



## *Making Maths Fun*

A workshop for volunteer mentors with the School Volunteer Program of the ACT

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## Introduction

Volunteer mentors with the School Volunteer program of the ACT have many opportunities to help students to improve their numeracy skills. Working with students on a one –on-one basis or in a small group you can talk about and play with lots of number facts and concepts.

This booklet has some ideas for **games** that you can play that are fun, yet will develop essential number processing skills such as:

- Number recognition and the naming of numbers
- The usefulness of a number line
- Using addition, subtraction, multiplication and division
- Understanding fractions, ratios, decimals and percentages
- Understanding money
- Naming and identifying shapes and seeing how they fit together
- 2D and 3D shapes
- Maps, grids and coordinates
- Estimating
- Measurement

**Don't feel guilty because you are *playing* games with your student. You have the luxury of time and the interactions will strengthen your relationship. This is what you are working to achieve – a great relationship with your student! Along the way your student will improve their confidence in using numbers and operations.**

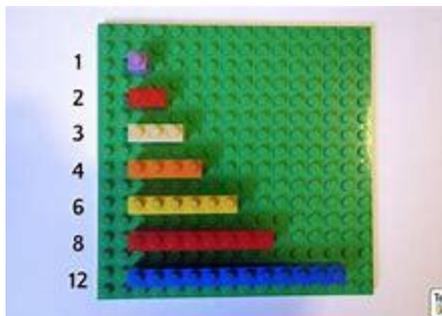
**These ideas and resources have been collected from a wide variety of sources. Where possible sources have been identified.**

**Have fun!**

## Using lego bricks

Bring a bag of lego bricks to your mentoring session.

- **Counting Studs** - Count the studs on the top of each brick. How many are there? Which brick has the most studs? Can you sort the bricks in order of 'size', from those with the lowest number of studs to those with the highest?

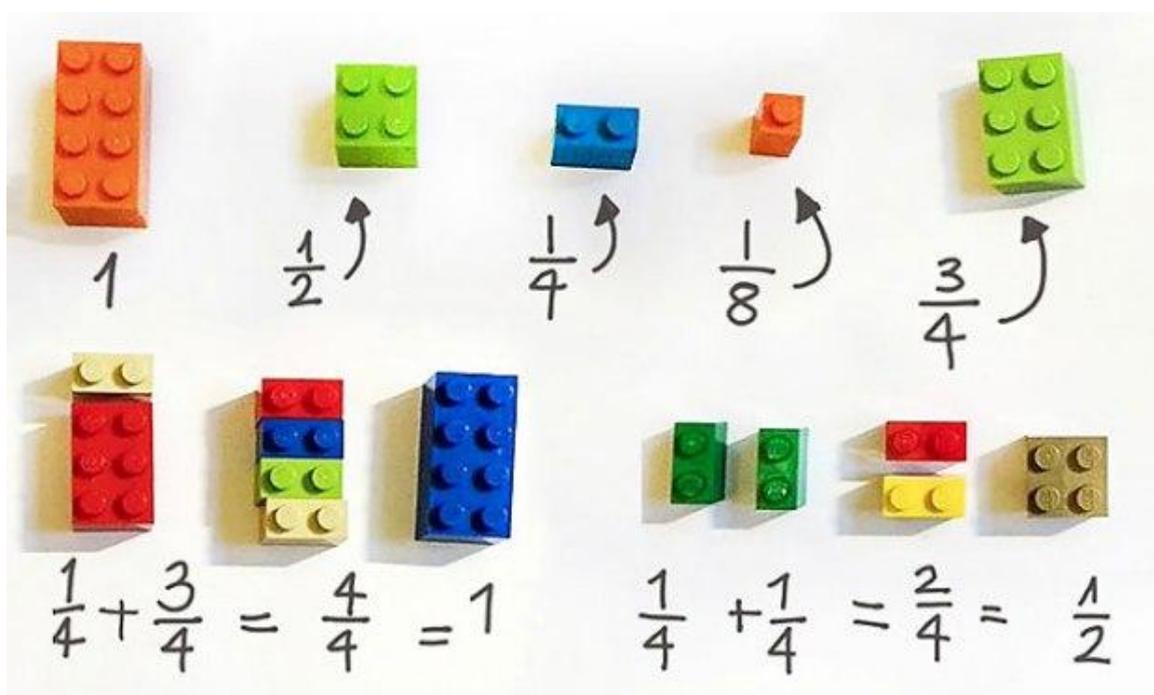


This is just the beginning. Kids love lego. Have a look at this site to see how lego can be used to teach lots of maths concepts:

<http://www.teachingideas.co.uk/maths/ways-to-use-lego-in-the-classroom>

## Teaching Fractions with LEGO

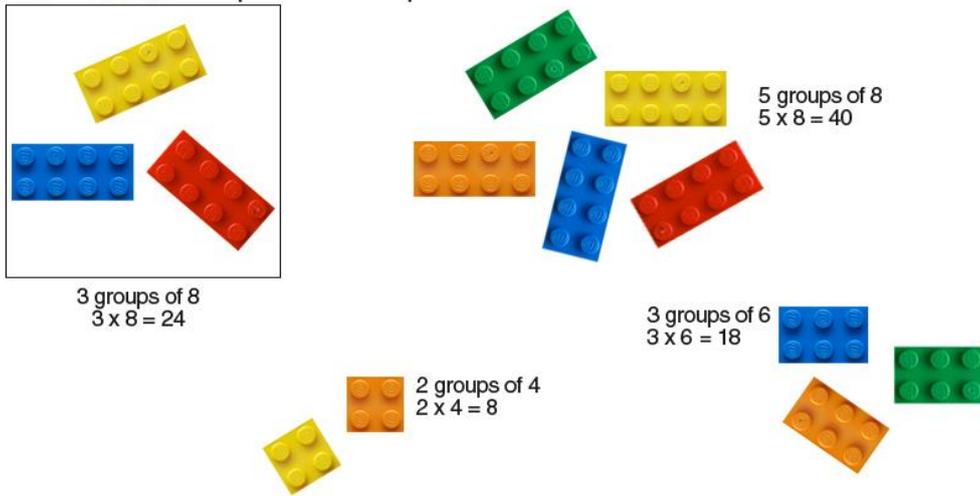
The bricks do the teaching! The relationships are obvious.



Involve the student in selecting bricks from the pile and explaining the numbers they have created using the bricks.

# Teaching multiplication with LEGO

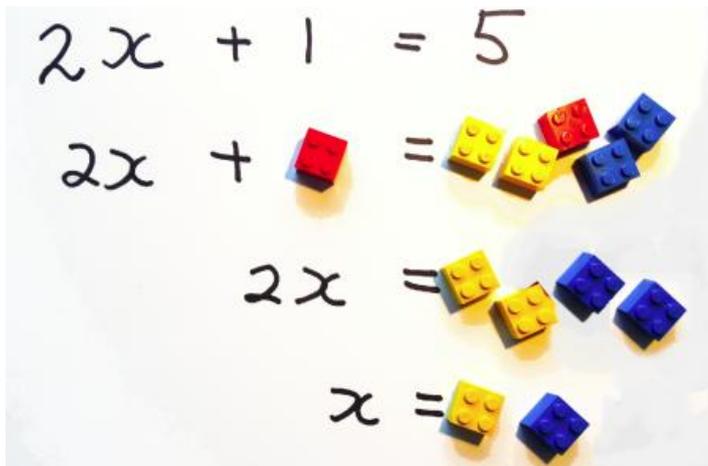
## LEGO Multiplication: Groups of



Involve the student in sorting and grouping and conversation about the numbers.

## Solve the algebra-trouble

Use this Lego math idea to teach algebra and I am sure your kids will fall in love with algebra.



### How to use it?

- Spread a large number of blocks on your table (but don't count the number of blocks you've taken!) and assume the number as "x".
- Involve the child in adding and removing blocks and write the matching equations.
- Your children will easily be able to learn to form algebraic expressions like this one: removing 2 blocks from the pile will change the expression to "x - 2".
- Similarly adding 3 more blocks will result in the formation of an expression "x + 3".

This will assist the kids to learn the basic facts on the topic.

## Using board games

Do you remember the fun you had playing Snakes and Ladders, Ludo, Chinese Checkers etc? These games are great for number recognition, counting and following instructions. It is even more fun if you can get the giant boards so that playing the games involves more moving around to shift the counters and roll the big dice.



## Using playing cards

For very young children playing Fish or Snap with cards is great for number recognition and talking about numbers. You can also set up an array of cards face down on the table and use them as a memory game.

