Project EAGLE
Eliciting Advanced Gifted Learning Evidence

Ready to POP!
A Dynamic Approach to Spotting Mathematical Points of Promise in English Learners

Del Siegle, Susan Dulong Langley, & Talbot Hook

July 17, 2024

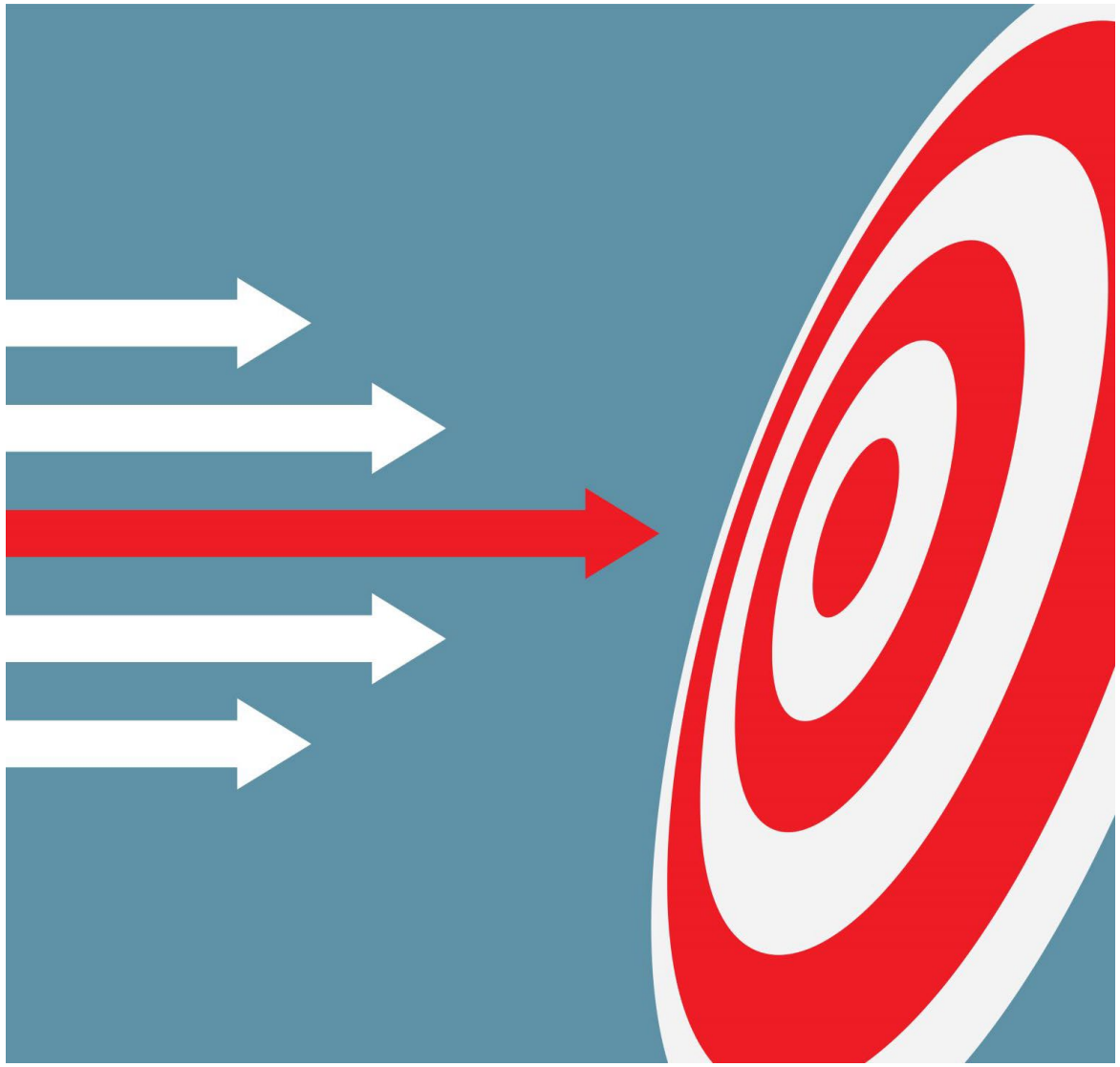
Confratute

- Underrepresentation of gifted ELs
- Little attention to EL mathematical thinking

