Maths and Calculations Policy

Date: July 2023

Review date: July 2024

Approved by the Advisory Board: July 2023

Signed

S. Dag—

Version Control

Version	Date of review/change(s)	Page and paragraphs affected	Summary of update
New policy	July 2023		

Intent

Our vision for maths at All Saints School is for every students' maths learning to support their unique journey in education and develop their maths skills for life. Our aim is for students to have developed secure numeracy skills to allow them to access the next stage of education that they would like to follow as well as give them the mathematical and problem solving skills that will support them in adult life.

Many students starting at All Saints have gaps in their maths education and also lower reading abilities which makes accessing the reading of maths material difficult.

The teaching of maths at All Saints School is student focused to ensure students feel comfortable, confident and secure in their maths class while at the same time ensuring students follow a learning path that ensures they achieve the best possible outcome and results in their maths to help them take their next steps in both education and life.

Implementation

To achieve this in KS2 and KS3 maths is taught in "stages" (based on students' current mathematical understanding) rather than in year groups. This allows teaching to be focused at a level appropriate to students and allows teachers to support any gaps in understanding, misconceptions and allows for consolidation of topics.
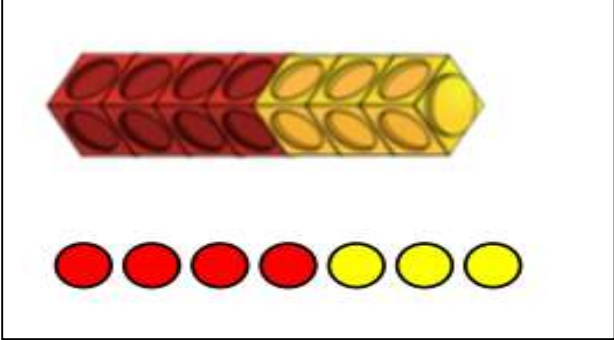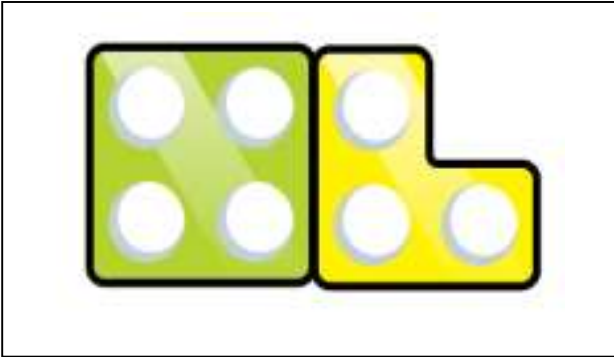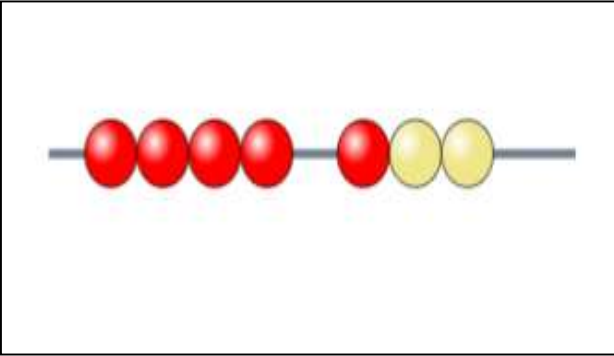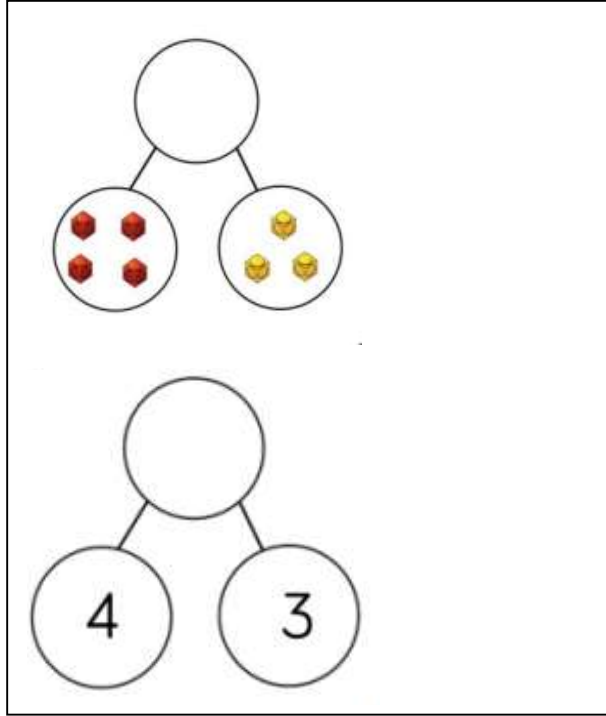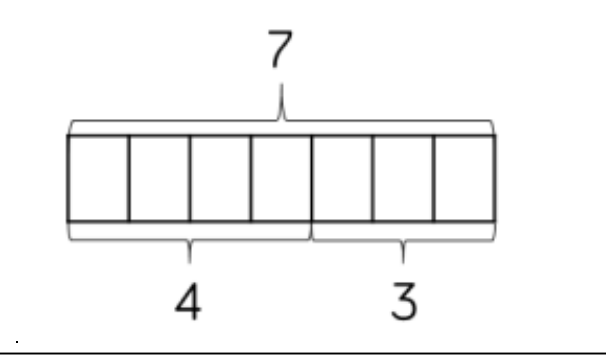
Students build on their knowledge as they move through the stages (there are 6 stages in KS2/KS3). Students begin at the school at the stage which is appropriate for them and progress through the stages based on the development of their own mathematical knowledge. This method of teaching ensures students' progress at the rate that is right for them and each student reaches their full potential.

