

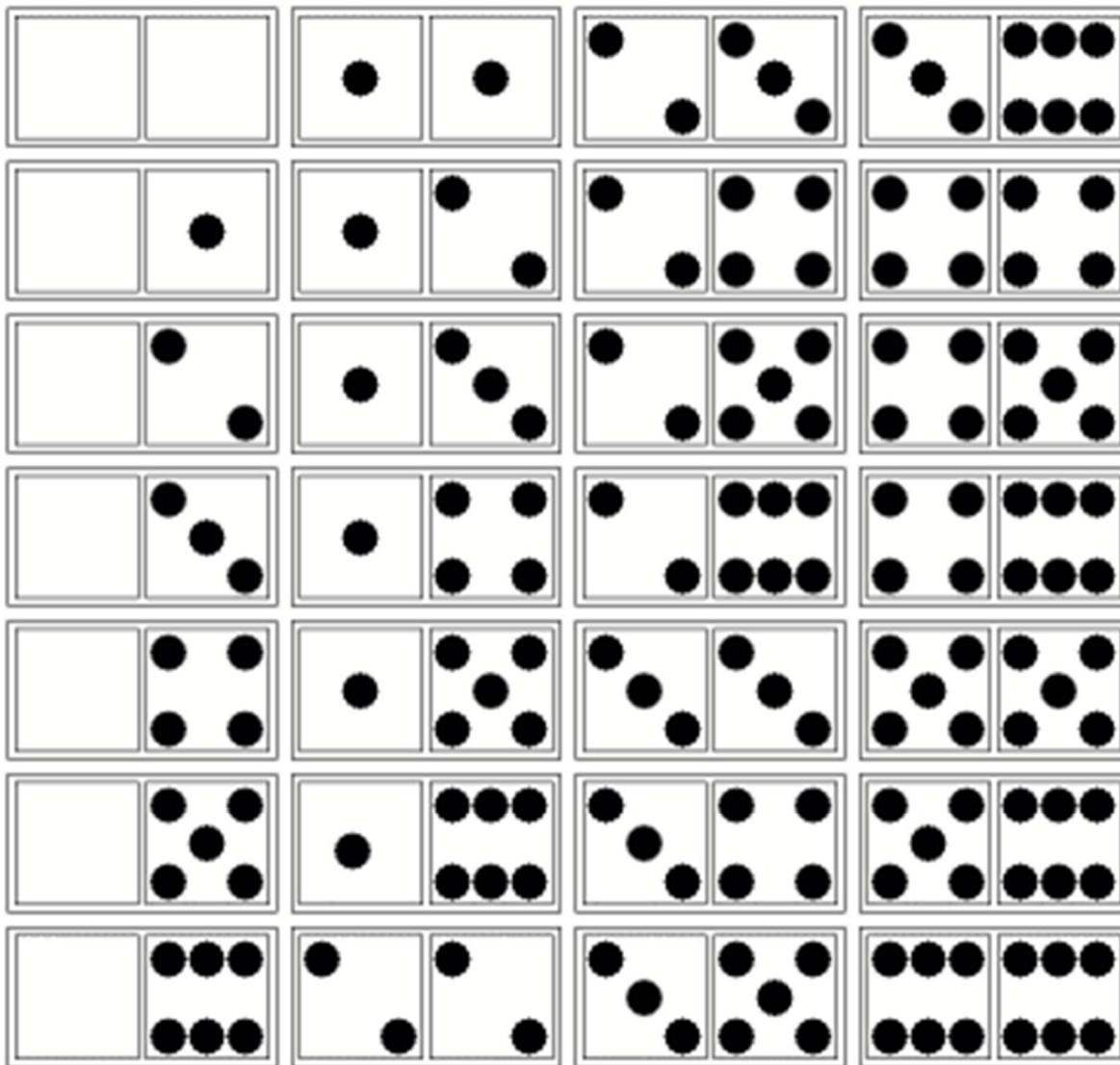
# Introduction

Here's a collection of games and puzzles using an ordinary set of dominoes.