(Coronado & Lewis, 2017; De Araujo et al., 2016; Gubbins et al., 2020; Mun et al., 2020; Siegle, 2020)

Goals

- Create dynamic ID approach
- Increase capacity for spotting EL/ML talent
- Increase EL/ML gifted referrals



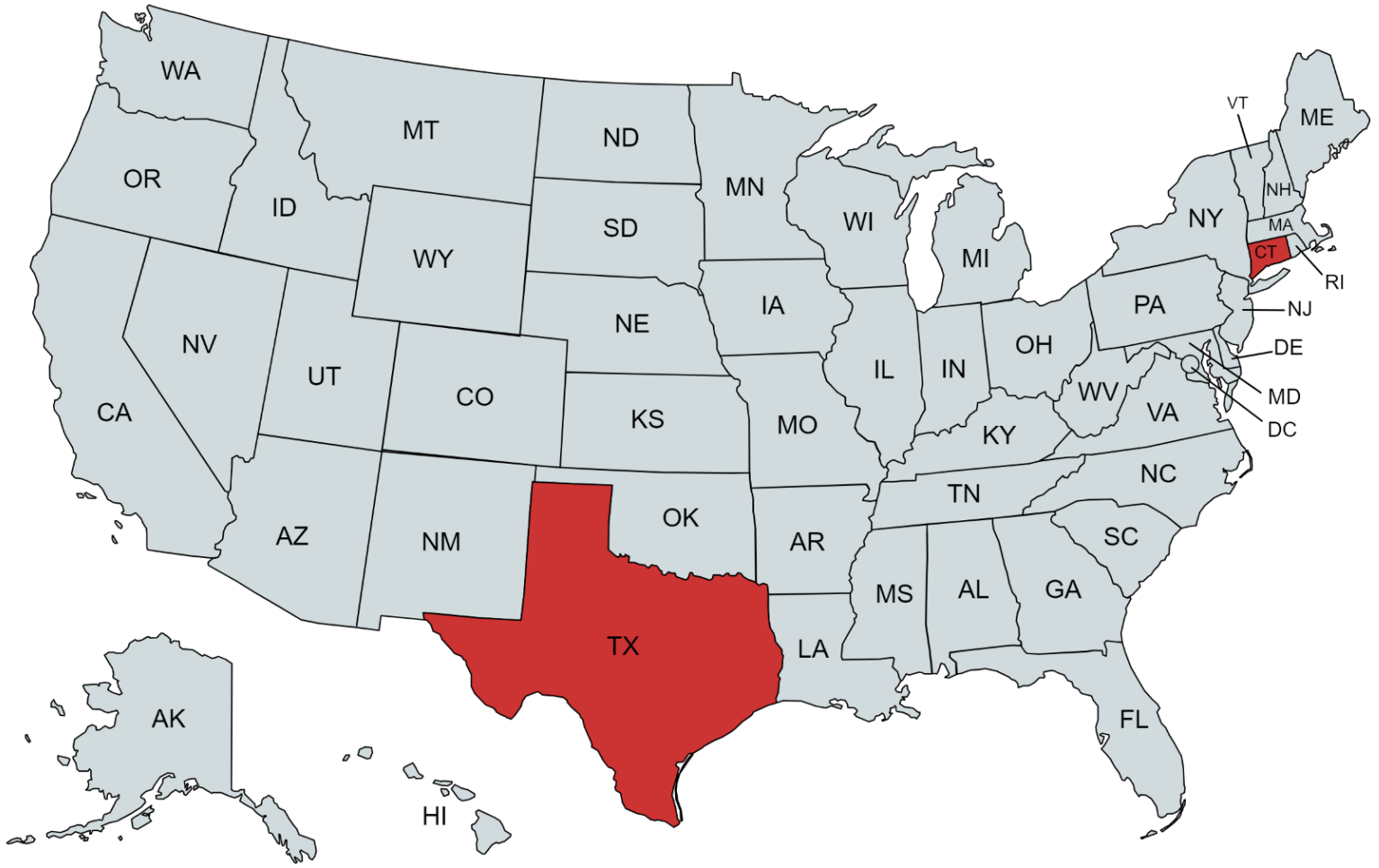
Lessons to Elicit POP Behaviors

- Problem-based math tasks
- EL scaffolds
- Dynamic approach
  - Encourage
  - Elicit

