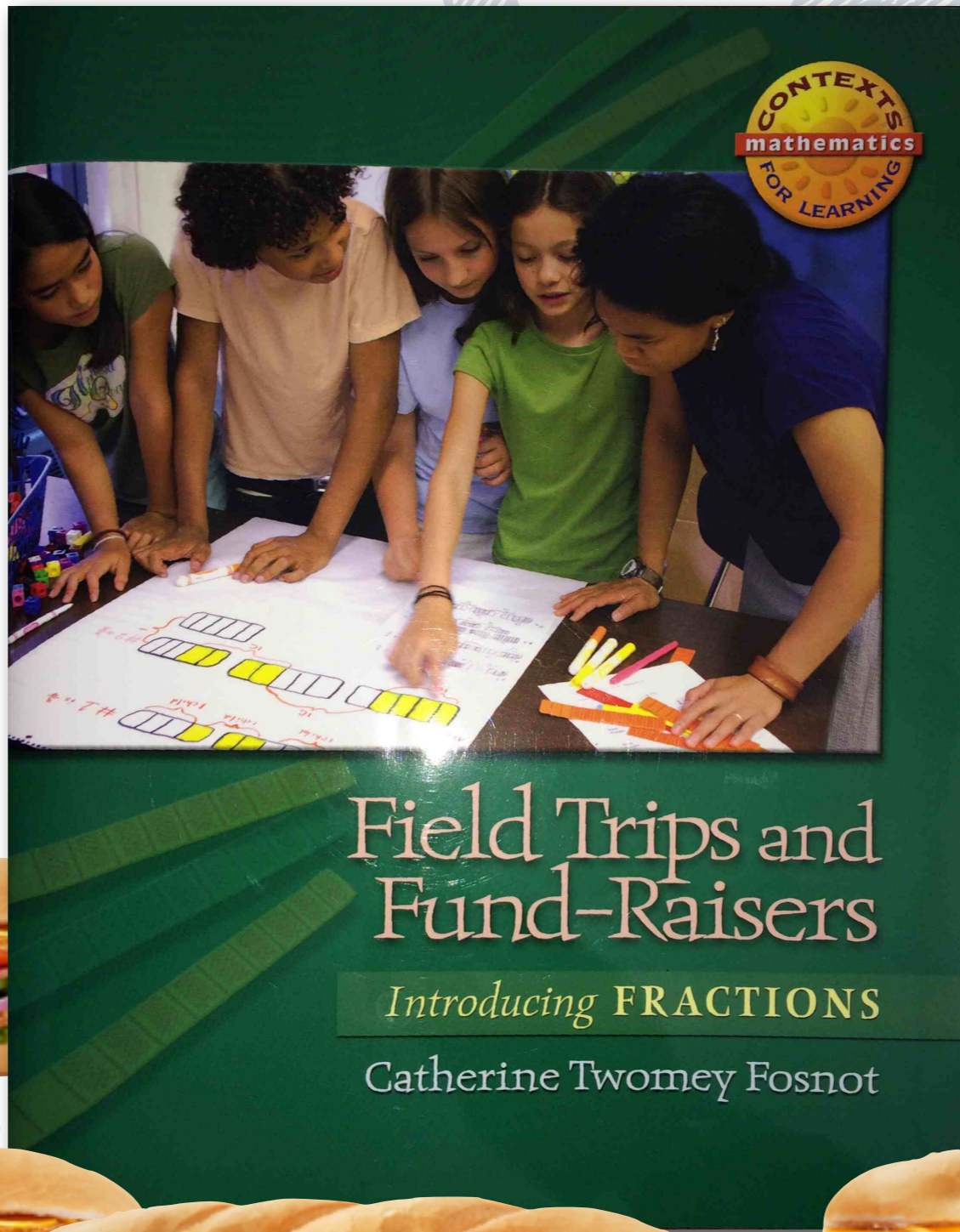


“Every effort must be made in childhood to teach the young to use their own minds.”

