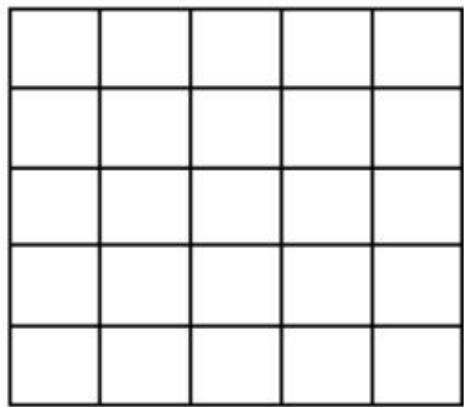
One Pair = 10 points
Two Pair = 20 points
Three Alike = 40 points
Straight = 50 points
Full House = 80 points
Four Alike = 160 points



One Pair = 10 points
Two Pair = 20 points
Three Alike = 40 points
Straight = 50 points
Full House = 80 points
Four Alike = 160 points



One Pair = 10 points
Two Pair = 20 points
Three Alike = 40 points
Straight = 50 points
Full House = 80 points
Four Alike = 160 points



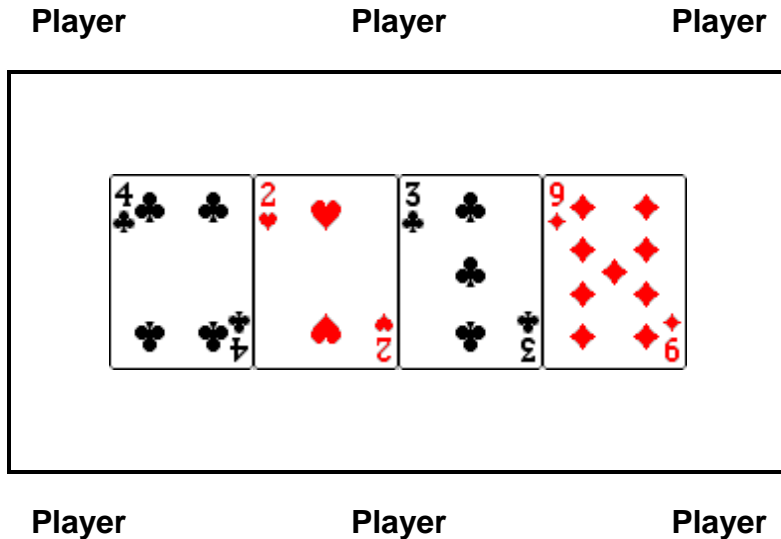
One Pair = 10 points
Two Pair = 20 points
Three Alike = 40 points
Straight = 50 points
Full House = 80 points
Four Alike = 160 points

1111 - 9999

Players: 2-8 with a standard 52-card deck of playing cards, the 10s, Jacks, Queens, and Kings removed.

Arrangement of Players: In this game players must pick a side of the table to sit on, because as you will see the side you sit on drastically changes the game's outcome.

The Deal: Pick any person to start by dealing four cards to each player. Then deal four cards face up in a row.



DO NOT HAVE ANYONE PICK UP THEIR CARDS UNTIL THE FOUR CARDS ARE ALL FLIPPED FACE UP ON THE TABLE

The way the cards are facing you is the number you must try to match (so if the cards are 4 2 3 9 for me (*sitting below the table in the above diagram*), the person on the other side of the table has the number 9 3 2 4). Now everyone simply reorganizes their cards to form a four digit number that is as **close as possible** to the number on the table as they see it. Set your cards down on the table face up, and move on to scoring.

Scoring: In this game you want to avoid scoring points. A player's score is the difference between their number and the table number - i.e. the bigger number minus the smaller number. So in the example above if I had been dealt 5 8 7 2 and I played it so my number became 5,278, I would take 5,278 and subtract 4,239 from it to get my score of 1,039. After each hand the scores are recorded on paper and the deal is passed to the next person in clockwise order.

Getting 3 of a Kind: If you are dealt three of a kind or 4 of a kind, set your hand down immediately. If you are the first person to do this on the hand, you instantly score a 0.

Ending the Game: The game ends when one person reaches a score determined by the number of players in the game. The winner has the lowest score.

100

100 or BUST

100

EQUIPMENT:

One die, pen and paper

BASIC RULES:



Two players take turns rolling a die. After each roll, that player must decide whether to add the value of the roll or ten times the value of the roll to his or her score (e.g. a 2 can be counted as a 2 or a 20). After seven rolls, the person with the highest total less than or equal to 100 is the winner. A score over 100 counts as 0.

VARIATION:

Play closest to 1000, rolling a die ten times, using a HTU table.

RESOURCES:

[\[Document\]](#) UncoverMath_Act01.pdf



OPERATION CHALLENGE

PLAYERS: 1 or 2

EQUIPMENT: Two thirty-sided dice, game-board, paper and pencil.

BASIC RULES: The goal is to either fill in all of the numbers across or fill in a column. Players take turn rolling the dice. They then identify the numbers and record the following in the appropriate space.

1. The sum of the two numbers if it fits on the forty space graph.
2. The difference of the two numbers by subtracting the smaller number from the larger.
3. The product of the two numbers if it fits on the graph.
4. The quotient if it is evenly divisible.

QUESTIONS:

1. Shade in your graph.
2. Compare graphs for any similarities or differences.
3. Are certain numbers more likely?
4. Does odd and even factor into the game?

VARIATIONS:

1. Allow exponents to be used (eg. $4^2 = 4 \times 4 = 16$)
- 2.

OPERATION CHALLENGE

	1	2	3	4	5
0					
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
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39					
40					

OPERATION GOLF

Can you get under par on the "18 Hole Golf Course" below? You must:

1. use the correct order of operations (BIDMAS), with
2. the three digits above (use in any order or quantity), to
3. make the target number.



Your score for the "hole" is how many digits you use to make the target number.

GOLF CLUBS FOR FRONT NINE:



HOLE	TARGET	WORKING OUT	PAR	SCORE
1	67		4	
2	9		3	
3	84		4	
4	46		5	
5	15		4	
6	32		4	
7	96		3	
8	101		5	
9	192		5	
		OUT	37	

GOLF CLUBS FOR BACK NINE:



HOLE	TARGET	WORKING OUT	PAR	SCORE
10	64		4	
11	25		4	
12	36		3	
13	100		5	
14	78		4	
15	11		4	
16	15		3	
17	98		5	
18	52		4	
		IN	36	
		OUT	37	
		TOTAL	73	



OPERATION HISTOGRAM

PLAYERS: 2 to 4

EQUIPMENT: Two ten-sided dice, game-board, paper and pencil.

- BASIC RULES:**
1. Players take turn rolling the dice.
 2. After each roll, form an addition expression.
 3. Write the expression on the game-board in the correct column.
 4. Roll the dice a total of twenty times.

- QUESTIONS:**
1. Which sum is most likely?
 2. What is the most common shape for the histogram? Why?
 3. Which sum is least likely?
 4. What is the probability for each possible sum?

- VARIATIONS:**
1. Record the difference between the two numbers rolled.
 2. Change the number of rolls possible (30, 40) and see how it effects the histogram.
 - 3.

OPERATION HISTOGRAM

5																					
4																					
3																					
2																					
1																					
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

5																					
4																					
3																					
2																					
1																					
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

PENTA PLACE

For 2, 3 or 4 players

You will need:

- A chess board.
- Stiff card (preferably marked in squares)
- Scissors
- Paper
- Pencil and thin marker pen
- Ruler



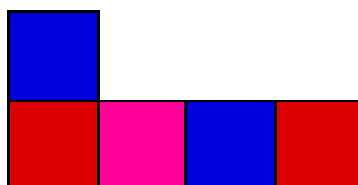
Goal: To be last person to be able to place a pentomino piece on the playing board. To prevent your opponent(s) from finding space to place pentomino pieces on the board.

To prepare for play:

1. Find all of the 12 pentomino shapes*, sketch them on paper.
2. Draw them using the marker pen onto card that is marked in squares the same size as the chess board you use.
3. Don't mark the pentominoes in any way so that there is no way to tell the top, bottom, front or back.
4. Cut out the set of pentominoes.

To Play:

- Lay out all of the pentomino pieces.
- Decide who will go first, second etc.
- The first person chooses one of the pieces, then the second person chooses a piece etc.
- Players lay his or her chosen pieces in front of them for others to see.
- The first person to play chooses one piece and places it on the board.
- Players take turns to place pieces on the board.
- Try to decide which are the best moves to block opponents from placing their pieces.
- The winner is the last person to place a piece on the board.



PLACE VALUE DICE

- Each player has a game sheet and takes it in turns to throw 2 ten-sided dice.
- The numbers are used to create 2-digit numbers, e.g., a 5 and a 2 could be recorded as 25 or 52.
- Players record their numbers in the most appropriate position between 0 and 100.
- If numbers cannot be placed, the player misses his/her turn.
- The winner is the first to fill all places.

0	<input type="text"/>	<input type="text"/>	<input type="text"/>						
			<input type="text"/>						
			<input type="text"/>						
			<input type="text"/>						
		<input type="text"/>	<input type="text"/>	<input type="text"/>					
					<input type="text"/>				
					<input type="text"/>				
					<input type="text"/>				
					<input type="text"/>				
					<input type="text"/>	<input type="text"/>	100		

POLYGON CAPTURE

Preparation:

Each pair of players needs a set of property cards and a set of polygon cards. The polygons go into the centre of the playing area and the side and angle property cards are separated into two piles.

Goal:

Capture the most polygons.

Play:

1. Randomly choose who goes first.
2. Player 1 flips over an angle card and a side card. She captures any card which satisfies both these properties. When finished she says: "Done"
3. Player 2 may capture any polygons which player 1 missed.
4. Player 2 takes a turn, turning over two new property cards and capturing the appropriate polygons.
5. Play continues in this manner until two or fewer polygons remain.

Notes:

If you run out of angle or side property cards, reshuffle that pile and continue.

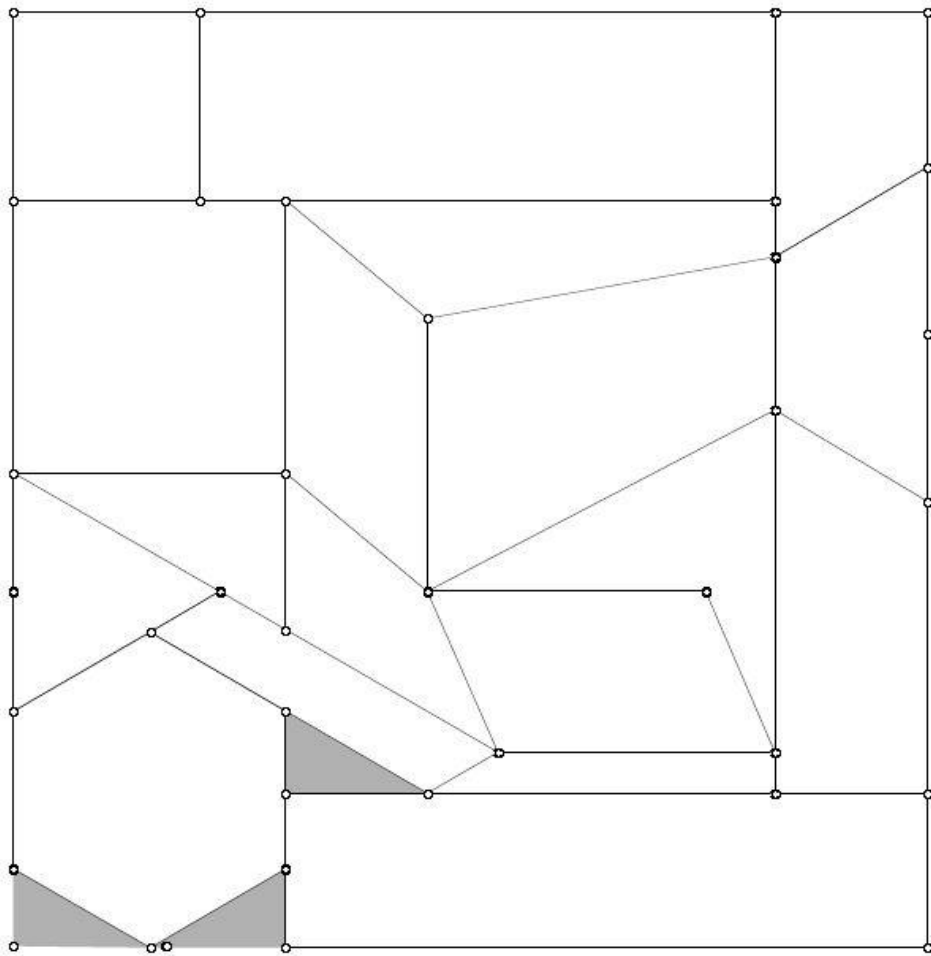
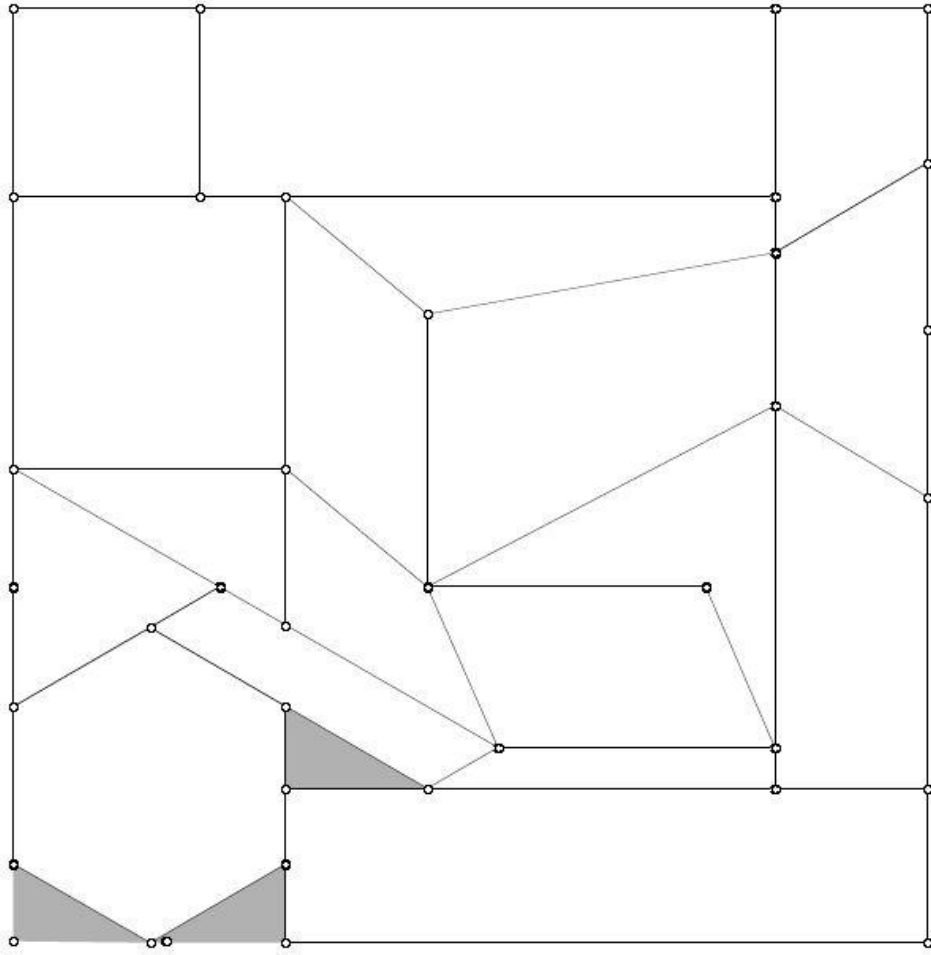
Any player can challenge the capture of a polygon. If a player chose a polygon incorrectly, it goes back into the centre pile and their turn is done.

If the Wild Card comes up, the player may choose any side property. For example, if the angle card is "All angles are right angles", she may choose "All opposite sides are equal" and capture all rectangles.

If the Steal Card comes up, the player picks one side property and one angle property, and steals all of the polygons the other player has captured which satisfies those properties. Ignore the other card.

Example:

Player 1 turns up "All angles have the same measure" and "It is a quadrilateral". She then captures the square, the short rectangle and the right trapezoid and says "Done." Player 2 may then capture the long rectangle. Then he begins his turn.



All angles are right angles	At least one angle is obtuse	No angle is a right angle	At least one angle is less than 90°
At least one angle is a right angle	At least two angles are acute	All angles are the same	STEAL CARD Select a pair of properties. Steal all these polygons from your opponent
No pairs of sides are parallel	All sides are of equal length	Exactly one pair of sides is parallel	At least one pair of sides is perpendicular
All pairs of opposite sides are parallel	It is a quadrilateral	All pairs of opposite sides have equal length	WILD CARD Pick your own side property

PRODUCT GAME

Read the following rules before you begin playing The Product Game.

1. Player 1 puts a counter on a number in the factor list. No square on the product grid is marked with Player 1's colour because only one factor has been marked; it takes two factors to make a product.
2. Player 2 puts the other counter on any number in the factor list (including the same number marked by Player 1) and then shades or covers the product of the two factors on the product grid.
3. Player 1 moves either one of the counters to another number and then shades or covers the new product.
4. Each player, in turn, moves a counter and marks a product. If a product is already marked, the player does not get a mark for that turn. The winner is the first player to mark four squares in a row - up and down, across, or diagonally.

1	2	3	4	5	6
7	8	9	10	12	14
15	16	18	20	21	24
25	27	28	30	32	35
36	40	42	45	48	49
54	56	63	64	72	81

1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---

QUADRATIC DOMINOES

① Cooperative Game

Two dominoes can be placed together if they share a factor. For example, $x^2 - 3x + 2$ and $x^2 - x - 2$, share a factor of $(x - 2)$. Continue until all possible dominoes are placed

② Competitive Game

Two players start with 7 dominoes and take turns playing their dominoes into the centre as per normal domino games. Whoever places their last domino before the other player finishes is the winner.

$$x^2 + 4x - 32$$

$$x^2 - 10x + 16$$

$$x^2 - x - 6$$

$$x^2 - 2x - 3$$

$$x^2 - 3x + 2$$

$$x^2 - 2x - 8$$

$$x^2 + 7x + 12$$

$$x^2 - 2x - 15$$

$$x^2 + 4x - 5$$

$$x^2 - 13x + 40$$

$$x^2 + 11x + 28$$

$$x^2 + 6x - 7$$

$$x^2 - 9x + 8$$

$$x^2 - x - 2$$

$$x^2 + 5x + 6$$

$$x^2 + 4x + 3$$

$$x^2 + 3x + 2$$

$$x^2 + 5x + 4$$

Quadrilateral Concentration

Materials: Deck of quadrilateral cards. May want rectangles or protractors as players get more precise. 2-4 players.

