2

Learn & Explore

MATHEMATICS

ELEMENTS
LEARNING SYSTEM

Benchmarks

Grade 1-2-3

Numbers, Data & Measurements

[Number] Students will be able to demonstrate knowledge of place value (up to 4 digit numbers); represent whole numbers with words, diagrams, number lines, or symbols; order and compare numbers.

They will add and subtract numbers up to 4-digit numbers; multiply (up to 3-digit numbers with 1-digit) and divide (3-digit by 1-digit number). Solve problems involving odd and even numbers, addition, subtraction, multiplication and division of numbers (involving missing numbers, money, quantities and measures), round numbers to nearest tens, hundreds and thousands and make estimates.

[Measurements] Students will be able to measure, compare and order mass (kilograms/grams/milligrams),

They would also solve problems involving weight/mass, and time (including addition and subtraction).

Read, write and compare time (hours and minutes);

[Data & Stat] Read and interpret data from pictographs, bar graphs, tally charts, block graphs and Carroll diagrams.

Organize and represent data using pictographs, bar graphs, tally charts, block graphs and Carroll diagrams to answer questions.

Describe the probability of an event.

Fractions

Recognize fractions as parts of wholes or collections; represent fractions using words, numbers, equivalent fractions in simplest form; compare and order simple fractions; add and subtract simple like and unlike fractions, including those set in problem situations.

Demonstrate knowledge of decimal place value to the tenth.

Geometry

[Geometry] Students will be able to use properties to describe and compare three dimensional shapes (cube, cuboid, cone, cylinder, sphere, prism and pyramids) and relate those with two dimensional shapes; differentiate and classify polygons.

Identify parallel and perpendicular lines; reflective symmetry, right angles and angles smaller and larger than a right angle; positions, directions and movements, centre, radius, and diameter of a circle.

[Measurements] Students will be able to measure, compare and order

lengths (Kilometers/meters/ centimeters),

capacity (liters/ milliliters);

They would also solve problems involving length and capacity (including addition and subtraction). Measure area and perimeter using square grids.

Algebra

Students will be able to analyze and complete geometrical and number patterns; find the missing number or operation in a number sentence.

MISTAKES + ALLOW - x =

THINKING TO HAPPEN % <

Unit: 1

The Fundamentals of Numerals and Symbols

Learning Objectives:

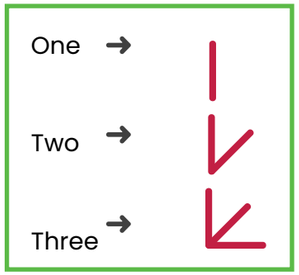
- Read and write Roman numbers up to 12.
- Recognize the place value in 3-digit numbers.
- Compare and order numbers up to 999.
- Count numbers up to and across 999 (3-digit numbers) forwards and backwards, beginning from zero or one, or from any given number.
- Count and write in 10s and 100s.
- Count backward in tens from any given number.
- Recognize the position of objects and write it using ordinal numbers up to 20.

Vocabulary:

Symbol | Figure | Numeral | Place Value | Greater than | Less than

Writing Numbers in Figures (Symbols & Numerals)

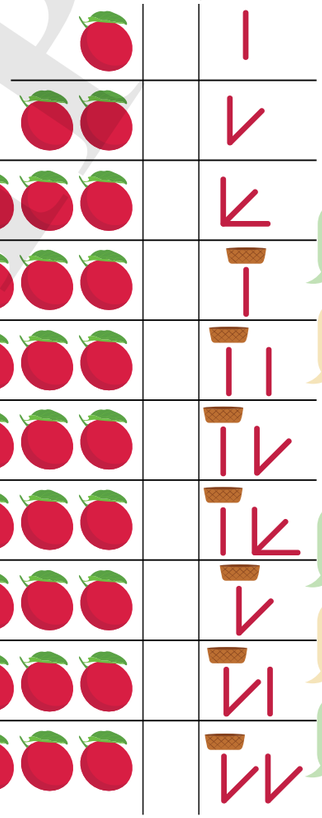
An “Amazon” tribe had only symbols for one, two & three



How would they write up to ten?

