Livingston Public Schools: Bringing Math into Focus

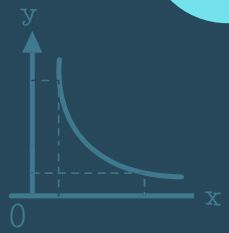
Agenda

01 Overview of Math in Focus

02 Data Journey

03 Shifts in Teaching & Learning

04 Looking Forward



Vision of Livingston Elementary Mathematics

2+2=4

Everyone can learn math to the highest levels.

Math class is about learning not performing.

Mistakes are valuable.

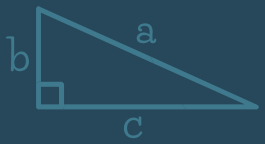
Math is about connections and communicating.

Questions are really important.

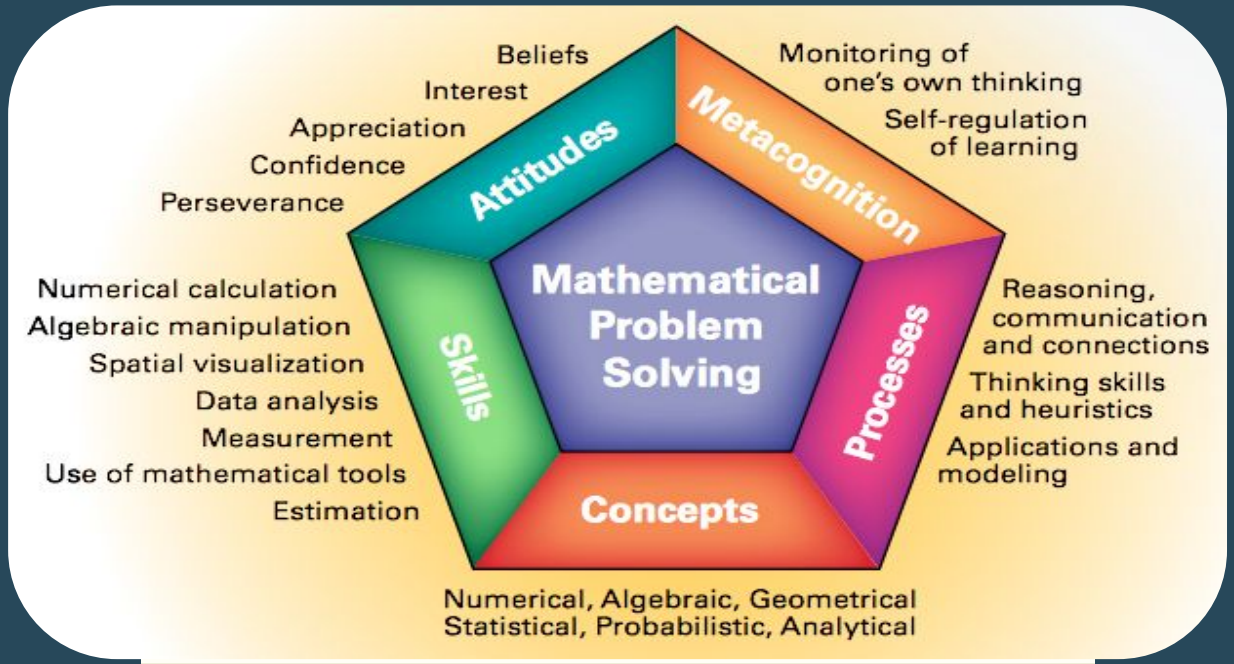
Depth is more important than speed.

Math is about creativity and making sense.