Setup: Set aside the Joker, and randomly deal the cards out into almost a rectangle. (I prefer 6x7 with two extra on top, but choose your own.)

Gameplay: On each turn, a player turns up two cards letting everyone see. If they are the exact same type of quadrilateral, you can collect them. If not, turn them down after all players have had a chance to see them. Whether it is a match or not, it is the next player's turn. All players should agree on a match.

Winner: Player to collect the most pairs.

Quadrilateral Go Fish

Materials: Deck of Quadrilateral cards. Best with 3-5 players.

Setup: Deal 5 cards to each player. Put the rest face down in the middle, either in a neat stack, or mixed up in a big pond.

Gameplay: Start to the left of the dealer. On a player's turn they can ask a particular player for a specific property. For example: "Do you have a shape with opposite angles congruent?" You can not ask for a shape by name. ("Do you have a rectangle?") If the player has a card like that, they have to give it over. If they have more than one, they get to choose which card to give away. If you have a matched pair of the same type, you can play them down.

Winner: First winner is the first player to go out. Second winner is the player with the most pairs.

Quadrilateral Guess Who

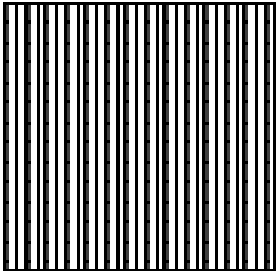
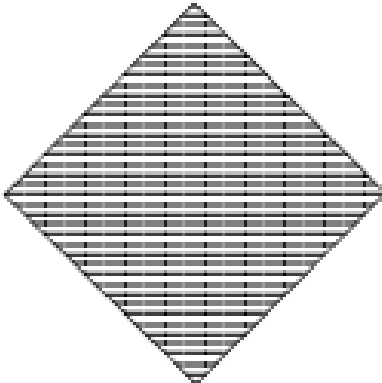
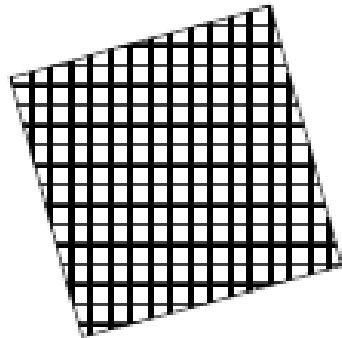
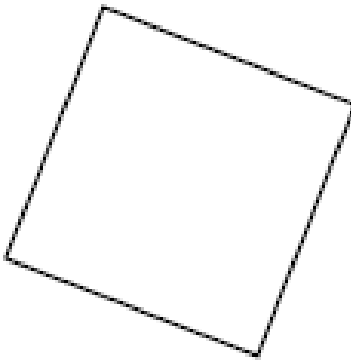
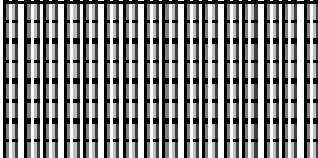
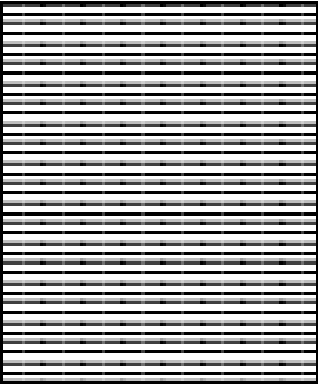
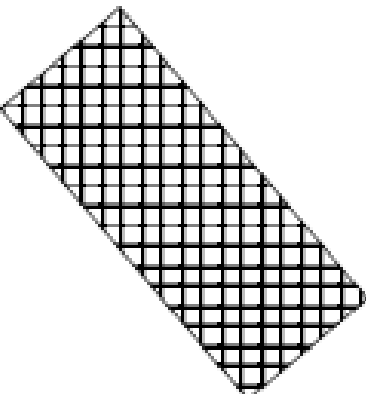
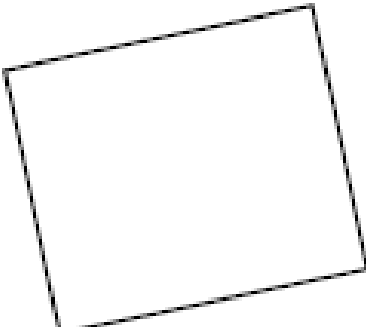
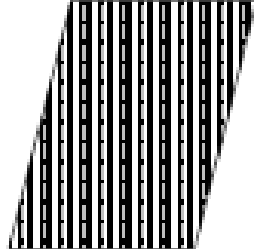
Materials: Quadrilateral card deck. 2 players.

Setup: Sort the quads by type. Each player puts one quadrilateral of each type face up in front of them, and the others go face down in the middle. Each player draws a card from the middle and keeps it hidden from the other player.

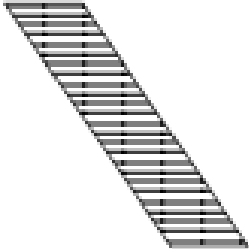
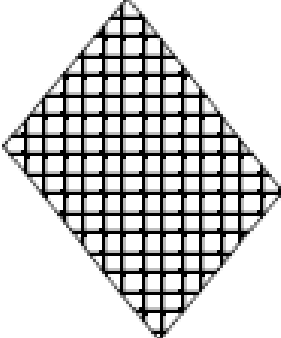
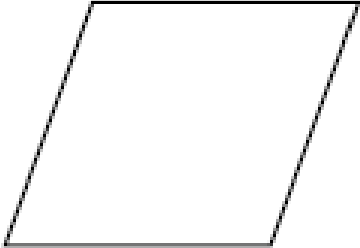
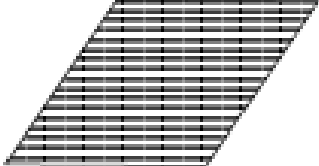
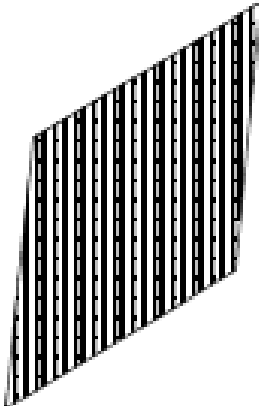
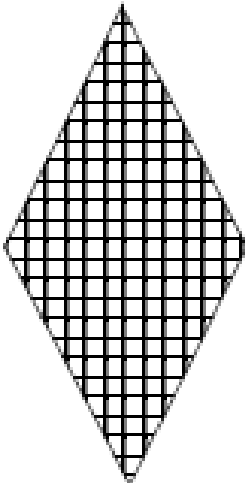

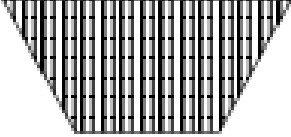
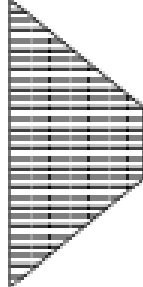
Gameplay: On your turn you can ask one question about the other player's hidden quadrilateral. That player answers yes or no. Turn face down the quads you have that don't match.

Winner: first player to guess the other player's card.

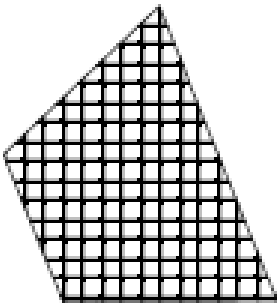

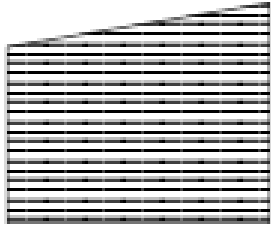
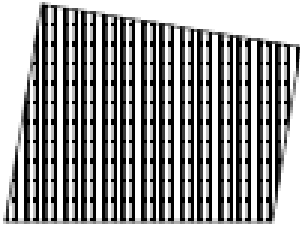
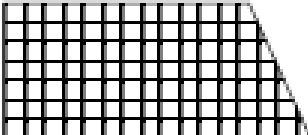
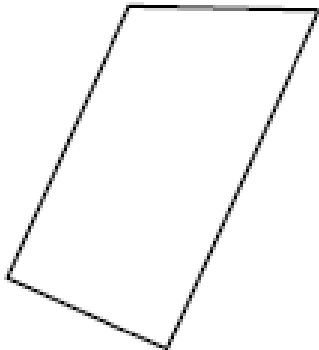
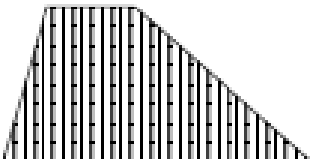
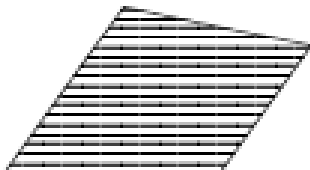
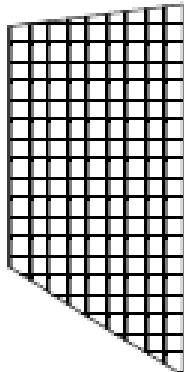
Quadrilateral Cards (1 of 5)

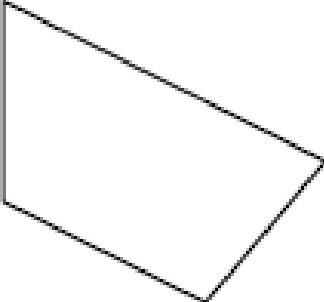
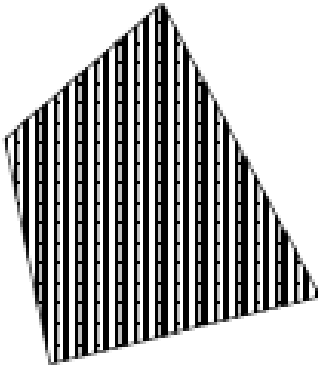

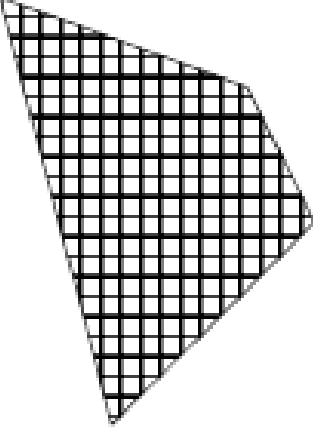
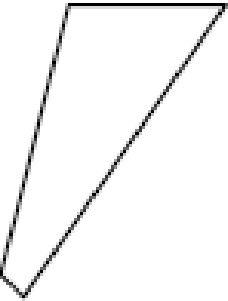
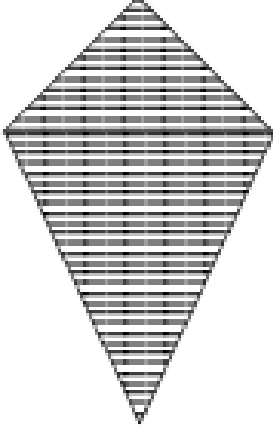
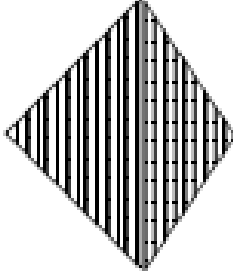
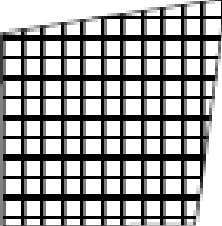
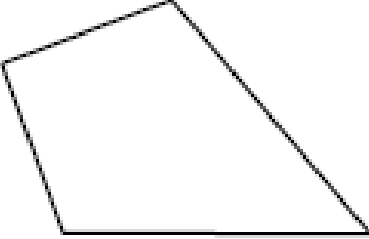
Quadrilateral Cards (2 of 5)

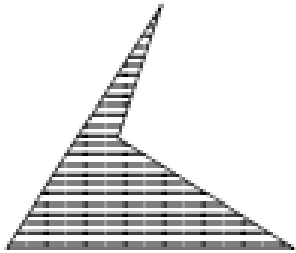
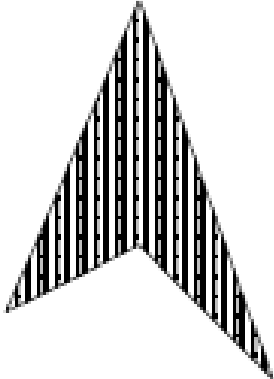
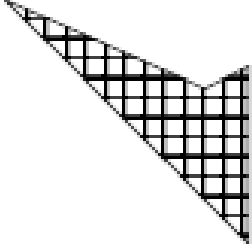
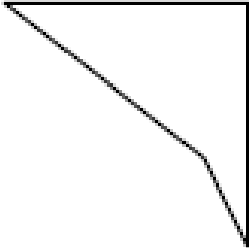
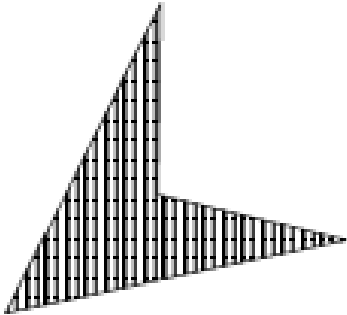
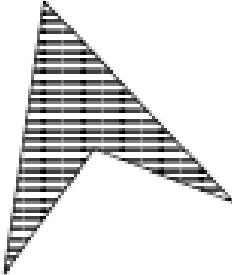
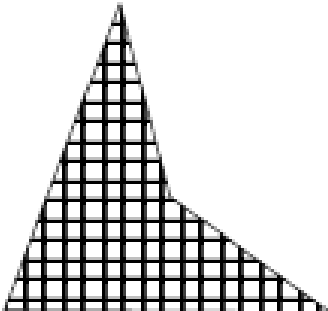
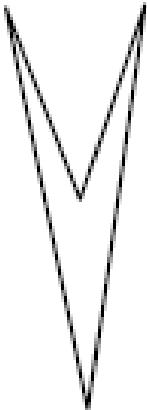

Quadrilateral Cards (3 of 5)

Quadrilateral Cards (4 of 5)

Quadrilateral Cards (5 of 5)

		
		
		<p>joker</p>  <p>joker</p>



YOUR ALGEBRA SKILLS 1

Name _____

Factor _____

	Risk	Points
		100
1. Write in algebra: "5 is added to a number and the result is doubled"		
2. $5 - (+7) - (-8) - 9 =$		
3. $(-1)(-2)(-3)(-4)(-5) =$		
4. $100 - 4^3 + 2(7 - 3)^2 =$		
5. $7x + 3y$ when $x = 4$ and $y = -3$		
6. $b^2 - 4ac$ when $a = -2$, $b = -5$, $c = -3$		
7. $\frac{2}{3} + \frac{1}{4} =$		
8. Expand: $3y(7 + 2y)$		
9. Expand: $(x - 7)(x + 4)$		
10. Factorize: $x^2 - 5x - 104$		
Tiebreak:		

WORKING:



YOUR ALGEBRA SKILLS 2

Name _____

Factor _____

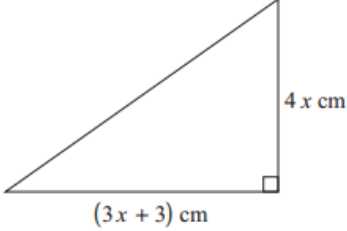
	Risk	Points																								
		100																								
1. Simplify: $6x + 17y - 8x - 19y$																										
2. Expand $5x(x - 2)$																										
3. Expand $(x + 6)^2$																										
4. Expand $(x + 4)(x - 3)$																										
5. Factorize $x^2 + 6x + 8$																										
6. Factorize $x^2 - 100$																										
7. Factorize $9x^2 - 225$																										
8. The sum of the numbers in the 7 th row of Pascal's Triangle																										
9. Complete the following table of values:																										
<table border="1"> <thead> <tr> <th>x</th> <th>-2</th> <th>-1</th> <th>0</th> <th>1</th> <th>2</th> </tr> </thead> <tbody> <tr> <td>$x + 2$</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>$(x + 2)^2$</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>$(x + 2)^2 - 3$</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	x	-2	-1	0	1	2	$x + 2$						$(x + 2)^2$						$(x + 2)^2 - 3$							
x	-2	-1	0	1	2																					
$x + 2$																										
$(x + 2)^2$																										
$(x + 2)^2 - 3$																										
10. For the graph: $y = x^2 - 5x - 14$, state the y intercept, x intercepts and turning point.																										
Tiebreak:																										



YOUR QUADRATIC SKILLS

Name _____

Factor _____

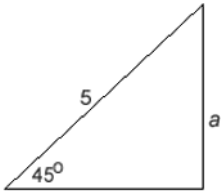
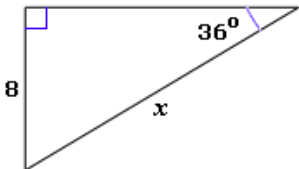
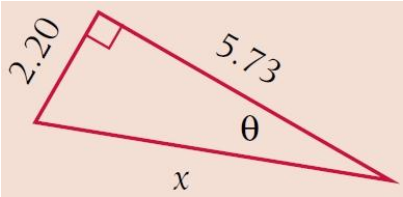
	Risk	Points
		100
1. $y = -2x^2 + 5x - 3$ (State the coefficients a, b and c)		
2. Expand: $(x + 1)(x - 2)$		
3. Expand: $(x - 7)^2$		
4. Factorize: $x^2 - 9x - 36$		
5. Factorize: $x^2 - 81$		
6. Solve: $x^2 - 6x = 27$		
7. Find the discriminant of: $y = 3x^2 - 5x + 2$		
8. Solve by completing the square: $x^2 + 6x - 7 = 0$		
9. The triangle shown has an area of 120 cm^2 . Find the value of x: 		
10. Sketch the graph of: $y = x^2 - 6x + 8$ (clearly label axes and intercepts)		
Tiebreak: What is the longest word you can find using the letters of the word EQUATION? (apart from "equation" of course!)		



YOUR TRIGONOMETRY SKILLS

Name _____

Factor _____

	Risk	Points
		100
1. Write the 3 trigonometric ratios:		
2. Use a calculator to find $\sin(26^\circ)$ correct to 4 d.p.		
3. Use a calculator to find $\tan^{-1}(1.5476)$ correct to nearest degree		
4. Change 46.65° to degrees and minutes		
5. Find "a" to 2 d.p.		
		
6. Find "x" to 2 d.p.		
		
7. Find the angle "theta" to the nearest degree.		
		
8. Change 225° to radians		
9. A plane flies S47°E at 1050 km/h after taking off at 11:15 am. How far due south of its starting point is the plane at 2:45 pm?		
10. Sketch the graph of: $y = 2 \sin(2x)$		

ROLLING DECIMALS

PLAYERS: 2 to 4

EQUIPMENT: Four 0-9 dice, game-board, pencil

- BASIC RULES:**
1. A player rolls all four dice and arranges them to create a number that is one whole number followed by tenths, hundredths, thousandths (eg. 3.407)
 2. After each number a running total is calculated.
 3. At the end of 5 rounds, all of the answers are totalled at the bottom.
 4. The player (team) who's answer is closest to any whole number wins the game.



