

Thinking, writing and drawing with maths - Guidelines for teachers

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This document explains how to use “Creative Writing co-laboratory” on maths learning activities.

The examples used are partly based on Minister of Education evaluation tests for K4, ages 9 to 10. Similar exercises can be made for K-6.

The main idea is that maths are much about reading, writing and drawing and that it's possible to write creatively on the understanding of maths concepts.

Maths are much about reading and understanding, setting up a visual schema of the problem as a path to find the solution, explaining how the solution was found, and justifying why a solution can be considered as a correct one.

Creative Writing can be used as a tool for maths activities, because it's easy to have visual data representations of problems that can be handled to estimate possible solutions.

More research is needed to clarify how the collaboration tools of Creative Writing can be used to better understand maths and to share a positive approach to mathematical thinking and mathematical writing.



Section Maths, template Thinking, writing and drawing**Simple Exercises:**

01. Using the TTS facility it's possible to train how to correctly write numbers both with digits and letters.

1 Colour the numbers on the left with the same colour as their written form on the right. Complete the last ones.

10540	One thousand and fifty four
10054	One Thousand, five hundred and forty
1540	Ten Thousands, five hundred and forty
1054	Ten thousands and fifty four
11266	
1724	

12. Tables of different formats can be constructed like backgrounds or textboxes. Using the fill tool different activities can be performed, like fill in the multiples of a number, sequences, number patterns...

12

Fill with the same colour all the squares with multiples of 6.

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

Visual and spatial discrimination

03. Discriminating simple geometric figures on geometric complex figures. Fill and line tools can be used as discrimination helpers.

3

In picture *A* there are 3 squares.
Can you see them.
How many do you see in picture *B*?
You can use the fill tool.

Figure A is a large square divided into three vertical rectangles. The rightmost rectangle is further divided into two smaller squares stacked vertically. Figure B is a large square divided into three vertical rectangles. The rightmost rectangle is divided into a top square and a bottom rectangle. The bottom rectangle is further divided into two smaller squares stacked vertically.

06, 09. Using grids as backgrounds to solve visual problems with areas or perimeters

6

Consider Picture A as the unit of area.
Fill in the table for Picture B and C.

Picture A

Picture B

Picture C

Area of picture B =

Area of Picture C =

Understanding a problem and explaining the way of finding the solution

02. Manipulating visual representations of quantities to find out solutions.

2

Between January and May, Richard's colleagues have collected 2000 bootles for recycling. Complete the table using the Copy tool, in such a way that April is the month with more bootles collected and January the month with less bootles. Choose different colours for these two months. In the text box on the right, explain the table.



January	
February	
March	
April	
May	

Table showing how many bootles Richard's school

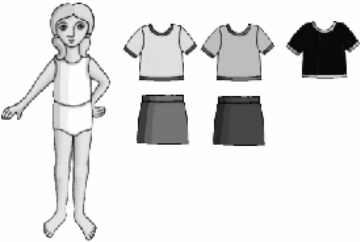


represents 100 bootles, on the table

04, 08, 10. Manipulating visual representations as a helper to explain the correct solution for every day problems

4

Diana has got 2 skirts: one red and another blue.
She has also 3 t-shirts: one yellow, one green and another black.
She is very proud, because she can dress a lot of different combinations.
How many different combinations do you think Diana can dress?



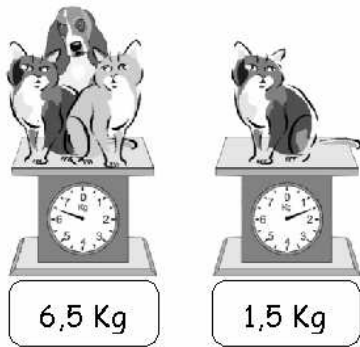
Explain how you found the solution.

[Empty box for writing the solution]

07, 13. Explaining about how the solution of a problem was found

13

Write a story, based on the pictures, about the weights of the two cats and the dog.

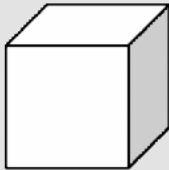


A large, empty rectangular box intended for writing a story.

05, 11. Describing mathematical entities by the use of clear sentences

11

Pick the phone and try to explain to a friend the geometric solid represented on Picture A, without using the word cube.



Picture A



Section Maths, Numbers and Operations

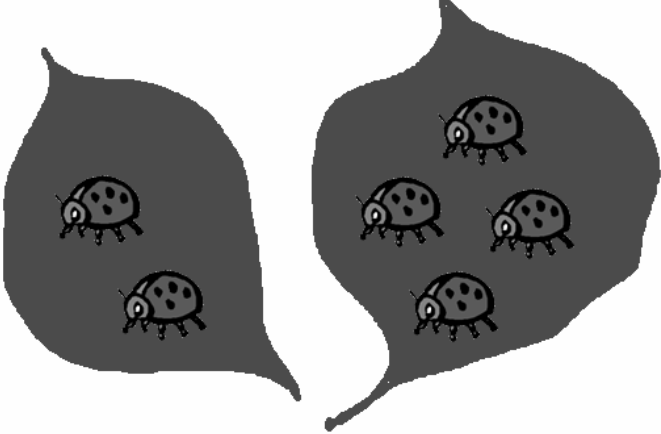
We can use drawing tools, objects and textboxes to represent numbers and operations on Creative Writing

Page 1



Numbers and operations

6

$1+5$
...

