Manipulatives of the Month

Dominoes

Dominoes

Dominoes is a game played with small tiles called dominoes. A domino is a rectangular tile with a line in the middle that separates it into two sides/ squares. Each side has a number of black dots The number of dots is different on each domino. Some dominoes have a side that is blank.

History:

Dominoes are most likely invented by the Egyptians, but more easily traced back to China during the 12th century. Dominoes were traditionally made from bone, wood, or even carved from ivory—materials readily available at the time. Nowadays, modern sets are more commonly made from heavy plastic.

It was during the 1700's that dominoes spread in popularity throughout Italy, quickly becoming one of the most favourite games to be played in family homes.

By 2009, a Guinness World Record was recorded in France where 4,491,863 dominoes were toppled from a single-push domino chain!

10 ways to use dominoes in the maths lesson

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

Dominoes are a fantastic resource for the classroom.

There are lots of different types of sets of dominoes although the most popular are double-six dominoes. There are also larger sets of double-nine, double-twelve, double-fifteen, double-eighteen and even double-twenty-one dominoes which have 253 tiles.

The standard game of dominoes involves matching two numbers that are the same. However, dominoes can be the source of much mathematical activity.

Dominoes is great for building student's core maths skills as the game strategy is built around numeric patterns. For this reason, the game also develops problem solving skills and strategic thinking. Dominoes engages students and can be used to learn key maths concepts as well as deepen students' mathematical understanding and reasoning.

Dust off your sets of dominoes and try these activities with your students, you won't regret it!

Activities

1. Play the game
   - *Collaboration & strategy*
2. Sort it out
   - *Looking for patterns and working systematically*
3. Fact families
   - *Related addition and subtraction facts with 3 randomised numbers*
4. Domino squares
   - *Mental calculations*
5. Domino addition/multiplication
   - *Investigations*
6. Domino keepers
   - *Fluency practice with addition, subtraction and multiplication*
7. Race to 100
   - *Fluency practice with addition, subtraction and multiplication*
8. Domino magic squares
   - *Logic and problem solving*
9. Domino fractions
   - *Ordering, sorting and comparing fractions*
10. Domino windows
    - *Logic and problem solving*

1. Play the game

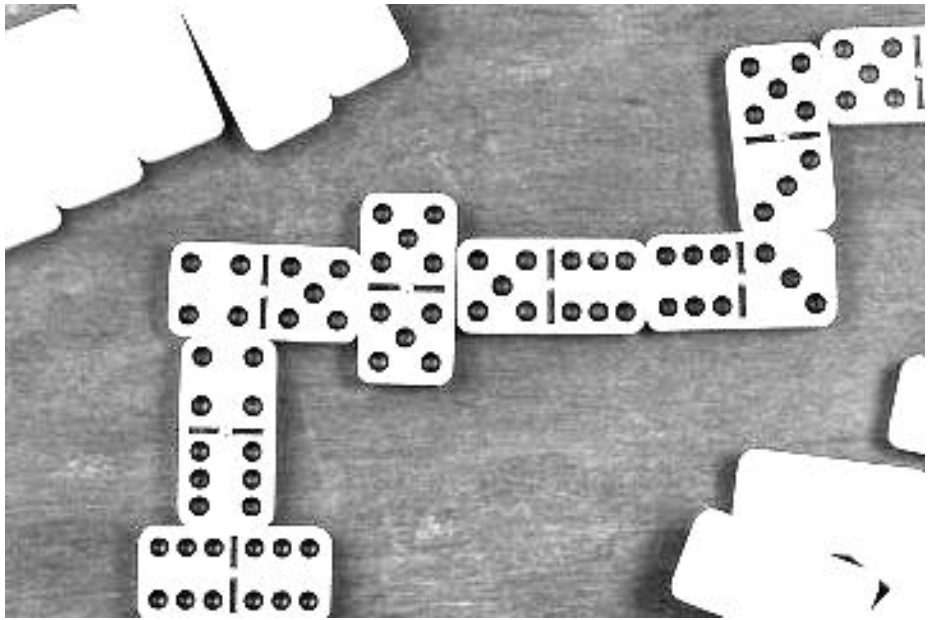
Get students to play the game.

Once students have played a traditional game or two, explore different patterns and sequences.

There are so many patterns you can make with the dots on them.

You could ask some questions:

- What do you notice about the dominoes?
- Have a look at two or three dominoes. What is the same and what is different about them?
- Tell me about your pattern.
- Why have you arranged them like that?
- Which one would go next/on top/by the side of this one?
- Are there any more that would go in that line?