We see Key Stage 4 as a natural continuation from KS3. Students continue to learn maths based on the stage they were at the end of KS3. A further 2 stages cover GCSE maths topics for the Foundation and Higher papers. This allows students to follow the path that is right for them so that students are entered into the most suitable maths qualification for them. Students are able to take the Functional Skills (Entry Level, Level 1 or Level 2) and/or the Edexcel Level 1/Level2 GCSE (9 to 1) examinations.
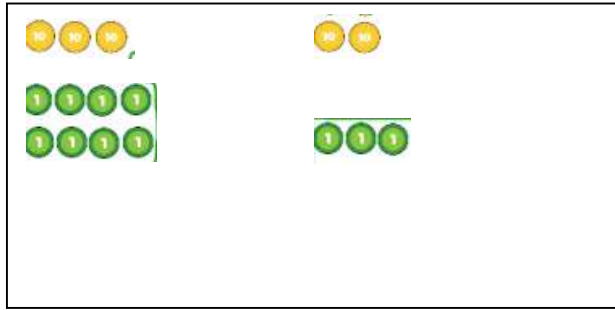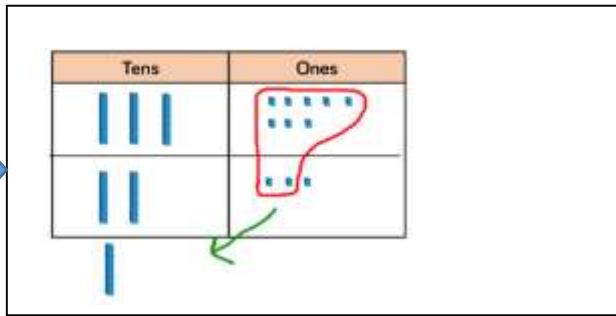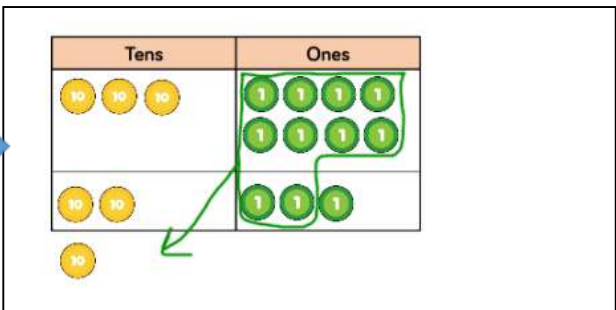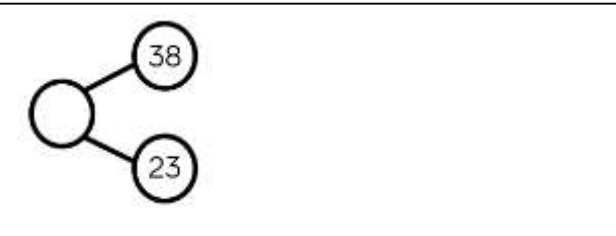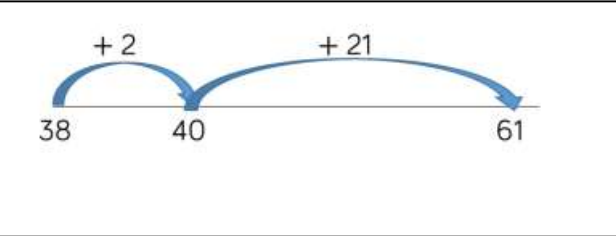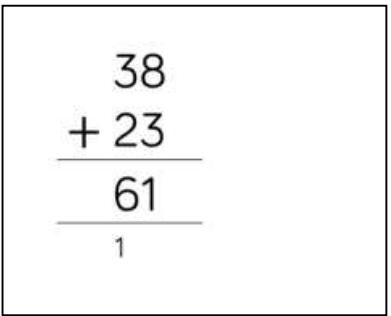
For teaching KS2 and some KS3 maths we use the White Rose Maths resources which follow a mastery approach using concrete, pictorial and abstract techniques to develop students understanding of topics. Appendix one sets out our calculation policy giving guidance on the techniques used to teach students.
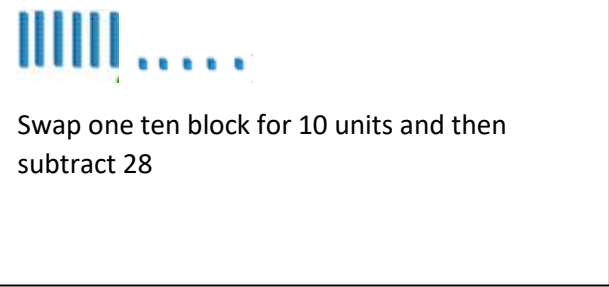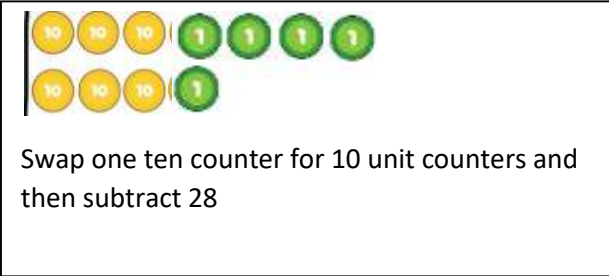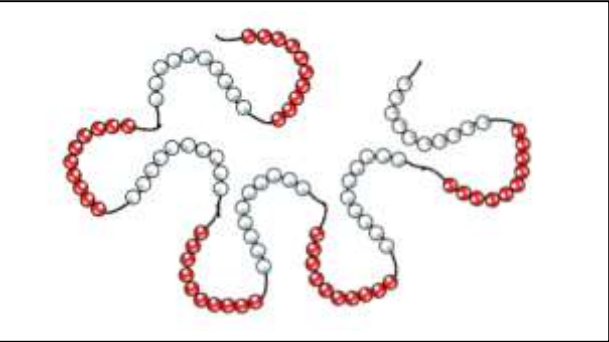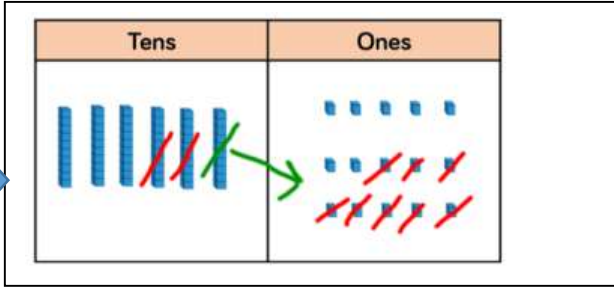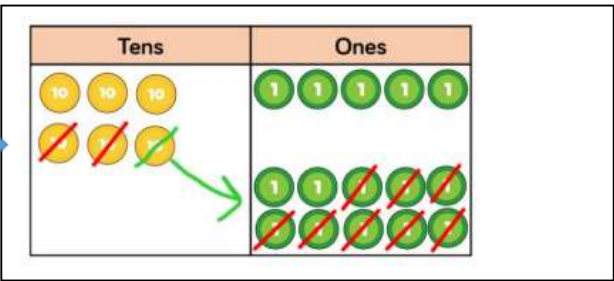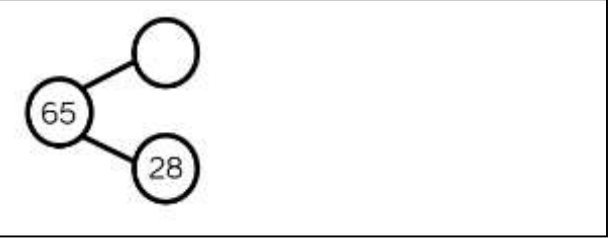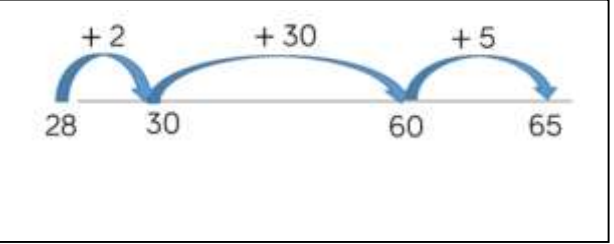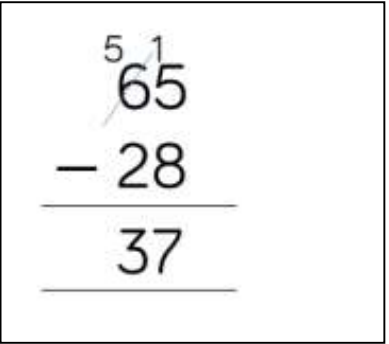
Impact:

Students complete lesson reflections and RAG their effort and understanding at the end of each lesson which allows them to reflect on what they have achieved in the lesson. Teachers also RAG the lesson objectives. Benchmark assessments are completed by students at the beginning and the end of core numeracy topics. These assessments evidence that progress that students are making. A year-end assessment will also track students' progress over the year and assess their readiness to move to the next stage.

