

The land of Oct



Category	Choices
Title	The land of Oct - Het land van Oct - It lân fan Okt
Objective	With this activity, pupils learn to count in the octal number system and become aware of other cultures.
Target group	First grades of secondary school
Subject	English Mathematics
Duration	45-55 mins
Link to curriculum	Linguistics
Languages	Frisian, Dutch, English
Link to FREPA	Knowledge about cultural differences Knowledge about languages in Fryslân, Europe and the world
Skills	Speaking
Theoretical support	Language awareness, language comparison
Activity description	<p>Step 1: Introduction (slide 2 and 3) (5-10 mins)</p> <ul style="list-style-type: none"> • There is a land, far away from here, called the land of Oct. The people in the land of Oct look a lot like us. They have two ears, two eyes, two arms and two legs. But they have eight fingers instead of ten! This might look like an insignificant difference, but it has had a lot of influence on the number system of the country. Listen to this: A man from the land of Oct asks the greengrocer: 'How much for your apples today?' 'Seven-oct-three per case.' Says the greengrocer. • Talk about the objective of the lesson: I know what the decimal system is, and I can convert this knowledge into an octal system. I am learning to do maths with other number systems. <p>Step 2: Instruction (slide 4 and 5) (10 mins)</p> <ul style="list-style-type: none"> • The decimal system consists of units, tens, hundreds, thousands, etc. You could also call this the building blocks of our number system. With them, it all falls apart. The metric system is also built on the decimal system (factor 10). • Het land of Oct uses the octal system. To make things easier for us, we use the symbols that we're used to (see table in PowerPoint). • >What do you call '100' in the land of Oct? Let your students think of words that suit the featured language and the octal system. For example, 'plate' (1 plate = 10 oct = 100) • Count further on until you reach seven-'plate'-seven-oct-seven. • >What comes after 777? What do you call that number? Again, let the students think of a word that suits the language and the octal system. For example, 'box' (1 box = 10 plate = 100 oct = 1000) • Write the words you came up with, in the table on your worksheet (exercise 1).

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Activity description	<p>Step 3: Practice (slide 6) (10-15 mins)</p> <ul style="list-style-type: none">• Go through the exercises on the worksheet. What do the students have to do for each exercise. Give more instruction when needed. <p>Step 4: Application (slide 7) (15 mins)</p> <ul style="list-style-type: none">• The students now think of their own system. They give their system a name and a country and describe the 'units', 'tens', 'hundreds', etc. They can use the backside of the worksheet.• When they are finished with developing their system, they think of a variation of equations for their neighbour to solve. Require a minimum amount of equations before they switch.• Let the students switch systems. They must try to understand each system and try to solve the equations. <p>Step 5: Evaluation (5 mins)</p> <ul style="list-style-type: none">• Talk about the lesson: What went well? What was difficult/easy? Did you reach the objective? Etc.
Materials	<ul style="list-style-type: none">• PowerPoint presentation 'The land of Oct'• Work sheet - The land of Oct• Answer sheet - The land of Oct
Tips	<ul style="list-style-type: none">• The lesson is suitable as preparation for doing math with the binary system.• The assignment in step 4 can also be given as a homework assignment.

Work sheet - The land of Oct

Exercise 1: Structure of the decimal and octal system

Fill in the empty brackets:

Decimal system	Octal system
Units (1-9)	Units (1-)
Tens (10-90)	Octs (..... -)
Hundreds (100-900)
Thousands (1000-9000)
Factor 10	Factor

Exercise 2: Write the numbers

Write the numbers fully down from the octal system.

For example: 17 = oct-seven of 20 = two-oct

16 =	100 =	1000 =
10 =	123 =	
4 =	257 =	4300 =
27 =	640 =	
35 =	776 =	7777 =

Exercise 3: Translate the numbers

On the left you see decimal numbers between 1 and 800. Translate these numbers to octal numbers.

For example: 16 = 20, want 8 = 10 ... 32 = 40 dus 34 = 40 + 2 = 42

Tip: Use the factor!

8 =	9 =	152 =
24 =	27 =	231 =
56 =	38 =	473 =
72 =	80 =	630 =
96 =	99 =	800 =

Exercise 4: Solve the equations

You now know how to translate decimal numbers to octal numbers. That can help you with solving the equations. Start with translation the numbers, then solve the equation.

8 + 8 =	16 - 8 =	4 x 4 =
14 + 5 =	27 - 3 =	8 x 9 =
23 + 76 =	187 - 56 =	23 x 13 =
144 + 83 =	452 - 300 =	16 : 4 =
400 + 34 =	1000 - 437 =	48 : 6 =

Answer sheet - The land of Oct

Exercise 1

Decimal system	Octal system
Units (1-9)	Units (1- 7)
Tens (10-90)	Octs (10 - 70)
Hundreds (100-900)	(1) Own answer (100-700)
Thousands (1000-9000)	(2) Own answer (1000-7000)
Factor 10	Factor 8

Exercise 2

Look at the table (exercise 1) for the correct answers

16 = Two-oct	100 <i>Example: 'Plate' (1)</i>	1000 <i>Example: 'Box' (2)</i>
10 = Oct-two	123 = (1)-two-oct-three	
4 = Four	257 = Two-(1)-five-oct-seven	4300 = Four-(2)-three-(1)
27 = Two-oct-seven	640 = Six-(1)-four-oct	
35 = Three-oct-five	776 = Seven-(1)-seven-oct-six	7777 = Seven-(2)-seven-(1)-seven-oct-seven

Exercise 3

8 = 10	9 = 11	152 = 190
24 = 30	27 = 33	231 = 285
56 = 70	38 = 46	473 = 581
72 = 90	80 = 100	630 = 786
96 = 120	99 = 123	800 = 1000

Exercise 4

D = decimal O = octal

D	O	D	O	D	O
8 + 8	= 10 + 10 = 20	16 - 8	= 20 - 10 = 10	4 x 4	= 4 x 4 = 16
14 + 5	= 16 + 5 = 21	27 - 3	= 33 - 3 = 30	8 x 9	= 10 x 11 = 110
23 + 76	= 27 + 94 = 121	187-56	= 233 - 70 = 163	23 x 13	= 27 x 15 = 405
144 + 83	= 180 + 103 = 293	452-300	= 564 - 374 = 190	16 : 4	= 20 : 4 = 5
400 + 34	= 500 + 42 = 542	800-437	= 1000 - 545 = 455	48 : 6	= 60 : 6 = 10