Phase 1

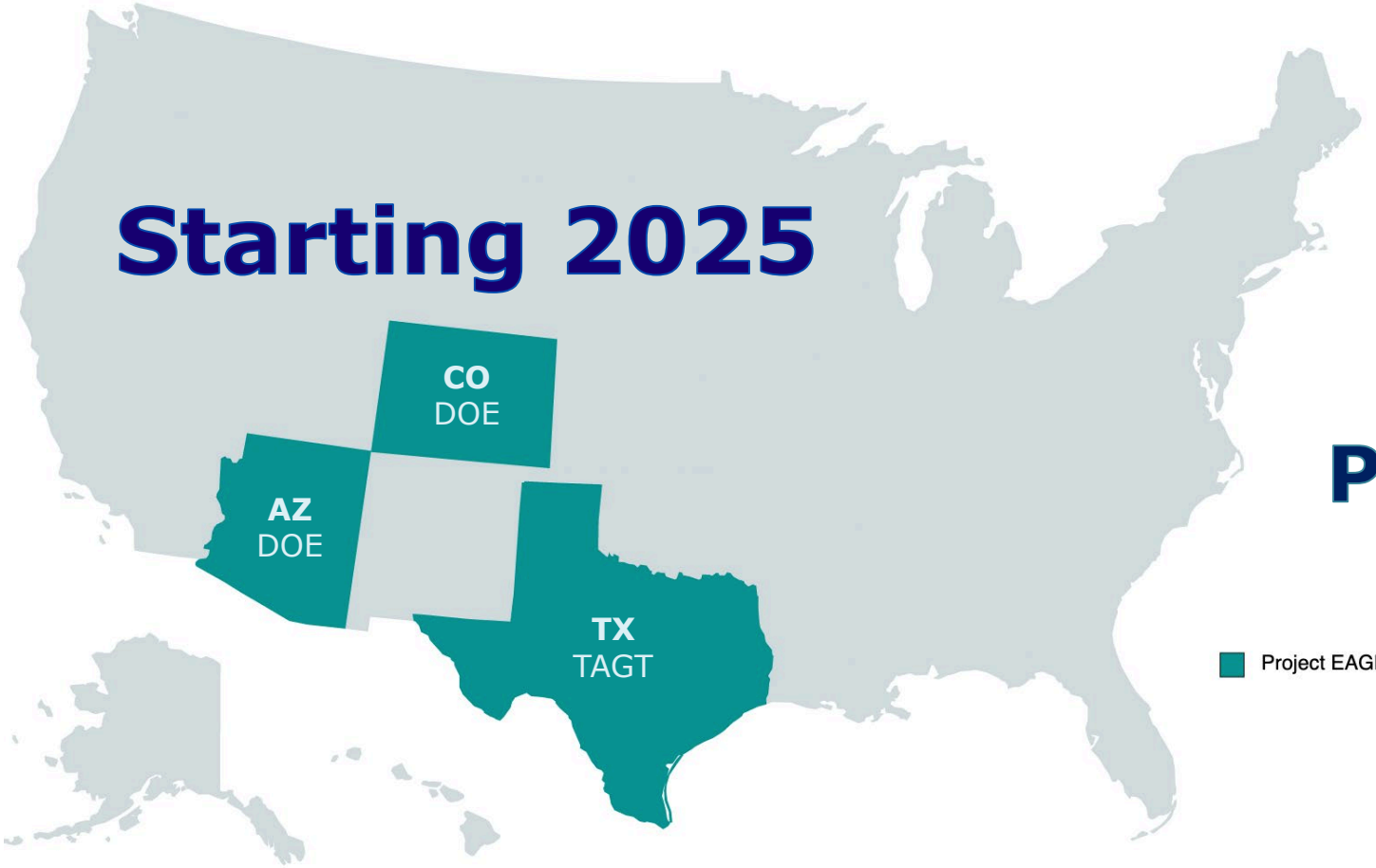
Field Test Classrooms

EL Population



Phase 2

Starting 2025



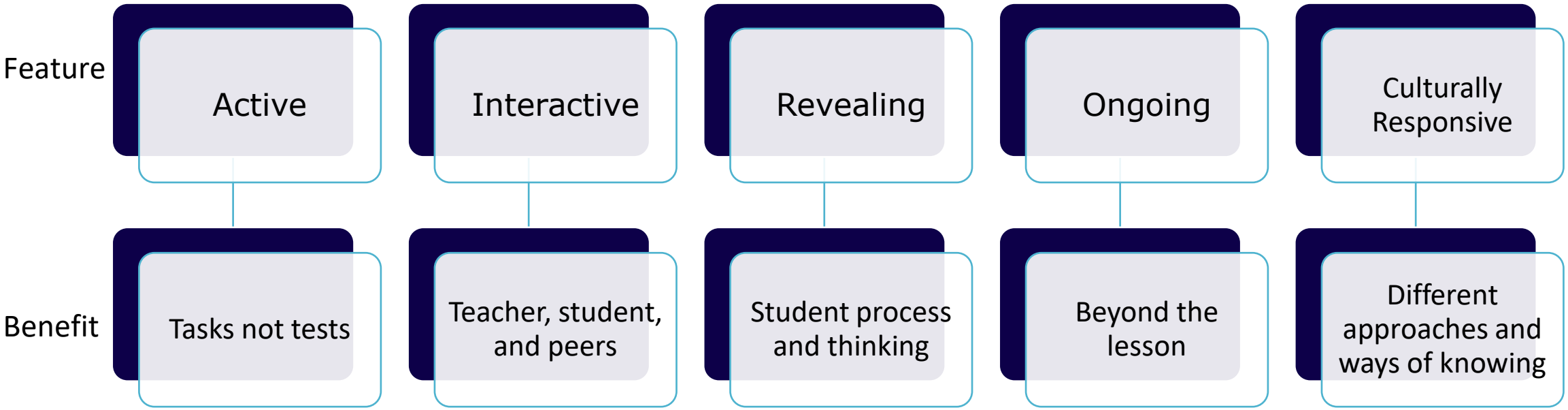
State Partners

Research says...

- Linguistic and cultural considerations
- Measures
  - Multiple
  - Beyond standardized
  - Strength-based
  - Dynamic

NCRGE—Mun et al., 2020

Project EAGLE: Dynamic Approach



(Sternberg, 2002; Tzuriel, 2018)

Agenda

Introduction to Project EAGLE

Points of Promise

Behaviors that POP!

- Eliciting
- Spotting

Cultural and Linguistic Considerations

Why Points of Promise?

- **Foster and spot mathematical talent**
  - Research-based
  - Expert advisory board
- **Utilize a checklist**
  - **Any** indication of behavior is acknowledged
  - Behaviors “POP” out

Nine Points of Promise

Teacher Language	Student Language
1. Is motivated and persists in solving difficult math problems.	1. I enjoy working on math and continuing to try to find the answer even when the problems are difficult.
2. I learn new concepts easily by making connections.	2. I connect what I am learning to what I have learned before in math.
3. Applies mathematical concepts to real-world situations.	3. I relate the math we are learning to everyday life outside of math class.
4. Shows flexibility in using a variety of thinking or problem-solving strategies.	4. I try different strategies to solve math problems.
5. Demonstrates original ways of approaching math problems	5. I think of new ways to solve math problems and new problems to solve.
6. Makes inferences based on logical reasoning.	6. I use logical reasoning...
7. Organizes information in a variety of ways to discover mathematical patterns.	7. I recognize patterns in math and use them to organize information.
8. Demonstrates a strong number sense.	8. I understand and use relationships between numbers to order, compare, and estimate.
9. Displays spatial abilities.	9. I can figure out how shapes fit together in different ways.

[Connections] [-- Creativity --] [-------- Patterns --------]

Project EAGLE Points of Promise
"I am thinking mathematically when..."