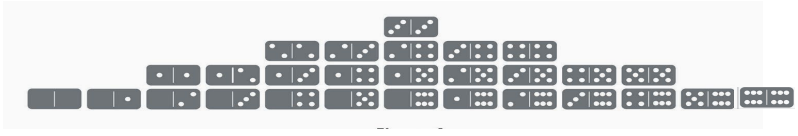


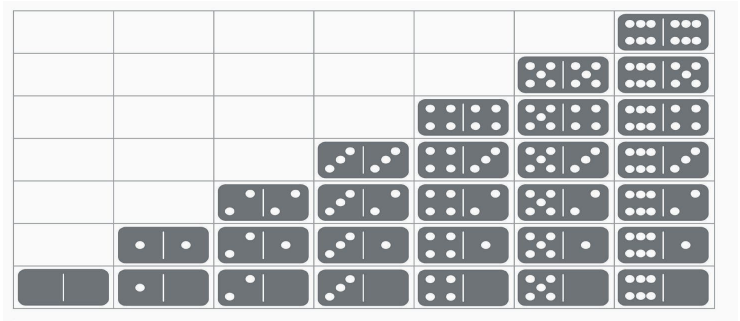
2. Sort it out

Looking for patterns and working systematically

To get students familiar with a set of dominoes, ask them to check that the domino set is complete. Doing this, students should start to look for patterns and work systematically arranging the dominoes.

- ❑ Do they have a full set?
- ❑ How do they know?
- ❑ How many tiles are in a double-six set? *(28 in standard set)*
- ❑ How could the dominoes be sorted?
- ❑ How many dots are there altogether? *(168)*





Students should be able to explain how they have sorted them. They have probably identified an attribute and use this as their sorting system.

- Odd and even dot sums
- Doubles and others
- Dot Totals, 0, 1 , 2, 3 etc. *(see example 1)*
- All the dominoes with a six in them, followed by all the remaining dominoes with a five etc. *(see example 2)*

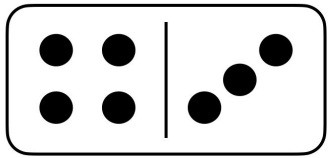
Remove one domino (not a double) can your partner work out which one has gone missing? Make the usual chain to work it out.

Amy has a box containing domino pieces but she does not think it is a complete set.
She has 24 dominoes in her box and there are 125 dots on them altogether.
Which of her domino pieces are missing? How do you know?

3. Fact families

Related addition and subtraction facts with 3 randomised numbers

Give the students a selection of dominoes and get them to choose one tile. Ask students to look at both halves of the domino and tell how many dots are in each square.

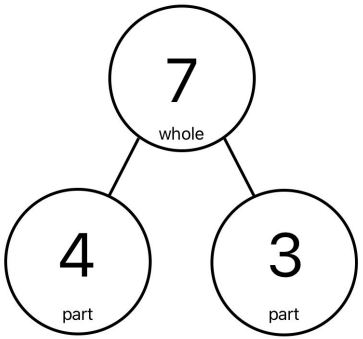


$4 + 3 = 7$

$3 + 4 = 7$

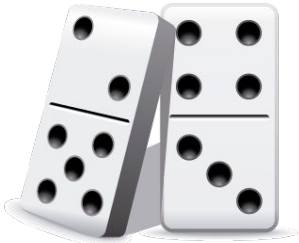
$7 - 3 = 4$

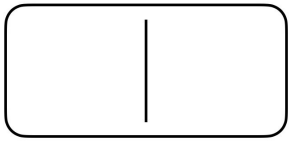
$7 - 4 = 3$

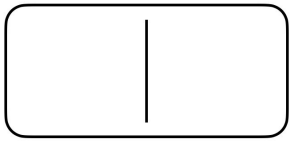


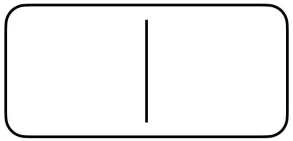
Students can fill in the dots and write the number fact family on the template. See overleaf.

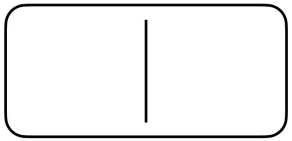
- What is the sum if you add the dots in each square?
- Will the sum change if I rotate the domino? Why do you think this?
- What would the difference be if you subtracted the number of dots on one of the squares from the sum?