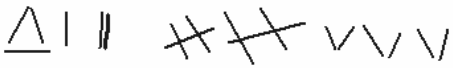


How many arrangements can you do with 3, 4, 5, 6 lady-birds?

	
3	?
4	?
5	?
6	?

Children can make different kinds of books with similar activities with numbers from six to 10 or any other quantities. Instead of leaves and lady-birds they can use lots of different representations. This is a way of writing coloured maths books that can be printed or simple shared between children.

Page 2

Numbers and operations		Invent different representations for the same number.	
6		7	
$3+1+2$	$3+3$	$2+2+2$	
8		9	

This is another variant of similar exercises that children can do with creative writing. Drawing different representations of the same number and using textboxes to write the correspondent equations is another possibility for children to make illustrated books about numbers.

Section Maths, the Shepard and the river



This is a logic problem presented as a story.

A Shepard has to traverse the river with a goat, a wolf and a basket of cabbages.

In the boat he can take with him only a thing each time. How to traverse everybody in such a way that the goat does not eat the cabbage and the wolf does not eat the goat?

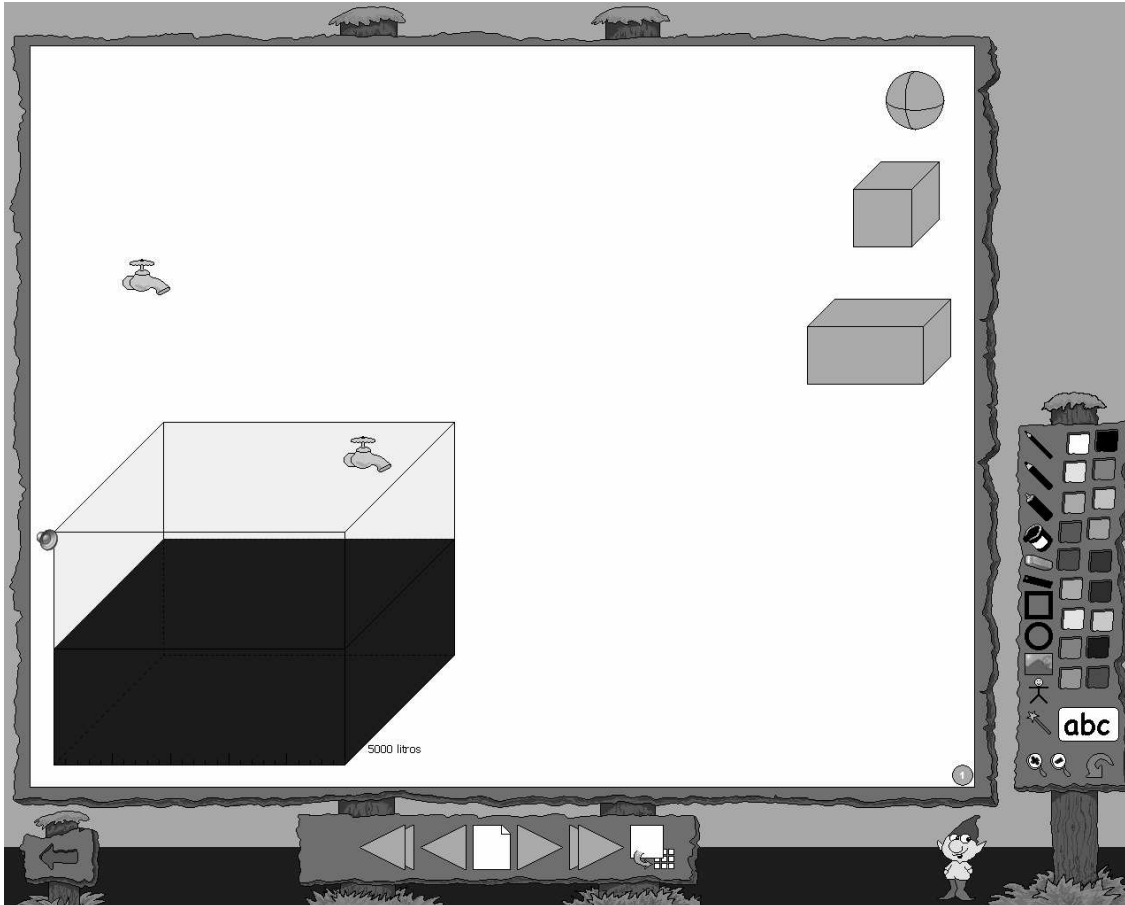
The solution can be tested with visual simulations.

