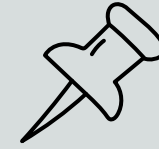
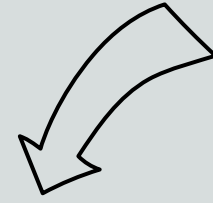
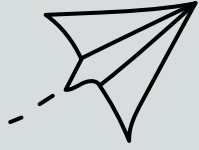




BUILDING THINKING CLASSROOMS

Presented by: Karen Ho

Gr. 3 Teacher, Bessborough Drive Elementary & Middle School

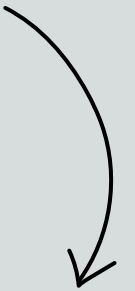
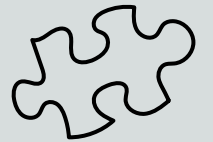
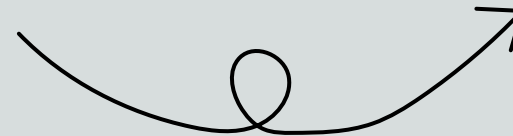


Have you ever thought?

"What did my child learn at school today?"

"Don't they teach the times table anymore?"

"I don't understand this new math my child is learning at school."



Direct Instruction

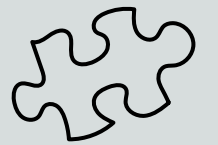
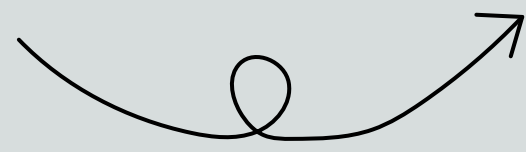
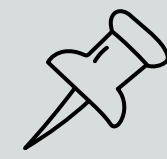
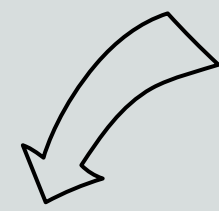
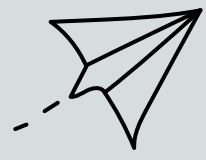
Inquiry Based Learning

Building Thinking Classrooms

How does learning math look like?

Math Congress

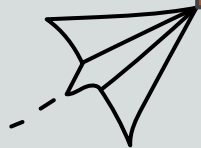
Universal Design of Learning



KEY MESSAGE



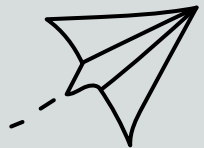
We will focus on how to foster a classroom community that promotes ***THINKING*** through Building Thinking Classrooms.

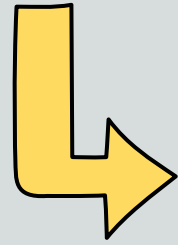




AGENDA

1. The WHY? Understanding Dr. Peter Liljedahl's Research
2. Four Practices for Building Thinking Classrooms





HAVE YOU NOTICED?

Students not thinking?