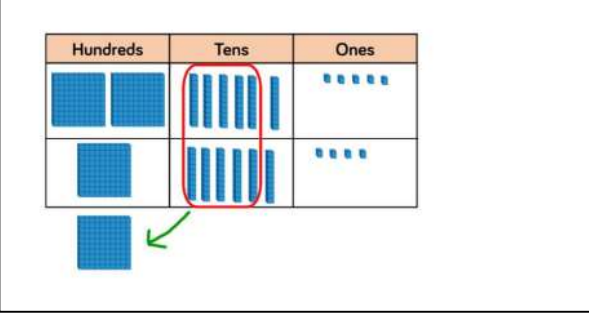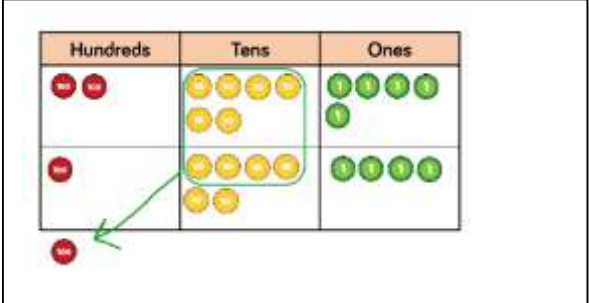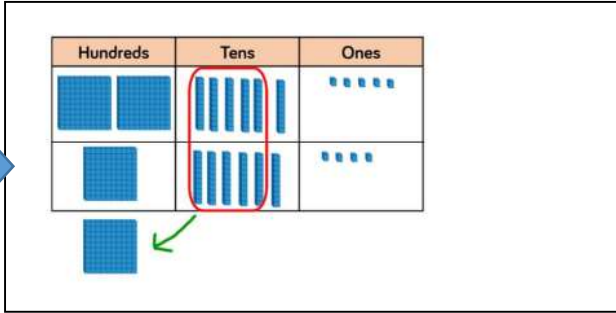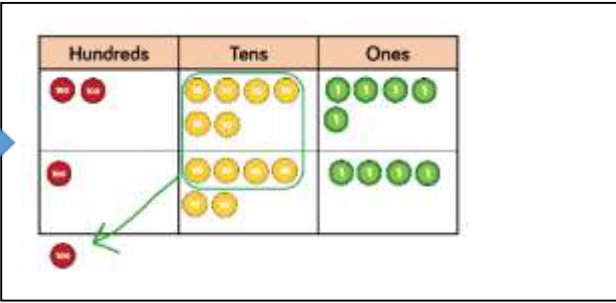| Objective	Concrete	Pictorial	Abstract
Students will understand number bonds up to 100 Number bonds let students split number in useful ways. Example: 3 + 4 = 7	Counters/cubes Numicon Beads Note: for 2-digit numbers dienes may also be used.	Part whole model Bar model 	Seven (7) can be split different ways: 1 and 6 2 and 5 3 and 4
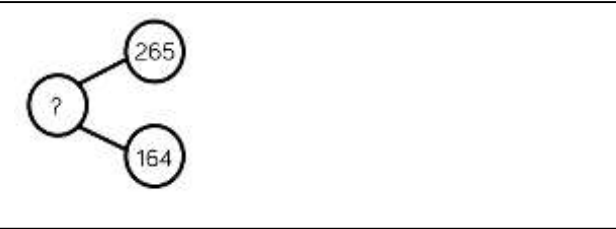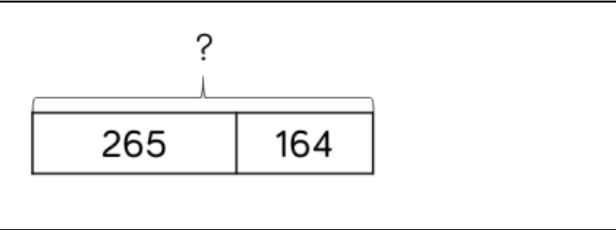
STAGE A – Addition and Subtraction

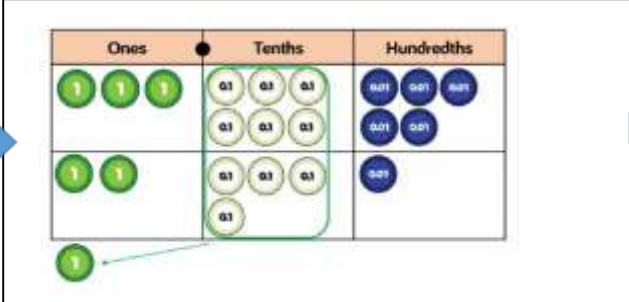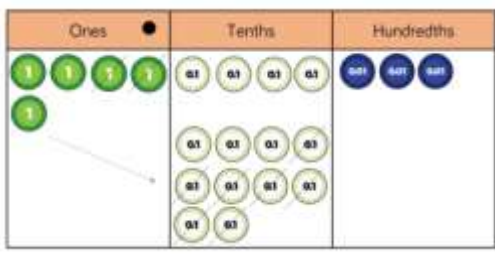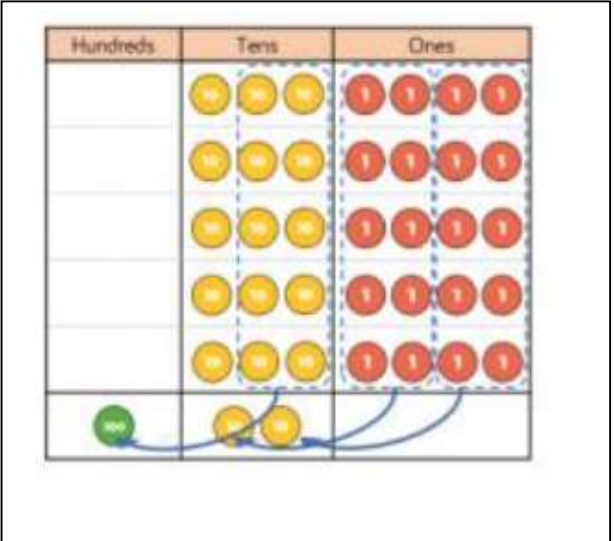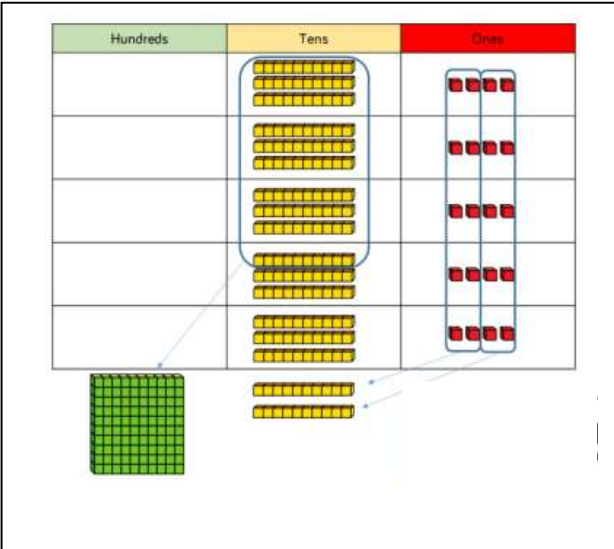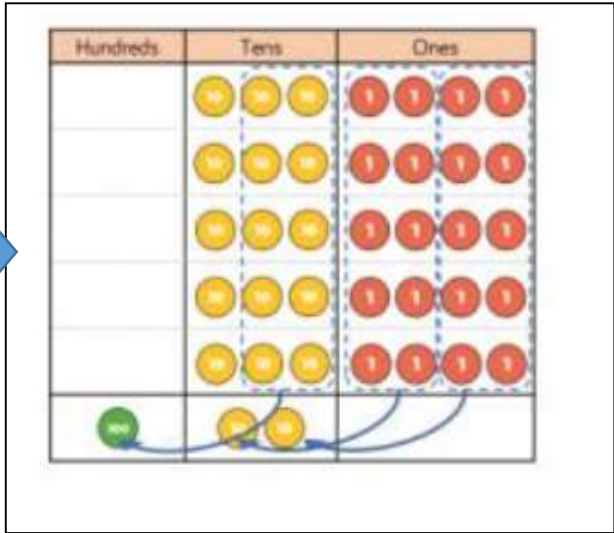| Objective	Concrete	Pictorial	Abstract
Students will be able to add up to 2 digit numbers from 2 digit numbers with 1 exchange. Example: 38 + 23 = 61	**Dienes** **Counters** 	**Draw dienes on PV chart** **Draw counters on PV chart** **Part Whole Model** **Number Line** 	**Column Method**
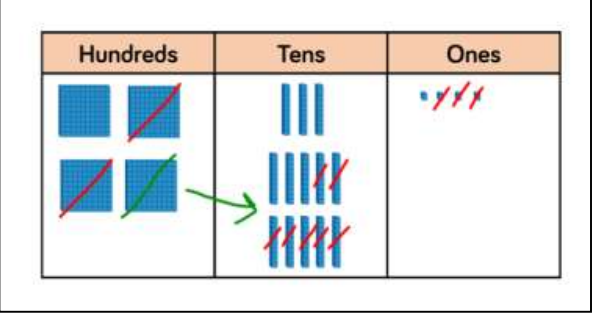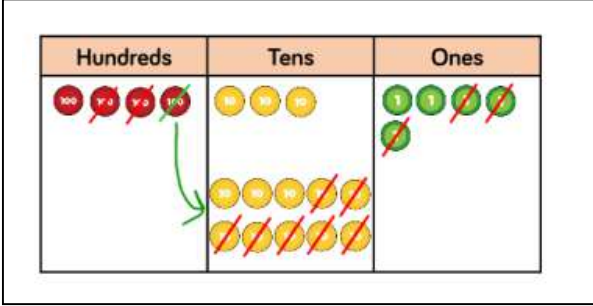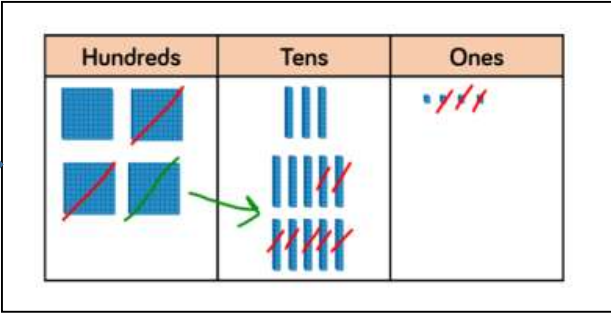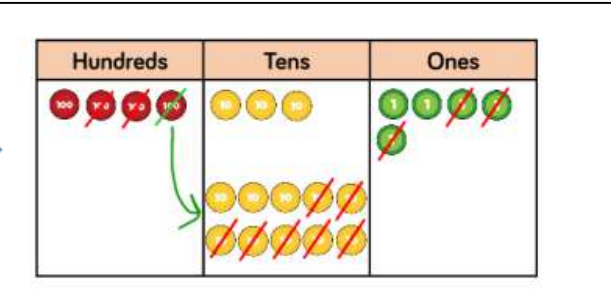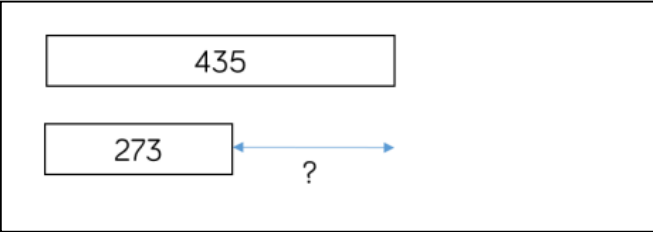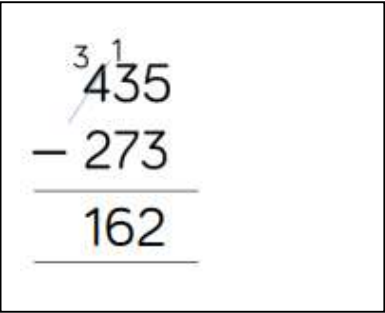
STAGE A – Addition and Subtraction