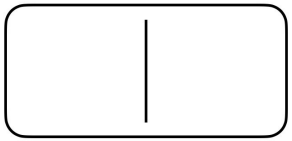


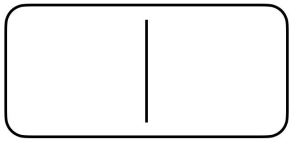


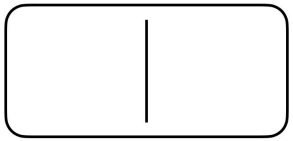


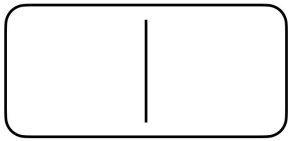












whizz EDUCATION

__ + __ = __
__ + __ = __
__ - __ = __
__ - __ = __

__ + __ = __
__ + __ = __
__ - __ = __
__ - __ = __

__ + __ = __
__ + __ = __
__ - __ = __
__ - __ = __

__ + __ = __
__ + __ = __
__ - __ = __
__ - __ = __

__ + __ = __
__ + __ = __
__ - __ = __
__ - __ = __

__ + __ = __
__ + __ = __
__ - __ = __
__ - __ = __

__ + __ = __
__ + __ = __
__ - __ = __
__ - __ = __

__ + __ = __
__ + __ = __
__ - __ = __
__ - __ = __

4. Domino squares

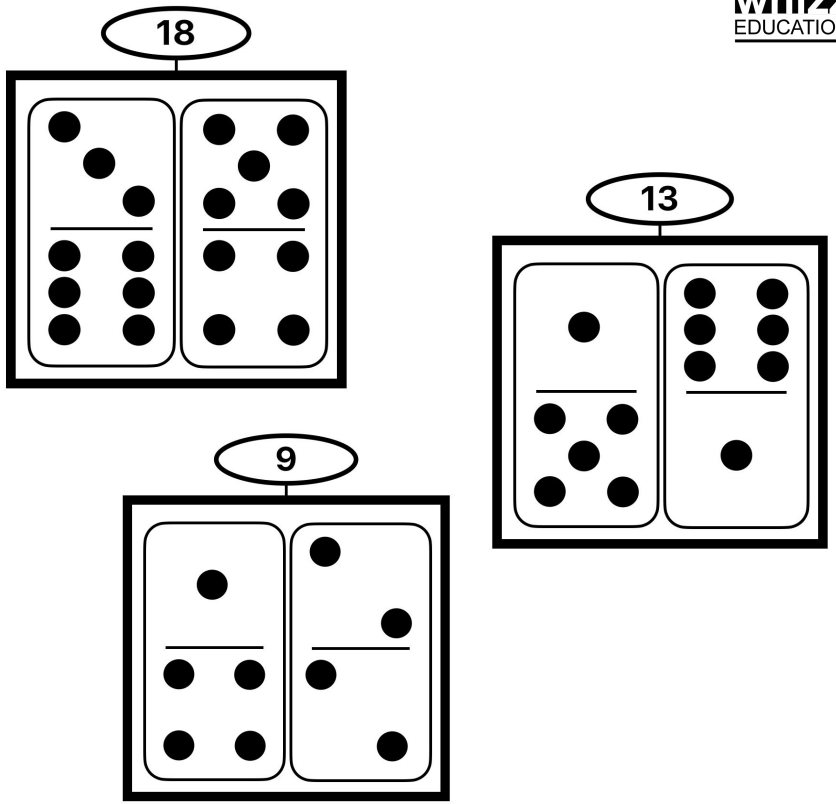
Each square will take a pair of dominoes. The object is to place a second domino in the square so the total number of dots inside is equal to the total for that square.

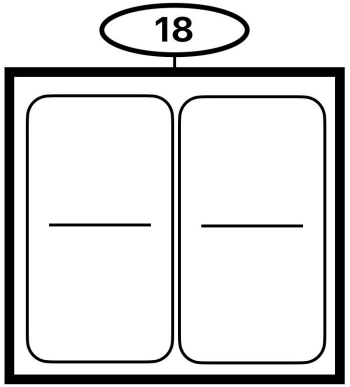
All the dominoes from the set are placed upside down on the table.

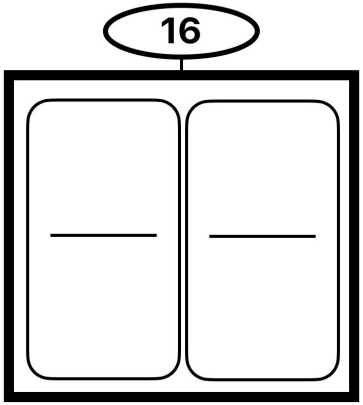
Each player takes six.
Take turns to place one in a square.

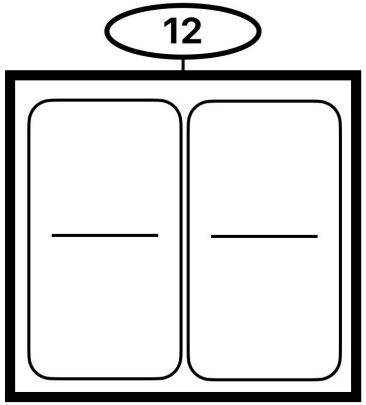
Players can replace the domino used from the set.