## A Domino Set

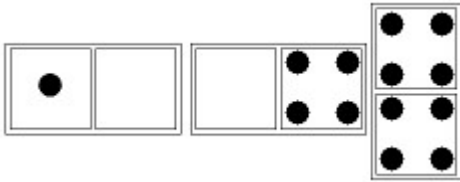
A set of dominoes usually consists of 28 rectangular dominoes, each having two squares with 0, 1, 2, 3, 4, 5, or 6 spots.

Every combination is represented. The value of the domino is the sum of the values of the two squares. Use a readymade set of dominoes or make one for yourself out of cardboard; then you can enjoy many different games and puzzles.



### Basic rules for Dominoes

The basic rule in playing dominoes is that you make a chain of dominoes placing them end to end. In extending a chain, you always match one square of one of your dominoes to a square on the end of the chain. The exception to this is if you have a double domino - one with the same number on both squares. In this case, you can match both squares of the domino to one on the end of the chain, by placing the double domino perpendicularly across the end of the chain, like this:



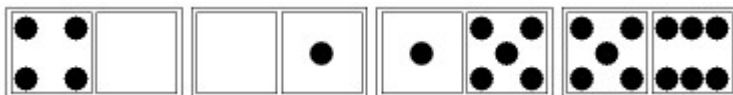
This creates a branch in the chain, and you now count both squares on the double domino as ends of the chain which can be built upon. (Of course, if you prefer, you can just play the double domino in the usual way.)

The players all start with the same number of dominoes and you win if you are the first player to use up ALL your dominoes. If there are extra dominoes at the start they are placed face down as the 'pool'. Usually the player with the highest double starts. When it is your turn, you place one of your dominoes on one end of the chain and, if you cannot do so, then you have to pass, taking one domino from the pool if it is not empty.

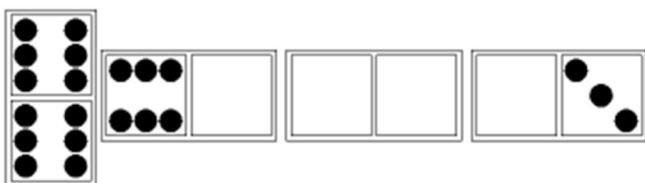
### Rules for Fives and Threes

You play dominoes in the usual way but you score points when the dominoes at the ends of the chain add up to a multiple of 5 or a multiple of 3. Divide the total on the ends by 5 or 3 and add the answer to the player's score. If the end total is divisible by both 5 and 3 then you score both, so for the end total of 15 you score 8 points. You also score 10 points for being the first to finish, plus one point for every domino held by another player, but you might not be the winner even if you do finish first.

In the following example the (1,5) domino starts, scoring 2 points. Then the (0, 1) domino scores 1 point because the ends add up to 5. Then the (4,0) domino makes the ends add up to 9 so it scores 3 points. Finally the (5,6) domino makes the end total 10 scoring 2 points.



In this example the (6,6) starts, scoring 4 points. Then the (6, 0) scores 4 points, then the (0,0) scores 4 points and finally, with the (0, 3) the end total is 15, scoring 8 points.



### Dominoes for Older Children

#### Domino War: Addition or Multiplication

Pass out all the dominoes to each player. Just like War, each player turns over one domino. Find the sum or product of the two numbers. Whoever has the highest (or lowest) sum/product wins that hand. The winner takes all the dominoes in that round and then plays another round. Whoever has the most dominoes at the end wins the game! To increase practice of facts, have your children write the facts in a math journal. This will help with memorization and automaticity of facts.