3.316

ROLLING DECIMALS

Roll #	Whole Numbers	Tenths 0.1	Hundredths 0.01	Thousandths 0.001	Running Total
1		•			+ 0.000 = •
2		•			+ • = •
3		•			+ • = •
4		•			+ • = •
5		•			+ • = •
Total					= •

ROLL A PRODUCT

1. Working in a group of 3, decide who will be players A, B, and C.
2. Take turns rolling two dice and multiplying the numbers that land face up.
3. Cross out the product on your hexagon.
4. If the product is not on your hexagon or is already crossed out, miss a turn.
5. When all numbers on a hexagon have been crossed out, that player wins.

ACTIVITY 1

- a) To help you understand whether the game is fair, fill in record the number of times each product occurs.
- b) Record the overall number of games A, B, and C won in the class.
- c) Based on a) and b), do you think the game is fair?

these tables and

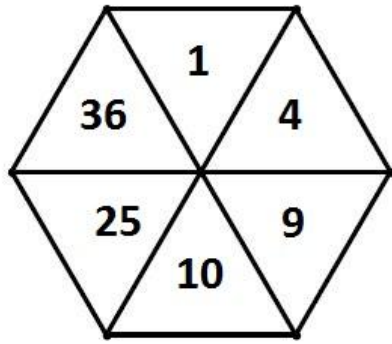
Possible Products of Two Dice Chart

x	1	2	3	4	5	6
1						
2						
3						
4						
5						
6						

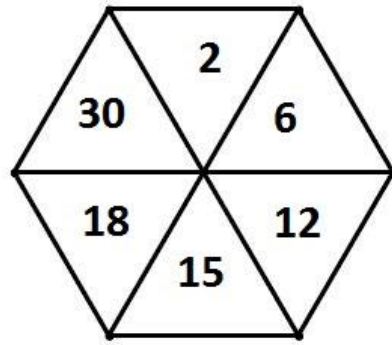
Product	Number of Ways to Roll
1	
2	
3	
4	
5	
6	
8	
9	
10	
12	
15	
16	
18	
20	
24	
25	
30	
36	
Total:	

ACTIVITY 2

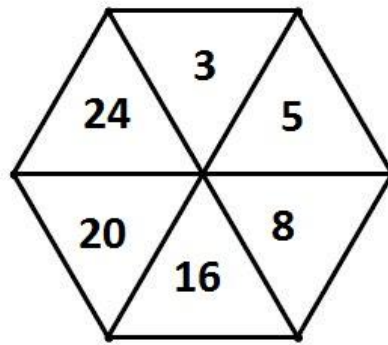
- a) What should the probability be for each player if the game is fair? Explain.
- b) Use your discoveries to create three hexagons, each of which is equally likely to win.



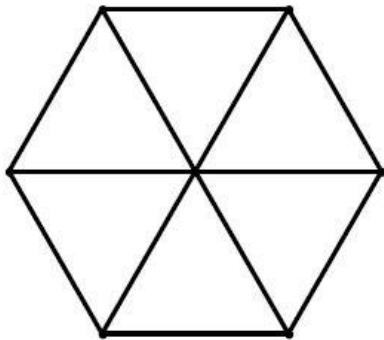
Player A



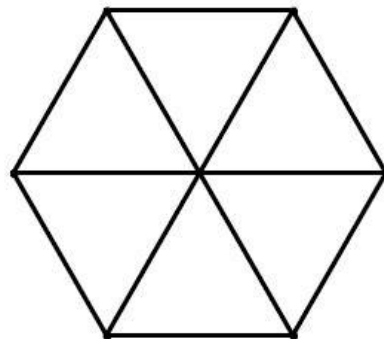
Player B



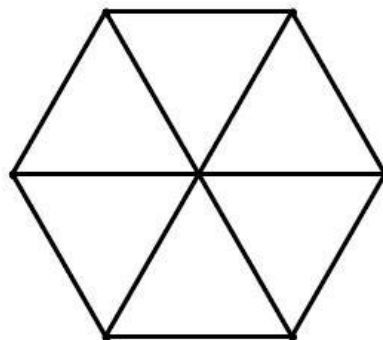
Player C



Player A



Player B



Player C



SALUTE THE KING



PLAYERS: 2 to 4

EQUIPMENT: Pack of cards with the jacks, queens, kings and aces removed.

- BASIC RULES:**
1. Deal all the cards face down. It is better if everyone has the same amount of cards, but it is not mandatory.
 2. The object of the game is to get rid all your cards. The first person to do that is declared the winner.
 3. Every player must now, turn over the top card on their pile.
 4. Total the cards flipped over and then:

A Square Number	STAND UP
A Multiple of 5	SALUTE THE KING
A Multiple of 3	HAND ON HEART
30 to 39	CLAP HANDS

5. Last player to perform the correct action takes all the cards.



SANTORINI

The game: is for two players, represented by Cubes and Cylinders, which are referred to as "men". Cube moves first.

Equipment: Each player has 2 pieces of his type, and there is an unlimited supply of square tiles.

The **object of the game** is to win by either moving a man to stand on the third level above the base of the board, or alternatively to manoeuvre so your opponent cannot move on his turn.

Setup:

Play starts with a 5x5 grid of squares. First Cube, then Cylinder place both their men on unoccupied squares.

Moving:

Each turn has two parts. First move one of your men to an adjacent space. The destination space must be unoccupied, and no more than one level higher than your starting height. If you cannot move, you lose.

Building:

The second part of each move is to place a new tile **adjacent** to the man which just moved. You can place it in any unoccupied square.

Building Domes:

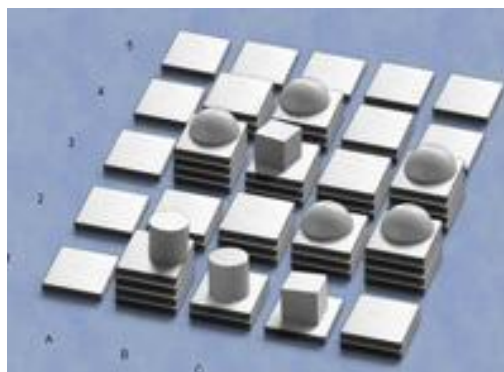
A square placed on level 3 (making it 4 above the base) is immediately replaced by a dome. Domes cannot be moved onto or built upon.

Winning:

The normal way to win is to move one of your men to stand on level 3. The other way to win is to box in your opponent so he/she cannot move.

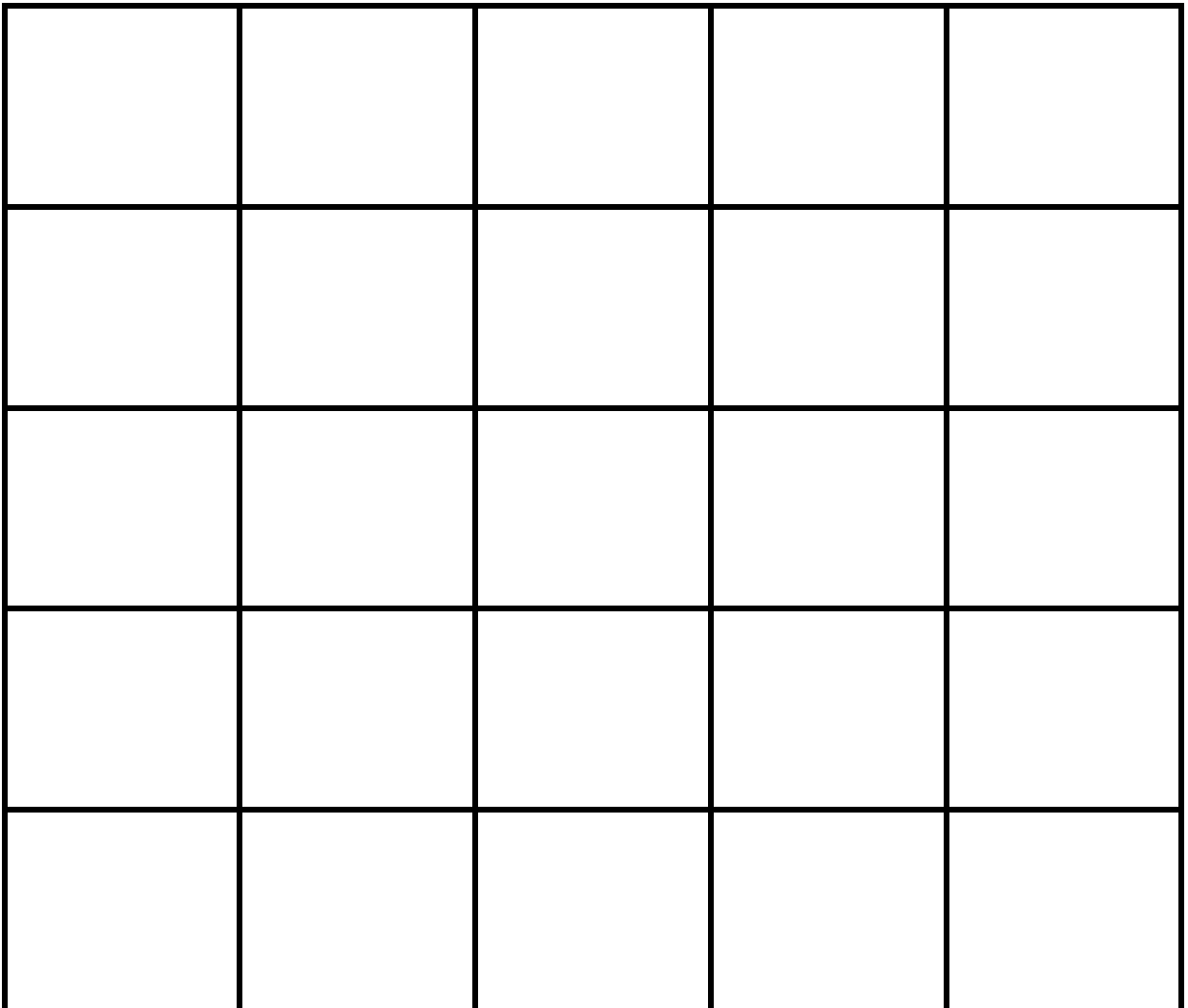
Variation:

The basic game can be extended by adding **Gods** and **Heroes**, which alter the rules of the game (as gods are prone to do).



SANTORINI BOARD

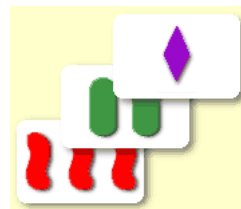
Take it in turns to move a man and then place a tile adjacent to it.



Whoever moves one of their men to level 3 wins.



SET GAME



An excellent game, which uses both hemispheres of the brain. Some students will excel at this game easily beating adults or students who usually excel in most other aspects of Maths.

EQUIPMENT:

Set Cards



BASIC RULES:

The object of the game is to identify a 'Set' of three cards from 12 cards laid on the table. Each card has a variation of four features:

(A) Colour

(B) Symbol

(C) Number

(D) Shading



A 'Set' consists of three cards in which each feature is EITHER the same on each card OR is different on each card. That is to say, any feature in the 'Set' of three cards is either common to all three cards or is different on each card. Here is a "set":



The Magic Rule
If two are... and one is not, then it is not a 'Set'.

SHAPES & SOLIDS BINGO

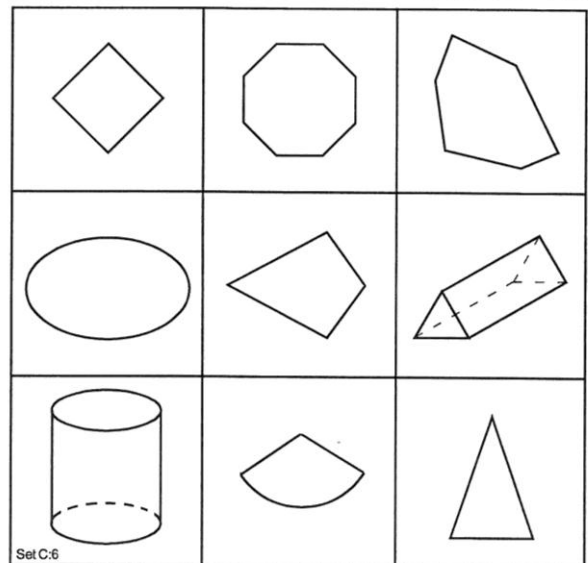
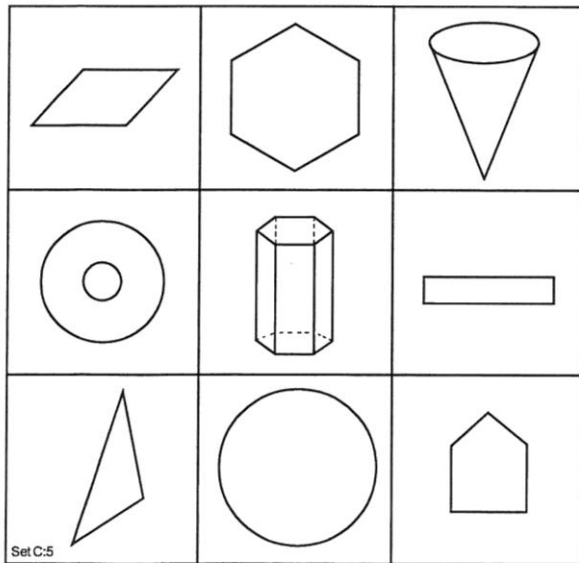
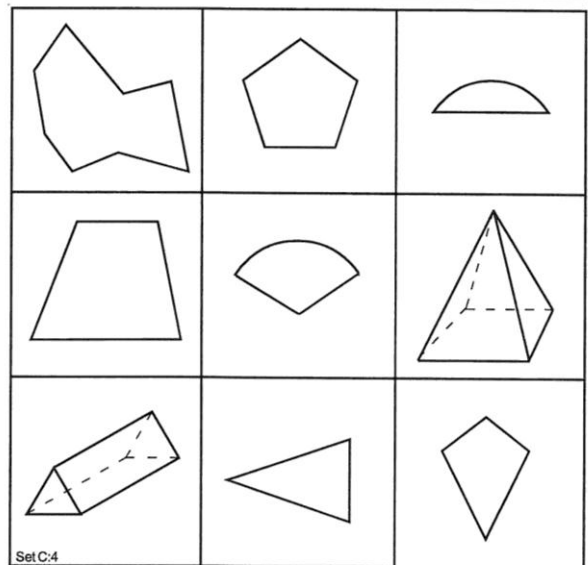
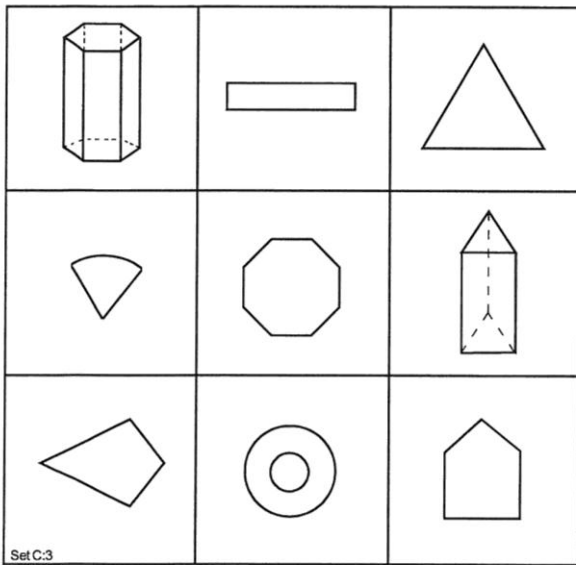
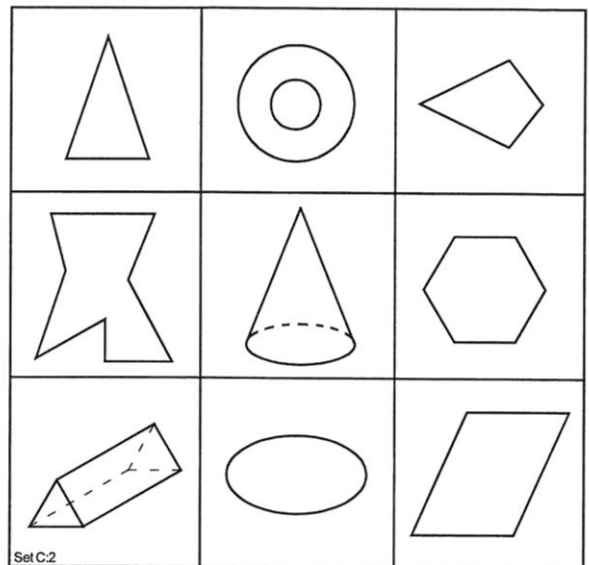
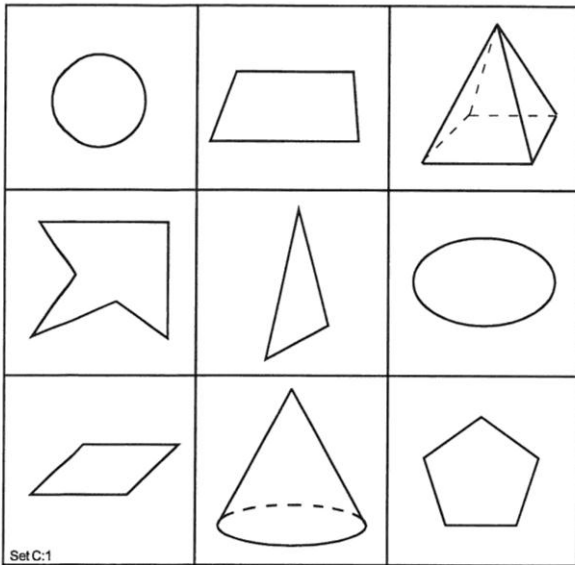
PLAYERS: Whole Class