ON the following pages are the instructions for four of the best maths games with cards taken from *Top Notch Teaching*, as well as some other ideas for card games.

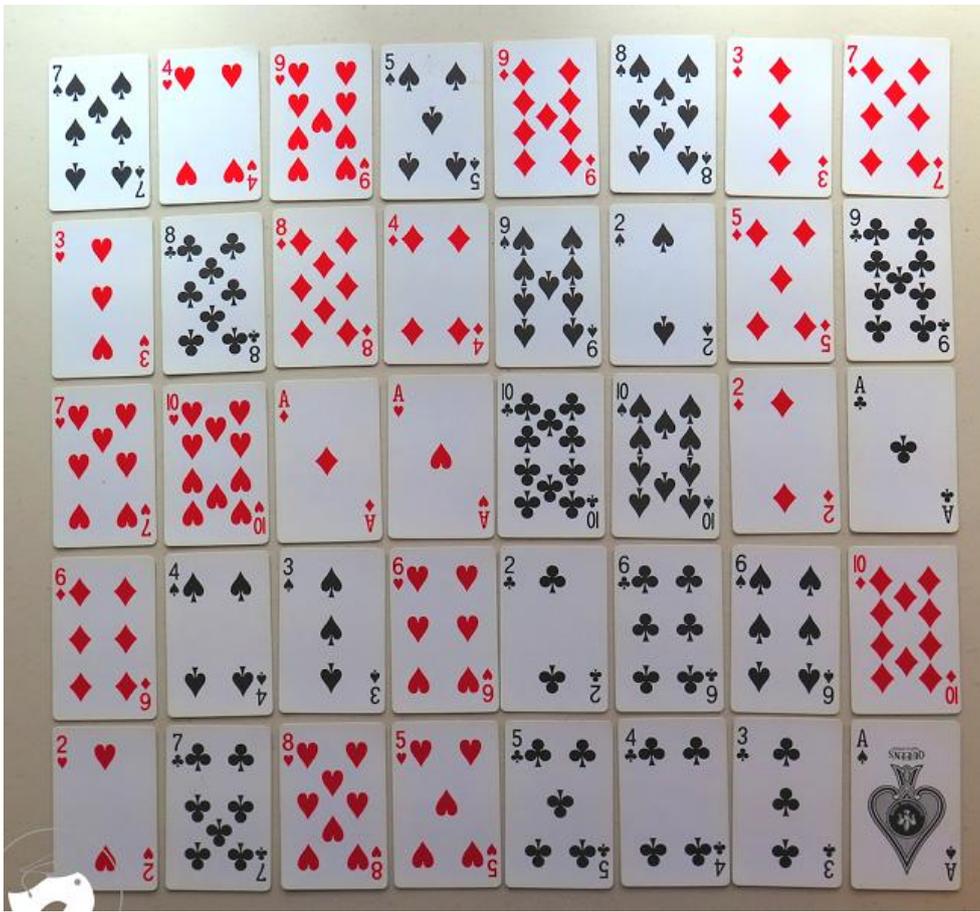
Source: <https://topnotchteaching.com/math/math-card-games/>

## I spy with my little eye

This card game is for two players. You will need one deck of cards with the picture cards removed (40 cards remaining).

### Instructions

1. The cards are dealt face up in an array, either a 10 x 4 or 8 x 5 array.
2. The first player challenges the other one to find two cards next to each other that add to make a particular number. The first player says, "I spy with my little eye two cards that add to make \_\_\_\_\_."
3. The second player then looks for 2 cards that add to make the number. The two cards to be added need to be next to each other either horizontally or vertically. The player then picks the cards up to add them to their pile. They do this with any other pairs that add to make the number as well.
4. If the second player misses any pairs that add to the number, then player one may claim them.
5. The players alternate taking turns and continue until all the cards are gone.
6. The winner is the player with the most cards at the end of the game.
7. As large gaps appear in the array, move the cards closer together to fill those gaps.



### Variations

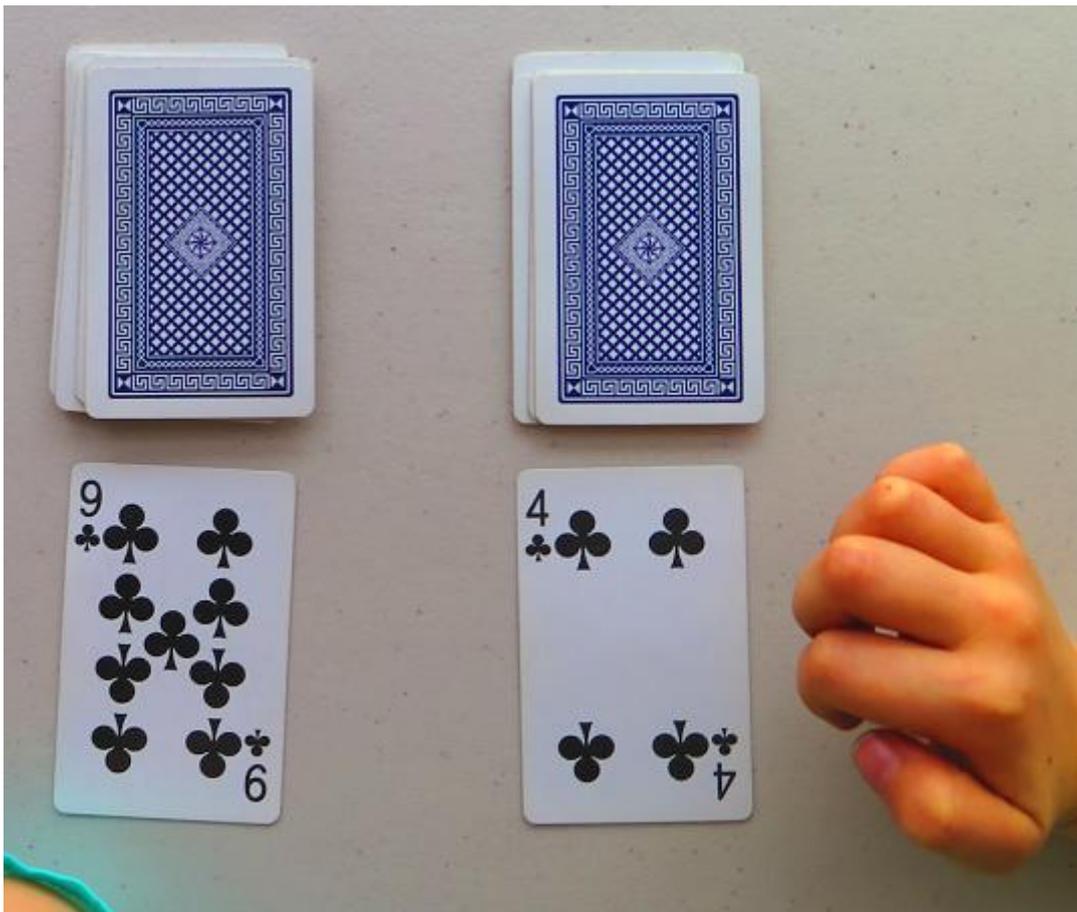
- You could change the operation that students use, for example, multiplication or subtraction.
- Allow your students to add three numbers together.
- You could also allow students to add pairs of cards diagonally.

### Counting on card game

This is a card game for 2 players. You will need a deck of cards with the picture cards removed (Jack, Queen, King, Joker). The ace can be used as a 1 in this game.

### Instructions

1. Separate the cards into two piles, one with the cards: ace, 2, 3 and 4 and the other pile with the cards 5 – 10.
2. Shuffle each pile so they're in a random order and place face down on the playing surface.
3. Players take turns turning over the top two cards. They add the two numbers using the counting on strategy: count on from the larger number, and count on the smaller number. For example, if the two cards turned over were 8 and 4. They would start with 8, count on 4: 9, 10, 11, 12.
4. If players have the correct answer, they get to keep both cards.
5. If the answer is incorrect the other player can have a go at answering the question to keep both the cards.
6. Continue play until one of the piles run out of cards.
7. The winner is the player with the most cards at the end of the game.