Counting

PASSION FRUIT



No symbol for four so we make basket (group)

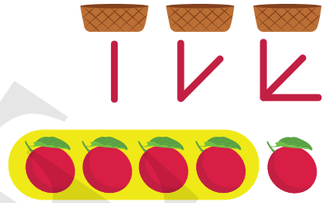
Five is ONE basket and ONE. (BASKET ON LEFT FOR CONVENTION)

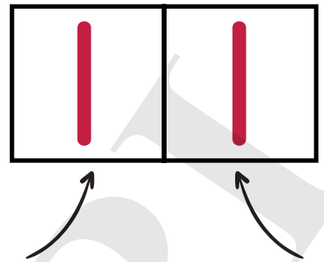
Here we have two baskets

Two baskets and one

Two baskets and two

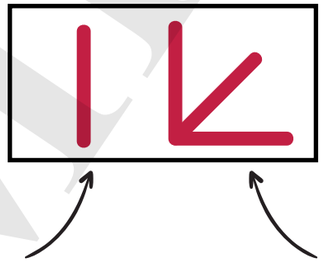
Why not make baskets and have a place value for baskets rather than making more symbols?





This place is for basket.

First place is fixed for units



One basket of fruits

Three fruits (units)

So  is Seven

What does  indicate?

HINT:

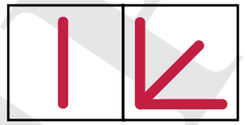
How many units? How many baskets?

When there are NO UNITS, Only Baskets

How will Amazon tribe write twelve?

Let's make groups of four i.e. three baskets(groups), and NO UNITS

Why groups of four? Why not of three?



Baskets

(three baskets)

if we write it _____

Units

(first place is for units)

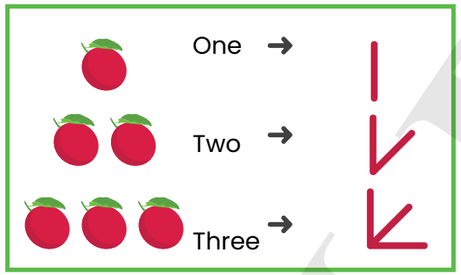
For units we have left a space

This may cause an error or confusion

So we write ZERO for that space

THREE BASKETS NO UNITS

Finally the Amazon Tribe would write (numerals) for numbers, like the following:



(Numbers)

No. of fruits (Numerals)	
One	
Two	
Three	
Four	
Five	
Six	
Seven	
Eight	
Nine	
Ten	
Eleven	
Twelve	

and so on

Number Making Activities

A 'penta' tribe has only four symbols.

Can you make(write) numerals for them.
Their symbols are:

One → |

Two → =

Three → ≡

Four → +

(Numbers)

No. of fruits (Numerals)	
Nil	○
One	▲ |
Two	▲▲ =
Three	▲▲▲ ≡
Four	▲▲▲▲ +
Five	▲▲▲▲▲
Six	▲▲▲▲▲▲
Seven	▲▲▲▲▲▲▲
Eight	▲▲▲▲▲▲▲▲
Nine	▲▲▲▲▲▲▲▲▲
Ten	▲▲▲▲▲▲▲▲▲▲
Eleven	▲▲▲▲▲▲▲▲▲▲▲
Twelve	▲▲▲▲▲▲▲▲▲▲▲▲

Number-writing activities

How can "binary" tribe write their numbers? They have only two symbols.

Nothing => 0 (zero)

One => 1

Write their numerals. (use Numbers-Numeral sheet on next page)

.....

You are "urban" tribe and have ten symbols.

Write your numerals on Numbers-Numeral sheet on next page

Symbols

Nothing => 0

One => 1, two => 2, three => 3,

Four => 4, five => 5 , six => 6,

seven => 7, eight => 8, nine => 9,

.....

Coin your own numeral (activities)

Name you tribe:_____

How many symbols you choose to have?

Write your numerals

(use Numbers-Numeral sheet on next page)

Zero => 0

One => _____

Two => _____

____ => _____

Numbers > Numerals

What are your symbols?