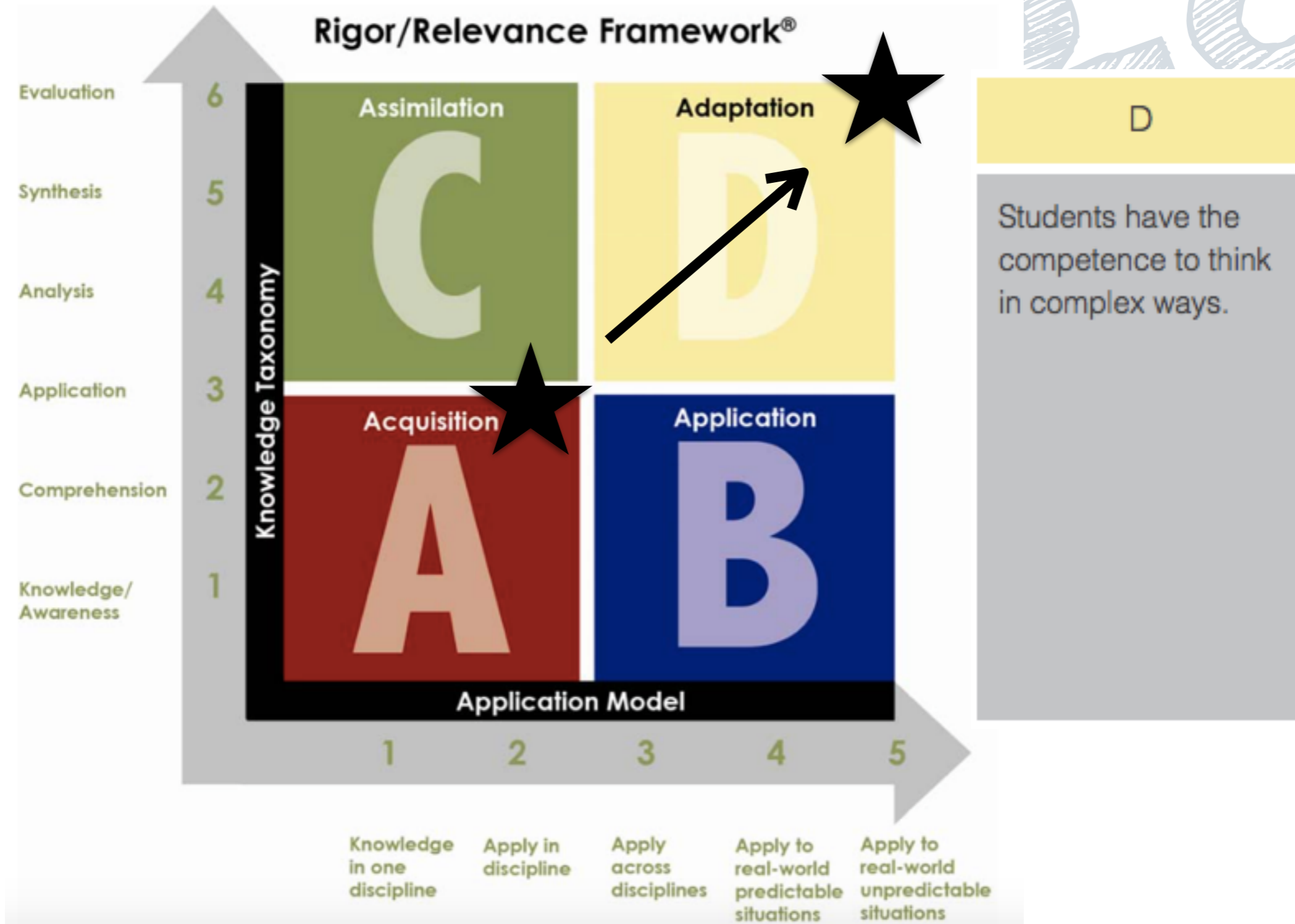
**Eleanor
Roosevelt**

CRITICAL
creating the conditions for
THINKING

LISA PILGRIM & BRIDGET GOODWIN



WHERE WERE THE STUDENTS ON THE FRAMEWORK?



WHAT IS CRITICAL THINKING?

(AND HOW DO YOU KNOW STUDENTS
ARE DOING IT?)