1. Slacking
2. Stalling
3. Faking
4. Mimicking

80%

5. Try it on your own

20%

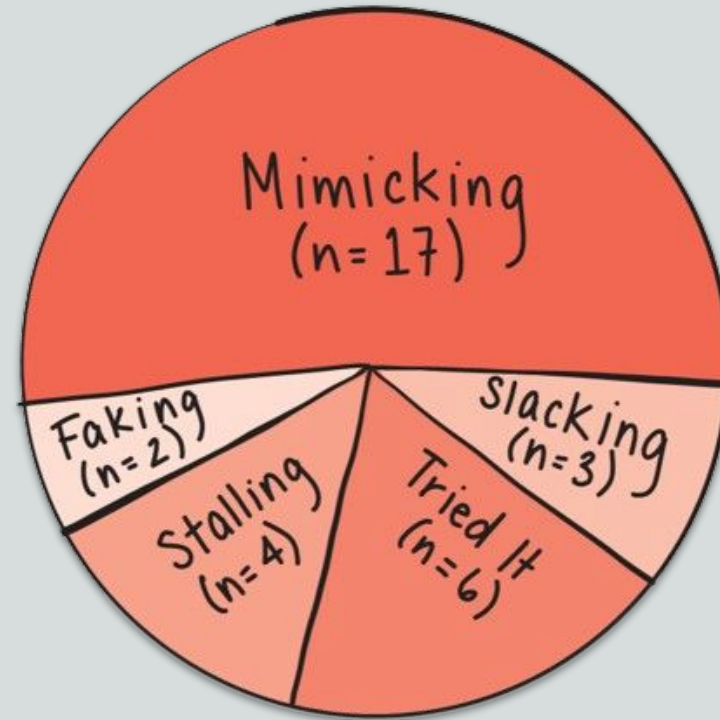
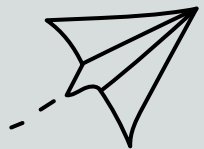
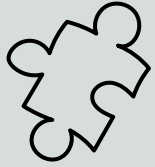


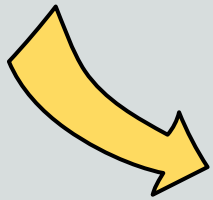
Figure i.3 Distribution of student behaviour on now-you-try-one tasks.
Peter Liljedahl Building Thinking Classrooms



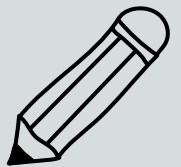
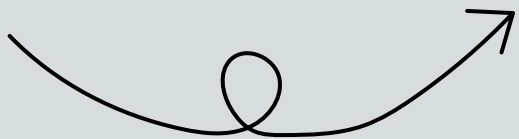


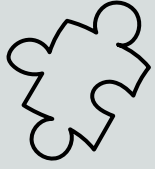
WHY?

WHY THINKING CLASSROOMS?

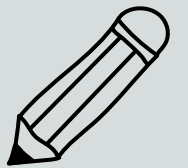
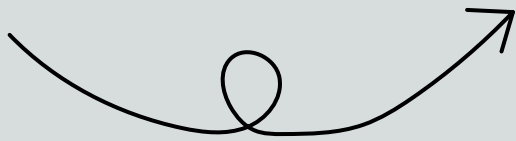


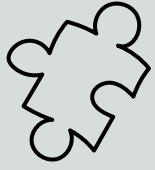
*“Thinking is a necessary precursor to learning, and if students are not thinking, they are not learning.”
(Liljedahl , 9)*



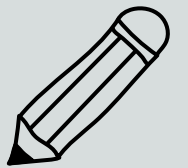


1. PRESENT INSTRUCTIONS VERBALLY & STANDING

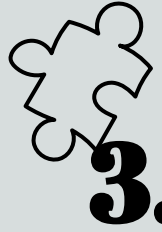




2. VISIBLY RANDOM GROUPS OF 3



Credit: Diana Hong (TDSB Hybrid Math Learning Partner)