Numbers (Numerals)		
Nil		
One	▲	
Two	▲ ▲	
Three	▲ ▲ ▲	
Four	▲ ▲ ▲ ▲	
Five	▲ ▲ ▲ ▲ ▲	
Six	▲ ▲ ▲ ▲ ▲ ▲	
Seven	▲ ▲ ▲ ▲ ▲ ▲ ▲	
Eight	▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲	
Nine	▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲	
Ten	▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲	
Eleven	▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲	
Twelve	▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲	

What strategy did you apply?

Roman Numerals

Introduce roman numerals and ask students what pattern they observe in them what rules are being followed.

When a smaller numeral is placed before a larger numeral, it is subtracted.

When a smaller numeral is placed after a larger numeral, it is added.

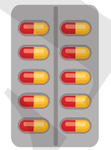
1 = I	7 = VII
2 = II	8 = VIII
3 = III	9 = IX
4 = IV	10 = X
5 = V	11 = XI
6 = VI	12 = XII

Real life Examples of Bundling

MEDICINE

Carton of 1000s

Packet of 100s



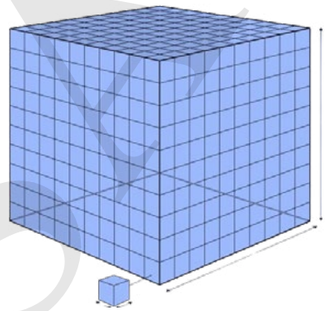
Strip of 10s

Tablets

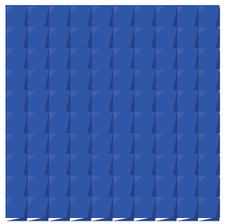
units

MONEY

NUMBER BLOCKS



Cube (1000s)

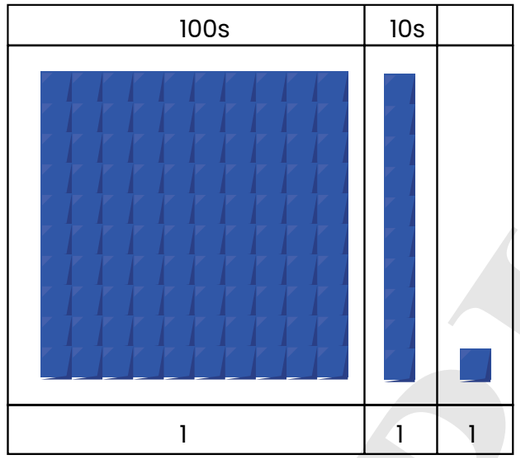


Fat (100s)

Long (10s)

Unit

Why we call it place value system?



PLACE VALUE
PLACE of digit tells is value.

First digit place is for UNITS.

Second-digit place is for TENS.

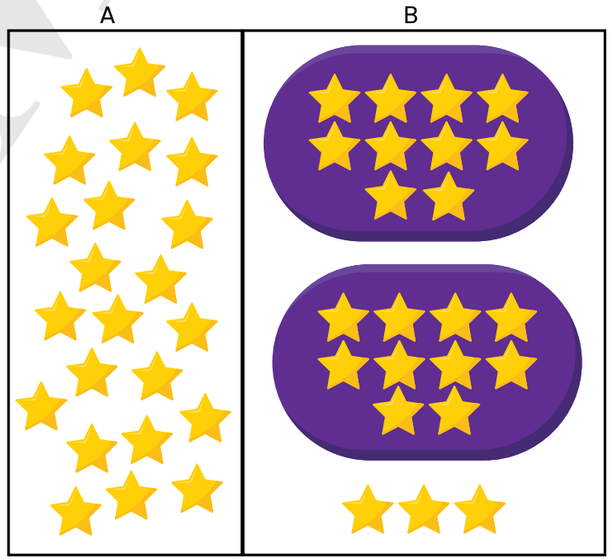
Third-digit place if for HUNDREDS.

One hundreds *One tens* *one unit*

Solve **Question 1** from **Exercise 1**

Count the following sets

Which set A or B was easier to count and why?