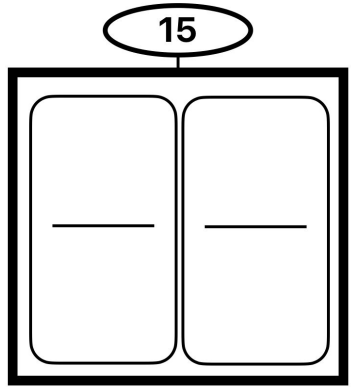
Each time a player completes a square with the correct number of dots, they score a point and must then place another domino down.

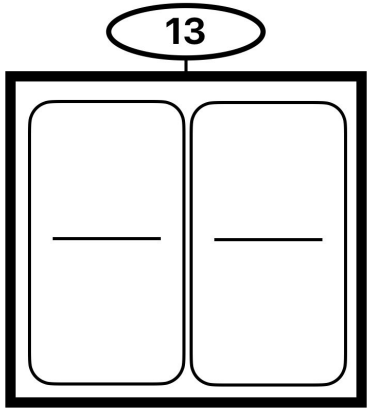


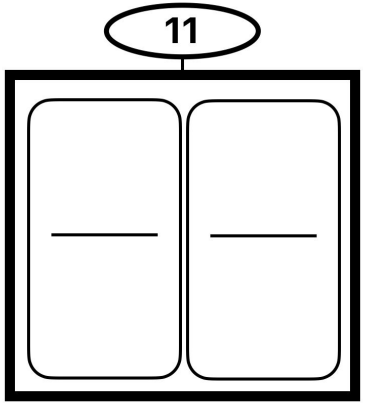


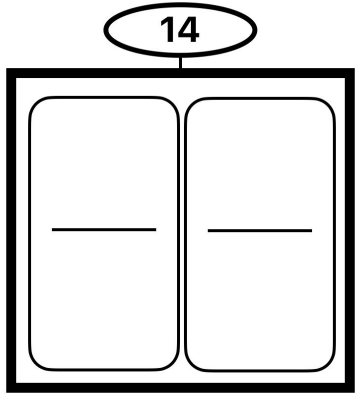


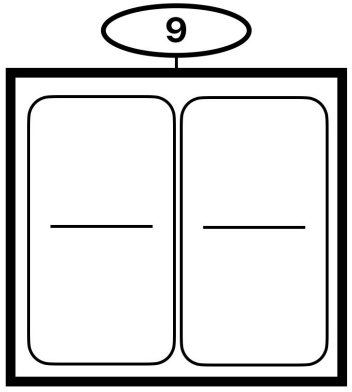












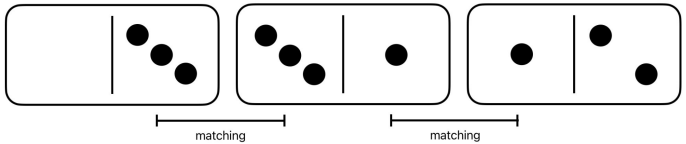
5. Domino addition/multiplication

Investigations

whizz EDUCATION

Trains of ten:

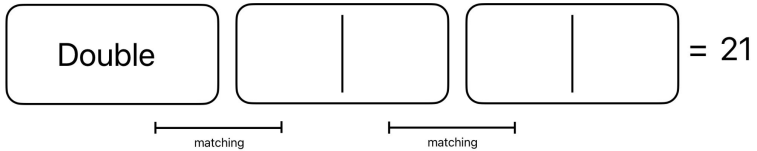
Students join dominoes to make ten. To join two dominoes the number of dots must match.
For example -



What is the shortest length train possible?
Longest? How many different length trains can be made?
What about a train of 5 dominoes with dots totalling 20? 10 dominoes totalling 40?

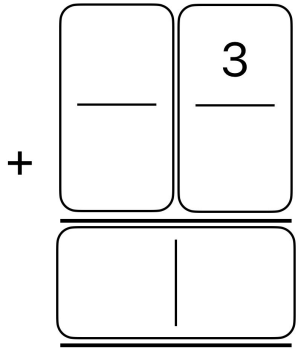
Three dominoes:

Three dominoes are joined, the total is 21. The first domino is a double. What could the other domino tiles be?



Column addition:

Using the dominoes listed below, can you complete the following additions.



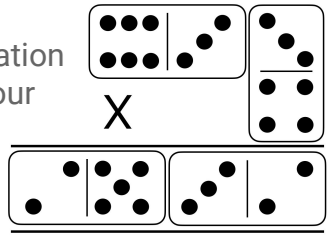
0 - 3; 1 - 4; 3 - 5

Make some domino additions like this.

How did you work it out?
What is the smallest total you can make? Highest total? Why?