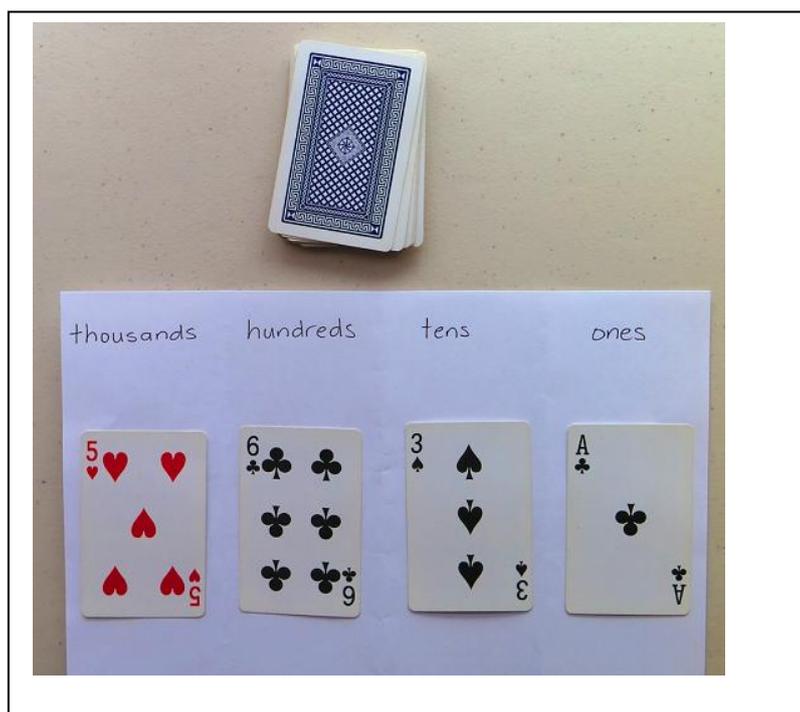
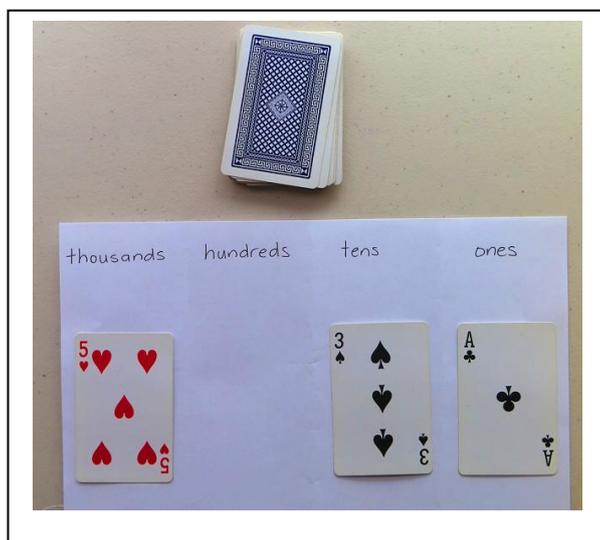


## Place value cards

This is a card game for 2 players or a small group. You will need a deck of cards with the 10s and picture cards removed. The ace can be used as a 1 in this game. You will also need a sheet of paper split into 4 columns labeled thousands, hundreds, tens and ones.

### Instructions

1. One student shuffles the deck of cards and places it in the middle face down.
2. Players take turns to pick a card from the top of the deck and turn it over.
3. The player must decide where to place the card, either in the ones, tens, hundreds or thousands place. They add the card to the column on their sheet of paper. The card is to be placed before another card is drawn from the deck.
4. Players keep adding cards to their sheet of paper until all columns are filled in. The winner is the player who produces the largest number.
5. In the example below 5 631 was produced using the cards, 5, 6, 3 and Ace. The best number that could have been formed was 6 5 31.



### Variations

- \* You could make larger or small numbers depending on the level of your students.
- \* Use numbers with decimals.
- \* Incorporate a scoring system.

## Let's make 21

This is the classic game of 'Pontoon', but with additional rules.

Each player gets two cards and they have to get 21. The Ace can be either 1 or 11.

The players then take turns to say hit or stick. After all turns have been completed the scores are written down (see below). 15 or under and busting = 0.

Play ten rounds and see which player has scored the most points.

### Scoring

21 = 10 points

20 = 5 points

19 = 4 points

18 = 3 points

17 = 2 points

16 = 1 point

### Extra Rules

If a player scores 13 on the first two cards they can burn and get two new cards.

If a player gets two cards the same. e.g. Two tens, two Queens etc. They can split and have two turns.

## Red 7's

Red7 is a quick and easy to learn card game that you can teach and play in five minutes. It involves players in number and colour recognition and putting numbers into the correct sequence. Red7 uses a deck of 49 cards, numbered 1-7 in suits of the seven rainbow colors. To begin a round, each player will receive a seven card hand, and one card face up in front of them. The face up cards begin each player's palette. The top card of the rules canvas(the discard pile) determines what the current rule is. The last player standing wins the round. If you're not winning the current game at the end of your turn, you're out!



## UNO

**Setup:** The game is for 2-10 players, ages 7 and over. Every player starts with seven cards, and they are dealt face down. The rest of the cards are placed in a Draw Pile face down. Next to the pile a space should be designated for a Discard Pile. The top card should be placed in the Discard Pile, and the game begins!

The player to the left of the dealer starts the game. You have to match either by the number, color, or the symbol/Action. For instance, if the Discard Pile has a red card that is an 8 you have to place either a red card or a card with an 8 on it. You can also play a Wild card (which can alter current colour in play).

At the conclusion of the game players with cards in their hands need to add their value to determine a score.

## SKIP\_BO

Each player is dealt a stockpile of cards and then attempts to win by playing all these cards on building piles in numerical sequence 1 – 12.

# Colouring

You can download a range of different pages from the computer for this purpose. The colour to be used in the picture is determined by finding the answer to simple sums.

$2 + 23 =$   
 $5 + 20 =$   
 $10 + 15 =$   
 $3 + 4 =$   
 $9 \times 0 =$   
 $6 + 9 =$   
 $7 \times 8 =$   
 $0 + 15 =$   
 $7 + 8 =$   
 $18 + 7 =$   
 $3 + 4 =$   
 $3 + 12 =$   
 $4 + 5 =$   
 $7 + 8 =$   
 $16 + 9 =$   
 $12 + 13 =$   
 $0 + 7 =$   
 $6 + 1 =$   
 $5 + 10 =$   
 $2 + 7 =$   
 $11 + 4 =$   
 $3 + 6 =$   
 $1 + 24 =$   
 $1 + 8 =$

**7 = Brown      9 = Yellow      15 = Red**

Here are some examples: **25 = Light Blue**

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

Key

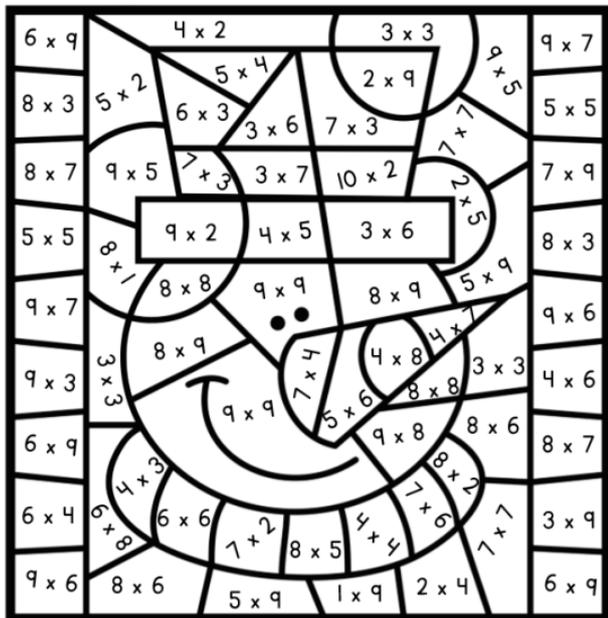
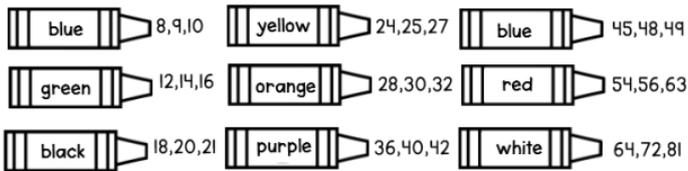
1 = Red	6 = Yellow
2 = Brown	7 = Orange
3 = Blue	8 = Gray
4 = Green	9 = Light Blue
5 = Purple	10 = White

iChild.co.uk  
**SAFARI**  
 Colour in and count!

How many **lions** can you find? \_\_\_  
 How many **explorers** can you find? \_\_\_  
 How many **elephants** can you find? \_\_\_  
 How many **rhinoceroses** can you find? \_\_\_  
 How many **monkeys** can you find? \_\_\_  
 How many **giraffes** can you find? \_\_\_

## Color by Code: Multiplication

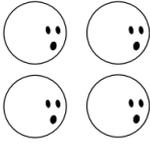
Find the answer to each multiplication problem. Then color by the code.