3. VERTICAL NON-PERMANENT SURFACES



RULES OF MARKER CLUB

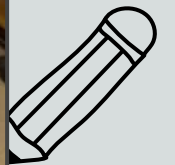
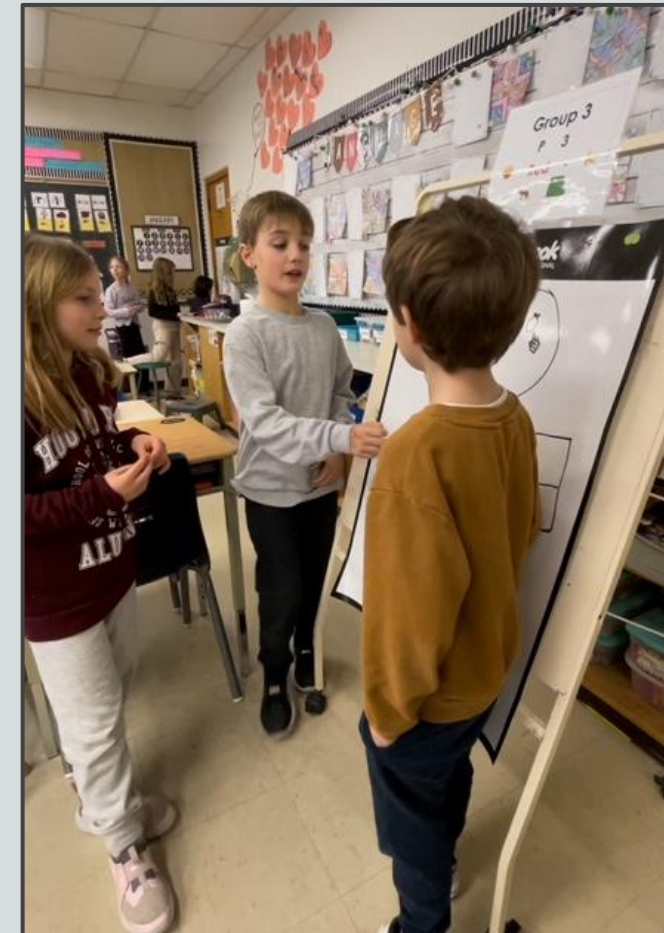
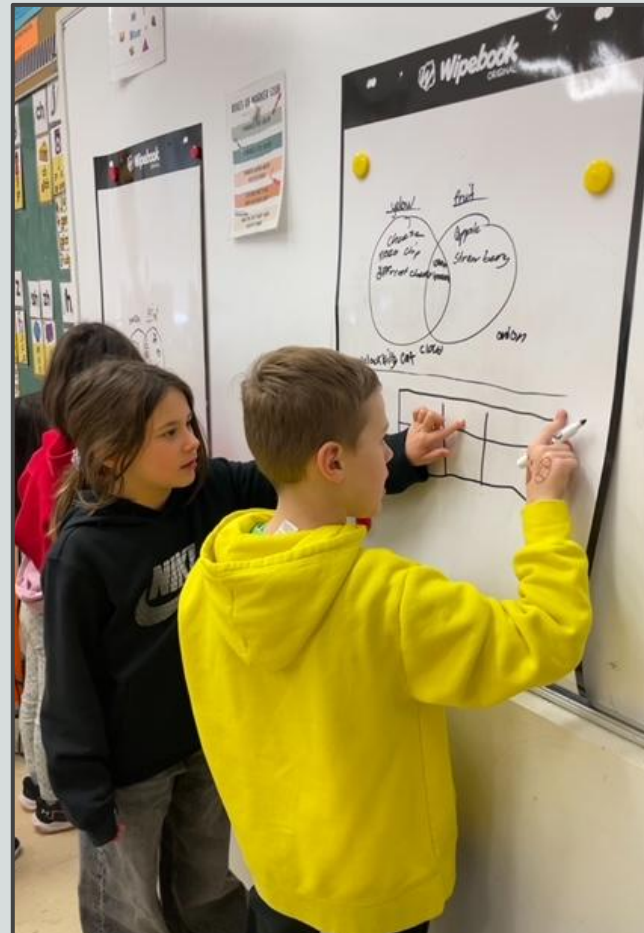
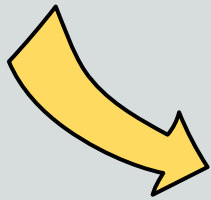
1 MARKER PER GROUP

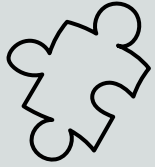
1 MARKER PER GROUP

MARKER HOLDER WRITES IDEAS OF OTHERS

EVERYONE MUST SHARE IDEAS IN MARKER CLUB

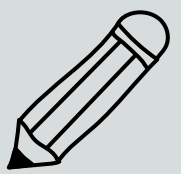
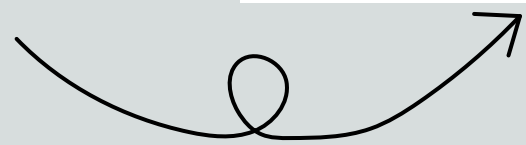
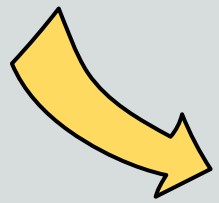
MAKE THE CAP "CLICK" WHEN YOU PUT IT BACK





Learning Goal:


I can create a new rounding rule for cents.