Critical thinking is that mode of thinking - about any subject, content, or problem - in which the thinker improves the quality of his or her thinking by skillfully analyzing, assessing, and reconstructing it. Critical thinking is self-directed, self-disciplined, self-monitored, and self-corrective thinking. It presupposes assent to rigorous standards of excellence and mindful command of their use. It entails effective communication and problem-solving abilities, as well as a commitment to overcome our native egocentrism and sociocentrism.

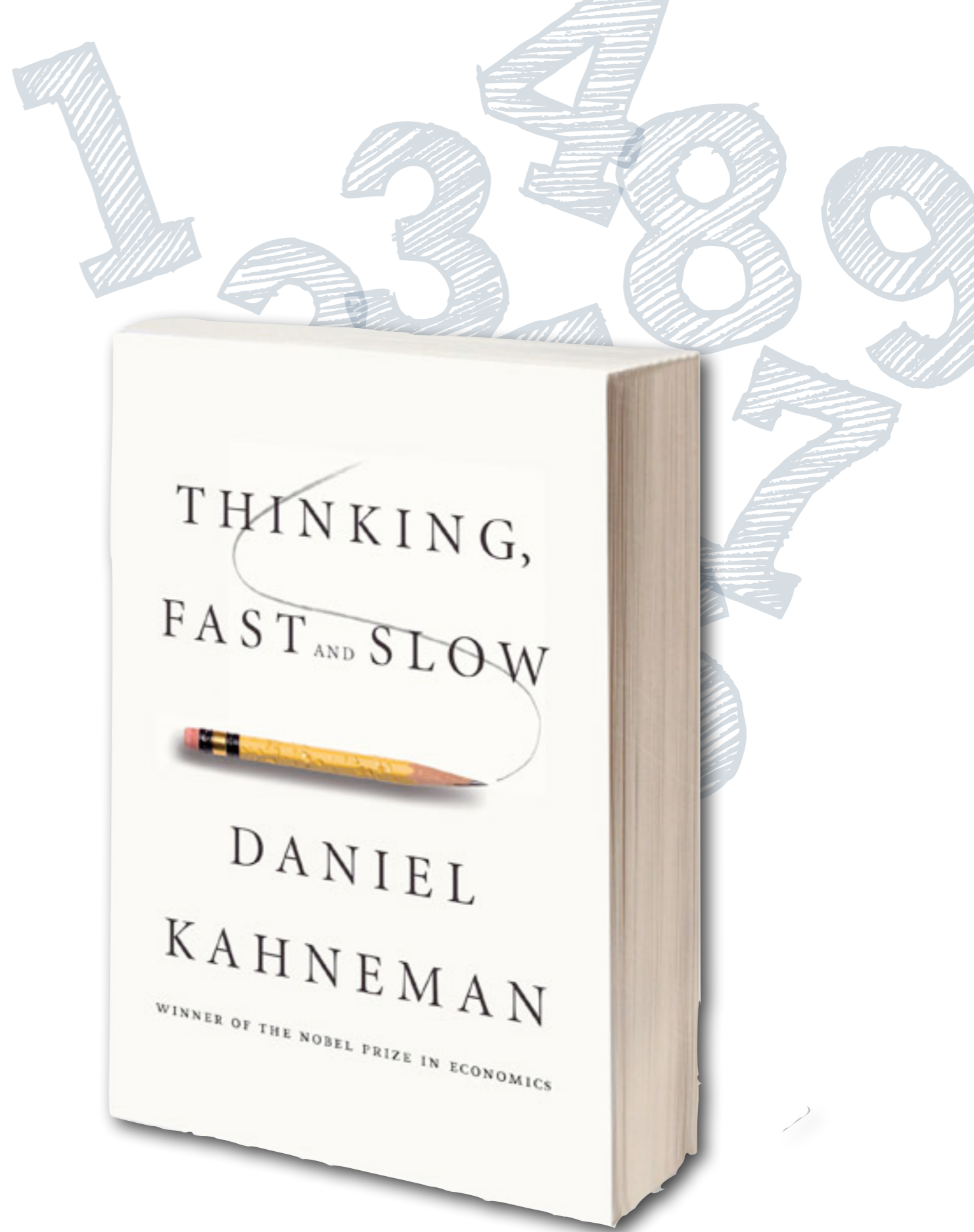
CRITICAL THINKING

**is not an innate skill that we
simply awaken in our
students.**

SYSTEM 1



SYSTEM 2



CAUSES AND CONSEQUENCES OF COGNITIVE EASE

THINKING, FAST AND SLOW PG. 60

REPEATED EXPERIENCE

CLEAR DISPLAY

PRIMED IDEA

GOOD MOOD

EASE

FEELS FAMILIAR

FEELS TRUE

FEELS GOOD

FEELS EFFORTLESS

In a lake, there is a patch of
lily pads. Every day, the
patch doubles in size. If it
takes 48 days for the patch to
cover the entire lake, how long
would it take for the patch to
cover half of the lake?

24 days OR 47 days

**“...cognitive strain,
whatever its source,
mobilizes System 2,
which is more likely
to reject the intuitive
answer suggested by
System 1.”**

The man's maximum height
more than 50 feet.

was (no) more than 50 feet?

Use to support your agree or
disagree answer?

The question being
asked in this video is?

What way of solving this problem?

How can we understand or move away
from the current position (and why is this
position)?

CATEGORIES OF QUESTIONING



CATEGORIES OF QUESTIONING

LOW DEMAND
TEACHING &
QUESTIONING



CATEGORIES OF QUESTIONING

Asking a Range of Questions

Student Directed Questioning
& Accountable Talk

Open Ended / Open Routed Questions

Critical Thinking



$$3 + 8 + 12 = ?$$

Bridget gives 3 pencils to her students in her period one class, 8 pencils to her period 2 class, and then shakes her head as she hands out 12 more pencils over the course of the afternoon.