Objective	Concrete	Pictorial	Abstract
Students will be able to subtract up to 2 digit numbers from 2 digit numbers with 1 exchange. Example: 65 - 28 = 37	**Dienes** Swap one ten block for 10 units and then subtract 28 **Counters** Swap one ten counter for 10 unit counters and then subtract 28 **Beads** 	**Draw dienes on PV chart** **Draw counters on PV chart** **Part Whole Model** **Number Line** 	**Column Method**
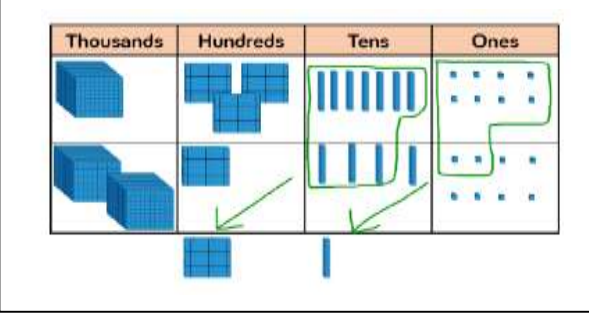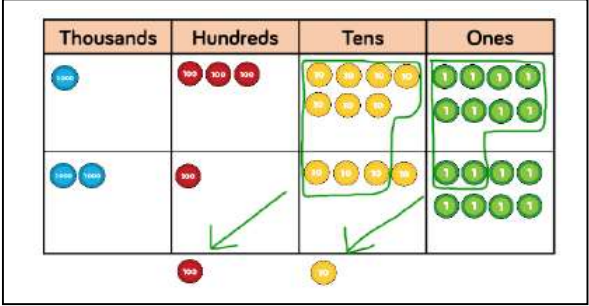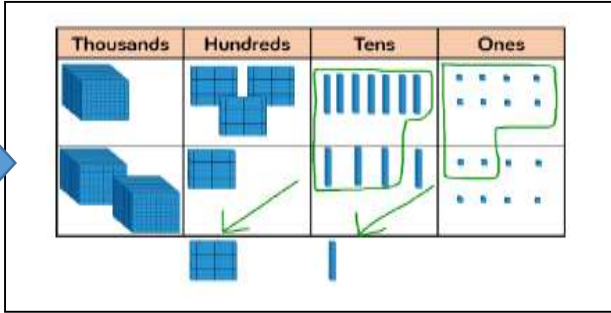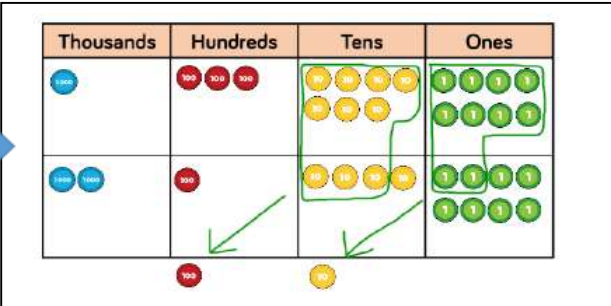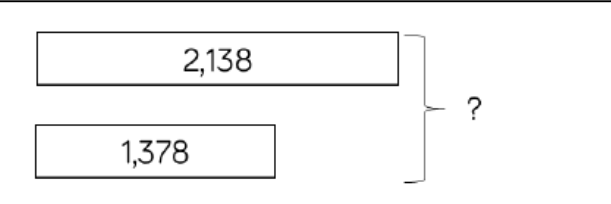
STAGE B – Addition and Subtraction