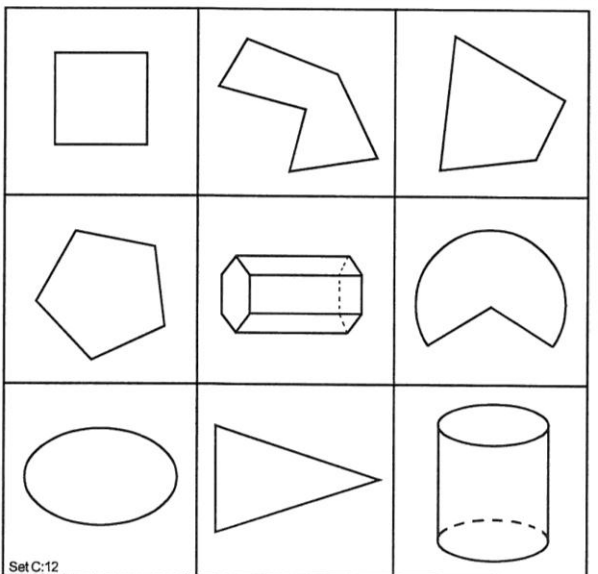
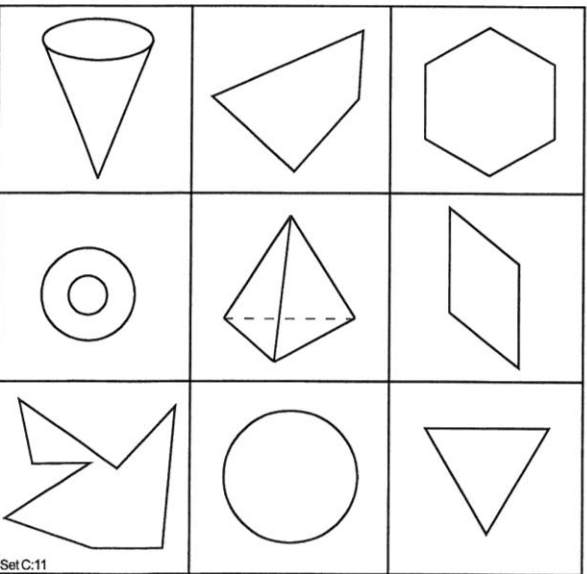
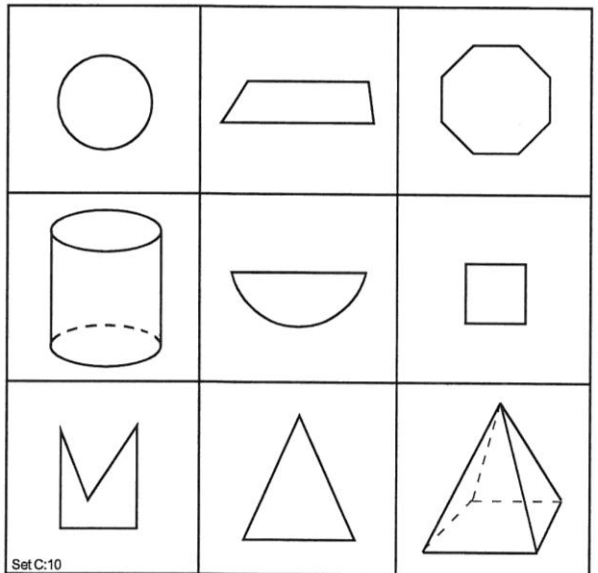
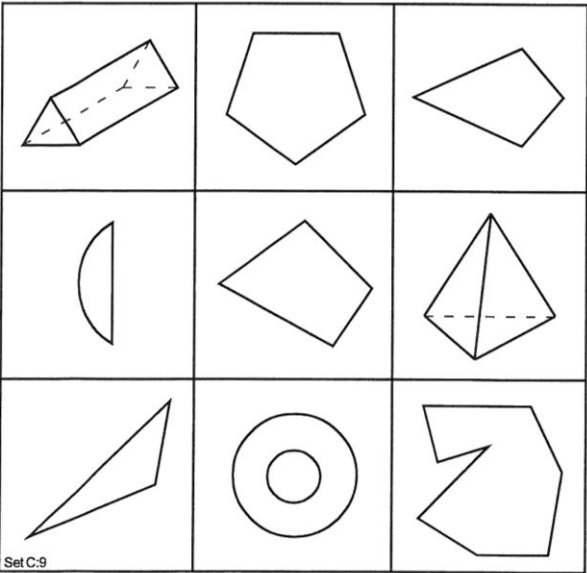
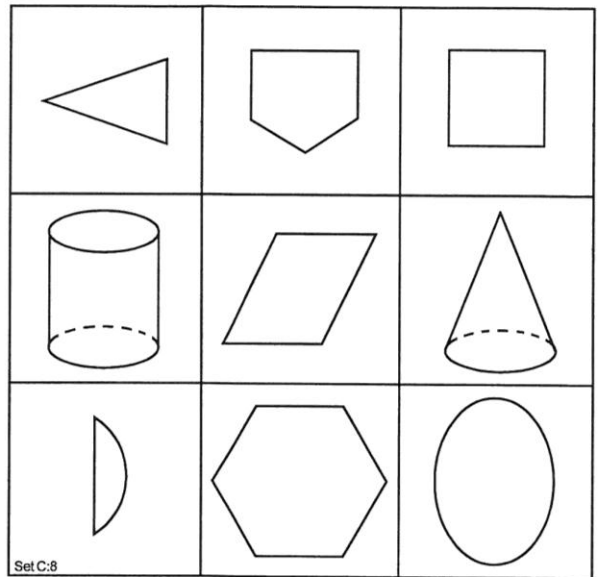
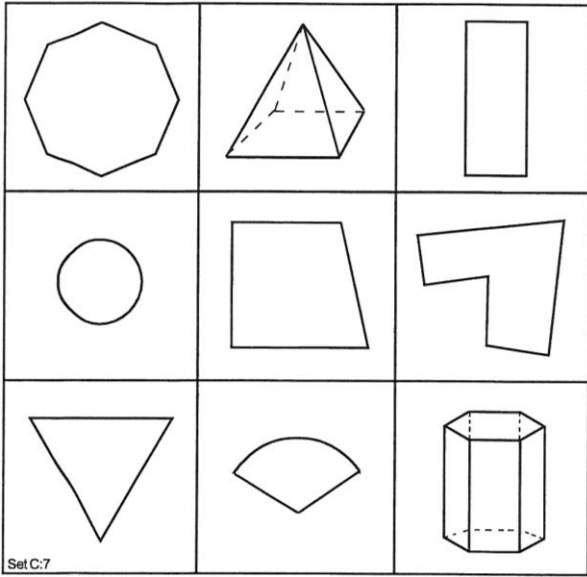
EQUIPMENT: Set of bingo cards.

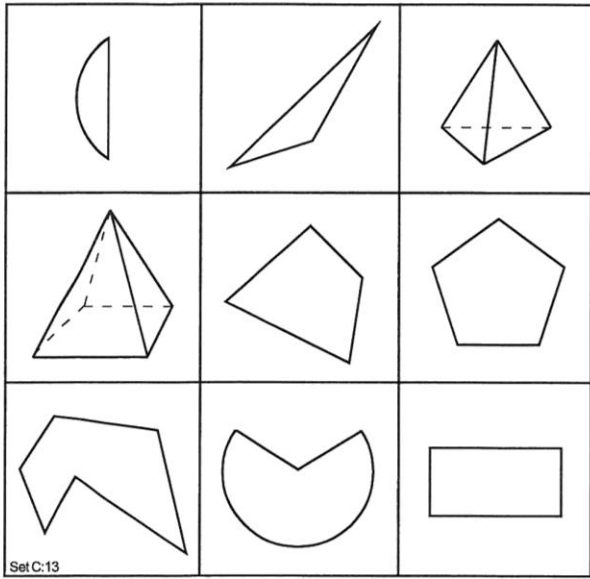
- BASIC RULES:**
1. Distribute a bingo card to each student in the class.
 2. Call out the following words in random order.
 3. Winner calls out bingo when all their shapes are called.

WORD LIST:

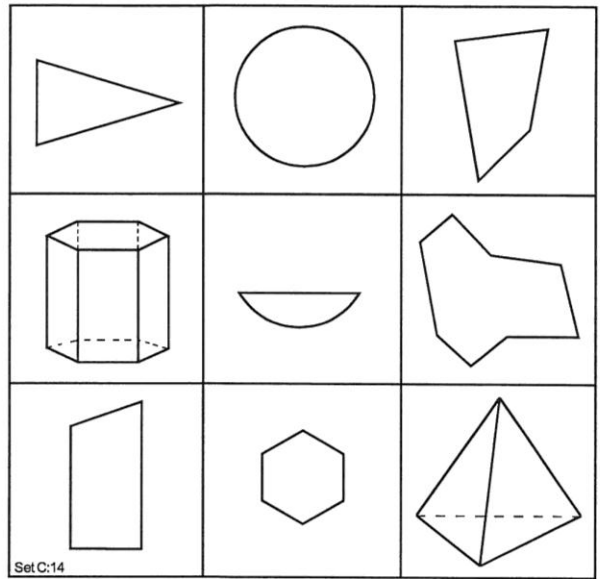
	Scalene triangle		Isosceles triangle		Equilateral triangle
	Regular pentagon		Regular hexagon		Regular octagon
	Irregular pentagon		Irregular hexagon		Irregular octagon
	Circle		Ellipse		Annulus
	Sector		Segment		Irregular quadrilateral
	Trapezium		Parallelogram		Kite
	Oblong		Square		Cone
	Pyramid		Tetrahedron		Cylinder
	Triangular prism		Hexagonal prism		



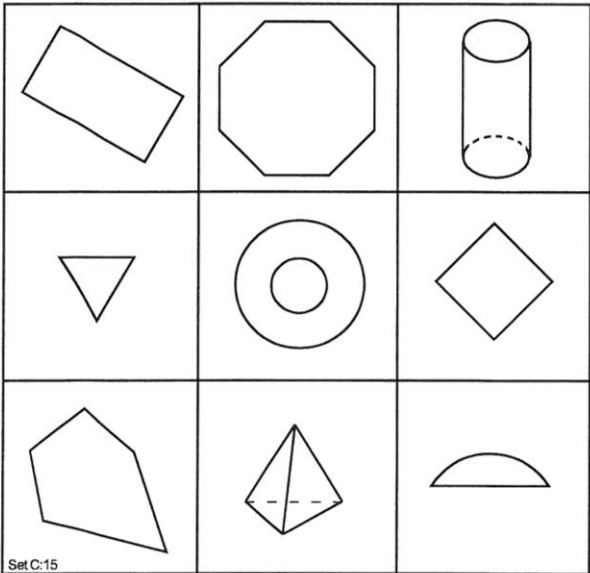




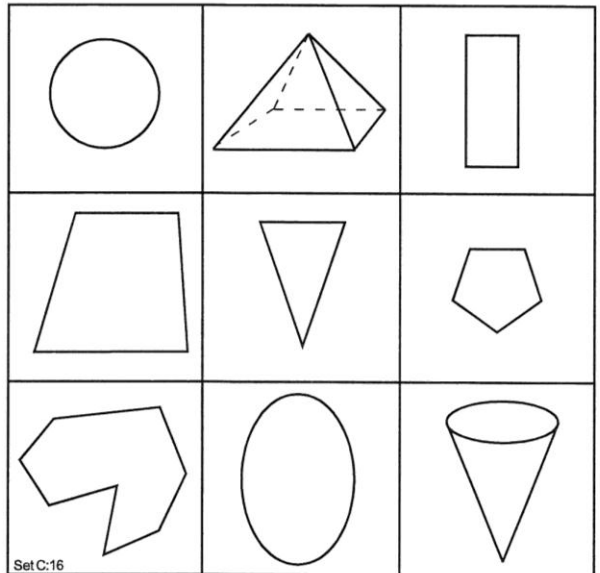
Set C:13



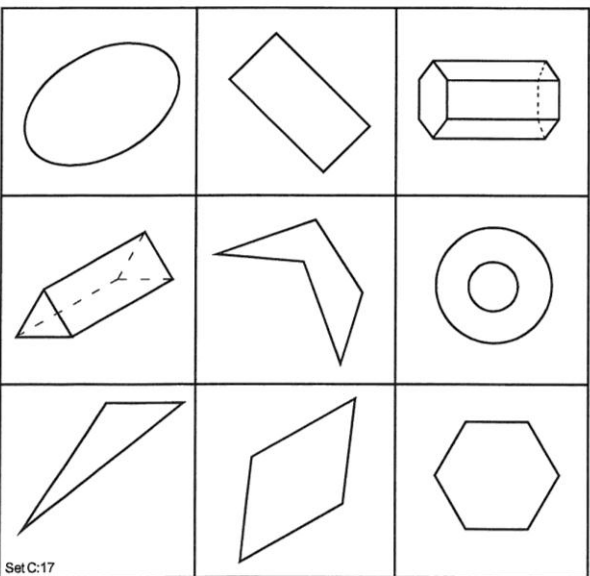
Set C:14



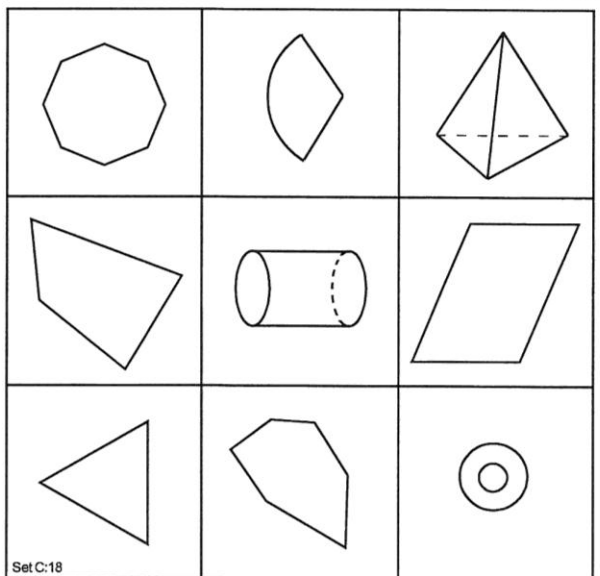
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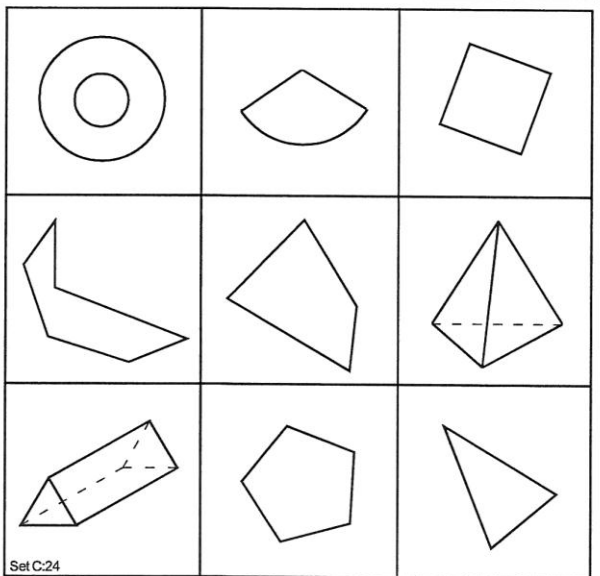
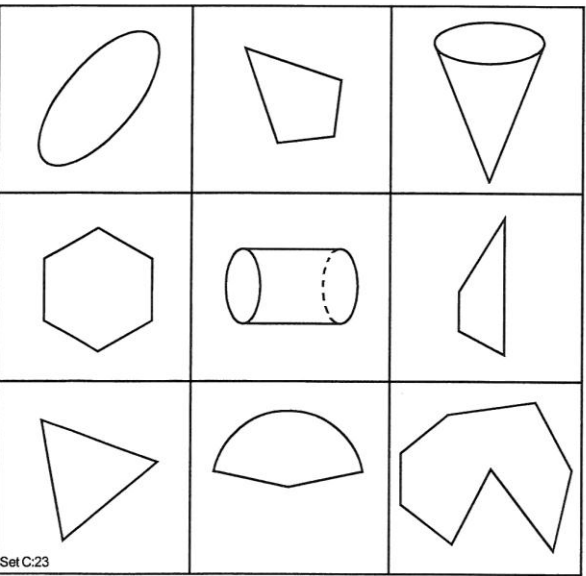
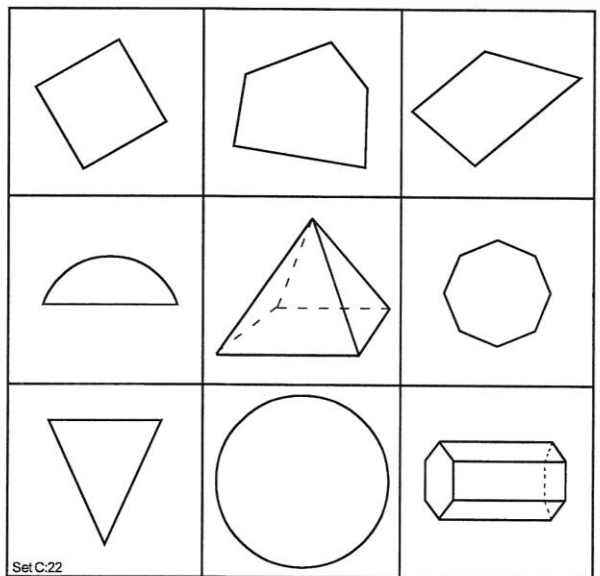
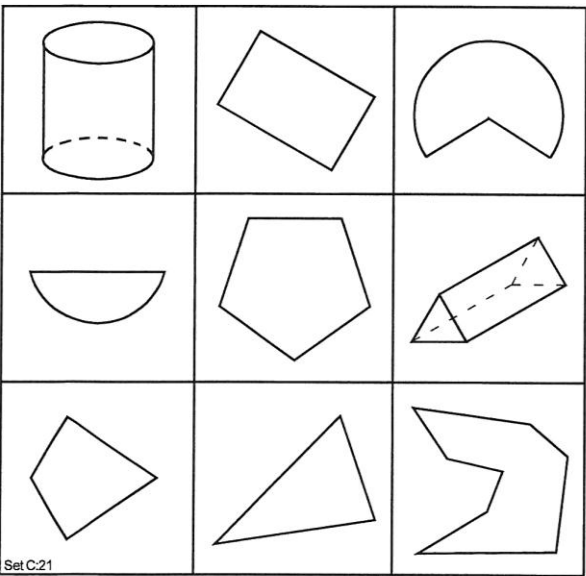
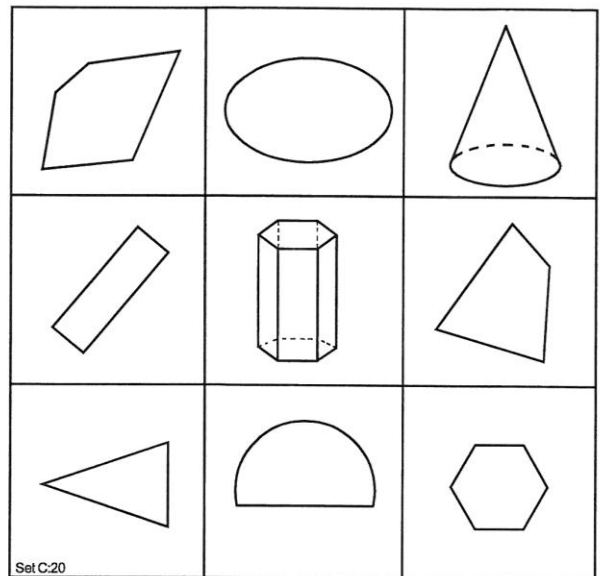
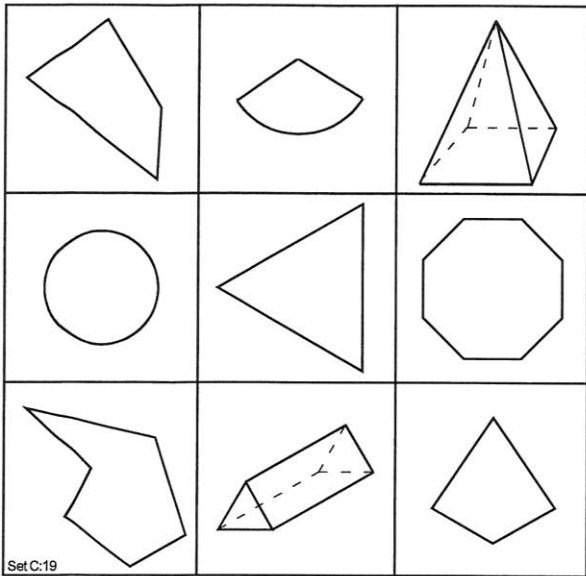
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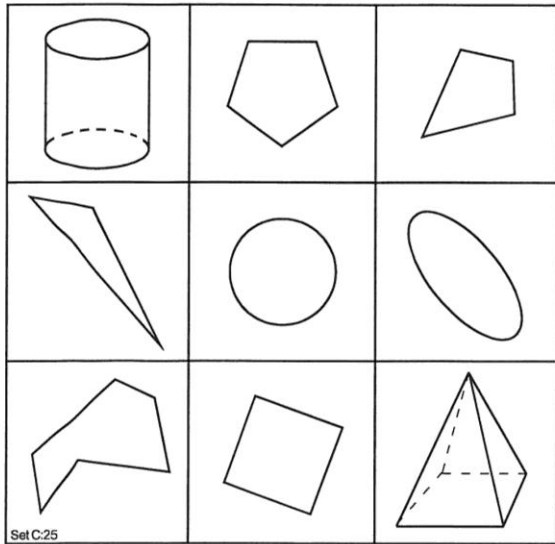