**A GOOD QUESTION
WILL REQUIRE A
STUDENT TO GO
DEEPER, MAKE
CONNECTIONS,
EXPLORE THE
EFFECTIVENESS OF
STRATEGIES, ETC.**

CATEGORIES OF QUESTIONING

Asking a Range of Questions

Moving away from a focus on acquiring content and skills to understanding them

Student Directed Questioning
& Accountable Talk

Open Ended / Open Routed Questions

Critical Thinking

CATEGORIES OF QUESTIONING

Asking a Range of Question

- Inference Questions
- Interpretation Questions
- Transfer Questions
- Questions about Hypothesis
- Reflective Questions

Questions that you can't 

CATEGORIES OF QUESTIONING

Asking a Range of Questions

**Student Directed Questioning
& Accountable Talk**

Changing the accountability of the learning from that of only the teacher to the whole classroom community

Open Ended / Open Routed Questions

Critical Thinking

CATEGORIES OF QUESTIONING

HOW TO HAVE GREAT MATH TALK

EXPLAIN
Explain:
"This is my solution/strategy..." "I think _____ is saying that..."
Explain your thinking and show your thinking.
Rephrase what another student has said.

AGREE or DISAGREE with reason
Agree or Disagree with reason:
"I agree because ...", "I disagree because..."
Agree with another student and describe your reason for agreeing.
Disagree with another student and explain or show how your thinking/solution differs.
Agree with another student and provide an alternate explanation

BUILD ON
Build On:
"I would like to build on that idea..."
Build on the thinking of another student through explanation, example, or demonstration.

GO BEYOND
Go Beyond:
"This makes me think about..."
"Another way to think about this is..."
Extend the ideas of other students by generalizing or linking the idea to another concept.
Can you connect what you have done to another activity, experience, or the real world?

WAIT TIME
Wait Time:
"... " shhhhhhhh...
Wait to think about what is being said after someone speaks (try five seconds).

