Polyominoes	Season	2
	Episode	13
	Time frame	1 period

Objectives :
- Introduce the concept of polyominoes.
- Enumerate all polyminos and find out their orders.

Materials :
- *Dominoes with mathematical symbols.*
- *Beamer.*
- *Lesson.*

1 – Enumerate the polyminoes — 25 mins

The teacher explains the concept of polyominoes with a beamer. Then, working in groups of 4 or 5, students have to enumerate all the triominoes, tetrominoes and pentominoes.

2 – Speed contest : find out the orders — 25 mins

Still working in groups, students have to find the order of all the triominoes, tetrominoes and pentominoes. The first team to complete the task (or the most advanced at the end of the hour) gets an A*, the second an A and the third a B. A one minute malus is given each time someone in the group speaks French.

3 – Buffer : the hexominoes — Remaining time

Enumerate the hexominoes and find their orders.

Polyominoes	Season	2
	Episode	13
	Document	Lesson

In recreational mathematics, a *polyomino* is a polyform with the square as its base form. It is a connected shape formed as the union of one or more identical squares in distinct locations on the plane, such that every square can be connected to every other square through a sequence of shared edges (i.e., shapes connected only through shared corners of squares are not permitted).

Definition 1 Small polyominoes

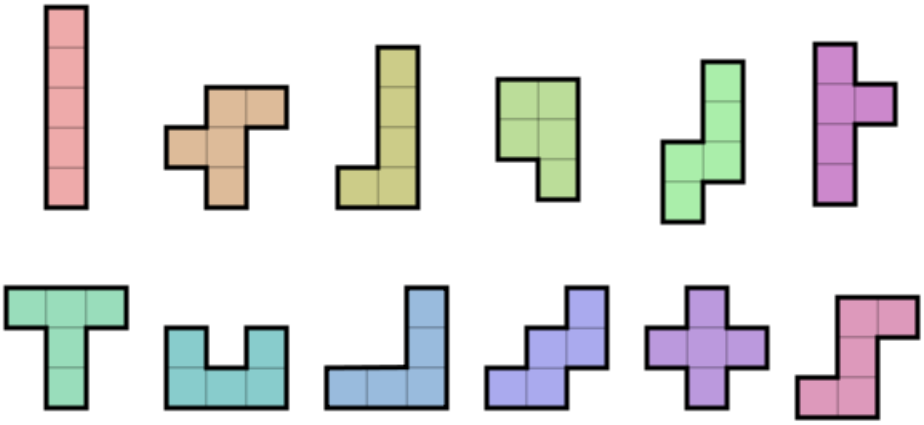
A *monomino* is made of just one square, *domino* is made of two, a *triomino* of three and so on for *tetrominoes, pentominoes, hexominoes,* etc.

In this sequence, we will work on *free* polyominoes, that are considered different from each other as long as none is a translation, rotation, or reflection of another.

Proposition 1 Numbers of small polyominoes

There are one free monomino, one free domino, two free triominoes, five free tetrominoes and twelve pentominoes.

The 5 free tetrominoes.



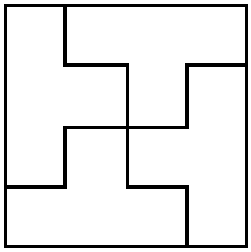
The 12 free pentominoes.

Definition 2 Order of a polyomino

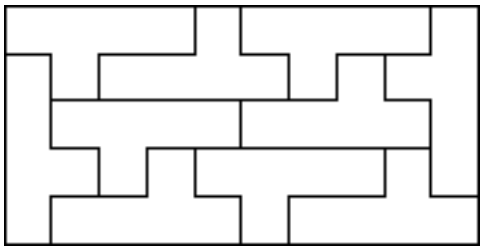
The *order* of a polyomino is the number of copies of itself you need to build a rectangle.

Proposition 2 Some orders

The monomino, the domino, the triominoes and most of the tetrominoes and pentominoes have order 1 or 2, except the T tetromino which has order 4 and the Y pentomino which has order 10.



The T tetromino has order 4.



The Y pentomino has order 10.