01
Math in Focus Overview



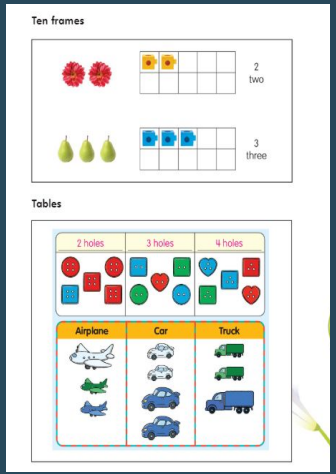
Singapore Mathematics Framework

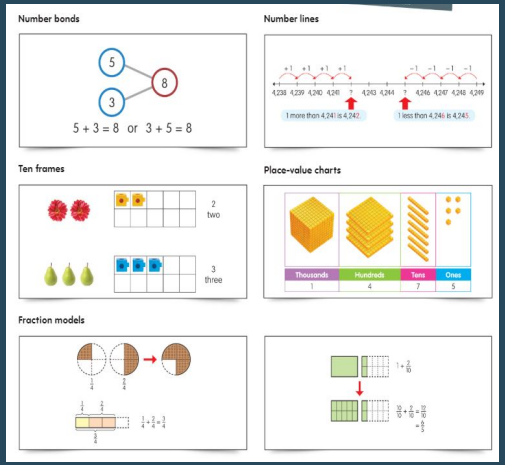


Key Instructional Strategies

Concrete-Pictorial-Abstract

Visualization





Key Instructional Strategies

Problem Solving

Polya's 4 Step Problem Solving Method

Step 1 - Understand the Problem
Step 2 - Think of a Plan
Step 3 - Carry out the plan
Step 4 - Check your answer

Heuristics

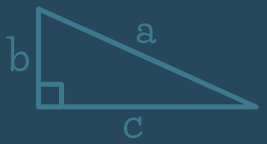
Look for Patterns
Work Backwards
Make a List
Guess & Check
Draw a Picture/Model
Act it Out
Solve Part of the Problem
Solve an Equation
Use a Model
Solve a Simpler Problem
Be Ingenious

Math In Focus Classroom - Looks Like Sounds Like

- Engagement
- Depth vs. Breadth
- Mathematical Discourse
- Teacher as the facilitator
- Differentiation
- Hands on Exploration
- Mistakes are opportunities for learning
- Mastery of content standards
- Excitement

02

Using Data to Focus Practice

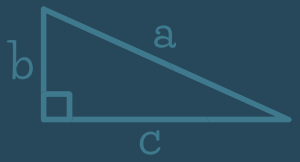


2+2=4

$\sqrt[n]{x}$

"Assessment is an ongoing awareness of students' learning and their needs, rather than an occasional event in the program. Minute-by-minute observations of students, along with an understanding of how children learn, allow teachers to make valid decisions and judgements …"

(Guide to Effective Instruction - Volume 4, 2006)



2+2=4

Summative Assessment

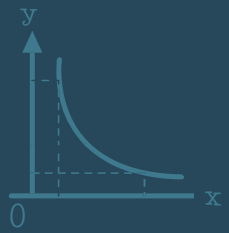
Opportunities for students to apply the mathematics they have learned in new, or novel, situations. Being able to apply the mathematics is the true test of whether the students have developed understanding or are just merely able to repeat a procedure.

x

y

Formative Assessment

Used consistently to help shape the direction of the lessons based upon student understanding.



"Look Fors" in Formative Assessments

Mathematical Discourse

Are students able to communicate their ideas? What noticings do students have? Are they making connections between content? Are there naive conceptions?