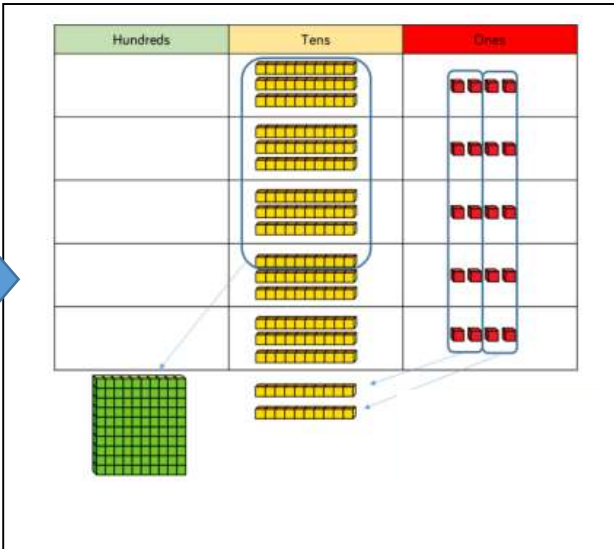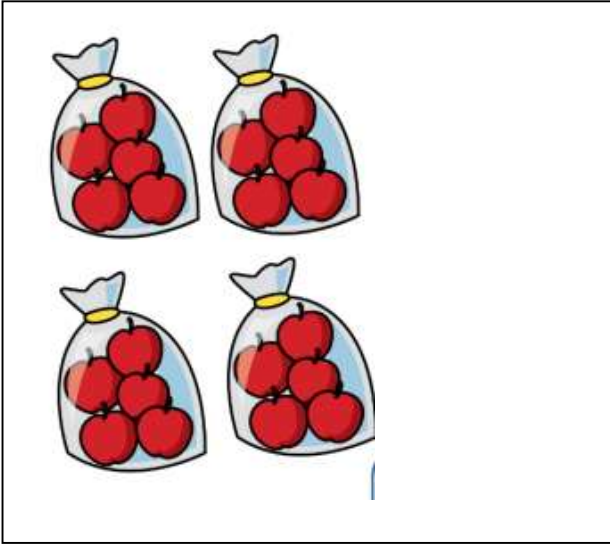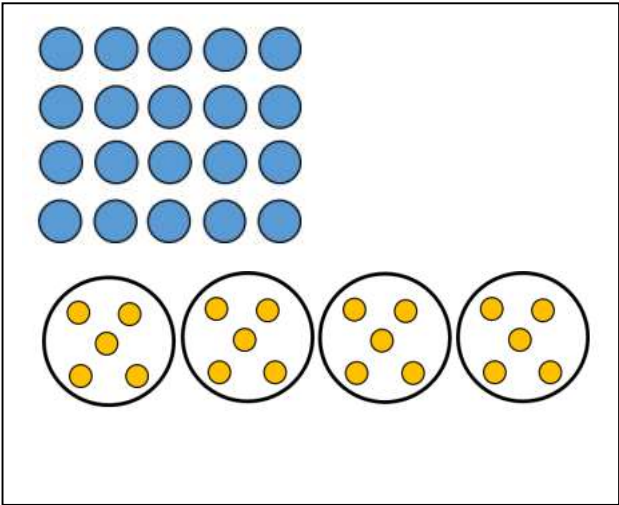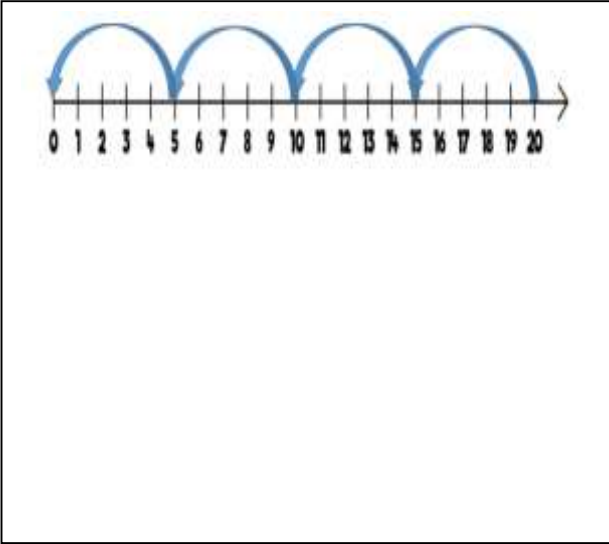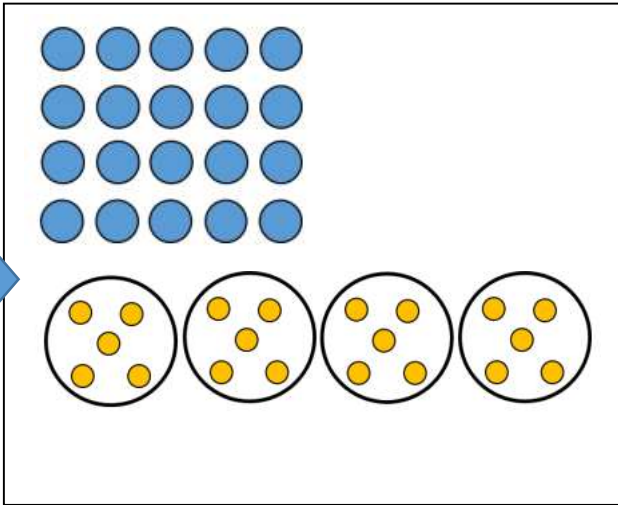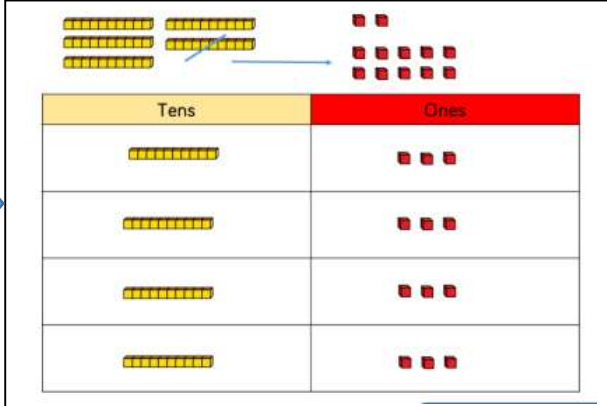| Objective	Concrete	Pictorial	Abstract
Students will be able to add up to 3 digit numbers from 3 digit numbers with 1 or more exchange. Example 265 + 164	Dienes placed on PV chart Counters placed on PV chart 	Draw dienes on PV chart Draw counters on PV chart Part Whole Model Bar Model 	Column Method $$265 + 164 = 429$$
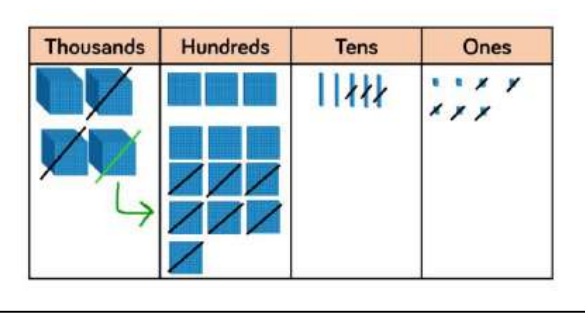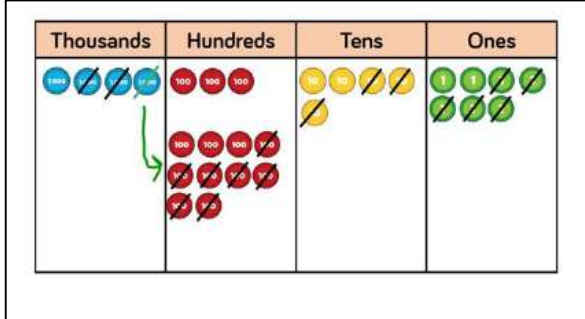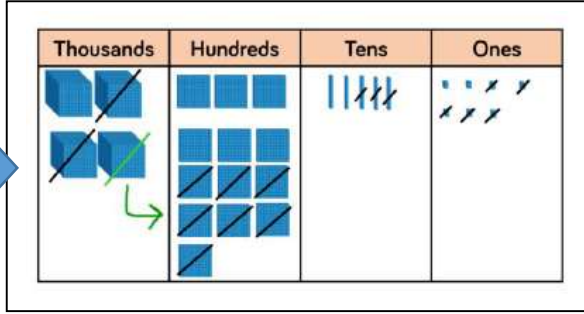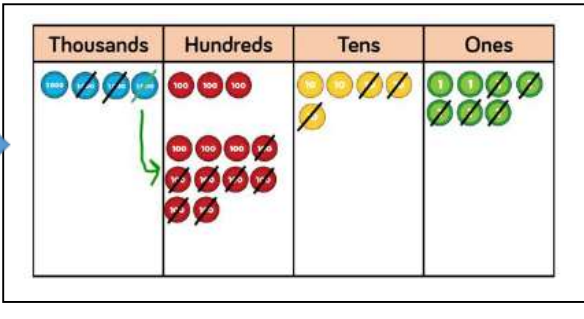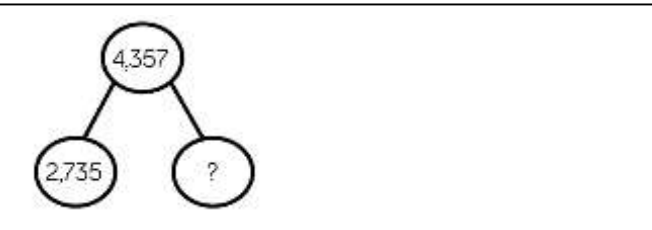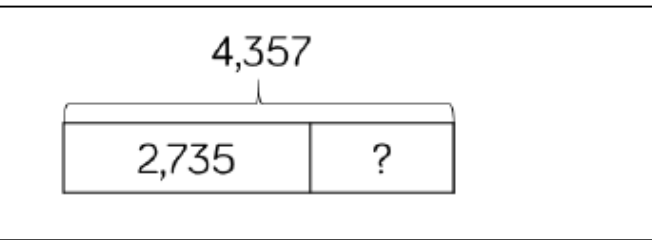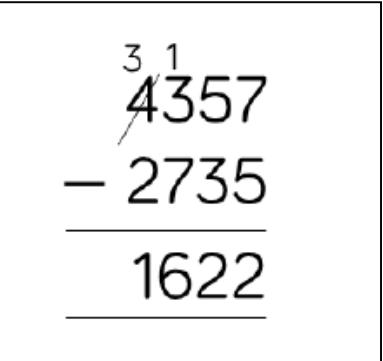
STAGE B – Addition and Subtraction