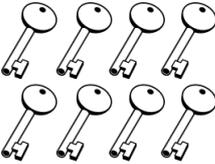


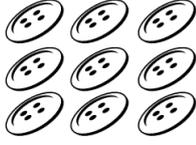
Color the fraction listed for each group.

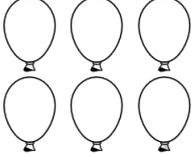
a.   $\frac{3}{6}$

b.   $\frac{2}{3}$

c.   $\frac{3}{4}$

d.   $\frac{7}{8}$

e.   $\frac{5}{9}$

f.   $\frac{5}{6}$

Super Teacher Worksheets - [www.superteacherworksheets.com](http://www.superteacherworksheets.com)

Use your internet browser to search for more maths colouring-in activities

## Using Dice

Dice games for Kindergarten to Year 8 students.

### Kindergarten

**Collect 10**      **Recognising numbers and counting.**

A game for pairs of students

### Equipment

To play this game you will need:

- a regular dice for each student
- counters

Players roll their dice and the player with the higher number showing scores a counter; if both throw the same number they both score a counter. The first player to collect 10 counters is the winner.

## Variations

The player with the lower number scores the counter each time.

Start with ten counters and the player with the higher number on the roll of the dice takes away this number of counters. The first player to have no counters is the winner.

### Kindergarten to Year 1

#### Dice Addition

Same as Collect 10 above, but each student has 2 regular dice and the total is obtained by adding the numbers rolled.

### Year 1 to Year 2

#### More Dice Addition

Same as Collect 10 above, but the total is obtained by adding three regular dice.

Note: Encourage the students to find quicker ways of adding the numbers.

For example:

1. Doubles:  $4+4$
2. Doubles plus one:  $4+5(4+4+1)$
3. Doubles less one:  $4+3(4+4 -1)$
4. Combinations to 5:  $1+4$
5. Combinations to 10:  $6+4$

#### Cross out Addition

An activity for two players. Each player writes the numbers 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, and 12 on a piece of paper. They take turns to roll two regular dice, add both numbers rolled and cross out the total on their piece of paper. The first player to cross out all the numbers is the winner.

### Year 2 to Year 4

#### Make 24 Addition

This game for individuals requires only 1 dice. The player throws the dice repeatedly, listing the numbers thrown in columns as follows.

	1	2	3	4	5	6
	1		2	4		6
		2			4	
		2				
TOTAL	1	4	6	14	20	36

The player has to keep a running total of each column in their head and stop when one of the columns reaches exactly 24 (The fifth column will never reach 24). Players play the game several times and compare their findings.

## Years 2 - 6

### Take 100 Subtraction

Each student begins with 100 points. In turn, students roll a regular dice and subtract the number from their 100 points. The first player to reach zero is the winner.

#### Variations

Change the number of points to begin.

The students may roll two regular dice and either add or multiply the numbers together before subtracting from the total.

### Crossout 9

#### Addition strategy

An activity for two to four players.

#### Equipment

Two regular dice, paper and pencil

Each player writes the numbers 1 to 9 on a piece of paper. The first player rolls the two dice then crosses out the numbers shown on the dice or the sum of the two numbers.

For example, student rolls a two and a three. On this roll, the player may cross out 2, 3 or 5 (2 + 3).

When six numbers or less are left only a single dice is used. The player's turn continues until they cannot cross off any more numbers. The remaining numbers are totalled and this is the score for that round. After five rounds the player with the smallest total wins.

## Year 4 to Year 8

### Make 100

Addition subtraction, multiplication, division

An activity for two players.

Equipment: two regular dice, paper and pencil

The aim is to make a total of 100 or as close to 100 as possible. Players take turns to roll the two dice and combine the numbers with **any operation** to produce a score. The player who reaches 100 or is closest to 100 is the winner. Encourage players to record their choices and calculations. For example:

Dice Throw	Calculation	Running Total
4, 6	$4 \times 6 = 24$	24
1, 4	$1 + 4 = 5$	29
2, 5	$2 \times 5 = 10$	39
6, 6	$6 \times 6 = 36$	75
5, 3	$3 \times 3 = 15$	90
6, 4	$6 + 4 = 10$	100

## Double, halve or stay

Multiplication, division

An activity for two to four players

Equipment: two different coloured regular dice

Decide on one coloured dice to represent the tens and the other to represent the ones. Choose a target number between 5 and 122. Players take turns to roll the dice. Once the dice are rolled a number is formed. The player then makes a decision to produce a number that is as close as possible to the target number. They can choose to:

- double their number
- halve their number
- keep the number as is

The player closest to the target is the winner.

## Total three

Addition, subtraction, multiplication

An activity for two players.

Equipment: two regular dice, paper and pencil

Players take turns to roll the two dice and complete the following calculations on each roll:

- add the two numbers shown on the dice
- find the difference between the two numbers
- multiply the two numbers
- add the three numbers to produce the score for that round

For example:

- $6 + 3 = 9$
- $6 - 3 = 3$
- $6 \times 3 = 18$
- $\text{Score} = 9 + 3 + 18 = 30$

After 10 rounds the player with the highest total is the winner. To make the activity more challenging change the type of dice used to 8, 10, 12 or 20 sided.

## Pile it On: A great way to introduce the idea of Multiplication



Equipment: A deck of cards (52), a dice, paper on which to keep score, pencils

This game provides an excellent demonstration of how multiplication works.

1. On a player's turn, they roll the die twice. Their first roll indicates how many piles they must make. Their second roll tells how many cards to place face down in each pile.

For example, I roll a 2 and a 7. I need to create two piles of cards and in each pile there will be 7 cards. This shows that  $2 \times 7 = 14$

2. The player will then create those piles, add up the total number of cards used (either by counting them or by using multiplication), and record their score.

3. Play for ten rounds. The person who uses the most cards total is the winner

When solving their problem, players can count the cards or use the multiplication facts they already know. As patterns appear within the game, players will gain a better grasp on multiplication.

## PIG

**This activity involves mental addition skills and developing a strategy to win the game!**

**Materials Needed:** 2 six sided dotted dice

PIG gameboard - one for each player



### **Goal:**

Players take turns (there can be 2 - 4 players) and the goal is to be the first player to score at least 100 points!

### **Gameplay:**

1. When it is your turn roll the **two dice** as many times as you want.
2. Mentally add all of your rolls for your total score for Turn 1. Record your score on the **PIG SCORESHEET**.
3. If a 1 comes up on one of your dice, your turn is over. You receive a score of 0 for your first turn.
4. On your next turn, you may again roll the dice as many times as you wish.
5. Add your total score for this turn to your previous score from Turn 1.
6. If a 1 comes up on one of your dice, your turn is over. You score a 0 for this round. Your score will be the same as that of your previous turn.
7. The first player to reach 100 or more wins the game.

## PIG SCORESHEET



Record your score at the end of each turn.

The first player to score 100 or more wins the game of PIG.

ROUND	PLAYER 1	PLAYER 2	ROUND	PLAYER 1	PLAYER 2
1			6		
2			7		
3			8		
4			9		
5			10		

## Over the Hill



Equipment: Three dice, copies of the games sheet

1. When it is your turn you need to throw the three dice.
2. Use the numbers that have been rolled to cross off numbers on the game sheet by performing addition or subtraction. For example, I throw 2, 4 and 6.

**If I chose to do subtraction then:**

$6 - 2 = 4$  so I can cross off 4.

$6 - 4 = 2$  so I can cross off 2.

**If I chose to do addition then:**

$2 + 4 = 6$  so I can cross off 6

$4 + 6 = 10$  so I can cross off 10.

3. Each player takes it in turn to roll the dice and do the sums to determine which numbers on the line get crossed off.

4. The game continues until one person has all the numbers on their gamesheet crossed off.

Variation: For older students you can include the operation of multiplication.

## THE MULTIPLE GAME 1-6

COVER UP ANY MULTIPLE OF THE NUMBER YOU ROLL ON A DICE.

### MULTIPLES OF 2 AND 4

0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40

### MULTIPLES OF 3 AND 6

0 3 6 9 12 15 18 21 24 27 30 33 36 39 42 45 48 51 54 57 60

12	20	13	25	30	15
27	24	22	14	12	35
40	21	28	45	60	8
27	16	10	32	16	50
4	13	9	36	7	2
17	11	33	6	26	18



IF YOU ROLL A 1, YOU CAN COVER UP ANY NUMBER ON THE BOARD!



Free Math Sheets, Math Games and Math Help

[MATH-SALAMANDERS.COM](http://MATH-SALAMANDERS.COM)

Equipment: a copy of the game sheet above, one dice, 15 buttons or counters for each player.