Set C:17

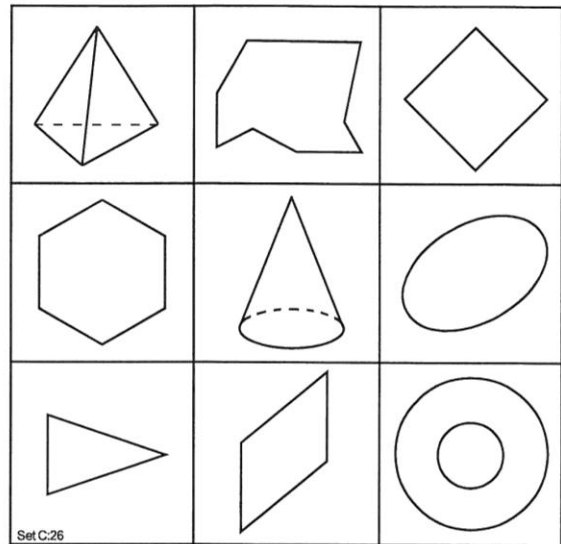


Set C:18

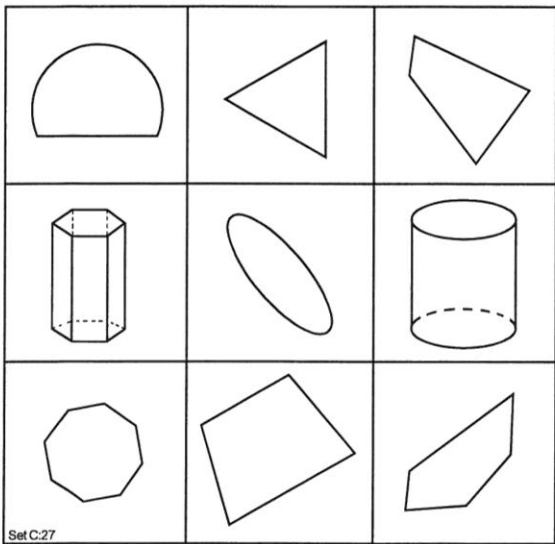




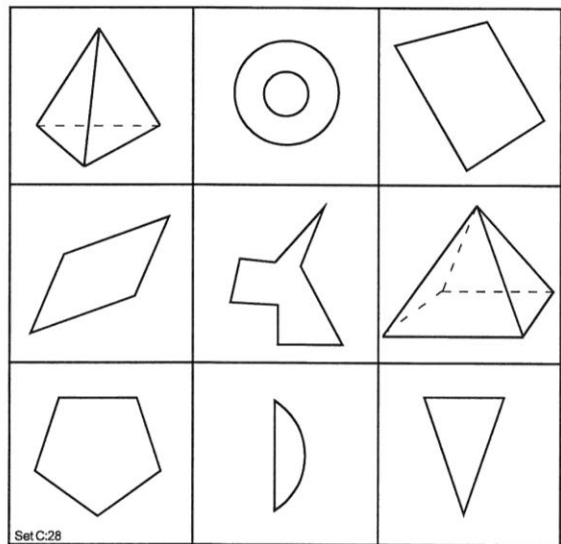
Set C:25



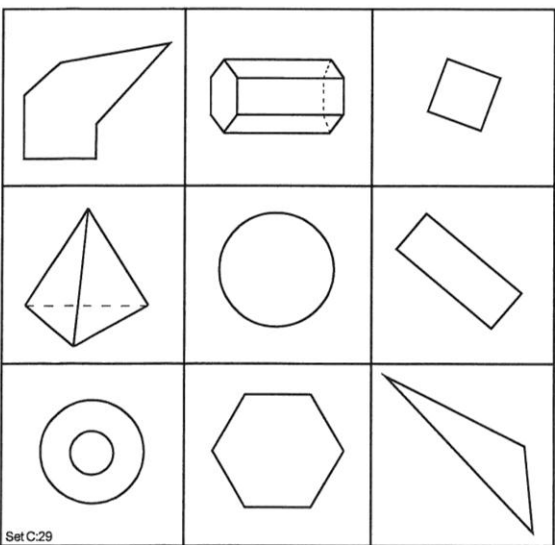
Set C:26



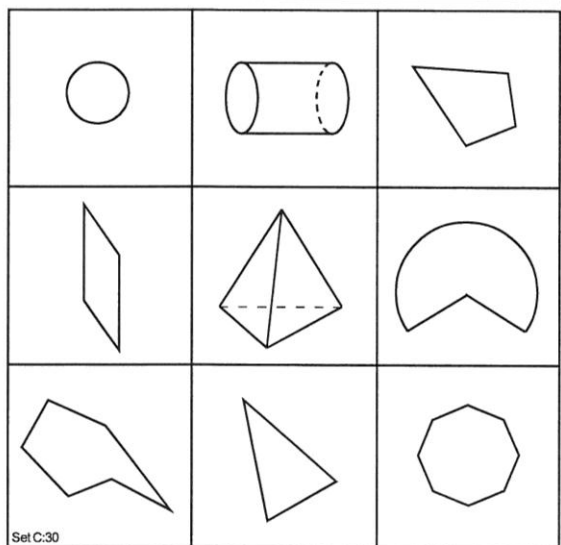
Set C:27



Set C:28



Set C:29



Set C:30



STOP OR DARE



A game for two or three players. You will just need a pack of cards.

Shuffle the pack and place it face down. Set a target score for the game, for example 100.

The first player turns over the top card and continues turning over cards, adding together the value of each card, until they decide to stop. Jacks score 11 and Queens score 12.

When the player stops, the total is recorded as their score.

However, **if an Ace or a King is turned over, no points are scored at all**, and the turn is finished.

The second player then starts turning over cards in the same way.

Players take turns until someone reaches the target score. This player is the winner.

If the cards are all turned over before the target is reached, just reshuffle the pack and continue.

Play the game a few times.

Can you develop any strategies to increase your chance of winning?

Now decide on some new rules and play the game again.

*You could change which cards (and how many cards) end the turn, or introduce a card that sets your **total** score back to zero.*

Once you have played your variant a few times, decide whether the same strategies are best.

STRIVE FOR THE HIGHEST

PLAYERS: 2

EQUIPMENT: Calculator, die, paper, pencil.

- BASIC RULES:**
1. You have six turns to earn the highest score.
 2. When it is your turn, roll the die and circle a number on the chart. This number cannot be used again.
 3. To calculate your score, increase the circled number by the percentage rolled on the die.

Example: Roll 4 on the die and circle 2350.

$$\begin{aligned} \text{Add 4\% to 2350} &= 1.04 \times 2350 \\ &= \underline{2444} \end{aligned}$$

4. Keep rolling the die and choosing a number.
5. After six turns, add all your scores. The person with the highest score wins.

- QUESTIONS:**
1. What advice would you give to a person who is going to play this game?
 2. What is the largest possible score you can get after 6 turns, if you were lucky?

VARIATION: Use a different die (eg. 10-sided, 20 sided)

Chart for Player 1	
2350	12400
8250	2550
11000	7450

Chart for Player 2	
2350	12400
8250	2550
11000	7450

SUM, DIFFERENCE, PRODUCT

Players: 2

Equipment:

Two standard dice



Play:

1. Each player in turn, rolls the two dice and completes the following calculations:

Add the numbers shown on the dice.

Find the difference between the two numbers.

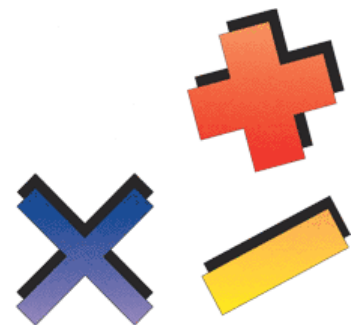
Multiply the numbers shown on the dice.

2. Add the three answers to get the score for the round.
3. After ten rounds the player with the highest cumulative total wins.

Example: 5 & 3. $\text{Sum}(8) + \text{Difference}(2) + \text{Product}(15) = 25$

Variations:

1. Play to a set total e.g. 100
2. Change the dice used e.g. 10 sided dice.



TAKE YOUR PLACES

Players: Small group or whole class.

Equipment: Counters, spinner or ten sided die to generate numerals 0-9. Do not use repeat numerals.

Method:

1. Generate a number. Each student must decide where to place that number to achieve the set goal (example: highest product).
2. Continue choosing numbers until all squares are filled.
3. Calculate the sum, difference, product or quotient and determine the winner.
4. Select game format from the following pages that best suits the current needs of your students.

Variations:

1. Use the following journal prompt:

“What patterns or rules did you learn that helped you decide where to place the number?”
2. For the given set of numbers, find the min/max product, etc.
3. Have students show all possible arrangements for a given set of numbers in a problem and the answers that can be achieved. For example, if you are multiplying a two-digit number times a two-digit number on problem A, there are 24 possible problems that can be created with four given numbers. However, they do not generate 24 different answers.
4. Rather than maximum or minimum, set a target number. Closest to the target is the winner.

Take Your Places

A

$$\begin{array}{r} \square \square \\ \times \square \square \\ \hline \end{array}$$

B

$$\begin{array}{r} \square \square \\ - \square \square \\ \hline \end{array}$$

C

$$\square \overline{\square \square \square}$$

D

$$\frac{\square}{\square} ? \frac{\square}{\square}$$

E

$$\begin{array}{r} \square \square \square \\ \times \square \square \square \\ \hline \end{array}$$

F

$$\begin{array}{r} \square \square \square \\ \times \square \square \\ \hline \end{array}$$

G

$$\square (\square - \square)$$

H

$$\frac{\square + \square}{\square}$$

Take Your Places

I

$$\frac{\square - \square}{\square}$$

J

$$\frac{\square + \square}{\square - \square}$$

K

$$\frac{\square - \square}{\square \times \square}$$

L (exponent)

$$\square \square \square$$

M

$$\square \times \square \square$$

N

$$\frac{\square!}{\square} \times \frac{\square}{\square!}$$

O

$$\frac{\square \times \square \square}{\square}$$

P

$$\frac{(\square + \square) \times \square}{\square}$$

TARGET 100

Players: 2 players



Equipment:

A deck of cards with joker, 100 number grid, tables chart, 2 counters.

Play:

One student deals cards out to his/her opponent who adds or multiplies the cards. This continues until the student decides to stop.

The winner is the player who gets closest to 100 without going over.

Example:

Player A is going first and having cards dealt by partner.

Card 5 is dealt first so player A moves counter to 5 on number board. Card 6 is the next card dealt. This could be $5+6$ and the counter is moved to 11 or it could be 5×6 and counter is moved to 30. Let's assume that Player A decides to move to 30. The next card is a KING so the student adds 10 and moves the counter to 40. Next card is 2. Student decides to multiply and moves to 80. Next card is Ace. Student decides to multiply and stay on 80, hoping that the next two cards are 10's and he/she can hit exactly 100. Next card is a 5. Student adds and moves to 85. Next card is 9. Student moves to 94 and decides to stop fearing that the next card flipped will be bigger than a 6 and she / he would bust.

Player B now has the cards dealt to him / her and tries to better 94 without busting. Once this game is completed, play again but player B goes first.

100 CHART

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

TARGET PRACTICE 1

You need: 3 ten-sided dice (different colours are useful but not essential) and a copy of the game sheet for each student.

TO PLAY:

1. Take turns to throw the dice.
2. Choose 2 of the numbers thrown to make a number as close to the target number as possible.
3. Mentally calculate 'how close' and record in the space provided.
4. The winner is the player with the smallest total.

Numbers Thrown	TARGET	Number Made	How Close?
	74		
	3.5		
	1.9		
	5.7		
	3.5		
	4.7		
	9.3		
	0.8		
TOTAL			



TARGET PRACTICE 2

You need: 4 ten-sided dice (different colours are useful but not essential) and a copy of the game sheet for each student.

TO PLAY:

1. Take turns to throw the dice.
2. Choose 3 of the numbers thrown to make a number as close to the target number as possible.
3. Mentally calculate 'how close' and record in the space provided.
4. The winner is the player with the smallest total.

Numbers Thrown	TARGET	Number Made	How Close?
	567		
	9.45		
	93.6		
	5.7		
	13.8		
	4		
	627		
	0.81		



THE DECIMAL GAME

7.86	8.434	9.1	9.563
8.9	9.58	10.356	10.7
8.203	10.43	8.7	10.3
9.001	8.373	10.256	8.623

1. Divide your class into two teams who then take it in turn to choose decimal numbers from the grid.
2. After they choose a number, cross it off the grid.
3. Each time they choose numbers they also write them on a whiteboard, lining them up so they can do some column addition with them.
4. Once all numbers have been chosen each team sums their decimal numbers and the team with the highest total is the winner. The correct strategy is to always choose the largest remaining decimal number on the board. When the game is over you can look down the columns of decimal numbers that each team recorded and they should be ordered from largest to smallest. If not, some interesting discussions can arise and you can get a gauge as their teacher how well your pupils have learned the skill of ordering decimal numbers.
5. You can create variations on the game, making it a two, three or four player game rather than a whole class game. Winner stays on etc... Who will be class champion?!



THE HIKE



An excellent board game, which includes simple probability events to determine a winner. Analysis of the game using tree diagrams should be made after playing the game to find the best strategy.

EQUIPMENT:

“The Hike” game board, 2 counters, 2 standard dice, 3 coins.

BASIC RULES:

1. Roll dice to decide who goes first.
2. Starting at “Stollywood” players decide whether they will go over the mountains or cross the river.
3. They then take turns to roll dice until they get the required target.
4. Continue making decisions (1ab, 2ab, 3ab, 4ab), rolling dice and flipping coins.
5. The winner is the first player to reach “Finisham”.

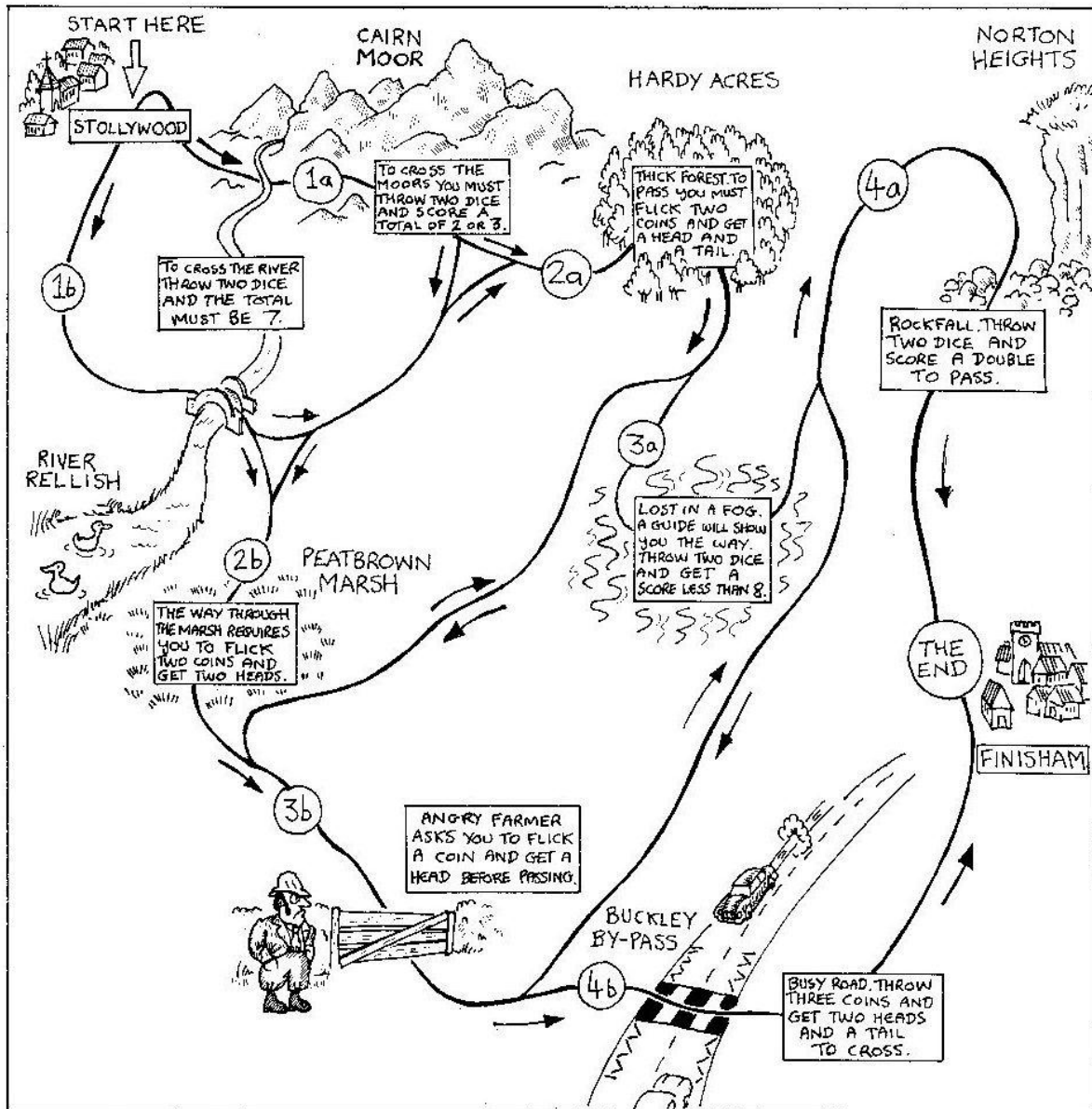
RESOURCES:

[Game board] The Hike.jpg



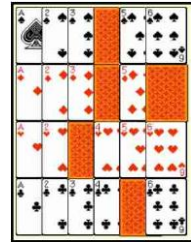
THE HIKE

GAMEBOARD





THIRTY ONE

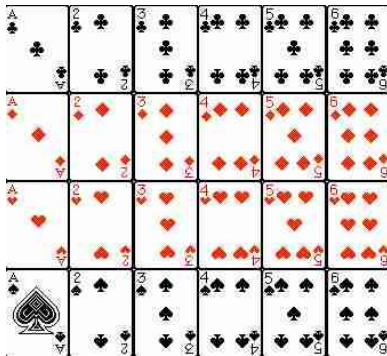


EQUIPMENT:

Sets of 24 cards (i.e.: four of each of 1, 2, 3, 4, 5 and 6).