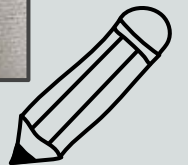
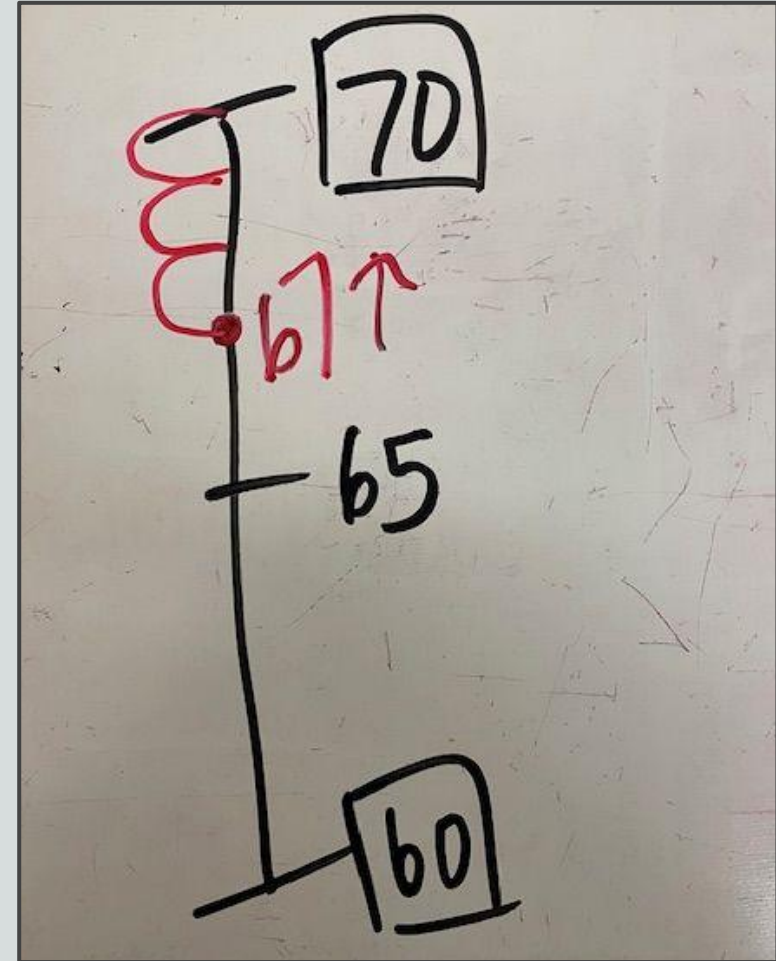
4. SCRIPTED CURRICULAR TASKS

Begin by asking a question about prior knowledge

How would you estimate the value of the items below?



We can use the rounding strategy!