Each player takes it in turns to roll the dice.

After rolling the dice they can cover **one** number on the game sheet that is a multiple of the number rolled. For example, if I roll the number 5 I can cover up 20 **or** 25 **or** 15 **or** 35, etc

If a player cannot place any counters down or gets an answer wrong then it becomes the other player's turn.

The first player to complete a full horizontal line of counters is the winner. Variation: Students can create their own game sheet before the game begins.

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3		Bouncer	3-6	X	X	X	
3		Mexico	2-6	X	X	X	
4		Busted	3-10	X	X	X	
4		Shut the Box	2-6	X	X	X	
5		421	3-10	X	X	X	
5		Martinetti	2-8	X	X	X	
6		Bluff	3	X	X	X	+ a cup
6		Slam	2-4	X	X	X	
6		Cops and Robbers	2-8	X	X	X	
7		Thunderstorm	4	X	X	X	
7		Drop Dead	3-8	X	X	X	
7		Finish	2-8	X	X	X	
7		Sevens	3-5	X	X	X	
8		Ten Thousand	2-8	X	X	X	
9		Pay the Rent	2-6	X	X	X	
10		Aces in the Pot	3-6	X	X	X	
10		Dice Roulette	4-10	X	X	X	
10		High Dice	4-10	X	X	X	
11		Yatzy	4	X	X	X	
11		Maxi Yatzy	2+	X	X	X	
12		Cameron	2+	X	X	X	
13		Killer	2-4	X	X	X	
13		Dice Poker	2-5	X	X	X	
14		Lucky Dice	2-8	X	X	X	
14		Five Aces	2-8	X	X	X	
14		Easy Money	2-8	X	X	X	
15			5	X	X	X	

Original rules: Dan Gimme

Here are twenty seven different dice games, with one, two, three or even more dice. We hope you have fun playing them!

## GAMES WITH ONE DIE

Here are examples of two fun games using just a single die.

### Big Six

A classic dice game, dating back to medieval times. For 2-6 players. In addition to the die you will need paper and pencil, plus chips or matches to keep score.

**Aim of the game:** To be the first to lose all your chips.

**How to play:** Draw a game board like the one shown, with six numbered spaces. All players take 5 chips each. Play proceeds in a clockwise direction. When it is your turn you roll the die. If the corresponding space is empty, put a chip there; but if there is a chip there already, you must take it.

1	2	3
4	5	6

If you roll a 6, you always put one of your chips on space number 6 – regardless of how many chips there are already. Chips on space number 6 are out of the game, and you never pick these up again.

The first player to get rid of all his chips is the winner.

### Bouncer

A dice game from Germany, and where you aim to stay in and not get "thrown out"! For 3-6 players. You will need 12 chips each.

**Aim of the game:** Having the most chips at the end.

### How to play:

Each player places their chips in front of them. First decide who starts the game. The first player rolls the die, and play then proceeds in a clockwise direction. The next player then rolls the die and compare the result with that of the preceding player.

If you rolled *higher* than the previous player, he must give you the difference in chips. *Example:* The previous player rolled a 3 and you rolled a 5. He must then give you 2 chips.

If you instead rolled *lower*, you must give him the difference in chips.

If your roll was the same as the previous player's, nothing happens and no chips change hands.

Once you have made your roll, the next player in turn rolls and compares his result with yours. If you roll a 1 or a 2, you usually have to pay chips to the players on both your right and your left!

When a player loses the exact amount of chips he has in front of him he/she can still stay in the game! The game ends as soon as a player suffers the fate of having to pay more than the amount of chips he has left; he then pays with what he has left, but is after that "thrown out" of the game. The winner is the player who at that moment has the most chips in front of him or her.

## GAMES WITH TWO DICE

Here are three games, all very different, using two dice each.

### Mexico

A simple but fun game, with an unusual way of keeping "score". For 2-6 players. You will in addition to the two dice need one extra die per player (or you can instead keep score using chips, or paper and pencil).

### Aim of the game:

To be the last player left in the game, after all the others have been forced out because of low combinations.

### How to play:

Each player places the extra die before him or her on the table, with the '6' face up. Decide who starts; the turn order then proceeds clockwise.

You play several rounds, and in each round the player with the lowest combination loses a "life" – shown by his die being rotated to the next lower number. Everyone thus starts with 6 lives. When your "life die" goes down to 0, you are out of the game.

When it is your turn, you roll both dice in the middle of the table. If you are not satisfied with the result you may re-roll. Each player is allowed up to three rolls. If you choose to re-roll you must do so with both dice – it is not permitted to keep one and re-roll the other.

The highest possible throw is "Mexico": 2-1.

Ranking just below Mexico are the pairs: 6-6 is the highest pair, and 1-1 is the lowest.

Ranking below the pairs are two different numbers on the dice, with the highest always being the decider and mentioned first: 6-5 is the highest combination here, followed by 6-4, 6-3, 6-2, 6-1, 5-4, 5-3 and so on all the way down to 3-1 which is the lowest possible throw.

When all players have rolled according to the above rules, the player who made the lowest result loses the round and one "life". *Example:* On the first round A rolled 5-4, B rolled 2-2, C rolled 6-1 and D rolled

4-4. Player A has made the lowest roll and loses one life, turning his "life die" so that it shows 5 instead of 6.

If two or more players are tied for low, they both lose one life each.

**Special rule:** Whenever a Mexico (or several) is rolled in the round, the loser loses TWO of his remaining lives!

When you are down to 0 on your "life die" you are out of the game. The last remaining player is of course the winner. If two or more players are left in the game, with 1 life each remaining, and they all lose the round because of a tie on the dice results, a "dead game" without a winner is declared.

### **Busted**

This dice game dates back all the way to the Thirty Years' War in the 17th century, when it was a gambling game among soldiers. **For 3-10 players.** You will need a supply of chips (25-30 each is suggested).

You also need paper and pencil to draw a game board as shown, with numbers on the various spaces.

3	4	5
6	7	8
9	10	11

### **Aim of the game:**

To be the last remaining player in the game, when all the others have "busted out" after losing all their chips.

### **How to play:**

Put the game board in the middle of the table, within reach of all the players. Divide the chips so that everyone gets the same amount. Decide who starts. Play then proceeds in a clockwise direction.

On your turn, roll both dice and add up the result.

If the sum is *not* 2, 7 or 12 and the corresponding space on the board is empty, place as many chips there as the number on the space. If you for example rolled a 6 and space number 6 is empty, place six chips on space number 6. This ends your turn.

If the sum is *not* 2, 7 or 12 and the corresponding space on the board already has chips on it, you instead take these chips and put them on the table in front of you. You may then if you wish roll again, or pass and hand the dice over to the next player.

If the sum is 7, you must place seven chips on the corresponding space on the game board – regardless of how many chips are there already. (This space is sometimes referred to as "the goal".)

If the sum is either 2 or 12, you are lucky and win ALL the chips currently on the whole game board, on all of the spaces! You *must* then immediately roll again. If you are unlucky and roll 2 or 12 again, you

must now fill ALL the spaces with the corresponding number of chips – three on space number 3, four on space number 4, and so on. (If you do not have enough chips, start with the lowest number and proceed as far as possible.) If you however roll any other sum on the re-roll, you as usual place that number of chips on the corresponding space.

If you "bust out" lose your last chip, you are out of the game. If you do not have enough chips left for a space, place the ones you have. The last player left in the game is the winner.

### **Shut the Box**

A classic dice game of Northern French origin, and several centuries old. It is said to have been especially popular among sailors. **For 2-6 players.** In addition to the two dice you will need nine chips, and paper and pencil.

### **Aim of the game:**

To "shut" as many "boxes" as possible, and thereby be the player with the lowest minus score.

### **How to play:**

First draw nine "boxes" in a row, as shown, and number them from 1 to 9.

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

Decide who starts. Play then proceeds in a clockwise direction.

In your turn, you try to roll the dice several times in a row, shutting one or two boxes with each roll.

Shutting a box is done by placing a chip on it. If you shut one box in your turn, the number of the box must correspond to the sum on the dice, and if you shut two boxes, their numbers must correspond to the two numbers on the respective dice. When you can no longer shut one or two boxes corresponding to your entire roll, your turn is over, and you receive as many minus points as the sum of the boxes which are still "open".

If you manage to shut the boxes 7, 8 and 9, you may from then on choose to continue rolling with one die only. If you however choose to roll both dice, you must shut two boxes for the roll to count as valid!