Column multiplication:

Try to make seven multiplication sums like this, each using four dominoes so that all 28 dominoes are used



633
x 4
2532

6. Domino keepers

Fluency practice with addition, subtraction and multiplication

Odd or even keepers:

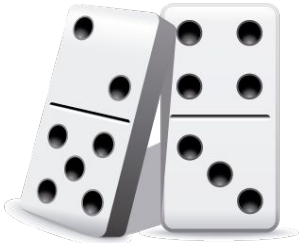
• Add, subtract, or multiply the dots on the dominoes then sort the answer by odd or even numbers.

• Want to make it a game? Before the game begins state a rule. The partner with the most even numbers or odd numbers wins the set.

Domino Keepers Multiplication:

• A game for 2 players (or two teams)

• Play this game same as addition opposite, but instead of adding the two numbers on the domino, multiply them.



Domino Keepers Addition:

• A game for 2 players (or two teams)

• All of the dominoes are placed in the center of the table face down.

• Both players pick up a domino at the same time.

• Each player tells the sum of the dots on their domino, e.g. 2+4=6, 5+3=8.

• The player with the highest answer keeps both dominoes. If both players have the same answer, each keeps a domino.

• The winner is the player or team with the most dominoes when all dominoes have been picked up.

7. Race to 100

Fluency practice with addition, subtraction and multiplication

Students place all dominoes face down.

Each student flips a domino and multiplies the two sides together. Then he/she writes down the total to keep a running total.

Players continue to flip dominoes at the same time and each player multiplies the domino's sides and adds its total to the former totals.

The first person to reach 100 wins!

This can also be played in the reverse, starting at 100 and working back to zero.

8. Domino magic squares

Magic squares can be made with the **25 dominoes** remaining when you have put aside (0-5), (0-6) and (1-6).

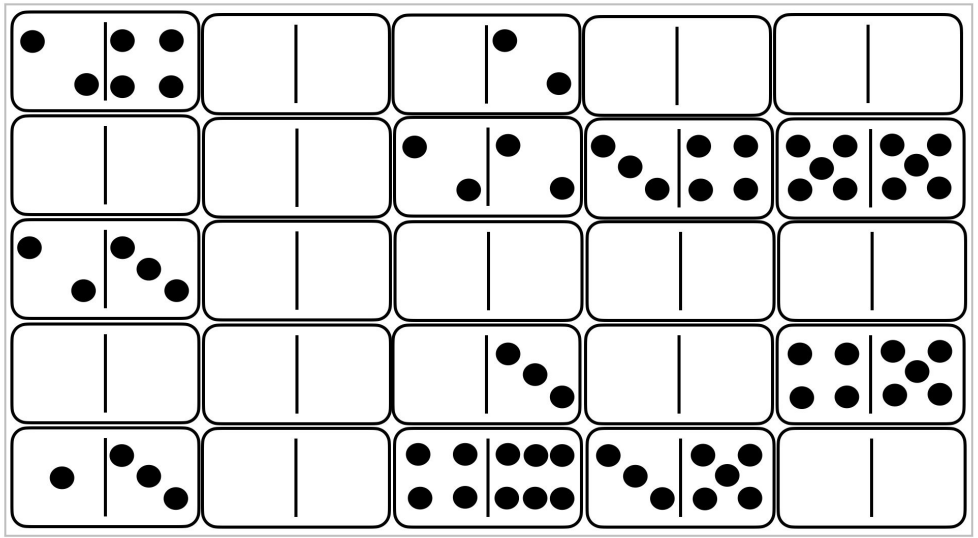
(5 dominoes x 5 dominoes grid)

The total of each row, each column and each diagonal is **30**.

This can be done in many different ways.

You might like to see how many magic domino squares you can find.

Here is the layout of one incomplete magic square to get you started.