Objective	Concrete	Pictorial	Abstract
Students will be able to subtract up to 3 digit numbers from 3 digit numbers with 1 or more exchange. Example 435 - 273	Dienes placed on PV chart Counters placed on PV chart 	Draw dienes on PV chart Draw counters on PV chart Part Whole Model Bar Model 	Column Method

Stage C and D – Addition and Subtraction

Objective	Concrete	Pictorial	Abstract
Students will be able to add up to 4 digit numbers from 4 digit numbers with 1 or more exchange. Example 1,378 + 2,148	Dienes placed on PV chart Counters placed on PV chart 	Draw dienes on PV chart Draw counters on PV chart Part Whole Model Bar Model 	Column Method

Stage C and D – Addition and Subtraction

Objective	Concrete	Pictorial	Abstract
Students will be able to subtract up to 4 digit numbers from 4 digit numbers with 1 or more exchange. Example 4,357 – 2,735	Dienes placed on PV chart Counters placed on PV chart 	Draw dienes on PV chart Draw counters on PV chart Part Whole Model Bar Model 	Column Method
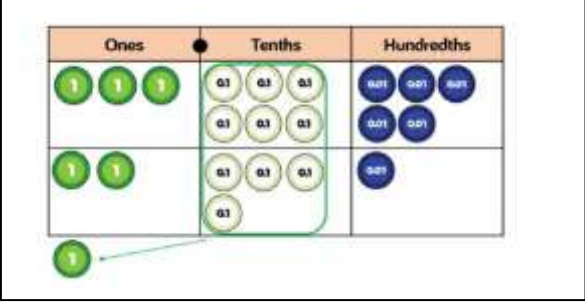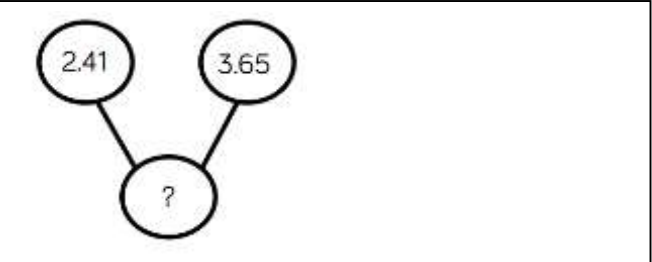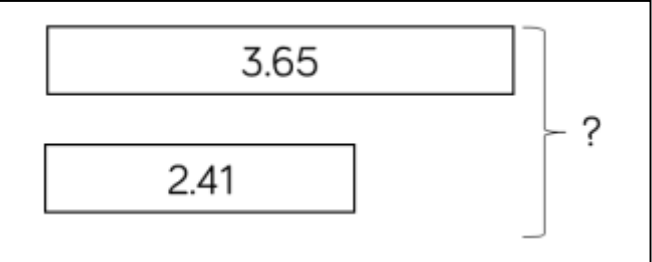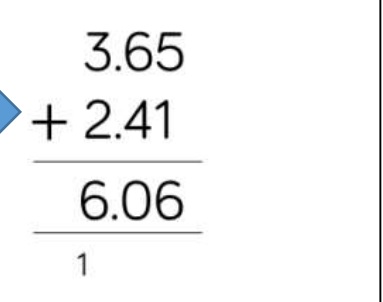
Stage E onwards – Addition and Subtraction

Objective	Concrete	Pictorial	Abstract
Students will be able to add any number of positive integers Example 104,328 + 61,731	Counters placed on PV chart 	Draw counters on PV chart Part Whole Model Bar Model 	Column Method

STAGE 5 onwards – Addition and Subtraction

Objective	Concrete	Pictorial	Abstract
Students will be able to subtract any number of positive integers Example 294,382 – 182,501	Counters placed on PV chart 	Draw counters on PV chart Part Whole Model Bar Model 	Column Method

STAGE E onwards – Addition and Subtraction
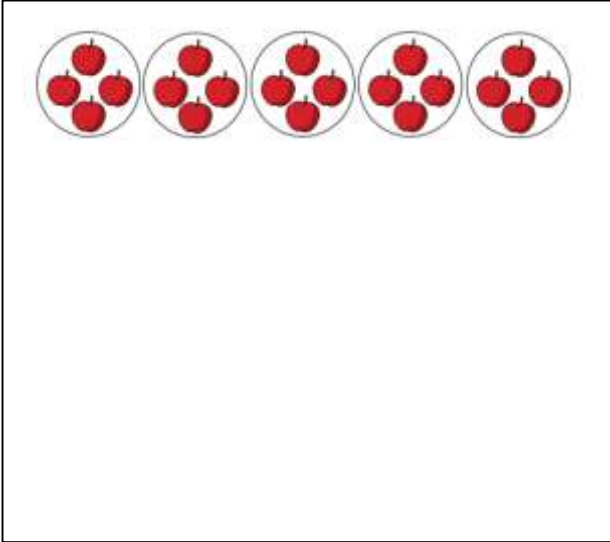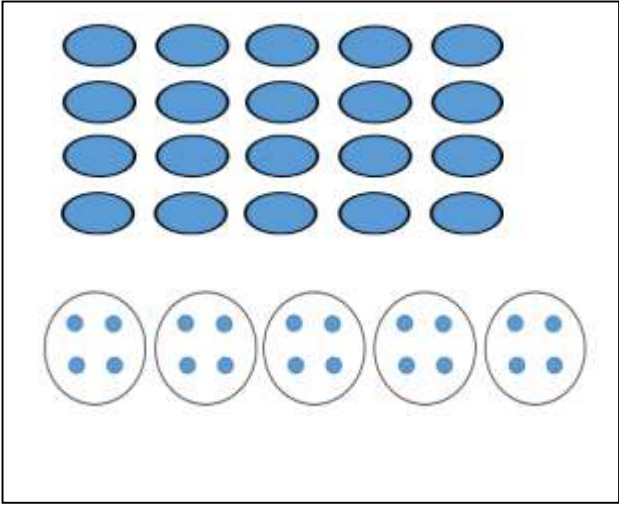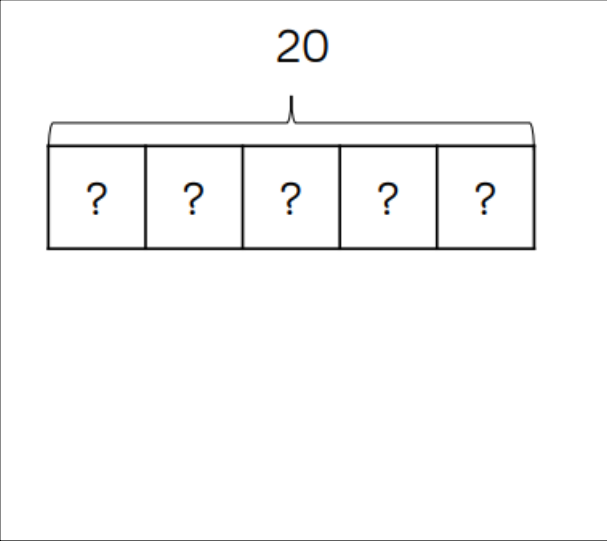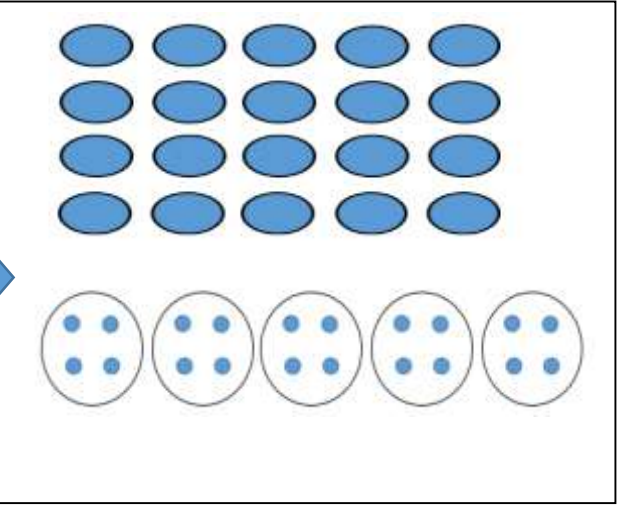
Objective	Concrete	Pictorial	Abstract
Students will be able to add any number with decimal places* Example 3.65 + 2.41 *Note: Stage E (up to 2 decimal places) Stage F onwards (any number of decimal places)	Counters placed on PV chart 	Draw counters on PV chart Part Whole Model Bar Model 	Column Method