BASIC RULES:

1. Set up the playing cards (or number cards) as follows:



2. Players take turns to turn over a card and call out the running total.

3. The person who makes the total 31 is the winner.

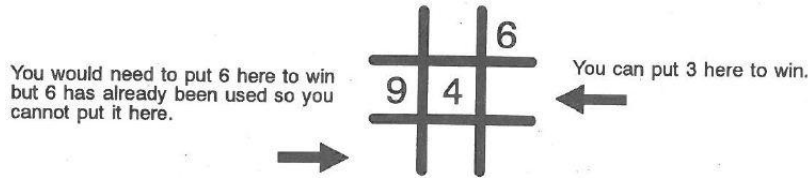
REFERENCES:

[MATHS300] Lesson 27: Game of 31

[Website] <http://www1.curriculum.edu.au/math300/>

TIC-TAC-TOE

1. This game is played on a normal noughts and crosses grid, but numbers are used instead of the noughts and crosses symbols.
2. Only the digits from 1 to 9 can be used and each digit may only be used once.
3. The winner is the first one to make three in a row add up to sixteen.



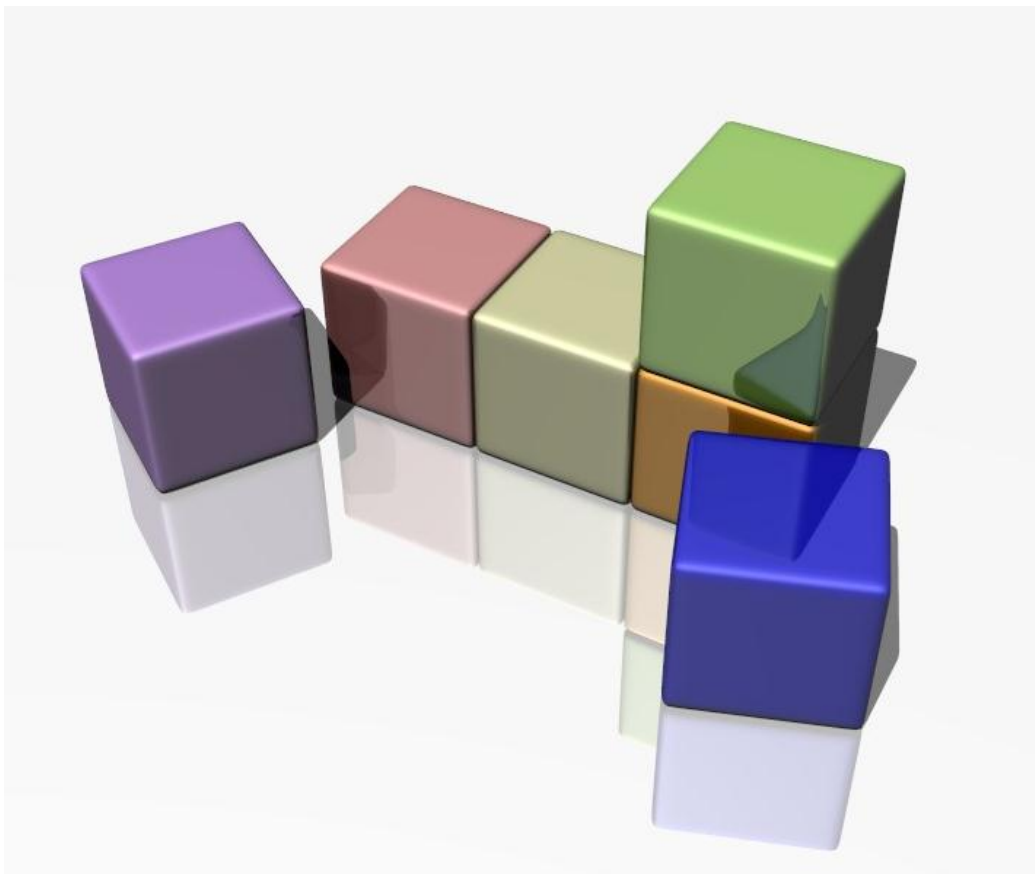
THREE CUBES

This game uses cubes in two colours, 12 in one colour for each of two players.

They take turns to place a cube on a 3 x 3 base. As well as playing at ground level, they may also go upwards, on top of any other cube, up to 3 cubes high.

The winner is the first to get three cubes of their own colour in any line – horizontally, vertically, or even diagonally through the structure.

Finally, students draw front, side and top views and submit to the teacher to claim a prize.



THREE THROW

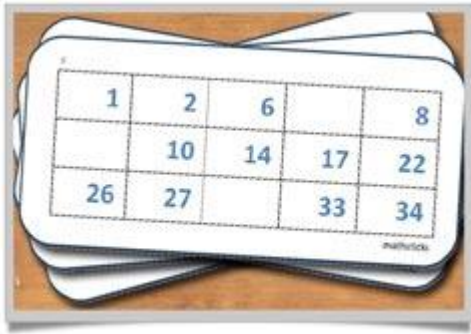
- Roll 3 six sided dice and multiply the numbers together. (Alternatively roll one die three times and multiply the three numbers together.)
- Put a counter on the answer square on the Game Sheet.
- Try to get three counters in a line: horizontally, vertically or diagonally.
- If a counter already occupies a number you cannot place another one on it.

Variation:

- Allow players to remove their opponent's counters if they make the same product.

1	2	3	4	5
6	8	9	10	12
15	16	18	20	24
25	27	30	32	36
40	45	48	50	54
60	64	72	75	80
90	96	100	108	120
125	144	150	180	216

TOTAL CONTROL BINGO



This maths game is designed to assist children in developing confidence with number calculations. It consists of a set of 15 bingo cards for the children, and question sheets for the adult. The children work in pairs to mark off, or cover up, numbers on their cards which answer specific maths problems called out.

So far so simple. This is just maths bingo. However there's a twist... the questions are organised so that you can easily control which bingo card wins!

How does this work? The maths questions are listed on 15 separate sheets, each one is labelled with a letter of the alphabet: "A" to "O". The bingo cards carry matching labels.

The question sheets carry 16 maths problems, 12 of which appear on one single bingo card - making that the winner!

For example, here's card "E" and the related question sheet - 7 questions have been called.

Four of the problems on each question sheet are marked with an asterisk (like the second question in the example above).

This indicates that that question does not have a corresponding answer on the 'winning' card... so, if time is short you can omit this question and there will still be a winner.

This makes the question-calling quite flexible, you can call all 16 questions, or ignore those with an asterisk and only call 12.

The question sheets feature a wide variety of maths functions and vocabulary, which may or may not be appropriate for your children. However, each sheet clearly indicates the answer too, so you can easily rephrase, or completely alter the questions.

E.	
4 lots of 2	8
* 3 more than 8	11
Half of 20	10
4 more than double 9	22
Double 7	14
1 more than 16	17
7 off 40	33
11 subtract 9	2
100 minus 99	1
* Double 10	20
49 minus 5	34
Half of 12	6
9 times 3	27
* Half of 32	16
* 4 times 10	40
34 take away 8	26

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A

2	3	7		14
	15	16	19	20
22	27	34	41	

mathsticks

B

	3	4	5	7
9	13	14	15	
20	22	27		42

mathsticks

C

2	3	4		12
14	18		21	22
27		33	34	43

mathsticks

D

5	9	10		14
15		22	23	24
27	34	37	44	

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E

1	2	6	8	
	10	14	17	22
26	27		33	34

mathsticks

F

1	2	3		7
11		14	18	21
22	27	30		45

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G

4		11	12	14
21	22	23		27
31		35	36	46

mathsticks

H

2	4	6		14
16		22	27	35
36	39	40	47	

mathsticks

I

2		9	11	12
14	18		20	22
25	27	39		48

mathsticks

J

3	4		14	16
17		22	25	27
33	34		42	49

mathsticks

K

	5	8	10	14
18		21	22	26
27	29	39		50

mathsticks

L

3	6		16	18
19		22	23	27
34	35		40	41

mathsticks

M

2	4	5		9
14	18		22	25
27	29	39		50

mathsticks

N

2	5	8		12
13	14		25	27
28		32	34	48

mathsticks

O

2		11	12	14
	27	31	32	34
35	36		41	45

mathsticks

A.

Half of 4	2
Two times 7	14
9 divided by 3	3
* Half 24	12
Double 8	16
9 add 18	27
1 less than half of 40	19
26 increased by 5	31
14 more than 20	34
* 3 less than 20	17
5 more than 10	15
5 times 4	20
* 4 less than 30	26
3 more than 4	7
* 5 groups of 8, plus 1	41
8 less than 30	22

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B.

Half of 28	14
1 more than double 6	13
* 2 less than 30	28
9 lots of 3	27
4 lots of 5	20
15 subtract 12	3
Double 11	22
* 1 less than double 10	19
100 take away 93	7
Half of 18	9
9 increased by 6	15
* 5 plus 6	11
* 4 groups of 4	16
6 less than 48	42
20 shared by 5	4
12 less than 17	5

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C.

Double 9	18
* Half of 32	16
12 shared by 4	3
3 lots of 11	33
19 minus 17	2
10 more than 24	34
* 1 more than double 6	13
* 1 less than 30	29
10 add 4	14
5 more than 22	27
7 less than 50	43
Double 10, plus 2	22
* Five 4s	20
24 divided by 6	4
Half of 42	21
3 lots of 4	12

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D.

100 minus 95	5
30 increased by 7	37
* 8 lots of 5	40
1 more than 33	34
Double 5	10
37 subtract 10	27
Half of 30	15
* Double 14	28
9 add 5	14
1 more than double 12	23
14 add 30	44
3 times 3	9
Double 12	24
* 3 less than 20	17
* Double 13	26
12 plus 10	22

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E.

4 lots of 2	8
* 3 more than 8	11
Half of 20	10
4 more than double 9	22
Double 7	14
1 more than 16	17
7 off 40	33
11 subtract 9	2
100 minus 99	1
* Double 10	20
49 minus 5	34
Half of 12	6
9 times 3	27
* Half of 32	16
* 4 times 10	40
34 take away 8	26

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F.

8 add 3	11
* 1 more than 3 lots of 10	31
A third of 9	3
Half of 44	22
4 more than double 5	14
10 plus 4 plus 4	18
9 minus 2	7
8 less than 10	2
27 minus 26	1
* Half of 30	15
7 off 52	45
* 4 more than 35	39
10 more than 17	27
* 11 less than 16	5
30 take away 9	21
10 lots of 3	30

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G.

* Double 10	20
18 lots of 2	36
* 15 divided by 3	5
20 subtract 9	11
3 more than 19	22
1 more than 5 x 6	31
A third of 12	4
3 more than double 10	23
7 plus 7 plus 7	21
8 more than 6	14
* A quarter of 12	3
6 plus 4 plus 2	12
* A tenth of 10	1
Take 4 from 50	46
Half of 70	35
3 off 30	27

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H.

6 times 6	36
* A third of 15	5
* A quarter of 40	10
A third of 12	4
Double 7	14
3 more than double 12	27
7 lots of 5	35
15 add 14 add 18	47
18 shared by 3	6
20 plus 10 plus 9	39
* Half of 60	30
2 lots of 11	22
Ten 4s	40
* Half of 16	8
16 divided by 8	2
8 lots of 2	16

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I.

* Double 12	24
1 less than 40	39
* 7 times 5	35
Twelve 4s	48
9 increased by 3	12
30 take away 8	22
3 lots of 9	27
1 more than a tenth of 100	11
A third of 75	25
* Half of 88	44
6 off 20	14
* A quarter of 20	5
3 less than 5	2
Half of 6 groups of 3	9
A quarter of 80	20
6 groups of 3	18

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J.

* 4 more than 9	13
Double 8	16
* Double 14	28
$3 + 18 + 12$	33
A quarter of 16	4
8 off 30	22
40 take away 13	27
44 subtract 10	34
A quarter of 100	25
* Half of 40	20
7 plus 7	14
* A fifth of 25	5
Double 21	42
6 add 6 add 5	17
7 squared	49
27 shared by 9	3

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K

* Half of 80	40
2 lots of 9	18
20 add 19	39
14 less than 19	5
* Double 18	36
Half of 16	8
24 take away 10	14
3 lots of 7	21
15 less than 25	10
30 take away 8	22
* 5 lots of 5	25
9 add 9 add 9	27
6 more than double 10	26
* 3 times 4	12
A quarter of 200	50
11 less than 40	29

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L

* 6 more than 5	11
30 shared by 5	6
* 8 groups of 3	24
18 off 40	22
* 6 less than 36	30
6 more than 5 times 7	41
4 add 30	34
8 lots of 5	40
Take 4 from 20	16
1 less than 2 lots of 12	23
7 groups of 5	35
3 times 9	27
* 5 less than 20	15
A quarter of 12	3
5 add 6 add 7	18
8 add 11	19

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M.

11 add 39	50
* Half of 24	12
12 reduced by 3	9
3 lots of 9	27
* A third of 30	10
6 plus 6 plus 6	18
20 divided by 4	5
6 shared by 3	2
* Double 10	20
1 less than 30	29
Half of 50	25
* 4 off 10	6
9 add 4 add 1	14
Eleven 2s	22
9 add 30	39
8 less than 12	4

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N.

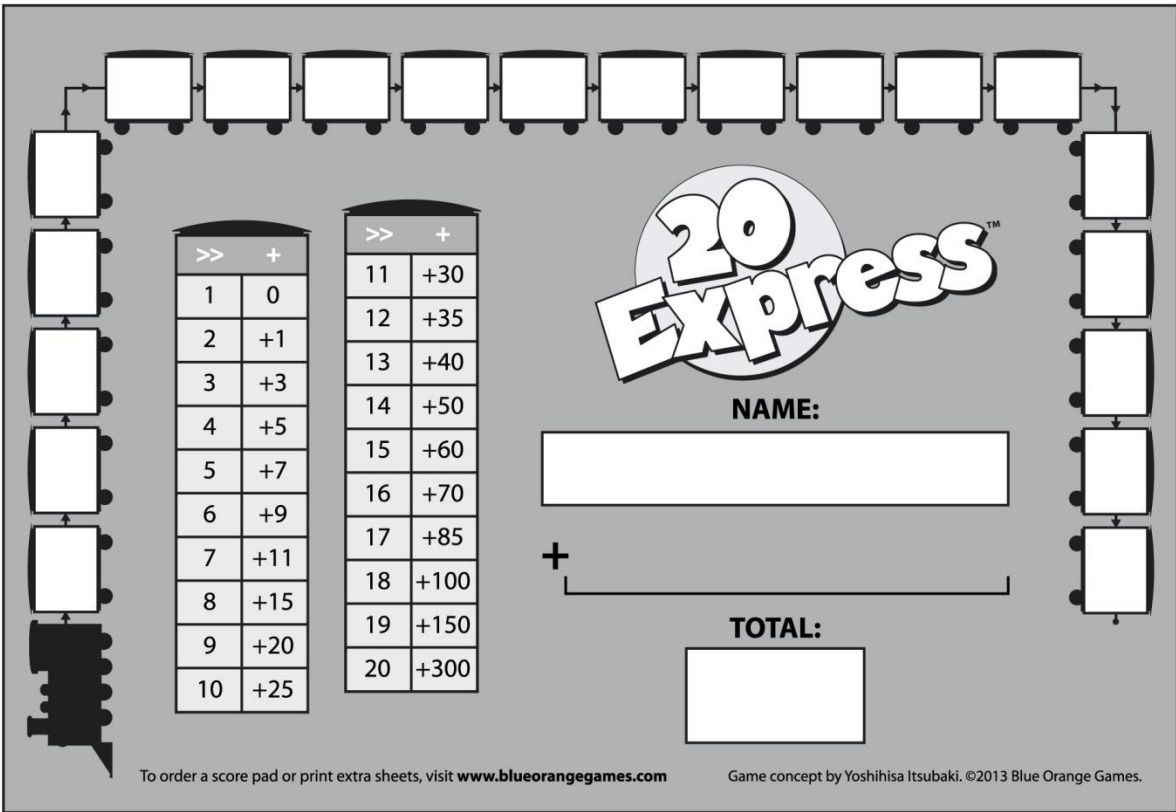
* Half of 80	40
Increase 11 by 3	14
* One third of 18	6
Take 6 from 40	32
12 less than 20	8
30 shared by 6	5
7 times 7, less 1	48
9 more than 19	28
Half of 54	27
9 minus 7	2
4 plus 30	34
Five 5s	25
A quarter of 48	12
* One fifth of 5	1
* 25, increased by 6	31
2 more than 11	13

mathsticks.com

O.