4. SCRIPTED CURRICULAR TASKS

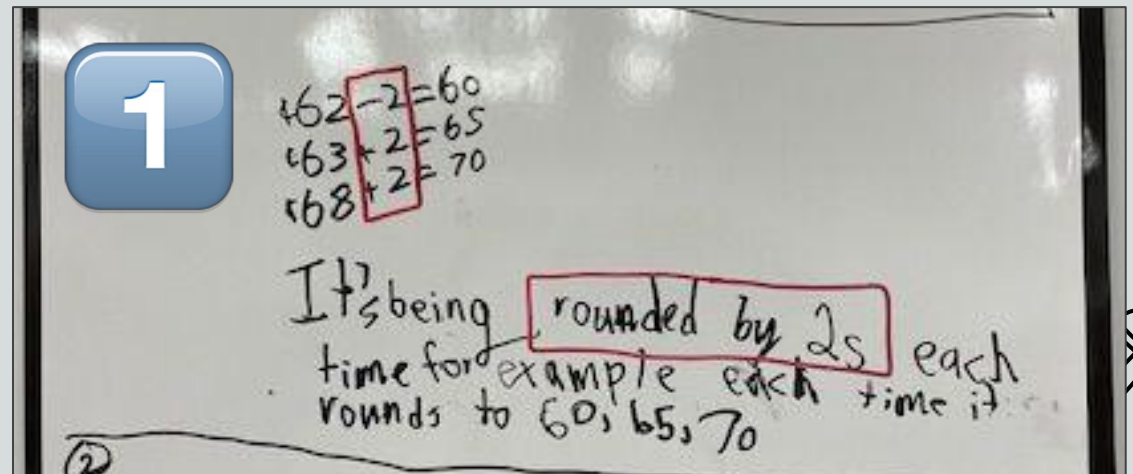
Then ask a question that is an extension of that prior knowledge

TASK #1

When rounding in cents, we do not round to the nearest 10¢.
For example:

- Cost is 62¢ → payment is 60¢
- Cost is 63¢ → payment is 65¢
- Cost is 68¢ → payment is 70¢

What is the rounding rule for cents?



4. SCRIPTED CURRICULAR TASKS

Then ask a question that is an extension of that prior knowledge

TASK #2

When rounding in cents, we do not round to the nearest 10¢.
For example:

- Cost is 61¢ → payment is 60¢
- Cost is 66¢ → payment is 65¢
- Cost is 69¢ → payment is 70¢

What is the rounding rule for cents?

1

$$\begin{array}{l} 62 - 2 = 60 \\ 63 + 2 = 65 \\ 68 + 2 = 70 \end{array}$$

It's being rounded by 2s each time for example each time it rounds to 60, 65, 70

2

$$\begin{array}{l} \$61 \approx 60 \\ \$66 \approx 65 \\ \$69 \approx 70 \end{array}$$

We rounded all the numbers by 10s and 5s

4. SCRIPTED CURRICULAR TASKS

Finally, ask students to do something without telling them how.

TASK #3

When rounding in cents, we do not round to the nearest 10¢.
For example:

- Cost is 31¢ → payment is ___¢
- Cost is 36¢ → payment is ___¢
- Cost is 39¢ → payment is ___¢

What is the rounding rule for cents?



1

$$\begin{array}{l} 62 - 2 = 60 \\ 63 + 2 = 65 \\ 68 + 2 = 70 \end{array}$$

It's being rounded by 2s each time for example each time it rounds to 60, 65, 70

2

$$\begin{array}{l} \$61 \approx 60 \\ \$66 \approx 65 \\ \$69 \approx 70 \end{array}$$