9. Domino fractions

Ordering, sorting and comparing fractions

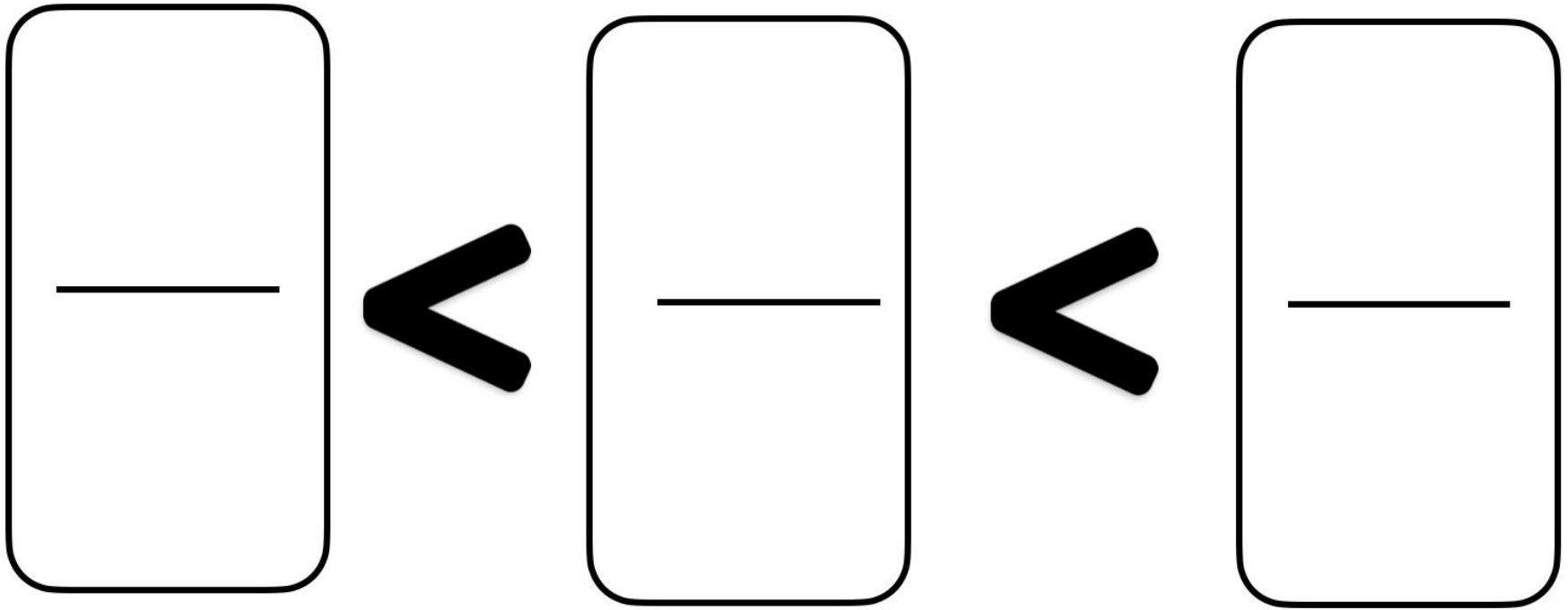
Compare fractions:
Each pair of students place 20 dominoes facedown.
Take turns to turn one domino faceup vertically.
Explain that the top half of the domino represents the numerator and the bottom half represents the denominator.
The player whose domino represents the greater fraction wins both dominoes. If the dominoes represent equal fractions, have the players keep turning two dominos faceup until one is greater.
The player with the greater fraction gets all of the faceup dominoes.
After ten rounds, declare the partner with more dominoes the winner.

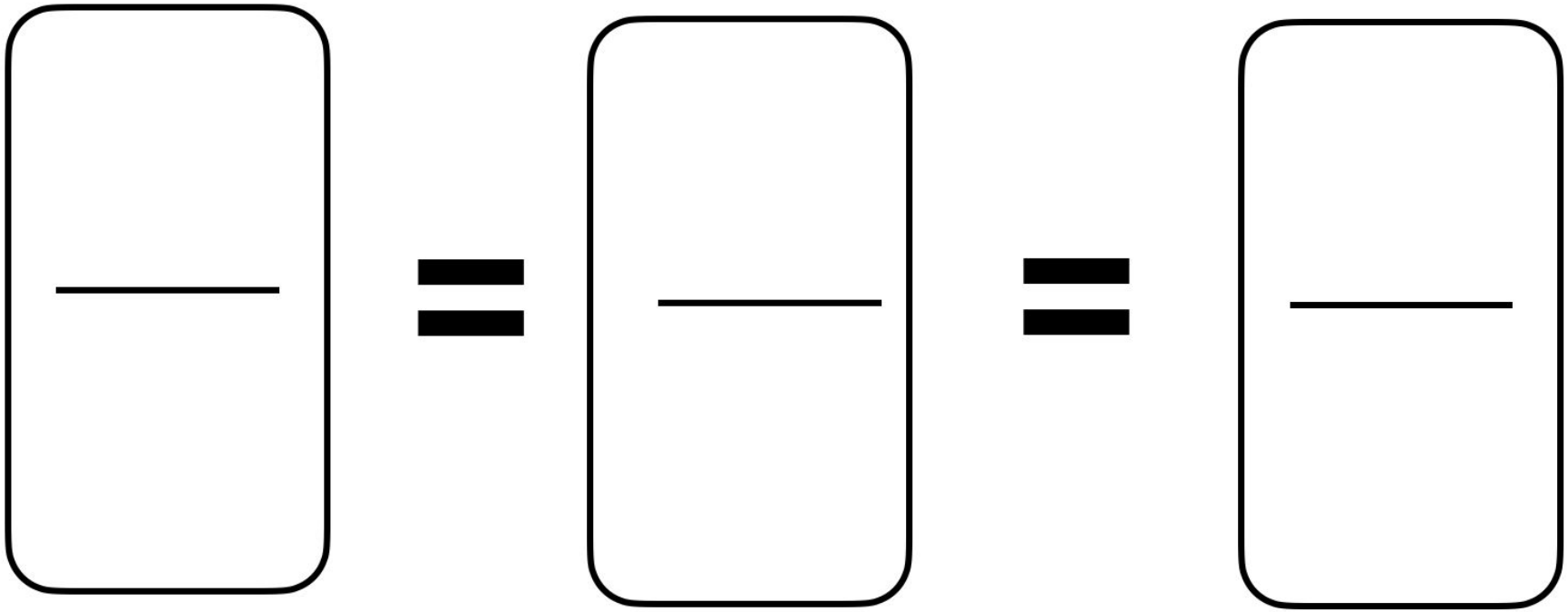
Order fractions:
Each student pick three dominoes from a set and list the fractions they represent in order from smallest to greatest in value.