**Example:** Your first roll shows 5-3, and you choose to shut box number 8 by placing a chip on it. If your next roll shows 6-5, and you have no choice but to shut boxes 6 and 5 (since there is no box with the number 11). Your third roll shows 2-6, which ends your turn – box 8 is already shut, and of the boxes 2 and 6, number 6 has already been shut. Since you cannot shut boxes using both dice, your turn is over. You score 1+2+3+4+7+9=-26 minus points, which is noted on the score sheet. Pass the dice to the next player.

The player scoring the fewest minus points is of

course the winner. **Note** that if you are unlucky enough to roll 5-5 or 6-6 on your first roll, your turn is immediately over and you score the maximum possible 45 minus points!

**Variation:** If you cannot use your entire throw as per the rules above, you may use it as far as possible before ending your turn. In the example above you would have been allowed to shut box number 2, scoring minus 24 points instead.

## GAMES WITH THREE DICE

Here are several challenging games!

### **#21**

A classic game in France, where it is often played in bars and cafés for small stakes. **For 3-10 players.** You also need a sufficient supply of chips – see below.

### **Aim of the game:**

To be the first to get rid of all your chips.

### **How to play:**

All players take 3 chips each. Put another 11 chips in the pot in the middle of the table, before the game starts.

All players make one roll each with the three dice. Highest (according to the ranking order below) starts the game. Play then proceeds in a clockwise direction. The game is played in two phases: In the first phase you take turns emptying the pot and accumulating chips, and in the second phase you try to get rid of the chips you have accumulated.

**During the first phase,** all the players in turn (beginning with the starting player) roll all three dice once, no re-rolls are allowed. It is suggested that you keep track of the results using paper and pen, to avoid any arguments! The player with the *lowest* result must take chips from the pot, according to the following rules and ranking order, from highest to lowest:

- If the highest result was 4-2-1, the player with the lowest result must take all the remaining chips in the pot except one. (If only one chip is left, he takes this.)
- If the highest result was 1-1-x, the player with the lowest result must take x chips from the pot (= the number on the third die, which must show any other number but 1).
- If the highest result was three of a kind (for example 5-5-5), the player with the lowest result must take three chips from the pot.
- If the highest result was a straight (for example 3-4-5), the player with the lowest result must take two chips from the pot.
- If the highest result was any other than the ones listed above, the player with the lowest result must take one chip from the pot.

The result 4-2-1 is the highest possible. Ranking the 1-1-x results, 1-1-6 is the highest and 1-1-2 the lowest; among three of a kind, 6-6-6 is highest and 1-1-1 lowest; among the straights 6-5-4 is highest and 3-2-1 lowest; and among the remaining possible results, the highest die is counted first, then the next

highest, and finally the lowest. Highest among these remaining results is thus 6-6-5, and the lowest possible roll is 2-2-1.

You play as many rounds as needed to empty the pot. In every round, the player who was forced to take chips in the preceding round rolls last.

**As soon as the pot is empty,** the second phase starts. The player who started the game rolls first again and may re-roll once or twice – but no more – if he so chooses, setting aside if he wishes one or two dice before each re-roll. The final result is noted down.

Then all players in turn also roll the dice, but may not use any more rolls than the first player! If he chose to not use any re-rolls, being satisfied with his initial result, the others must also roll only once each. (It is however permitted to use *fewer* throws than the starting player, if he rolled twice or three times.)

After all players have rolled, the player with the highest result puts chips back into the pot, with the number corresponding to the above list. **Special rule:** If the highest result in a round is 4-2-1, that player gives all his chips except one to the lowest player in that round, instead of putting them into the pot.

In every succeeding round, the player who put chips into the pot on the previous round rolls first.

The first player to get rid of all his chips is the winner. If during the second phase two or more players are tied for highest roll, they throw one die each to settle matters – highest wins.

### **Martinetti**

Martinetti is a very old dice game, said to date back to Ancient Rome. **For 2-8 players.** You will need paper and pencil for each player.

### **Aim of the game:**

To go from 1 up to 12 on one's own game board, and then down to 1 again. The first player to go back to 1 is the winner.

### **How to play:**

All players draw up their own game board on a piece of paper; see below. Decide who starts. Play then proceeds in a clockwise direction.

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

When it is your turn you try to roll several times in a row, crossing off as many numbers IN A ROW as possible using the results on the individual dice as well as the possible sums. When you roll a result you cannot use in any way, your turn is over and you pass the dice to the next player.

## GAMES WITH FOUR OR MORE DICE

*With four or more dice available, many fun and exciting games can be played!*

### Cops and Robbers

Two players are robbers trying to escape justice, while two are police constables trying to catch the robbers. **For 4 players** (playing in teams, two robbers versus two cops). You need one die each, and paper and pencil.

#### Aim of the game:

The robbers win if one or both can get down to 0 before being caught by the cops, and the cops win if they catch both robbers before then.

#### How to play:

The players sit around the table in the order cop-robber-cop-robber. One player keeps score. One of the robbers starts with 64 points and the other with 66 points, while both cops start with 75 points each.

Roll one die each. Highest makes the first "move", deducting as many points from his score as the number he rolled. The next roll is made by the robber to the first player's left, the next roll again by the cop to the left of the second player, and finally the fourth player rolls. From then on, you play in clockwise order.

The number you roll is deducted from your score, so that you have fewer and fewer points left as the game progresses. A few extra rules are in effect (but only from the second player round on, not during the initial round): **If you roll a 6**, you immediately re-roll and deduct one point if you roll 1, 2 or 3, or two points if you roll 4, 5 or 6. **If you roll a 5** in your turn (on your initial roll, not on any re-roll), the player on your left must skip his turn. **If you roll a 4**, both the nearest two players on your left miss their turn, and **if you roll the same number as the preceding player** (not counting any re-rolls), your throw does not count and is not deducted from your score.

If a cop catches a robber (= the same number of points or lower), that robber is out of the game while the other continues to try to reach 0.

If you wish you may draw a simple game board with 75 numbered squares, from 75 and down to 0, and use pawns to move.

### Thunderstorm

An entertaining family game! **For 3-8 players**. You need six dice, plus paper and pencil for every player.

#### Aim of the game:

To be the only player left in the game, by rolling at least one number 1 every time it is your turn.

#### How to play:

Decide who starts. Play then proceeds in a clockwise direction.

the truth and gives one of his chips to the player who called "Bluff!". If however the total on the three dice is lower than what was stated, the player who exposed the bluff guesses one of his chips to the player who made the false statement and was caught.

The next round then starts, in the same manner, with the player who exposed the preceding player's bluff. Any player accepting the previous player's statement may of course secretly look at the dice to see whether he was bluffing, but by then it is too late...

While a round is in progress and the previous statement is accepted, each succeeding player must call out a higher number, until finally someone calls "Bluff!" and demands that the dice be exposed.

The first player to get rid of all his chips is the winner, and takes the pot.

### Slam

A game where the object is to end up with a loser, rather than a winner. **For 2-8 players**. You will also need paper and pencil.

#### Aim of the game:

To roll a predetermined number as often as possible, thereby reaching 15 points quickly and leaving the game.

#### How to play:

Decide who starts. That player first rolls one die to decide the *slam* in the game, i.e. the number everyone will try to roll.

Every time it is your turn, you roll all three dice and keep on re-rolling for as long as you roll at least one slam. For every slam, you score 1 point. As soon as you make a roll without any die showing a slam, your turn is over and you pass the die to the next player.

**Example:** The 3 is the slam. In your first roll you get one 3, and score 1 point. You roll again, get a 3 once again, and score another point. Once again you roll, but this time no 3 shows. Pass the dice to the next player – but at least you scored 2 points in your turn.

**If two dice both show slam, this is called a small slam** and scores 5 points. Note that you must score 15 points exactly to get out of the game; if you already have 14 points and roll a small slam, your throw is not valid and your turn is over.

**If all three dice show slam, this is called a grand slam** and immediately gives you a score of 15 points (regardless of what you had before then). The last player left in the game is the loser.

**Example:** In your first turn, you roll 1-1-4. Now you can take your pencil and cross off square number 1 (since there was a 1 on at least one of the dice) and square number 2 (since 1+1=2). You cannot however cross off square number 3, since you did not roll any 3 and the sum 3 cannot be formed with any of your dice, and thus you cannot cross off square number 4 either, even though you have a 4 on one die. Bad luck! Your next roll results in 3-5-6 and you can only cross off square number 3. Your third roll gives you 1-2-6, and it is not possible for you to cross off square number 4. More bad luck! Since you cannot cross off anything with this roll, your turn is over and you pass the dice to the next player.

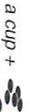
**The best possible starting roll is 1-2-4:** then you can cross off all the squares from 1 to 7 in a single swoop!