### Fact Families: Addition, Subtraction, Multiplication, and Division

Pick a "target number" for all players to reach. You can either pull a card from a deck or make the number up yourself. Spread the dominoes out and turn them face up. One at a time, each player chooses a domino that represents the target number. Players can record all the fact families for the domino and the target number. For example (for addition/subtraction) if the target number is 9, children might choose a domino with a 4 and a 5. They would then write all the fact families:  $4 + 5 = 9$ ;  $5 + 4 = 9$ ;  $9 - 5 = 4$ ;  $9 - 4 = 5$ . The play will continue until all the dominoes that can be chosen are picked. To make it more challenging, you can turn the dominoes over face down for a game of memory.

### Number Lines: Fractions and Decimals

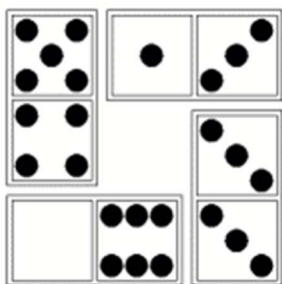
Draw a number line from 0 to 1, with  $1/2$  marked off. Spread the dominoes out and turn them over face down. Choose one domino at a time. Holding it vertically, read the domino as a proper fraction (numerator is less than the denominator) and place it on the number line, in the appropriate location. Have children verbally explain why they are placing the fraction in that specific location. Always encourage the use of strong math words!

You can play the same game with decimals. Hold the domino horizontally and read it as a number in the hundredths place – so 3 and 6 would be 0.36 or 0.63 – either way is fine.

To make it more of a challenge, place fraction dominoes and fractions decimals on the same number line!

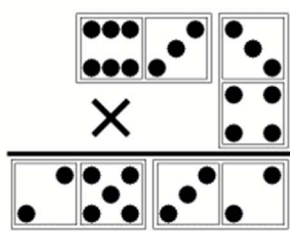
### Windows

This is a challenge that you might like to take on by yourself or with a group of friends. In this diagram the four dominoes make a 'window' with one empty space. The spots on each side total nine. Can you make seven windows like this using all 28 dominoes so that each window has the same spot-sum for each side? One window need not have the same spot-sum as another.



### Domino Multiplication

Here you have four dominoes laid out in the pattern of a multiplication sum. Can you make seven multiplication sums like this using all 28 dominoes? Again, like 'Windows' this organises the dominoes into seven sets of four.



## Dominos with younger children

**Number Recognition:** Subitizing is an important skill for young children to develop. When students subitize, they are seeing a number visually (for example: a dot representation) and connecting it to the numerical value. Dominoes are a great way for young children to "see" numbers. It can be as simple as showing one side of a domino, having children count the dots, recreate the dot representation on paper and write the numerical value. Focusing on how they know the dots represent a 3 without counting each dot is important. Having them see patterns as numbers get bigger makes the math fun and develops a deep understanding of what numbers are.

**Place Value:** Turn one domino over to represent a 2-digit number. Children decide which number they want to create. For example; a domino that has a 3 and 7 could either be 37 or 73 depending on which way you hold the domino. Ask place-value questions about either number, such as *How many tens are in 73?* or *How many ones?* They can practice writing the number in different ways: word form, standard form, and expanded form. As children get older, line dominoes up end to end to create 4- or 6-digit numbers to increase place-value understanding.

**Comparing:** Building on the number sense theme, children can compare numbers using just 1 domino. Turn over a domino and have your child compare 2 numbers verbally or in written form. So if the domino is a 4 and 1, a child could compare saying "41 is greater than 14" or "14 is less than 41." To push your children even more, ask them to prove their answer: "I know 41 is greater than 14 because 41 has 4 tens and 14 has only 1 ten." Encouraging "math talk" is very important!

**Ordering Numbers:** The age of your child will depend on the number of dominoes that is appropriate for him or her to order. I would start with 3 dominoes and increase gradually from there. Have your child pick 3 dominoes and determine which numbers they will be (refer to the place value section), then have him or her order the numbers verbally, in writing or physically with lining the dominoes up. Alternate between ordering the numbers from least to greatest, or greatest to least.