* 4 lots of 5	20
3 add 4 add 5	12
* Half of 15	15
Double 18	36
15 add 16	31
5 times 9	45
Take 3 from 30	27
17 lots of 2	34
23 minus 12	11
* 9 more than 3 lots of 10	39
20 subtract 6	14
* A fifth of 15	3
A tenth of 20	2
8 lots of 4	32
1 less than double 22	41
5 more than 30	35

mathsticks.com



20 Express™

NAME:

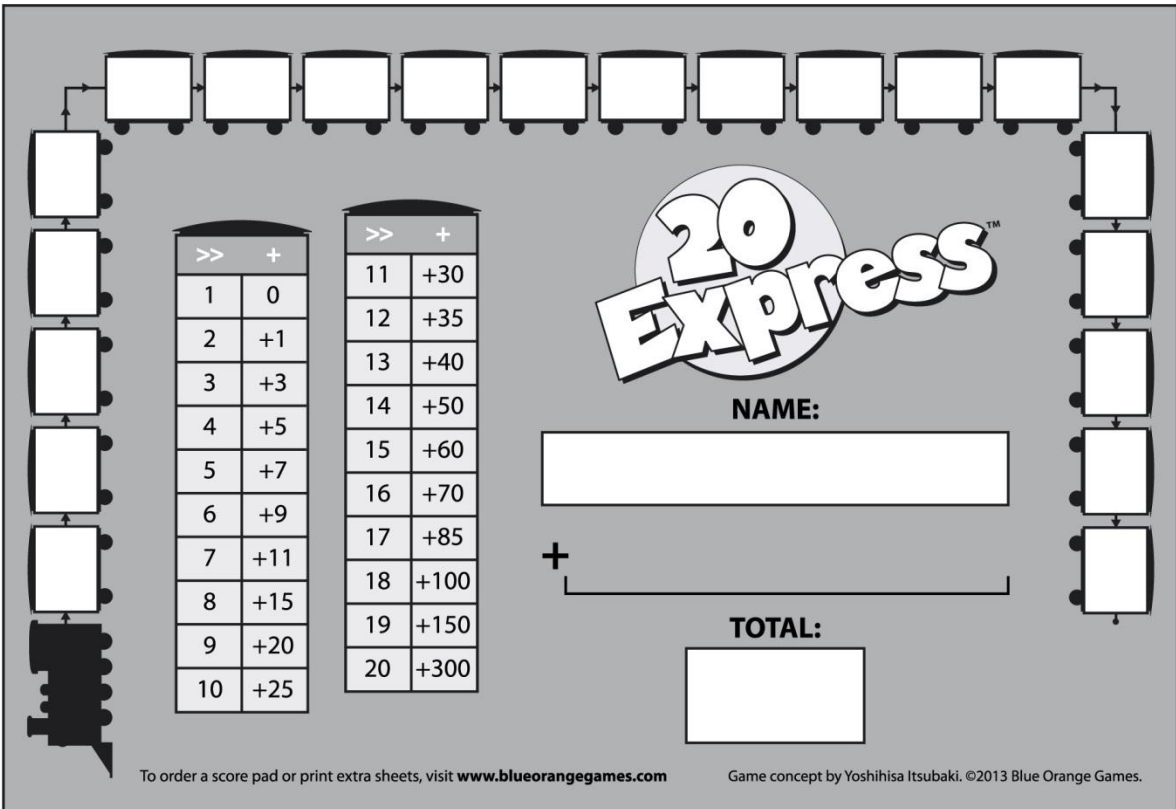
+

TOTAL:

>>	+
1	0
2	+1
3	+3
4	+5
5	+7
6	+9
7	+11
8	+15
9	+20
10	+25

>>	+
11	+30
12	+35
13	+40
14	+50
15	+60
16	+70
17	+85
18	+100
19	+150
20	+300

To order a score pad or print extra sheets, visit www.blueorangegames.com Game concept by Yoshihisa Itsubaki. ©2013 Blue Orange Games.



20 Express™

NAME:

+

TOTAL:

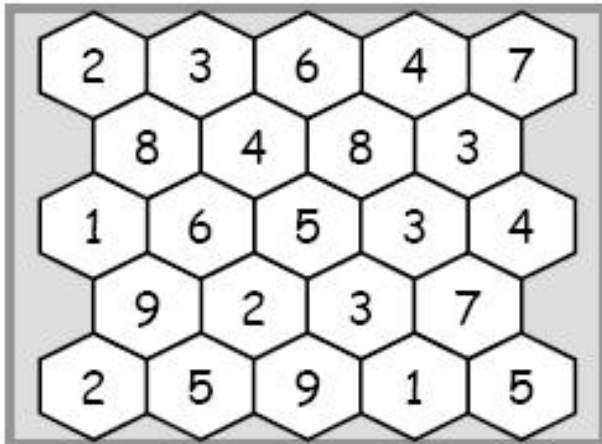
>>	+
1	0
2	+1
3	+3
4	+5
5	+7
6	+9
7	+11
8	+15
9	+20
10	+25

>>	+
11	+30
12	+35
13	+40
14	+50
15	+60
16	+70
17	+85
18	+100
19	+150
20	+300

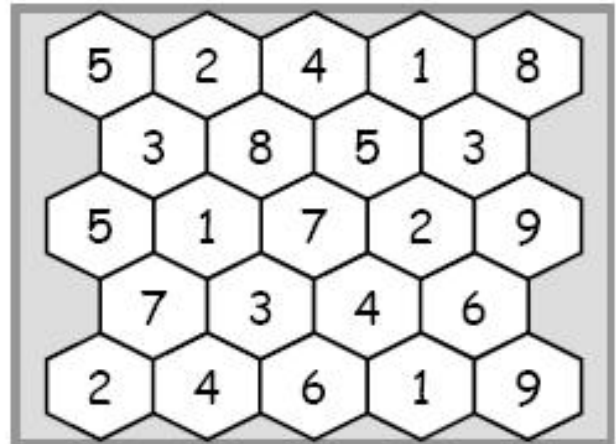
To order a score pad or print extra sheets, visit www.blueorangegames.com Game concept by Yoshihisa Itsubaki. ©2013 Blue Orange Games.

TWENTY SEVEN

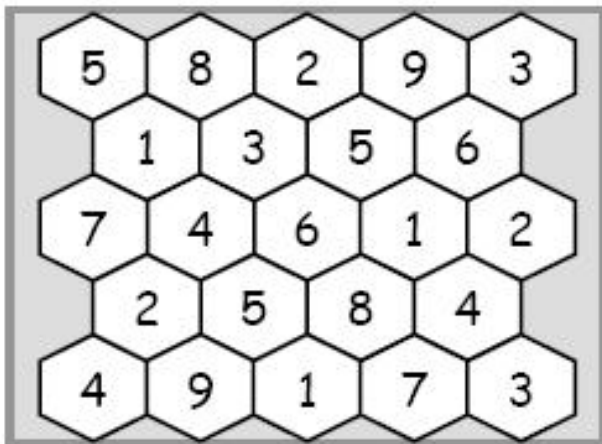
GAME 1



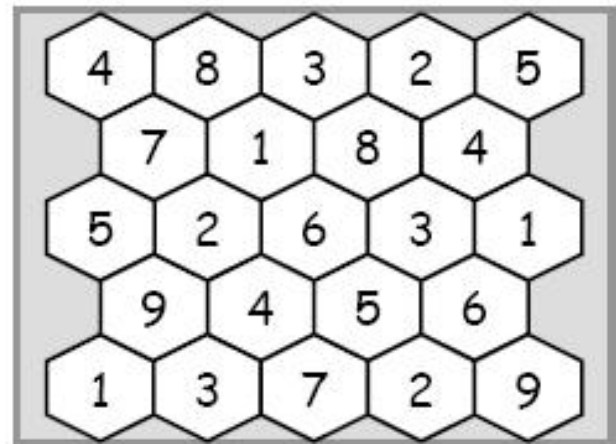
GAME 2



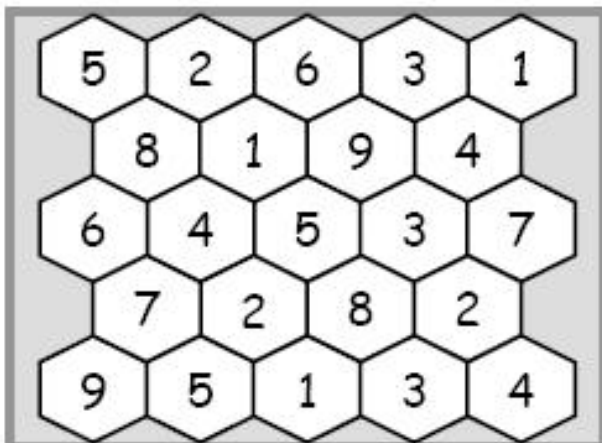
GAME 3



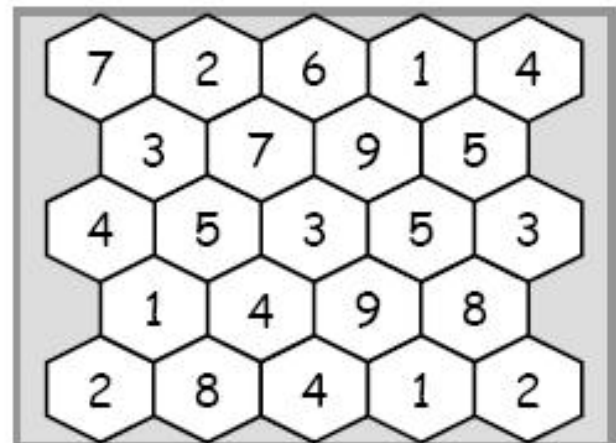
GAME 4



GAME 5



GAME 6



The first player colours a hexagon.

The second player colours a hexagon that joins to the first one.

This player adds this number to the first number and says the total.

Players take it in turns to colour a hexagon that joins to the last one coloured and add the number to the previous total.

The first player to reach exactly 27 is the winner. If a player goes over 27 they lose.

If a player colours a hexagon and this blocks the other player from having a go they also lose.

U Win Again

This is a two-person game played with a pack of 0-9 Digit Cards.

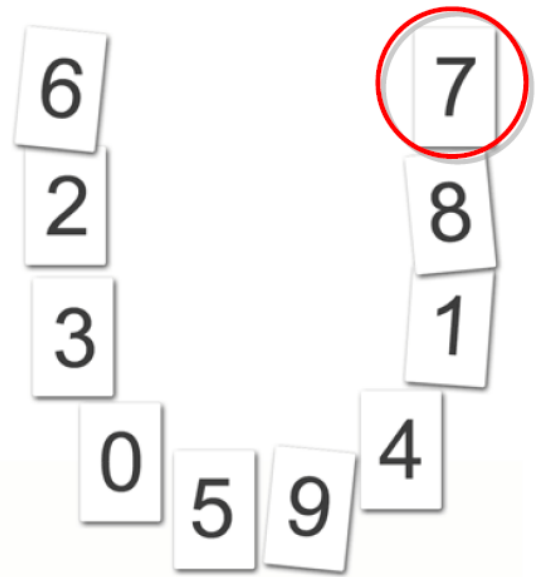
The cards are shuffled and dealt face-up in the form of a letter 'U'.

Children then take it in turns to choose (and remove) a card from one of the two 'end cards'.

Players can only choose one of the two 'end-cards'; each time a card is removed the card immediately next to it in the chain becomes the new 'end card'. When all of the cards have been removed, the game ends, and the players calculate their score from all of their chosen cards.

The player with the larger score is the winner.

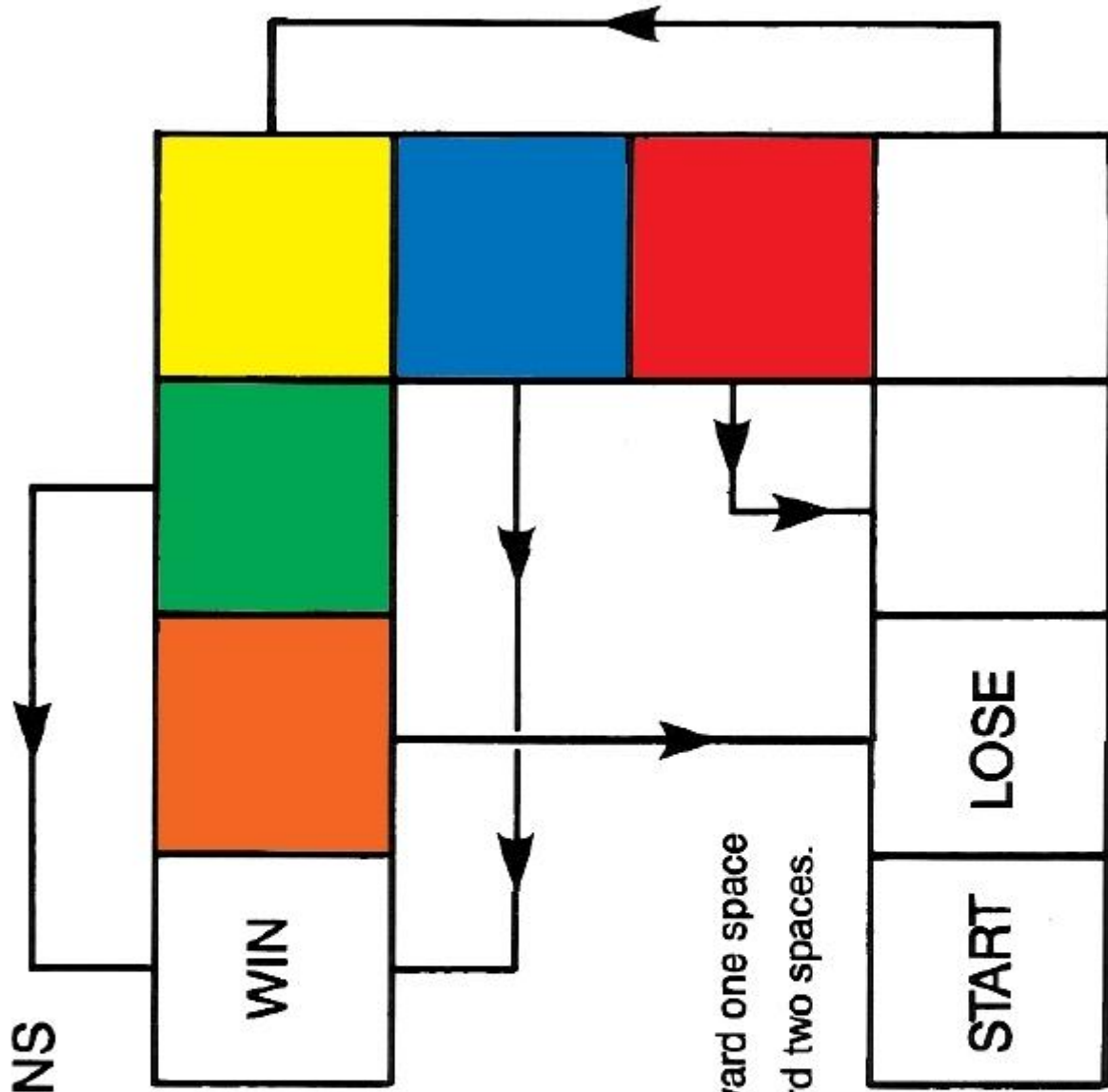
The focus of this game is not on the calculation but on the strategy used



Notes:

The focus of this game is not on the calculation, but on the strategy used when deciding which card to take. As with most games, the learning will be enhanced through adult intervention. In the first instance it may be useful to let the children simply play; observing how they take the cards and encouraging them to discuss any strategies they seem to be using as the games progress. After a while, children may start 'looking ahead' to see what their partner may do next, for example: In the game shown here, the 7 card seems a good starting point. However, the first player may decide to take the 6 card rather than the higher 7, since the 6 only opens up a 2 for their partner rather than the more valuable 8.

UPS AND DOWNS



UPS AND DOWNS

BUT IS IT A FAIR GAME?

Place counter on start.

Flick a coin

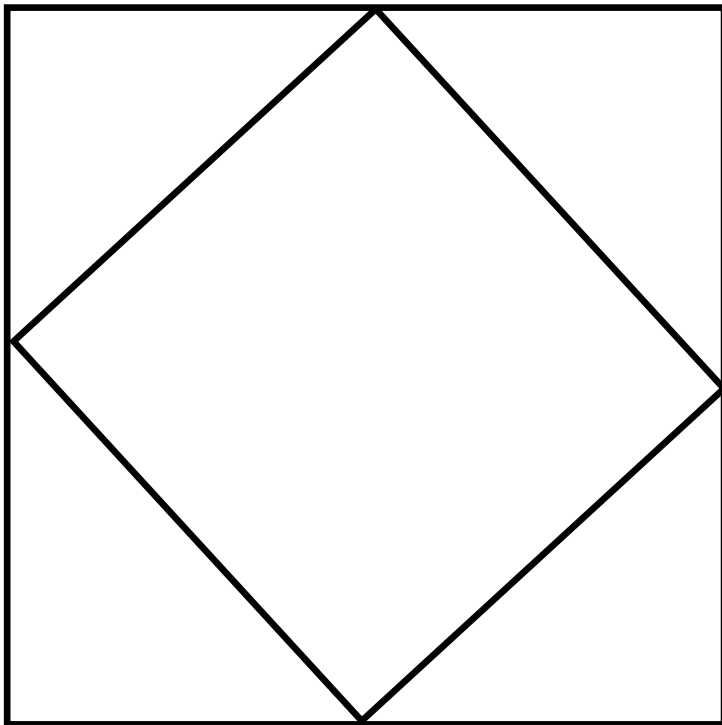
- Heads, move forward one space
- Tails, move forward two spaces.

Watch for the arrows.

Keep flicking until you win or lose.

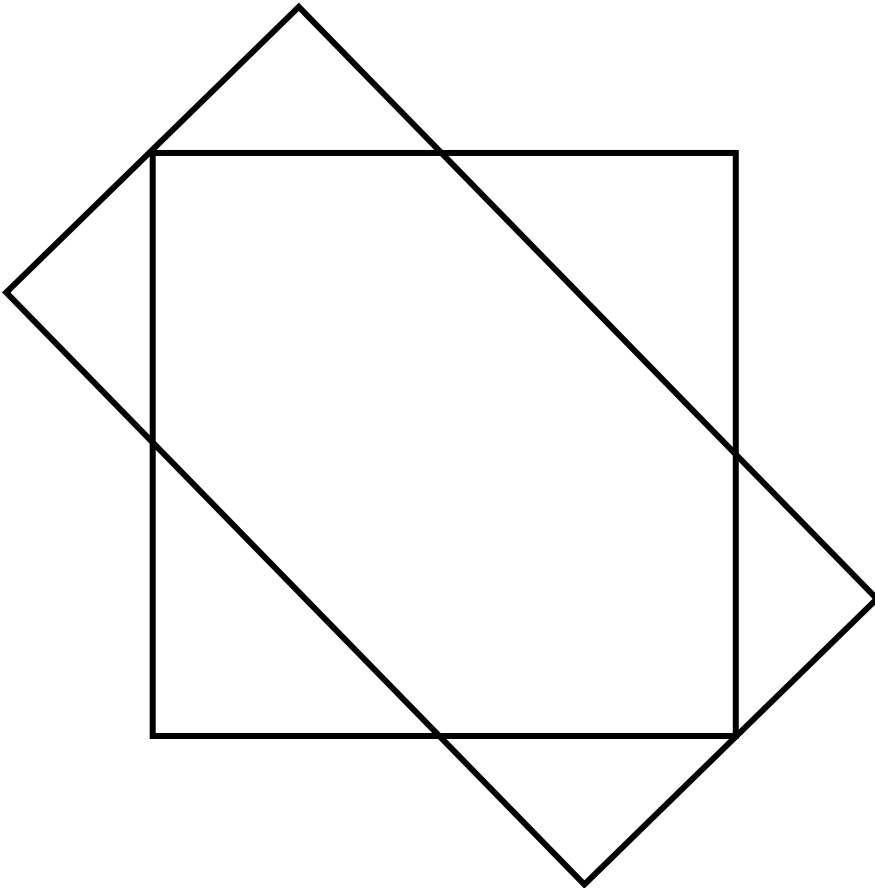
VISUALIZING SHAPES 1

Get your class to draw the figure below. You must give them only verbal instructions.