As soon as your roll results in you not being able to cross off at least one more square in sequence, this immediately ends your turn.

Once you have reached square number 12, this automatically ends your turn. You may not cross off both 12s with the same roll, but must wait for your next turn to start marching downwards.

The first player to cross off all his squares in sequence, all the way down to 1 again, is the winner.

### Bluff



A game for people with experienced poker faces, and which is played all over the world in an amazing number of variants! This is the basic version, **for 2-4 players**. In addition to the three dice, you need a dice cup or a tea mug, and 5 chips per player.

#### Aim of the game:

To be the first player to get rid of all your chips.

#### How to play:

All players roll once each, the person with the highest score starts. Play then proceeds in a clockwise direction.

The starting player (A) leads off by placing the three dice in the cup, gives them a good shake, and then puts the inverted cup on the table so that nobody can see the result – except A, who secretly lifts the cup to take a look at the result. He then calls out the total of the three dice. He may tell the truth or lie, whichever he wants! Then he looks at the player on his left (B).

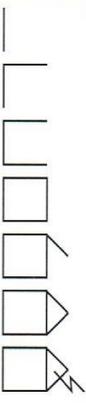
B may either *accept* A's statement, or call "Bluff!".

If B accepts, he takes the inverted cup with the three dice while A puts one of his chips in the pot in the middle of the table. Now B re-rolls all three dice in the same manner, secretly looking at them and calling out the result. Note that B now must call out a *higher* total than the preceding player! Then it is C's turn to either accept B's statement (in which case B puts a chip in the pot), or to call "Bluff!", and so on around the table.

**If any player calls "Bluff!"**, the dice cup is immediately lifted so that the dice are revealed. If the dice show the total called, or higher, the player with the dice told

The starting player rolls all six dice, keeps all those showing a 1, and passes the other dice on to the next player. This player does the same, and so on until all six dice show 1's. The next player in turn then starts over by rolling all six dice.

Every time it is your turn and you fail to roll at least one 1, you must draw a new line in your "house" – see diagram. After six failures and the same number of lines, your house is finished; the seventh time you fail to roll a 1 "lightning strikes your house" and you are out of the game. The last player left in the game wins!



**Example (with four players):** A rolls all six dice and gets 1-1-5-3-6-5. She keeps the two dice showing 1's, and passes the remaining four to B who rolls 1-2-6-4. Player B keeps the die showing 1 and passes the three remaining dice to player C, who rolls 3-3-4. Since C did not roll any 1, C must draw a line in his house. Player C passes all three dice on to D, who rolls 1-1-5. Player D keeps the two 1's, and passes the remaining die to A who rolls a 2. A draws a line on her house and passes the die to B, who rolls a 1! Now player C carries on by rolling all six dice, and so on.

### Drop Dead



Drop Dead is, despite its dramatic name, a great family game. **For 2-8 players**. You need five dice, and paper and pencil.

#### Aim of the game:

To score as many points as possible before the dice all "drop dead".

#### How to play:

Decide who starts. Play then proceeds in a clockwise direction.

All players roll all five dice. Any roll containing 2's and/or 5's does not score; any 2's and 5's are set aside, and you roll again with the remaining dice. A roll without any 2's or 5's scores; the result in that roll, you keep on rolling until all five dice have "dropped dead" (show 2's and/or 5's), and your total score is noted down on the score sheet.

**Example:** Your initial roll is 2-6-4-3. Since it contains a 2, it does not score. Set the die showing the 2 aside – it has "dropped dead".

In your next roll you get 3-1-4-6 and score 14 points, since the throw did not contain a 2 or a 5. Your next roll shows 5-5-6-3. It does not score, leaving you still on 14 points. Set the two 5's aside. Your next roll shows 2-4. This too does not score, leaving you still on 14 points. Set the 2 aside. Your next roll shows a 3. Now you have 17 points. Your next roll is a 4. Now you have 21 points. Your next roll is a 2. Now all your dice have "dropped dead", you have a total of 21 points on the score sheet, and it is the next player's turn.

The player with the most points is of course the winner.



**Finish** In this game you try to "complete" the rolls of the preceding players, while preferably at the same time ending the round in order to win chips. **For 3-5 players.** You need six dice, paper and pencil, and 10 chips (coins, matches...) each.

**Aim of the game:** To be the only player left in the game, as the others one by one drop out.

**How to play:**

Draw up a "game board" as shown, with the letters F-I-N-I-S-H and the numbers 1 to 6 underneath each letter.

F	I	N	I	S	H
1	2	3	4	5	6

Decide who starts. Play then proceeds in a clockwise direction.

The starting player rolls all six dice. If he rolls a 1, and preferably also several more dice in ascending order, he puts them on the respective letters on the board and passes the remaining dice to the next player. That player rolls them in turn, and tries to add them to the row from 1 to 6.

Any player who fails to add to the row on his roll, must pay to the pot as many chips as there are empty numbers on the board. Whoever finishes the row (rolls a 6 which is placed on the last empty number), receives one chip from each of the other players.

**Example (with four players):** A starts, and rolls 1-2-3-6-6-1. She places the 1, the 2 and the 3 on the respective numbers on the board, and passes the remaining three dice to player B.

B rolls 4-1-3, places the 4 on the corresponding number on the board, and passes the remaining two dice to C.

C rolls 6-2. Since he failed to roll the 5 he needed to keep adding to the row on the board, C must pay two chips to the pot (since two numbers in the row are as yet unoccupied). Player C passes the dice on to D.

Player D rolls 5-5, places one of the 5's on the corresponding number, and passes the last remaining die to A. A is lucky and rolls a 6, filling the last number on the board! Since player A finished the round, all the others must give her one chip each. The next round then starts, with B rolling all six dice.

If you lose your last chip, you are out of the game. The last player left in the game wins the pot. If the starting player in a round is lucky and rolls 1-2-3-4-5-6, he or she has immediately won the game as well as the remaining chips from all the other players!



**Scissors** Most dice games are about scoring as high as possible. In this game, you do the opposite! **For 2-8 players.** You need six dice, and paper and pencil.

**Aim of the game:** To be the last remaining player in the game, by scoring as few points as possible.

**How to play:**

Decide who starts. Play then proceeds in a clockwise direction.

The game is played over several rounds. In each round the starting player changes, one step to the left.

The starting player in a round rolls all six dice. After each roll you set aside pairs of dice which together form the sum 7, and may if you wish re-roll the remaining dice. After the second re-roll, or earlier if you so choose, you score as many points as the sum of the dice which are "left over".

**Example:** Your initial roll results in 2-2-4-5-6-6. You set aside 5-2 which form the sum 7, and re-roll the remaining four dice. Now you get 1-6-1-2, set aside 1-6, decide not to use your last re-roll, and score 3 points (for the remaining 1-2) on the score sheet.

After the starting player, the others follow in clockwise order, BUT they may not use any more rolls than the starting player! If the starting player used all three rolls, the other may do so too (or stop rolling earlier, if they so choose), but if the starting player only used his initial roll, all the others must also only roll once! In every round the respective points for the players are scored. Then the player to the left of the starting player becomes the new starting player, and the next round is played in the same way, with the points accumulating.

As soon as a player reaches 77 points he or she is out of the game. The last remaining player is of course the winner. If all the remaining players are knocked out in the same round, the winner is the player with the lowest score. If tied, the winner is the player with the lowest score before the last round was played.



**Ten Thousand** A dice game classic that calls for strategic and tactical skills, and which sometimes rewards nerves of steel! You may also "have" the game and play for a goal of 5,000 points. **For 2-6 players.** You will need six dice, and paper and pencil.

**Aim of the game:** To be the first to reach a total of 10,000 points, by rolling high-scoring combinations.

**How to play:**

Decide who starts; the turn order then proceeds clockwise.

In your turn, you roll all six dice. The following results score for you:

**Three 1's in the same roll score 1,000 points.**  
Three of a kind of 2's, 3's, 4's, 5's or 6's in the same roll score 200, 300, 400, 500 and 600 points respectively.  
A single 1 scores 100 points.  
A single 5 scores 50 points.

If you do not roll a score of any kind at all on your first roll - rolling 2-6-6-3-4-4 for example - your turn is immediately over, and you pass the dice to the next player. (The chance of this happening is 3%.) If you however roll a score of any kind, you set this die or these dice aside and may not touch them again.

You may if you wish roll again, even several times in a row, provided that you after EACH roll set aside at least one scoring die. You keep on re-rolling until you either

- Decide to stop rolling, add up the score as per above, and note down the result on the score sheet, or you

- Make a roll which contains no score. If this happens you lose ALL the points you have accumulated in your turn, and you must pass the dice to the next player.