STAGE E onwards – Addition and Subtraction
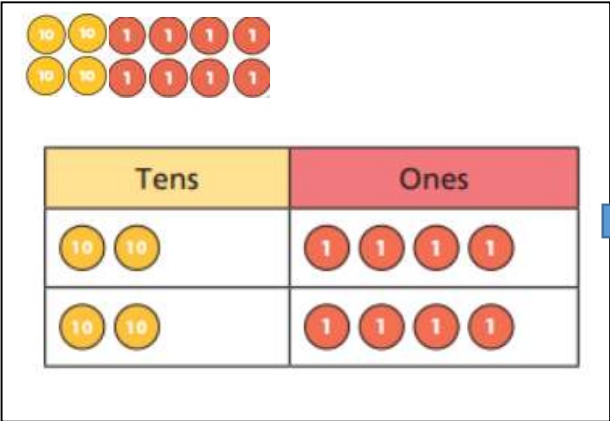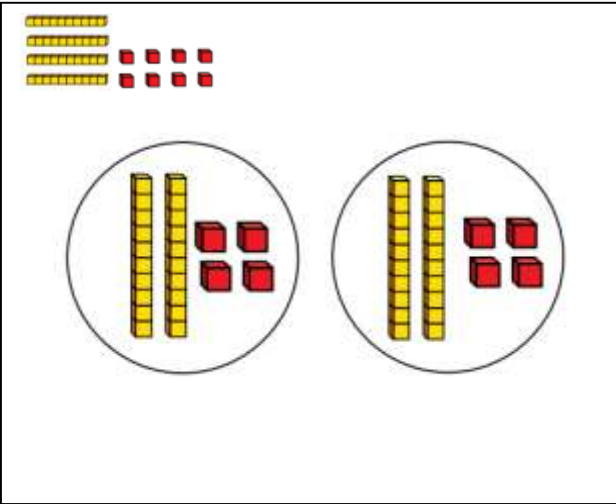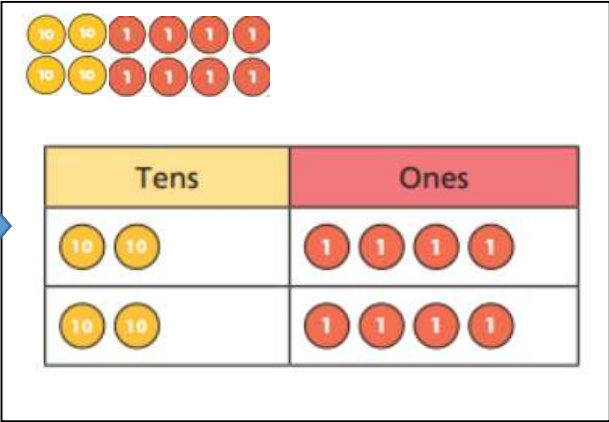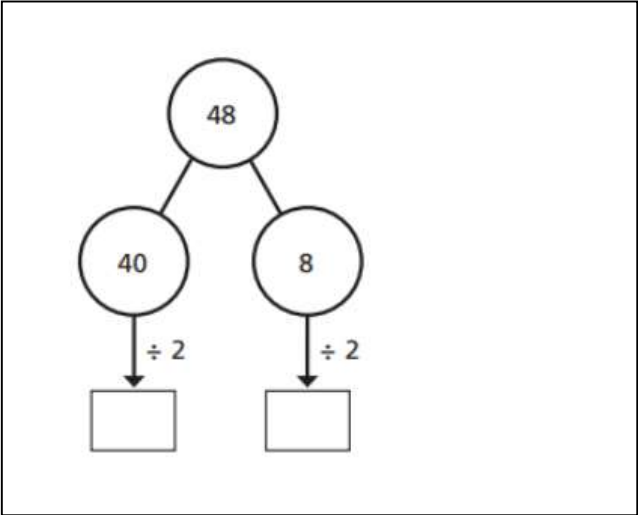
Objective	Concrete	Pictorial	Abstract
Students will be able to subtract any number with decimal places* Example 5.43 – 2.7 *Note: Stage E (up to 2 decimal places) Stage F onwards (any number of decimal places)	Counters 	Counters (PV chart) Part Whole Model Bar Model 	Column Method
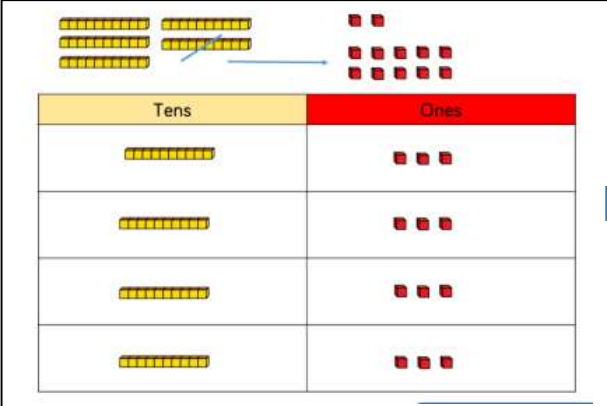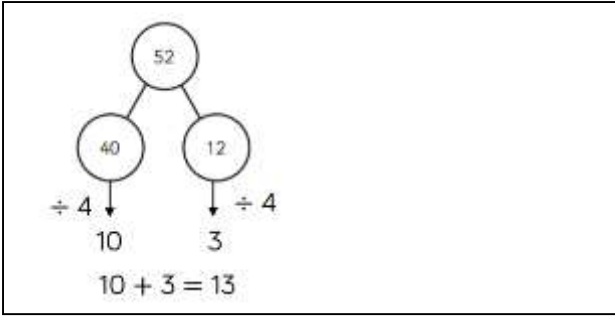
Objective	Concrete	Pictorial	Abstract
Students will begin to understand how to multiply two digits by one digit Example: 34 x 5 = 170	Counters Dienes 	Draw counters on PV chart Draw dienes on PV chart 	Expanded written method Short written method

Objective	Concrete	Pictorial	Abstract
Students will begin to understand how to **share** objects Example There are 20 apples altogether. They are shared equally between 5 bags. How many apples are in each bag?	Apples Counters 	Bar Model 20 ? ? ? ? ? Draw counters 	Understand divide sign $20 \div 5 = 4$