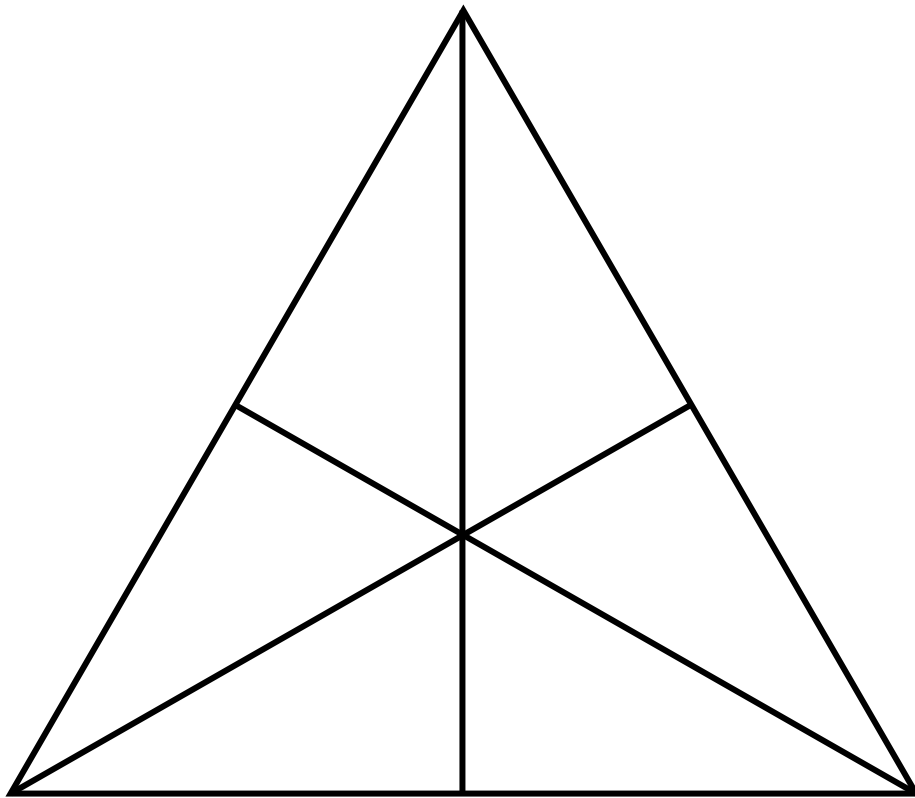
VISUALIZING SHAPES 2

Get your class to draw the figure below. You must give them only verbal instructions.



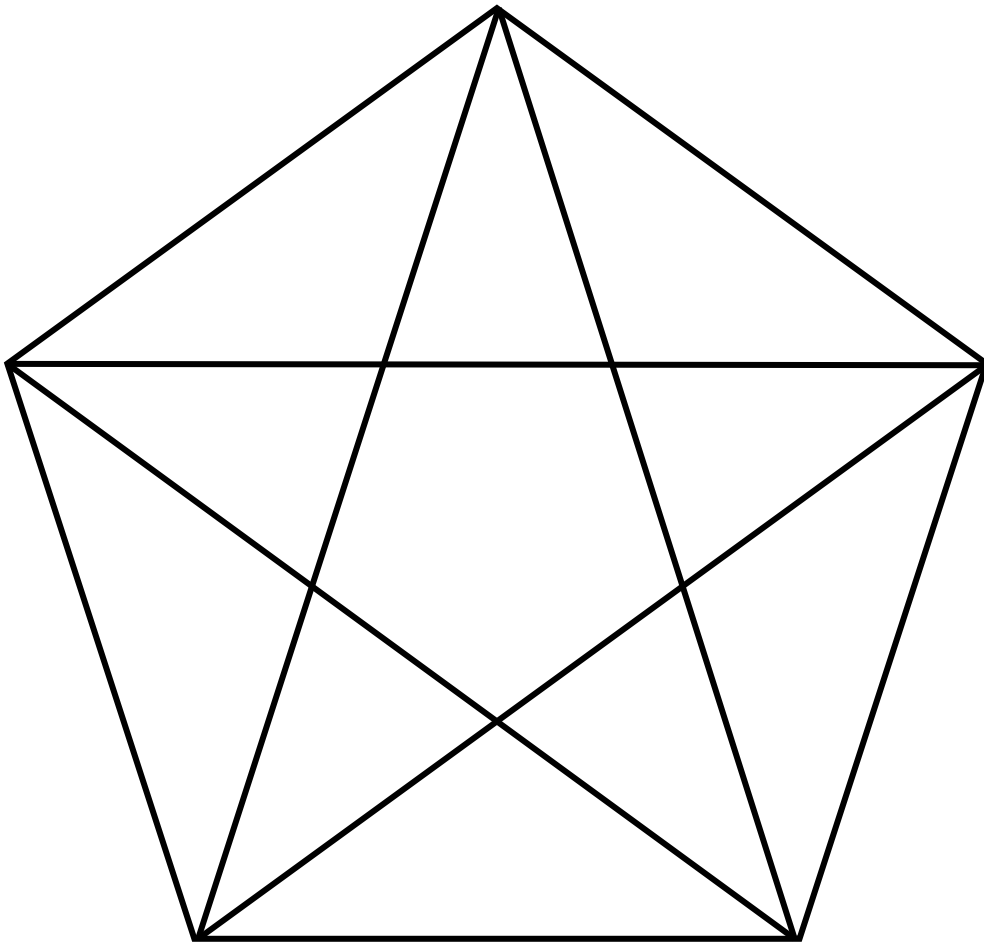
VISUALIZING SHAPES 3

Get your class to draw the figure below. You must give them only verbal instructions.



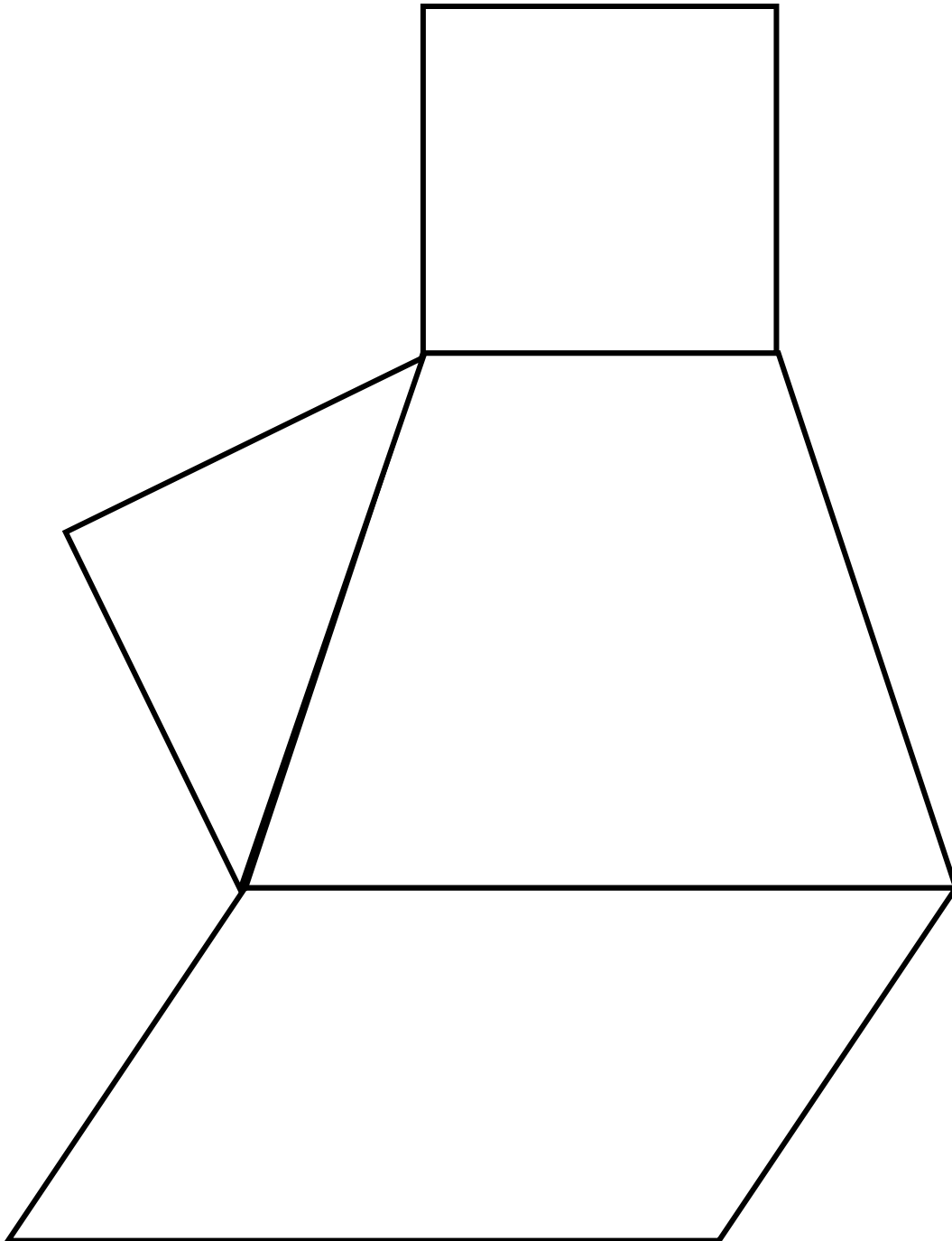
VISUALIZING SHAPES 4

Get your class to draw the figure below. You must give them only verbal instructions.



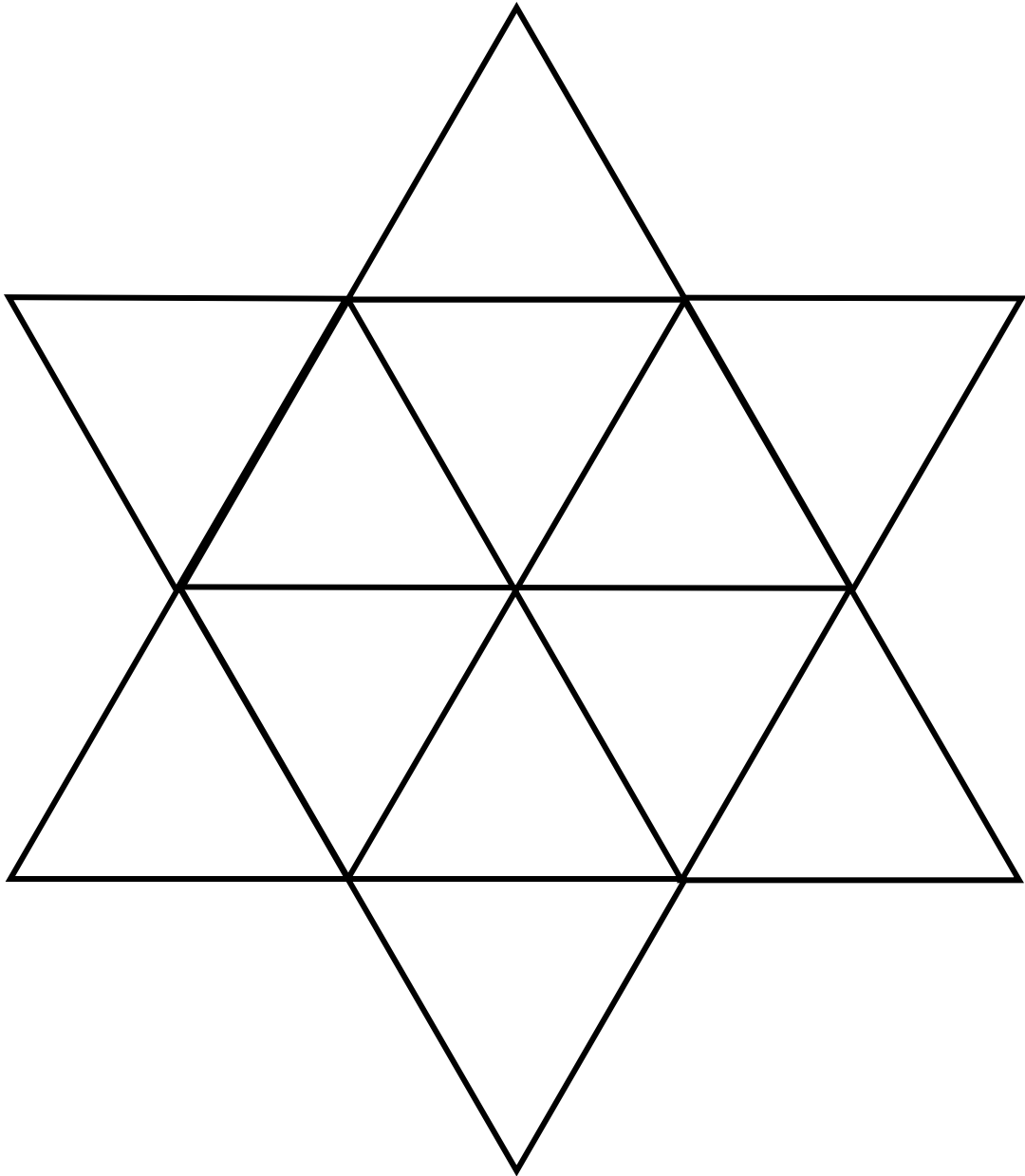
VISUALIZING SHAPES 5

Get your class to draw the figure below. You must give them only verbal instructions.



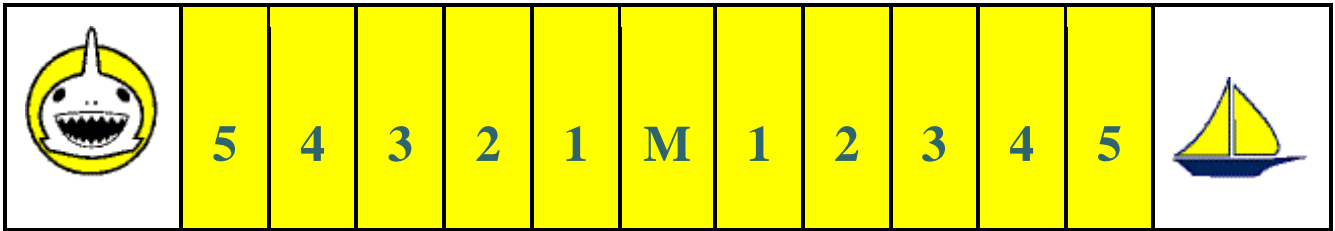
VISUALIZING SHAPES 6

Get your class to draw the figure below. You must give them only verbal instructions.



WALK THE PLANK

Ref: Maths 300 Task 32



Use this plank to try these challenges.

1. Start at S2 then roll this [S, B3] .	End up at
2. Start at S1 then roll this [S, F1] .	End up at
3. Start at B3 then roll this [B, B2] .	End up at
4. Start at B4 then roll this [S, F3] .	End up at
5. Start at S3 then roll this [B, B2] .	End up at
6. Start at B5 then roll this [B, B1] .	End up at
7. Start at M then roll this [B, B3] .	End up at
8. Start at M then roll this [S, F3] .	End up at
9. Start at M then roll this [S, B3] .	End up at

Now you choose.

10. Start at then roll this [B, F1] .	End up at
11. Start at then roll this [B, B2] .	
12. Start at then roll this [S, F3] .	
13. Start at then roll this [S, B2] .	

14. Find five different combinations which will finish at **M**.



WHAT'S IN THE BAG?



EQUIPMENT:

At least 20 mixed coloured cubes or counters and a suitable bag.

BASIC RULES:

Secretly one player puts twenty mixed coloured cubes in a bag.

Without looking in the bag, a second player is allowed to take a sample of four cubes. The sample is put back in the bag. With due drama the bag is shaken, and another sample of four is allowed. This is repeated one more time. The second player now has three clues to *What's In The Bag?* The object of the game is to correctly predict what's in the bag?

RESOURCES:

[Software] What's in Santa's Sack.swf

[MATHS300] Lesson 125: What's in the Bag?

[Websites] <http://www1.curriculum.edu.au/maths300/>

What's in Santa's Sack ?

duck	7	21.88%
teddy	11	34.38
cd	3	9.38
train	11	34.38
	32	

rew stop play

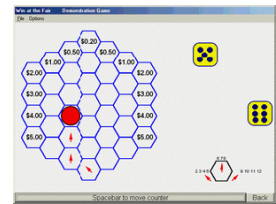
There are 10 presents in Santa's sack.
How many are there of each ?

duck	<input type="text"/>
teddy	<input type="text"/>
cd	<input type="text"/>
train	<input type="text"/>

check



WIN AT THE FAIR



I was at a school fête recently and one of the stalls was using a larger version of this playing board. What do you notice about the board? At the fair I saw, you had to pay \$1 to play.

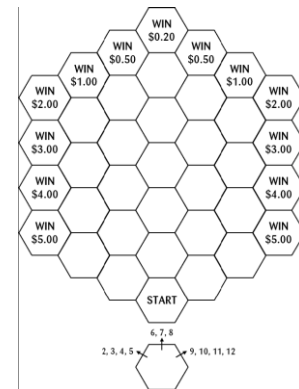
EQUIPMENT:

Playing Board

1 counter or coin and 2 dice per pair

BASIC RULES:

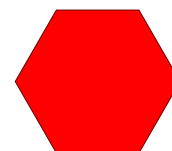
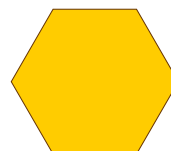
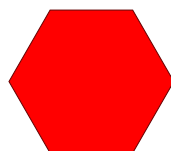
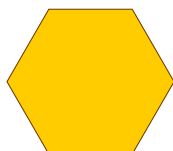
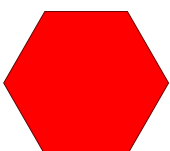
- ◆ Pay \$1 to play.
- ◆ Place your counter on the start.
- ◆ Roll 2 dice and add them together.
- ◆ Move your counter according to the rules at the bottom of the board.
- ◆ Continue until your counter reaches a winning hexagon.
- ◆ Collect your payout.



RESOURCES:

[MATHS300] Lesson 001: Win at the Fair

[Websites] <http://www1.curriculum.edu.au/math300/>



WIN AT THE FAIR