Comparing 3-Digit Numbers

A game for two players

You will need:

- Game cards: Page V (End of the book)
- Scissors

- Cut out the number cards.
- Place them face down on the table and mix them up.
- Both players pick up a card and turn it over at the same time.
- They both look at the numbers.
- The player whose number is greater says:
- _____is greater than_____
- The player whose number is less says:
- _____is less than_____.
- The player who speaks first claims both number cards.
- The winner is the player who collects the most cards..

Solve **Question 4** from **Exercise 1**

Compare the following numbers using symbols <, >, and =.

1.	100	____	90	1.	156	____	266
2.	762	____	651	2.	101	____	110
3.	530	____	521	3.	611	____	599
4.	887	____	998	4.	46	____	460
5.	675	____	608	5.	260	____	260

Skip Counting: 2s, 5s, and 10s to 100

A game for two players

You will need:

- Game board: Page VI (End of the book)
- A counter for each player
- A 1-6 dice
- A 100 square

- Place your counter on the 'Start' square.
- Roll the dice and move your counter that number of spaces.
- When you land on an instruction square, count out loud as told.
- If you count correctly, move ahead one space. Otherwise, stay where you are.
- The game ends when someone reaches the 'Finish' square. The first one to do so is the winner.

Ordering & Comparing Numbers Using Place Value

A game for two players

You will need:

- Game board
- A counter
- A 'Player card' for each player
- A 1-6 dice
- Two or three sets of Place value cards
- (2) A set of 'Less than/greater than' cards

Game 1:

- Players place their counter on 'Start'. They take turns to roll the dice and move their counter that number of spaces. Players collect the Place value card matching the numbers they land on. Players cannot collect more than one copy of each card, so if they land on a space of a card they already have, they do not collect a card.
- When they reach 'Finish', they use their place value cards to make the numbers requested by the Player cards. Players score a point if their number is the closest or highest.
- The winner is the player with the most points.

Game 2:

As Game 1 until players reach 'Finish'. They then use their cards to create number sentences using the Less than/greater than cards. The winner (or winners) is the player who uses all their cards in correct number sentences.

Solve **Question 5** from **Exercise 1**

Order the following numbers on your notebook in ascending order.

- 204,345, 219, 478, 532
- 583, 726, 419, 867
- 941, 123, 897, 456
- 654, 289, 715, 832
- 573, 426, 389, 647
- 102, 110, 201, 210

Ordinal Numbers

A game for the whole class

You will need:

- Ball or a parcel that can be thrown

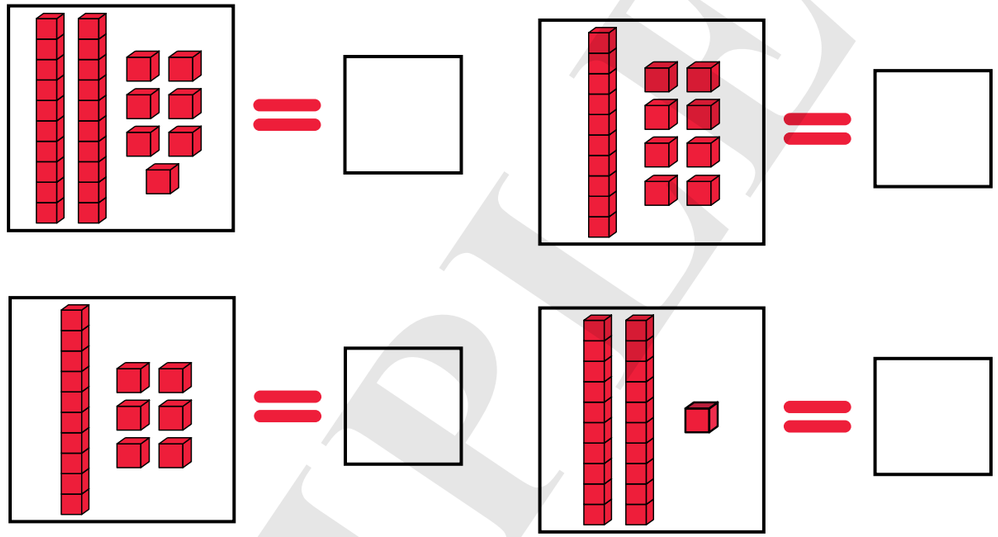
- Ask all students to sit in a line.
- Start at one point and that student is first in line.
- Say different numbers such as the 5th one and the student with the ball in their hand, will throw it to the 5th students.
- Repeat for many numbers up to 20.