**Example:** Your initial roll is 1-1-1-3-6-4. You set aside the three 1's, and re-roll the remaining three dice, resulting in 1-5-2. Now you decide to stop rolling, and score 1,000 points for your three 1's in the same roll, another 100 points for your fourth 1, and 50 more points for your 5, for a total of 1,150 points.

**Another example:** Your initial roll is 4-4-4-3-2-6. You set aside the three 4's and re-roll the remaining three dice, resulting in 2-2-6. Since this re-roll does not contain any scoring dice, you lose all your points in that round and must pass the dice to the next player.

**Special rule:** If you manage to set aside all six dice in your turn, after your initial roll or while re-rolling one or more times, make a mental note of your points so far - you may if you wish pick up all six dice and keep re-rolling in order to score even more points! But if you make a non-scoring roll, all your points in that turn are as usual forfeited!

Note that a three of a kind counts ONLY if you make it in one roll. If you for example set aside three 1's in two or more rolls, they only score 100 points each. The first player to reach 10,000 points or more, over several rounds, is of course the winner.

**CLASSIC BETTING GAMES WITH DICE**

Traditionally, many dice games are played for small or sometimes big stakes.



**Pay the Rent** The name? Because the inventor of this game could pay his rent with income from this game... **For 3-6 players.** You need three dice, chips and six different markers (one for the 1's, one for the 2's and so on).

Six ordinary playing cards, from Ace up to Six, will do fine.

**Aim of the game:** To win chips by rolling certain combinations.

**How to play:**

Decide who starts; the turn order then proceeds clockwise. All players should start with the same number of chips.

**Before every roll, all players must put one chip each into the pot.** The player whose turn it is then rolls all three dice.

If the three dice all show different faces, the pot remains on the table. Thus, it keeps on growing, as becomes the next player's turn and everyone must bet again.

If all three dice show the same result (for example 3-3-3), you win the entire pot. The dice are passed to the next player, and all players bet one chip each again as usual, starting a new pot.

If two of the dice show the same face, you take the corresponding marker and put it on the table in front of you. **Example:** You roll 4-4-5, and take the marker showing a Four. The pot remains on the table, growing once more when the next player takes his turn.

The next time a player rolls the same pair, the pot is split between the player who rolled and the player already have the marker with the Four, and the player opposite rolls 4-4-1. You two divide the pot between you. If it cannot be evenly split in two, the remainder stays on the table and becomes part of the next pot. (If you are the player rolling a pair of 4's, and you already have the marker with the Four, you of course take the whole pot!)

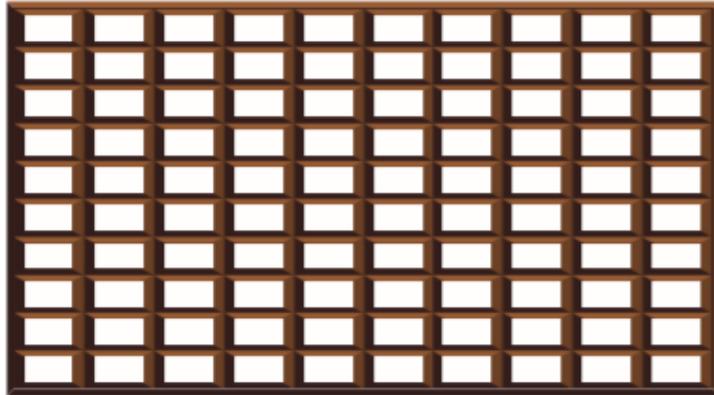
During the course of the game, the markers usually wind up before different players, but it may also happen that a player can have several markers at the same time. Whenever a player takes the pot, or two players split it, the markers are returned to the table as you start a new pot.

If you play with one player acting as a Banker, he always has the Six marker and thus receives half the pot whenever a pair of 6's is rolled for the second time. That is how the inventor could pay his rent...

## Chocolate Bar Maths

This is more fun if you use a real block of chocolate!

Use the chocolate bar template to work out the answers to the problems.



1 If this chocolate bar were to be shared equally between 20 people, how many squares would each person have?

 .....

2 If you wanted to make this chocolate bar last for 10 days, how many squares could you eat every day?

 .....

3 If you gave three quarters of this chocolate bar away, how many squares would you have left?

 .....

4 If you ate one tenth of this chocolate bar, how many squares would you have left?

 .....

5 If you gave three fifths of this chocolate bar to your friends, how many squares would you be giving away?

 .....

6 If each square of this chocolate bar measured 3cm x 2cm, what is the total area of the whole bar?

 .....

7 If each square of this chocolate bar measured 3cm x 2cm, what is the perimeter of the whole bar?

 .....

8 If each square of this chocolate bar measured 3cm x 2cm, what is the area of a quarter of the whole bar?

 .....

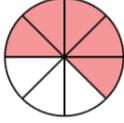
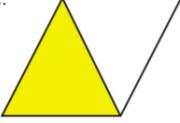
9 If each square of this chocolate bar measured 3cm x 2cm, what is the perimeter of two fifths of the whole bar?

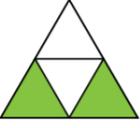
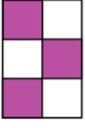
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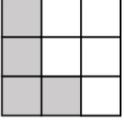
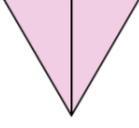
**EXTENSION ACTIVITY:** If you were to split this chocolate bar into individual squares using the minimum number of breaks, how many breaks would it take?

## Fractions

Tell what fraction of each shape is shaded.

a.  b.  c. 

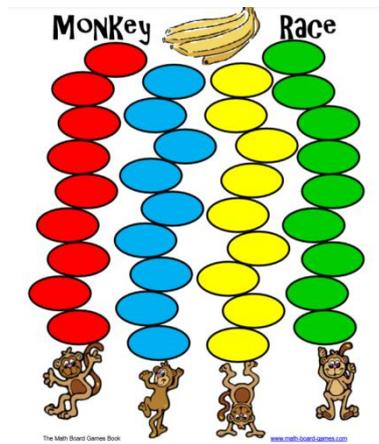
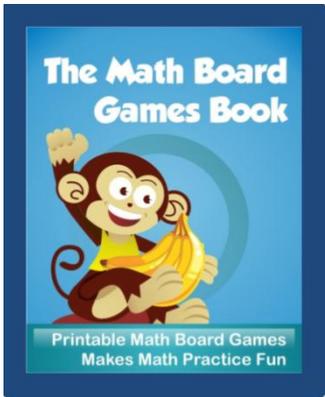
d.  e.  f. 

g.  h.  i. 

j.  k.  l. 

Super Teacher Worksheets - [www.superteacherworksheets.com](http://www.superteacherworksheets.com)

## The Maths Board Game Book



You can download this from :

<https://www.wsfcs.k12.nc.us/cms/lib/NC01001395/Centricity/Domain/3967/The%20Math%20Board%20Games%20Book.pdf>

It contains 47 pages of games with full instructions.

# Maths Bingo

**Addition Bingo: +10** Game 2

16	18	14	13	19
13	11	15	16	18
17	14	FREE	14	15
19	13	11	17	13
15	11	12	16	11

Put your playing piece anywhere on the outside path. Move by rolling a die. When you land on an addition problem, find and dot its sum on the center bingo board. When you get five in a row, the game is over.

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**Subtraction Bingo: -0, -1, -2** Game 1

9	2	7	8	6
5	3	9	1	4
6	7	FREE	5	9
9	4	9	7	1
6	8	10	3	9

Put your playing piece anywhere on the outside path. Move by rolling a die. When you land on a subtraction problem, find and dot its difference on the center bingo board. When you get five in a row, the game is over.

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Source: Anna Geiger, [themeasuredmum.com](http://themeasuredmum.com)

**Multiplication Bingo: x2** Game 2

20	2	4	18	10
0	18	16	6	8
12	10	FREE	16	20
10	6	14	8	10
12	12	4	14	14

Put your playing piece anywhere on the outside path. Move by rolling a die. When you land on a multiplication problem, find and dot its product on the center bingo board. When you get five in a row, the game is over.

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For each game you will need a counter and a dice and a marking pen.

Place the counter on any of the circles around the edge.

The player rolls the dice and moves forward the number of spaces shown on the dice. Then they need to solve the problem. The answer for each problem can be found in the grid in the centre of the board.

Colour in the number which is the answer to the problem.

Then roll the dice again. Keep rolling the dice, moving around the board and solving the problems until you get 5 numbers in a row- either horizontal, vertical or diagonal.