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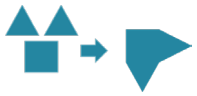

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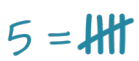

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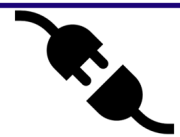	2. I connect what I am learning to what I have learned before in math.
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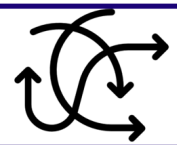	4. I try many different strategies to solve math problems.
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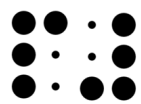
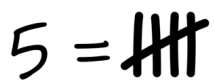
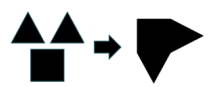
	7. I recognize patterns in math and use them to organize information.
	8. I understand and use relationships between numbers to order, compare, and estimate.
	9. I can figure out how shapes fit together in different ways.

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-------- patterns -------- -- creativity -- connections

Activity

Sort the sub-behaviors according to each POP.

Each POP has 2-4 sub-behaviors.

Uses mental computations easily

Mentally manipulates an object without physically touching it

Can think a few steps ahead

Picks up concepts quickly

1. Is motivated and persists in solving difficult math problems.
2. Learns new concepts in mathematics easily by making connections.
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- Identifies situations where math might be useful
- Connects mathematical concepts to personally meaningful experiences
- Recognizes patterns in phenomena or experiences

- Identifies real-world problems where math might be useful
- Connects mathematical concepts to personally meaningful experiences
- Recognizes patterns in real-world phenomena or experiences

3. Applies mathematical concepts to real-world situations

I relate the math we are learning to everyday life outside of math class.

- Student moves on when making mistakes
- Makes meaningful, sustained progress on a challenging task
- Is curious, intrigued or interested by math
- Persistence of effort

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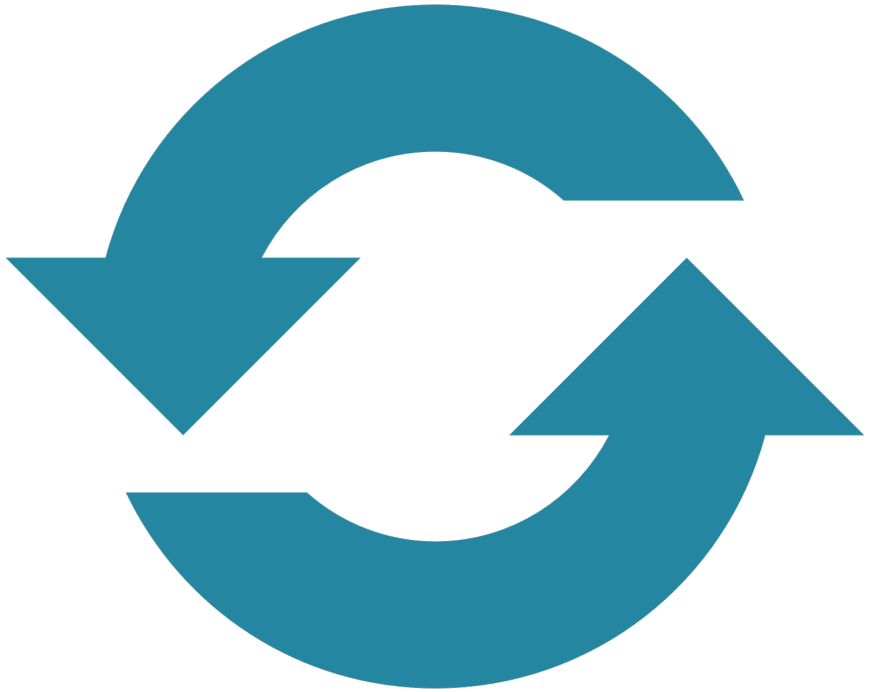
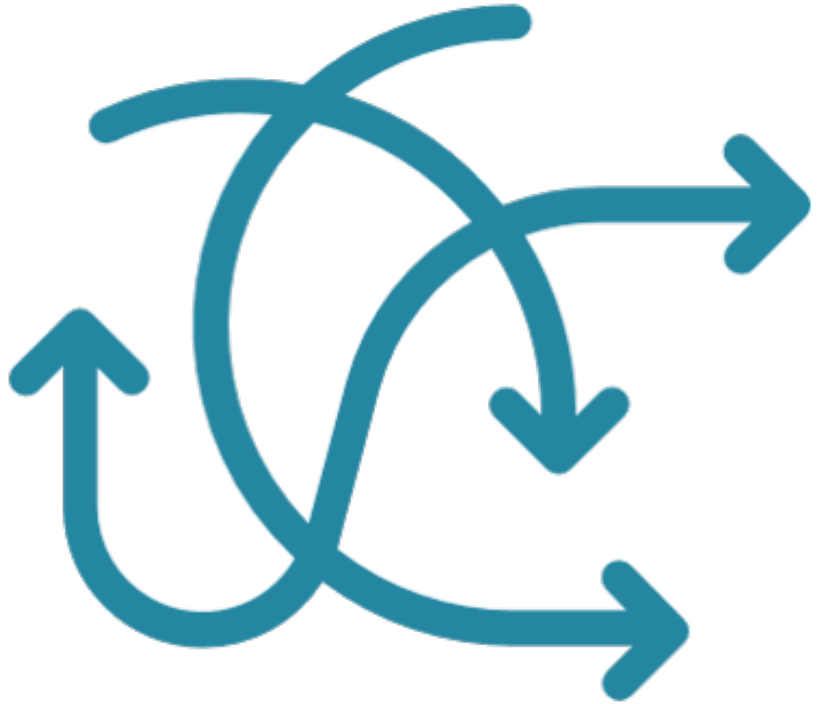