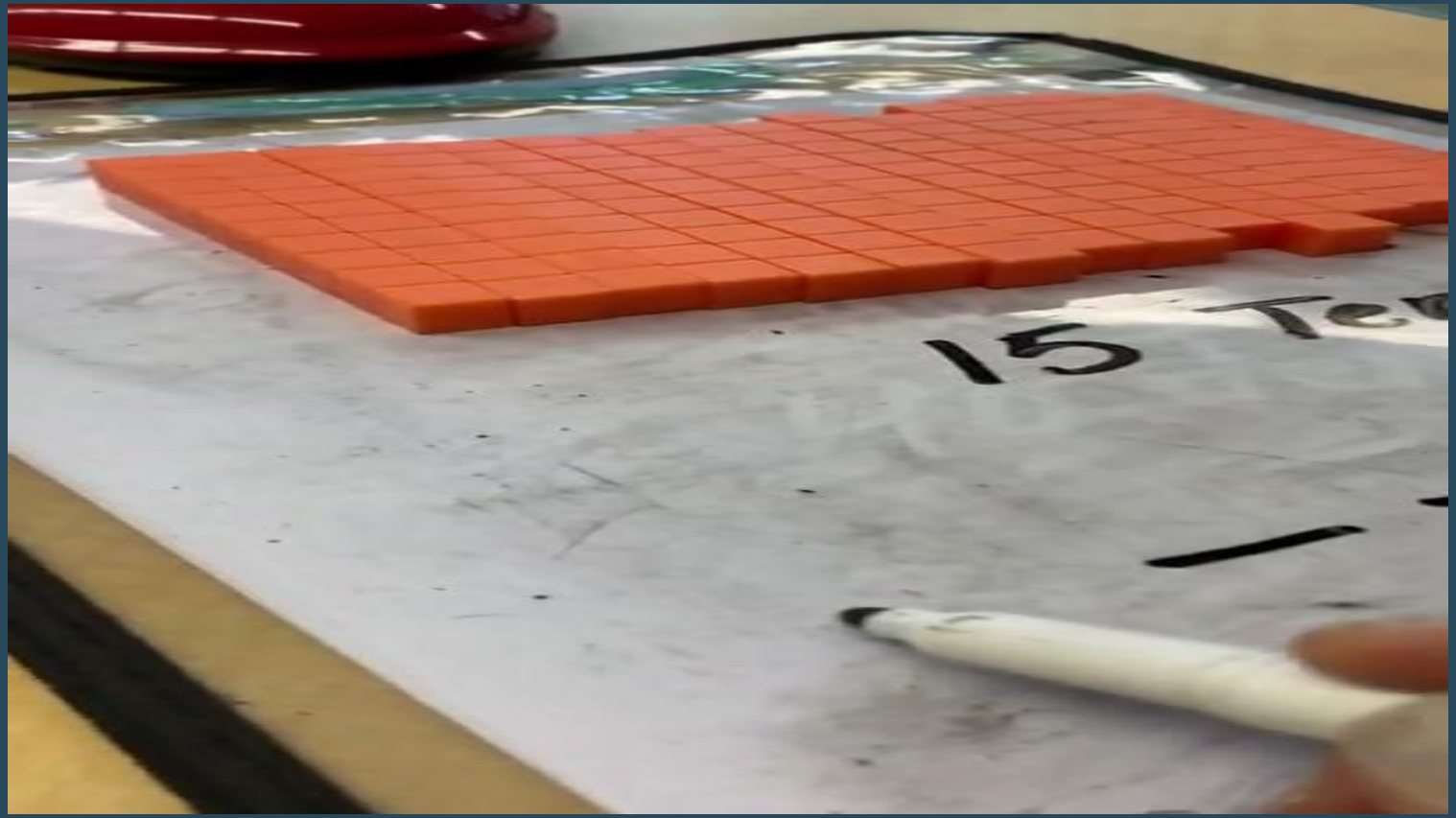
CPA Progression

Can students work through the concrete, pictorial, and abstract stages of a skill?

Heuristics

Do students persevere in solving problems through the use of strategies?

Video of CPA Progression



Formative Assessment Opportunities: By Lesson

Recall Prior Knowledge and Quick Check

Activate and review student schema. Gives teacher **data to determine if students are ready for the chapter or a review is needed.**

Try

Guided practice. Data is collected on student strengths and misconceptions to begin determination of small groups.