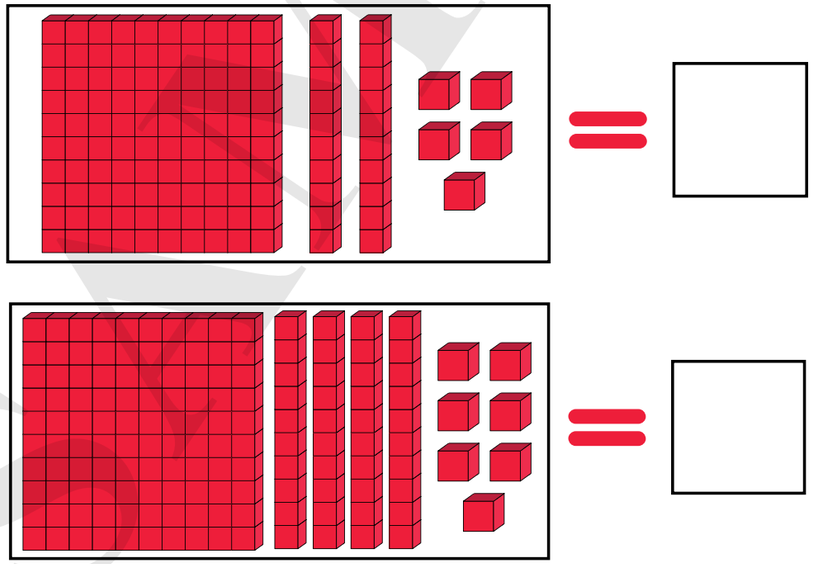
Order the following numbers on your notebook in ascending order.

- 1st _____
- 2nd _____
- 3rd _____
- 4th _____
- 5th _____
- 6th _____
- 7th _____
- 8th _____
- 9th _____
- 10th _____
- 11th _____
- 12th _____
- 13th _____
- 14th _____
- 15th _____
- 16th _____
- 17th _____
- 18th _____
- 19th _____
- 20th _____

Exercise 1

Question 1: Write the following base-10 block figures into numerals.





Exercise 1

Question 2: Fill in the blanks.

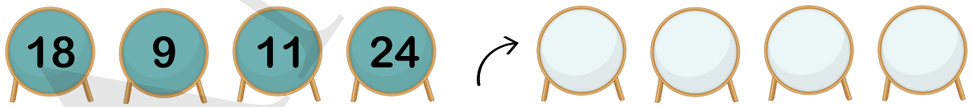
				46					
					901				
				560					
					203				
				497					
					641				
				132					

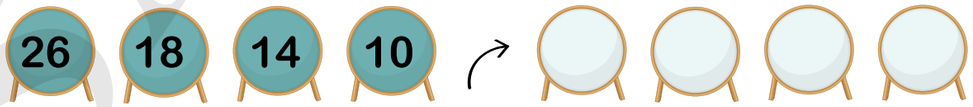
Question 3: Write the following numbers in words.

- 92 _____
- 84 _____
- 73 _____
- 54 _____
- 26 _____
- 61 _____
- 35 _____
- 16 _____
- 99 _____
- 48 _____

Exercise 1

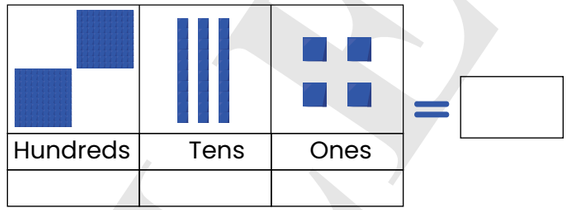
Question 4: Write the numbers from smallest to biggest.