- Changes strategies to a more efficient approach, as needed
- Restructures a problem to find a more workable form

4. Shows flexibility in using a variety of thinking or problem-solving strategies

I try many different strategies to solve math problems.



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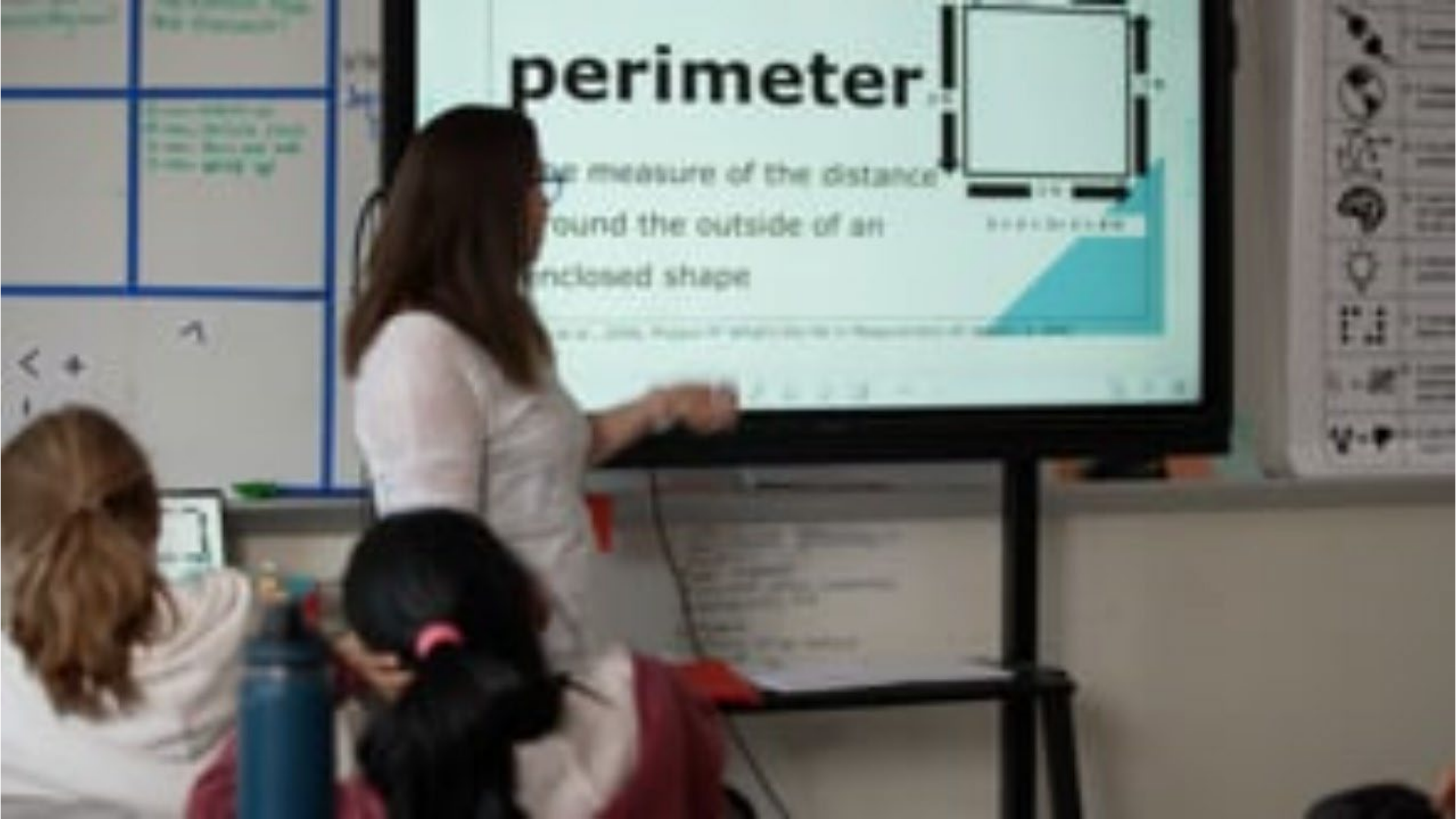
perimeter