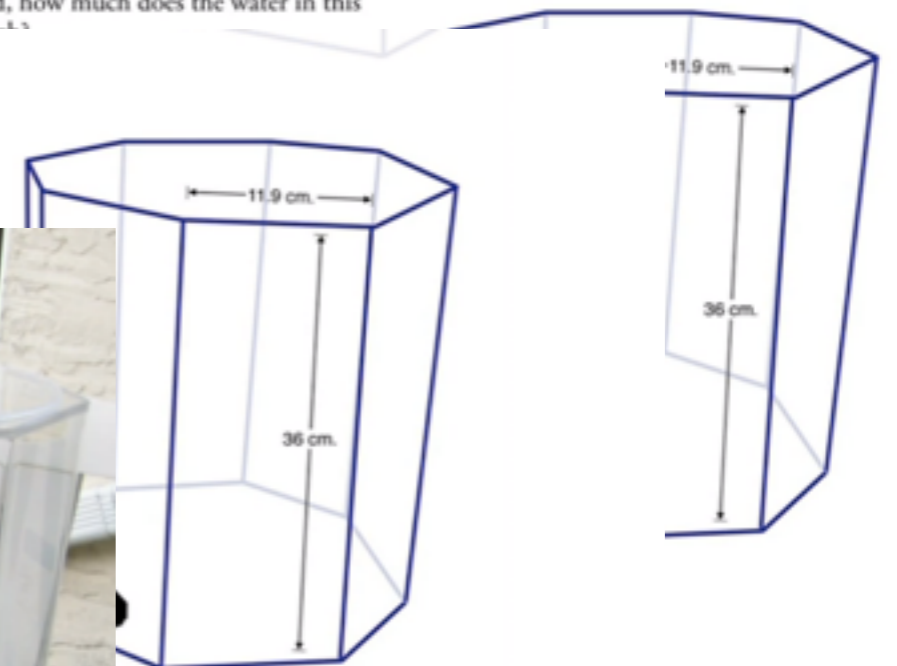


CATEGORIES OF QUESTIONING

10. A king-size waterbed mattress measures 5.5 feet by 6.5 feet by 8 inches deep. To the nearest pound, how much does the water in this waterbed weigh?

10. A king-size waterbed mattress measures 5.5 feet by 6.5 feet by 8 inches deep. To the nearest pound, how much does the water in this waterbed weigh?

11. A water tank is in the form of a regular octagonal prism.



IMAGES FROM: AN MEYER TED TALK
MATH CLASS NEEDS A MAKEOVER

CATEGORIES OF QUESTIONING

Asking a Range of Questions

Student Directed Questioning
& Accountable Talk

Open Ended / Open Routed Questions

Helping students become comfortable with there not always being a 'right answer' and not needing to approach their learning the same way as everyone else

Critical Thinking



The animals at the zoo were playing on the teeter-totter.

The first time they played there were five clowns on one side, and six monkeys on the other side. The teeter-totter was evenly balanced.

The second time they played there was a zebra on one side. On the other side there was one clown and four monkeys. The teeter-totter was evenly balanced.

The third time they played there was a zebra and two monkeys on one side. On the other side, there were six monkeys. What happened with the teeter-totter this time?

**WHICH NUMBER
DOESN'T BELONG?**

1919

1990

1991

9191

CATEGORIES OF QUESTIONING

Asking a Range of Questions

Student Directed Questioning
& Accountable Talk

Open Ended / Open Routed Questions

Critical Thinking

Self-directed questioning, analysis, evaluation or curiosity about a situation or a set of ideas

AGREE OR DISAGREE?

CHOOSE A SIDE. START A FIGHT. JUSTIFY. ASK QUESTIONS. ASK FOR INFORMATION.



CATEGORIES OF QUESTIONING

ASK A QUESTION

Agree or Disagree: The man's maximum height was no more than 50 feet.

ASK A RANGE OF QUESTIONS

Why do you think it was (no) more than 50 feet?
What could you use to support your agree or disagree answer?

STUDENT DIRECTED QUESTIONS

What do you think the maximum height achieved was?

OPEN ENDED QUESTIONS

What do you think the maximum height achieved was?

CRITICAL THINKING QUESTIONS

Do you want to stand or move away from your answer (and why is this your position)?

What was the most efficient way of solving this problem?

CATEGORIES OF QUESTIONING

Asking a Range of Questions

Student Directed Questioning
& Accountable Talk

Open Ended / Open Routed Questions

Critical Thinking

STUDENTS WHO ARE CAPABLE OF A NATURAL
STATE OF INQUIRY