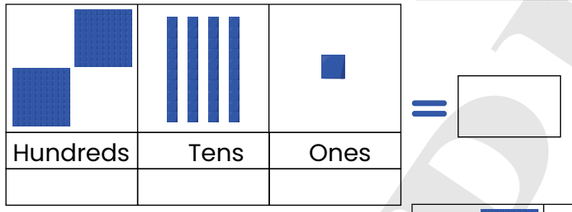


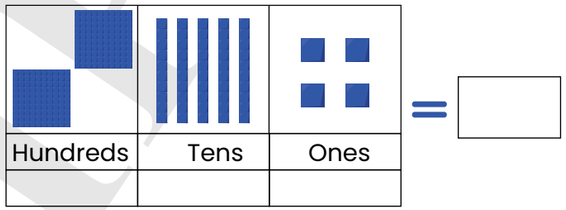


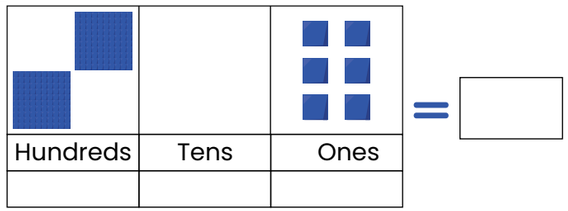
Exercise 1

Question 5: Write the following base-10 block figures into numerals and fill in the place value blanks.









References:

https://youtu.be/lzRGl0b61ug

https://youtu.be/Awth8srDk0g

https://youtu.be/GjHZxtf0tRs

Unit: 2

Money Maths and Estimation

Learning Objectives:

- Identify international currency and denominations.
- Adding numbers up to 25 on a numberline.
- Mentally adding numbers up to 20.
- Adding and subtracting in ones and tens.
- Patterns in a 100 grid.

Vocabulary:

Currency | Notes | Addition | Mental Math | Denomination

وطن ہمارا آزاد کشمیر

وطن ہمارا آزاد کشمیر، آزاد کشمیر، آزاد کشمیر

وطن ہمارا آزاد کشمیر، آزاد کشمیر، آزاد کشمیر

باغون اور بہاروں والا دریاؤں کوہساروں والا

آسمان ہے جس کا پرچم پرچم چاند ستاروں والا

جنت کے نظاروں والا جموں اور کشمیر ہمارا

وطن ہمارا آزاد کشمیر، آزاد کشمیر، آزاد کشمیر

وطن ہمارا آزاد کشمیر، آزاد کشمیر، آزاد کشمیر

کوہستانوں کی آبادی پہن چکی تاجِ آزادی

عزت کے پروانے جاگے آزادی کی شمع جلادی

جاگ اٹھی ہے ساری وادی ضامن ہے اللہ تمہارا

وطن ہمارا آزاد کشمیر، آزاد کشمیر، آزاد کشمیر

وطن ہمارا آزاد کشمیر، آزاد کشمیر، آزاد کشمیر

کر کے لالچ کیوں او شیطاں کیوں بچیں ہم دین و ایماں

پاکستان کے ساتھ کھڑے ہیں عزت حرمت حکمِ قرآں

جان بھی قربان مال بھی قرباں مال سے پیارا جان سے پیارا

وطن ہمارا آزاد کشمیر، آزاد کشمیر، آزاد کشمیر

وطن ہمارا آزاد کشمیر، آزاد کشمیر، آزاد کشمیر

قومی ترانہ

پاک سرزمین شاد باد　　کشورِ حسین شاد باد
تُو نشانِ عزمِ عالی شان　　ارضِ پاکستان!
مرکزِ یقین شاد باد

پاک سرزمین کا نظام　　قوّتِ اُخوّتِ عوام
قوم، ملک، سلطنت　　پائندہ تابندہ باد!
شاد باد منزلِ مراد

پرچمِ ستارہ و ہلال　　رہبرِ ترقّی و کمال
ترجمانِ ماضی، شانِ حال　　جانِ استقبال!
سایۂ خدائے ذوالجلال