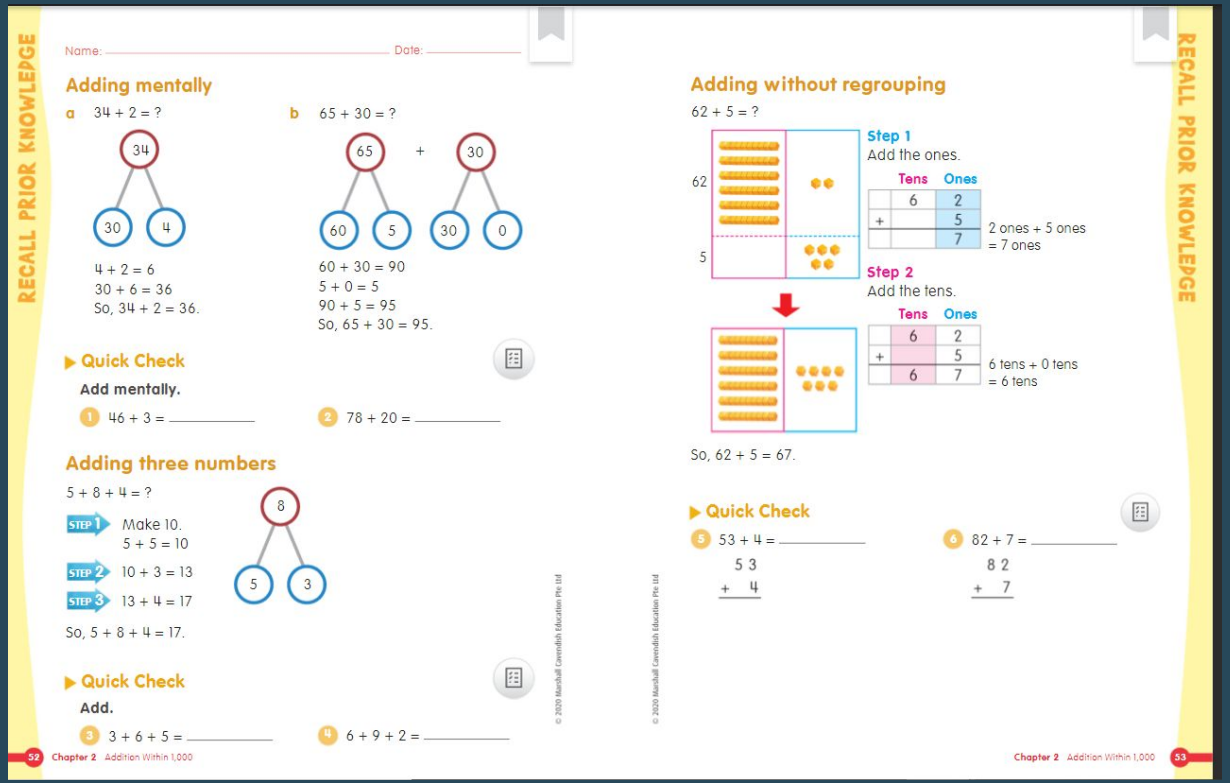
Think & Engage

Inquiry based activities. Data on strategies and approaches.

Independent Practice

Data is collected on individual students progress through the mastery of the skill. On level, remediation, and enrichment groups are formed.

Recall Prior Knowledge



RECALL PRIOR KNOWLEDGE

Name: _____ Date: _____

Adding mentally

a 34 + 2 = ?

4 + 2 = 6
30 + 6 = 36
So, 34 + 2 = 36.

b 65 + 30 = ?

60 + 30 = 90
5 + 0 = 5
90 + 5 = 95
So, 65 + 30 = 95.

Quick Check

Add mentally.

1 46 + 3 = _____

2 78 + 20 = _____

Adding three numbers

5 + 8 + 4 = ?

STEP 1 Make 10.
5 + 5 = 10

STEP 2 10 + 3 = 13

STEP 3 13 + 4 = 17

So, 5 + 8 + 4 = 17.

Quick Check

Add.

3 3 + 6 + 5 = _____

4 6 + 9 + 2 = _____

Adding without regrouping

62 + 5 = ?

Step 1
Add the ones.

	Tens	Ones
	6	2
+		5
		7

2 ones + 5 ones = 7 ones

Step 2
Add the tens.

	Tens	Ones
	6	2
+		5
	6	7

6 tens + 0 tens = 6 tens

So, 62 + 5 = 67.