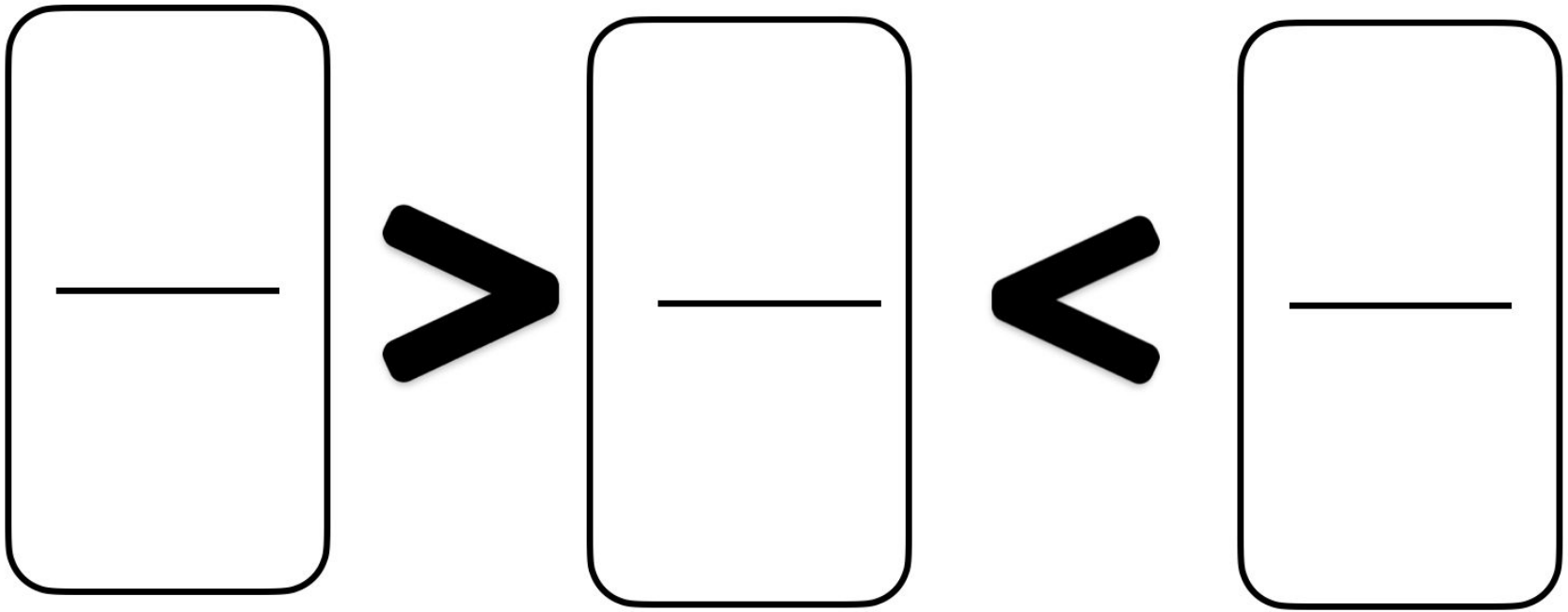
Sort fractions:
Each student sorts ten dominoes into groups according to the