Objective	Concrete	Pictorial	Abstract
Students will begin to understand how to **group** objects Example There are 20 apples altogether. They are put in bags of 5. How many bags are there?	Apples Counters 	Number line Draw counters 	Understand divide sign $20 \div 5 = 4$
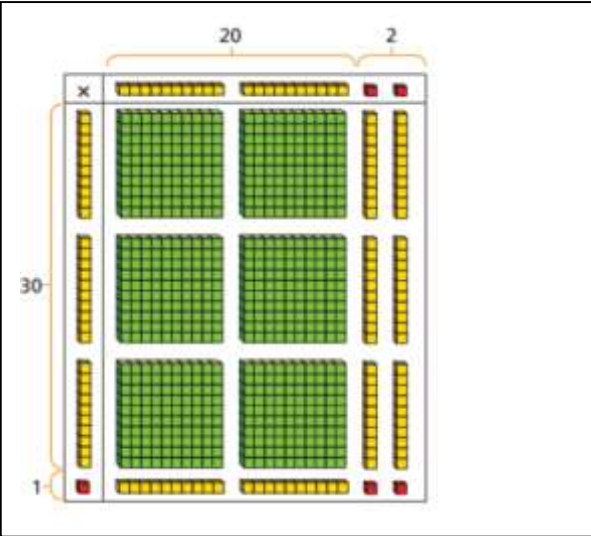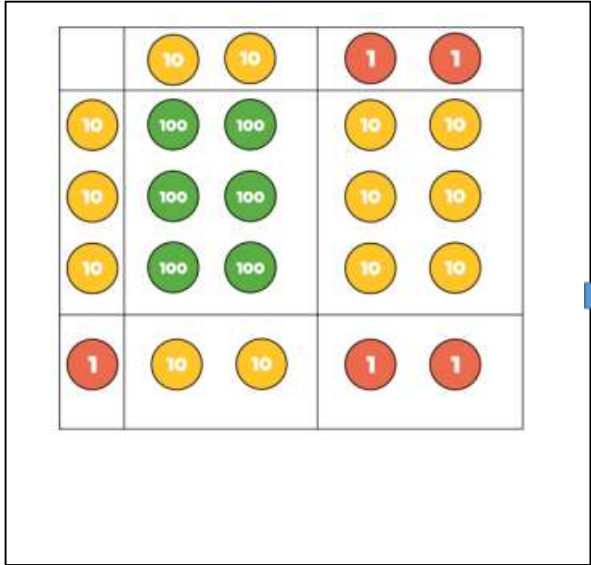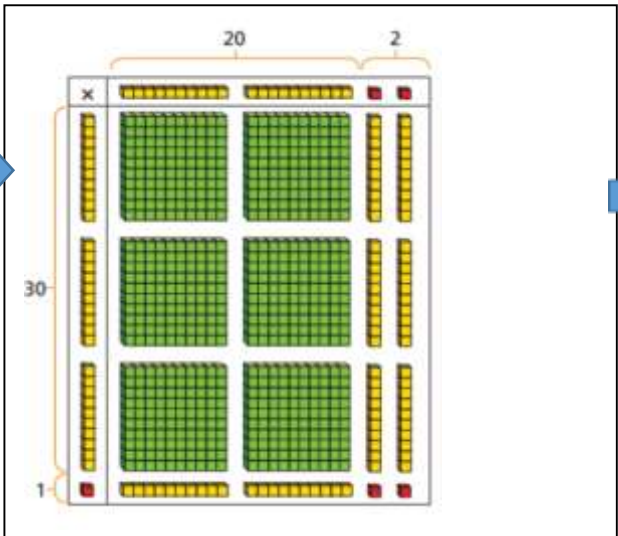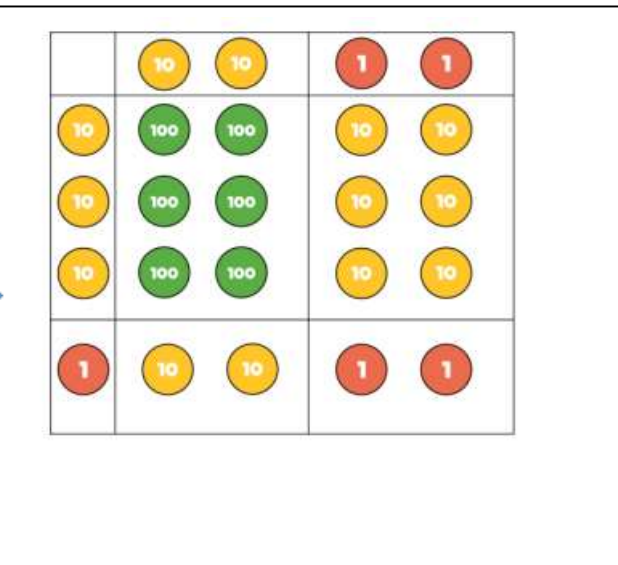
Objective	Concrete	Pictorial	Abstract
Students will begin to understand how to divide 2 digits by 1 digit (**sharing with no exchange**) Example $48 \div 2 = 24$	Counters Dienes 	Draw Counters in books Part whole model 	Understand divide sign $48 \div 2 = 24$

Objective	Concrete	Pictorial	Abstract
Students will begin to understand how to divide 2 digits by 1 digit (**sharing** with exchange) Example $52 \div 4 = 13$	Counters Dienes 	Draw counters in books Draw dienes Part whole model 	Understand divide sign $52 \div 4 = 13$
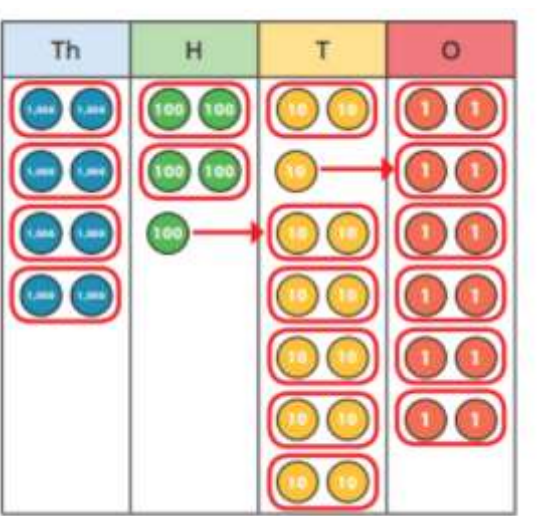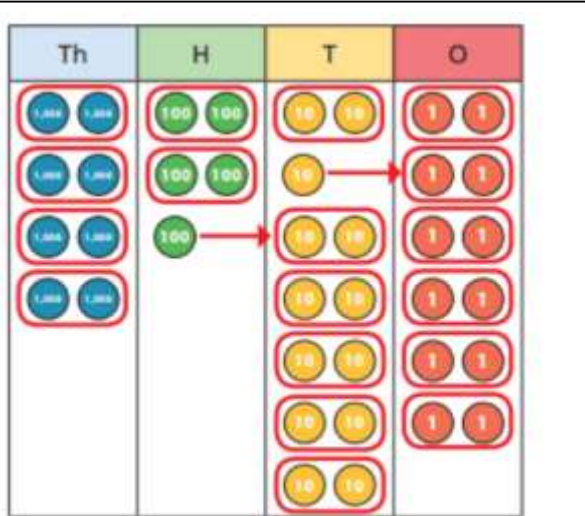
STAGE B – Multiplication and Division

Objective	Concrete	Pictorial	Abstract
Students will begin to understand how to divide 2 digits by 1 digit (**grouping**). Example: $52 \div 4 = 13$	Counters 	Draw counters in books 	Written Method
Students will begin to understand how to divide 3 digits by 1 digit (**grouping**). Example: $856 \div 4 = 214$	Counters: 	Draw counters in books 	Written Method

STAGE C – Multiplication and Division

Objective	Concrete	Pictorial	Abstract
Students will begin to understand how to multiply 2 or 3 digits by 2 digits Example: $22 \times 31 = 682$	**Dienes (Area model)** **Counters** 	**Draw dienes in books** **Draw counters in books** 	**Grid Method** | ×	20	2
---	---	---
30	600	60
1	20	2 | **Formal Written Method** |	H	T	O
		2	2
×		3	1
		2	2
	6	6	0
	6	8	2	

STAGE C – Multiplication and Division

Objective	Concrete	Pictorial	Abstract
Students will begin to be able to divide 4 digits by 1 digit (**grouping**)(with/without remainders) Example $8,532 \div 2 = 4,266$	Counters 	Draw counters in books 	Column Method

Stage D onwards – Multiplication and Division

Objective	Concrete	Pictorial	Abstract
Students will be able to divide any number of digits by 2 digits using **short division** (with/without remainders) Example $432 \div 12 = 36$ Example $7,335 \div 15 = 489$	Not used	Not used	Written Method It may help students to write out the multiples of 15 to support them in the calculations

Stage D onwards – Multiplication and Division

Objective	Concrete	Pictorial	Abstract
Students will be able to divide any number of digits by 2 digits using **long division** (with/without remainders). Example $432 \div 12 = 36$ Example $7,335 \div 15 = 489$	Not used	Not used	Written Method $12 \times 1 = 12$ $12 \times 2 = 24$ $12 \times 3 = 36$ $12 \times 4 = 48$ $12 \times 5 = 60$ $12 \times 6 = 72$ $12 \times 7 = 84$ $12 \times 8 = 96$ $12 \times 7 = 108$ $12 \times 10 = 120$ $1 \times 15 = 15$ $2 \times 15 = 30$ $3 \times 15 = 45$ $4 \times 15 = 60$ $5 \times 15 = 75$ $10 \times 15 = 150$