Quick Check

5 53 + 4 = _____

```
 5 3
+  4
```

6 82 + 7 = _____

```
 8 2
+  7
```


RECALL PRIOR KNOWLEDGE

- Presented & discussed prior to each chapter
- Represents prerequisite skills needed to be successful within chapter
- A teacher gathers data of student schema and determines if prior lessons are needed to prepare students for chapter within whole group or small group.

Formative Assessment Opportunities: By Concept

Math Journal

Data is collected to determine if the concepts students have learned can be applied through thinking and writing.

Chapter Review

Assesses the learning of the concepts and skills within the chapter.

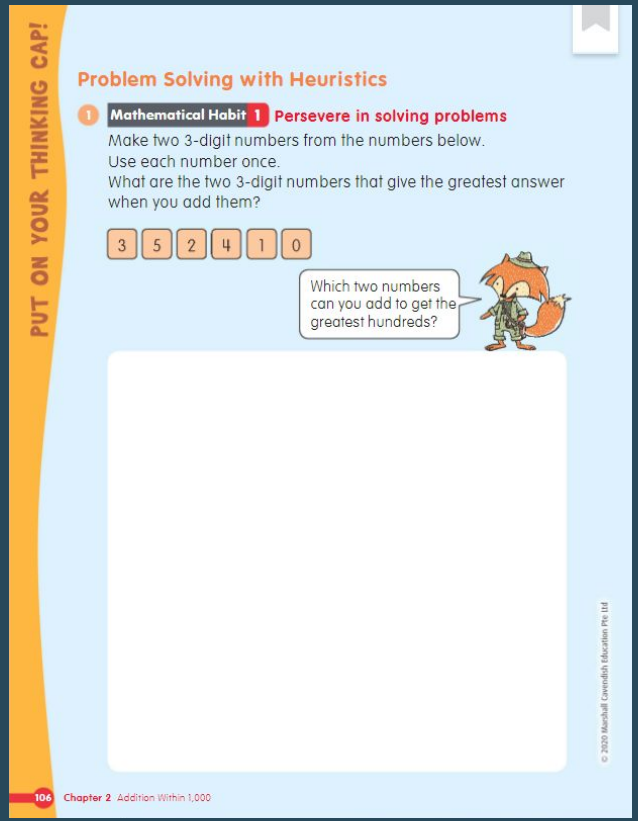
Put on Your Thinking Cap

Application based. Data is collected on if students can use heuristics to solve problems.

Performance Task

Rubric based. Data is collected through student conversation and modeling.

Put on Your Thinking Cap!


PUT ON YOUR THINKING CAP!

Problem Solving with Heuristics

1 Mathematical Habit 1 Persevere in solving problems

Make two 3-digit numbers from the numbers below.
Use each number once.
What are the two 3-digit numbers that give the greatest answer when you add them?

3 5 2 4 1 0

Which two numbers can you add to get the greatest hundreds?

- Focuses on Mathematical Habits
- Application based
- Teacher gathers data to determine student ability to utilize heuristics when faced with a novel problem.

Summative Assessments

Chapter Assessment

Comprised of direct application and novel problems. Assessment of mastery.

Cumulative Assessments

Compromised of direct application and novel problems over two or more chapters.

2+2=4


data
support CPA
small group
drives instruction
differentiation
skills trace
rubrics
identify standard mastery
create small groups
close gaps
team analysis of student work
support misconceptions
application based
lesson planning
flexibility within lesson
student conversation
know if lesson was successful
provide intervention
prepare future lessons
identify skills gaps
drive instruction
identify CPA
activate schema
support strategies
support enrichment
plan lessons
small group work
make small groups
provide enrichment
support students
bridge to build CPA
know which problems to give
know if student is in c, p, or a stage

$\sqrt[n]{x}$

Next Steps

Building Flexibility

Daily data collection drives planning and instruction

01

Write/Revise Curriculum

Update with all assessments and purpose in 2nd grade. Write 3rd grade.

02

Assessments

Determine common assessment types by grade

03

Data Collection

Formalize warehousing of data

04

Expand Capacity

Utilize PLC approach to analyze and facilitate data conversations

05