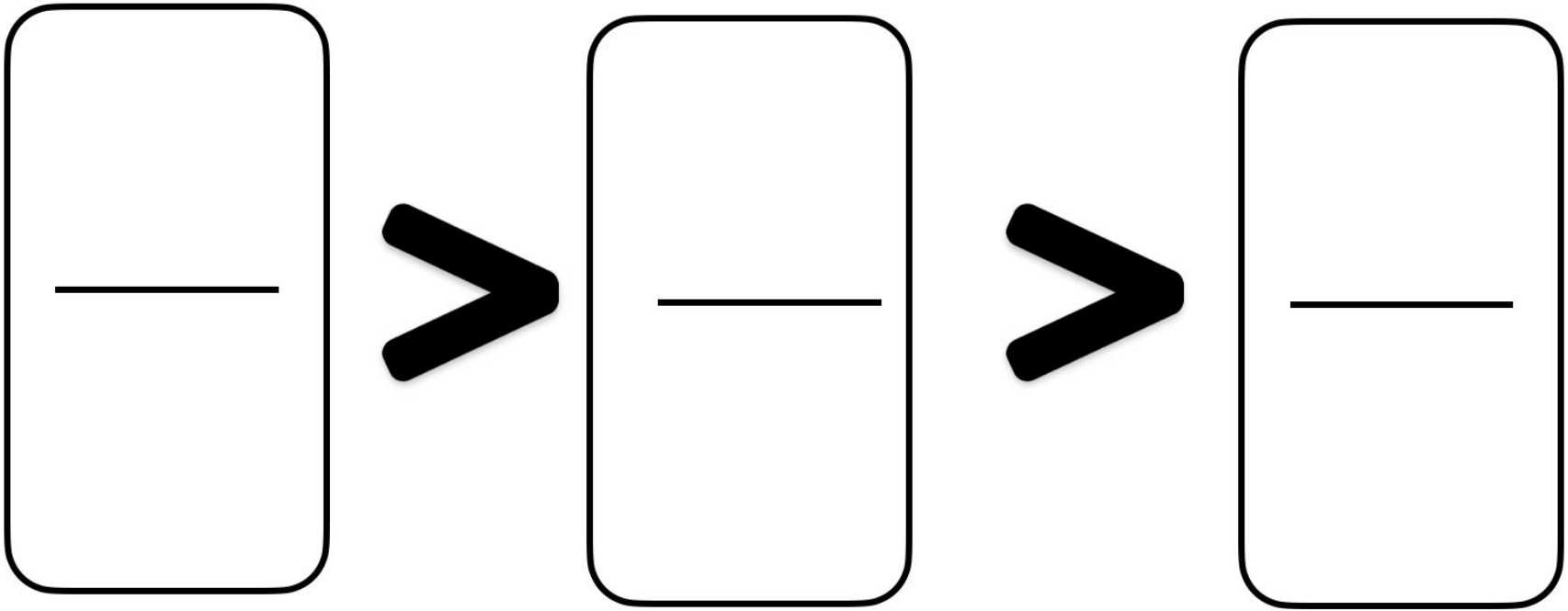
- value they represent (less than one or more than one)
- by the type of fraction (proper or improper).

Use the templates overleaf to compare fractions.



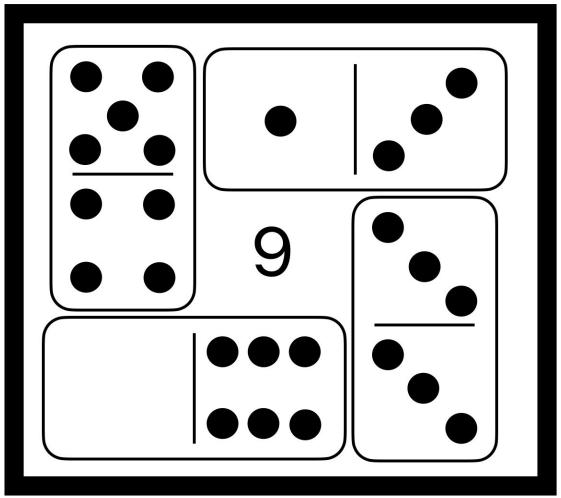






10. Domino windows

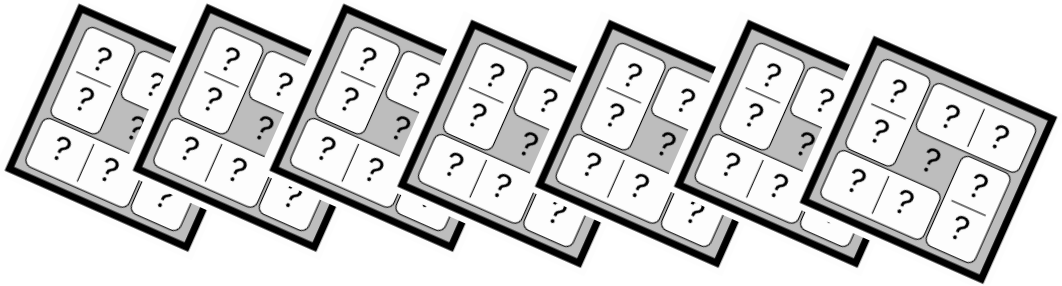
In this diagram the four dominoes make a 'window' with one empty space in the centre and the dots on each side total nine.



Try to make **seven** windows like this, each having four dominoes, so that all 28 dominoes get used.

Make sure that within a window each side has the same dot sum.

They will not all have the same dot sum – can you explain why?



Get more activities:

whizz.com