We rounded all the numbers by 10s and 5s

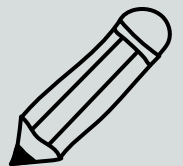
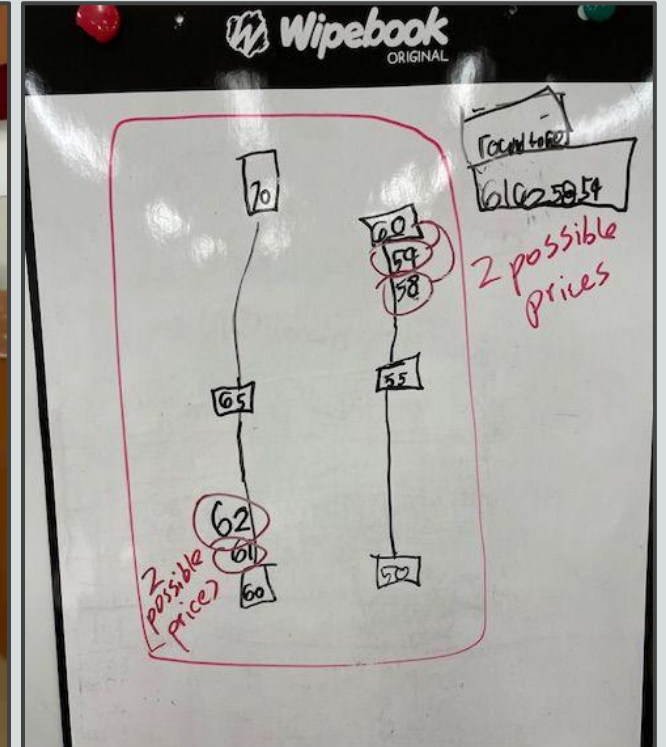
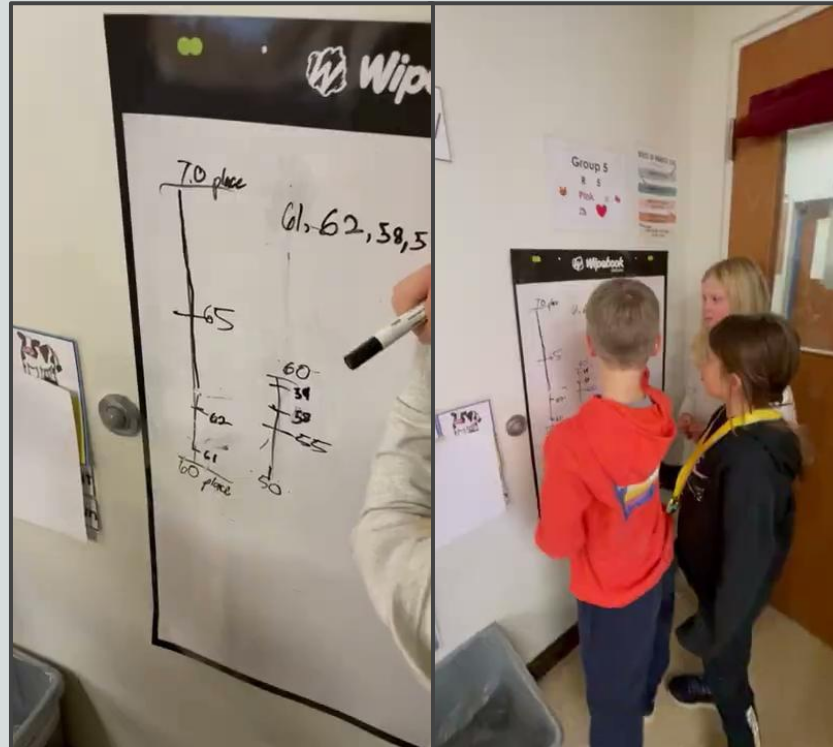
3

$$\begin{array}{l} 31 \approx 30 \\ 36 \approx 35 \\ 39 \approx 40 \end{array}$$


We rounded all the numbers by 10s and and 5s

OPEN QUESTIONS (*"The Fun Stuff"*)

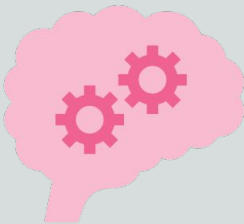
| Traditional Problem <i>(less thinking)</i> | Open Problem <i>(more thinking!)</i> |
|--|--|
| <p>Round 58¢</p> | <p>The rounded cost of an item is 60¢.</p> <p>What might be the exact price?</p> |




Student Learning **GOALS.**




Build strong conceptual understanding of key concepts



Use and develop the seven mathematical processes
(PS, R&P, Ref, Con, Com, Rep, ST&S)



Experience the joy & wonder of math in a risk-free environment



Build, repair, or strengthen student identities as math learners