After being found the correct answer an explanation can be written on the following pages like a logical narrative story.

Children can also invent and share others similar logical stories with different actors.

Section Maths, geometric solids

In this template, children can explore volumes of different solids, by putting them inside the vat where they can measure the volume of water. The shape of the solids can be changed to whatever you want, keeping in mind, that they will keep the previous volume.



Exercise of type 1

Try to find out the volume of each solid.

Exercise of type 2

Try to find out how many spheres, cubes, and so on you need to fill up the vat.

Exercise of type 3

Create a new object, like a stone. Using the increase/decrease tool on one of the solids, try to estimate the volume of this new object. When you think they are equivalent, you can make a copy of the equivalent solid and change its shape to the shape of the stone. You can now use the stone instead of the solid to estimate volume measures.

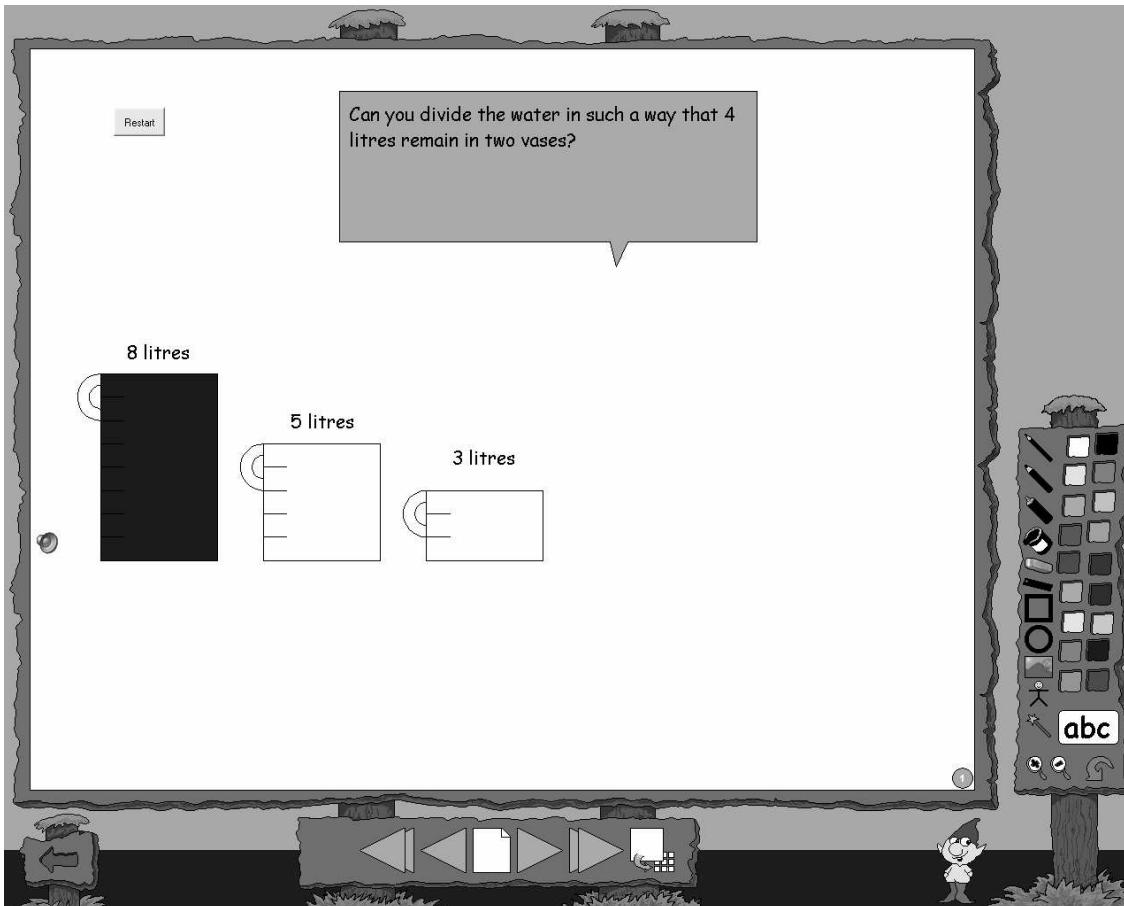
Exercise of type 4

In a new page describe your experiment, explaining your understandings of what you have simulated. You can also write about how the simulation reacts like a real one, or if you see differences or incorrect behaviours. Why do you think that there are incorrect behaviours on the simulation? What should be done to avoid inaccuracies?



Section Maths, in the oil-press

In this template children can explore the measures of capacity. There are three containers: one of 8 litres plentiful of oil, one of 5 litres (empty) and another of 3 litres. The owner of the oil-press needs to divide the oil for two clients in two equal parts of 4 litres each. How to solve the problem with only the three containers?



Exercise of type 1

Try to find out the solution by simulation.

Exercise of type 2

On page 2 write a story about the owner of the oil-press and how he solved the problem.

Exercise of type 3

Can you invent similar stories, with wine or milk and different measures of capacity.