- Draws inferences from recognizing patterns
- Recognizes and uses patterns to solve problems
- Groups multiple pieces of information together

7. Organizes information in a variety of ways to discover mathematical patterns

I recognize patterns in math and use them to organize information.

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- Groups multiple pieces of information together

- Generates unique questions or problems to solve
- Devises a novel approach or strategy for solving a problem

5. Demonstrates original ways of approaching math problems

I think of unique ways to solve math problems and new problems to solve.

- Generates unique questions or problems to solve
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- Demonstrates an understanding of and can represent place value
- Uses mental computations easily
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8. Demonstrates a strong number sense

I understand and use relationships between numbers to order, compare, and estimate.


So because the rule changes, then
you can get different numbers each time.

- Sees connections between new material and past material
- Connects ideas to other broader concepts
- Makes relationships between different mathematical ideas
- Picks up concept quickly

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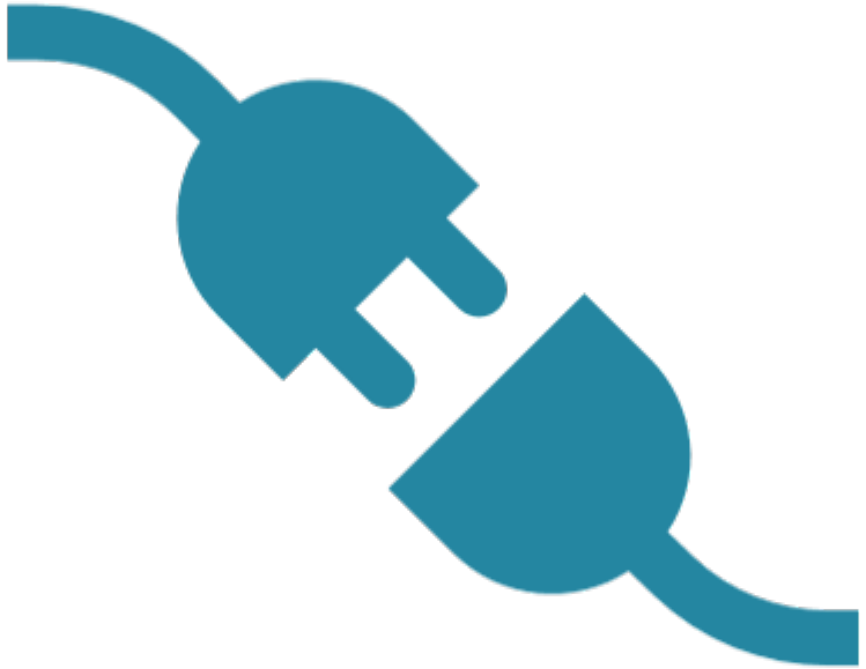
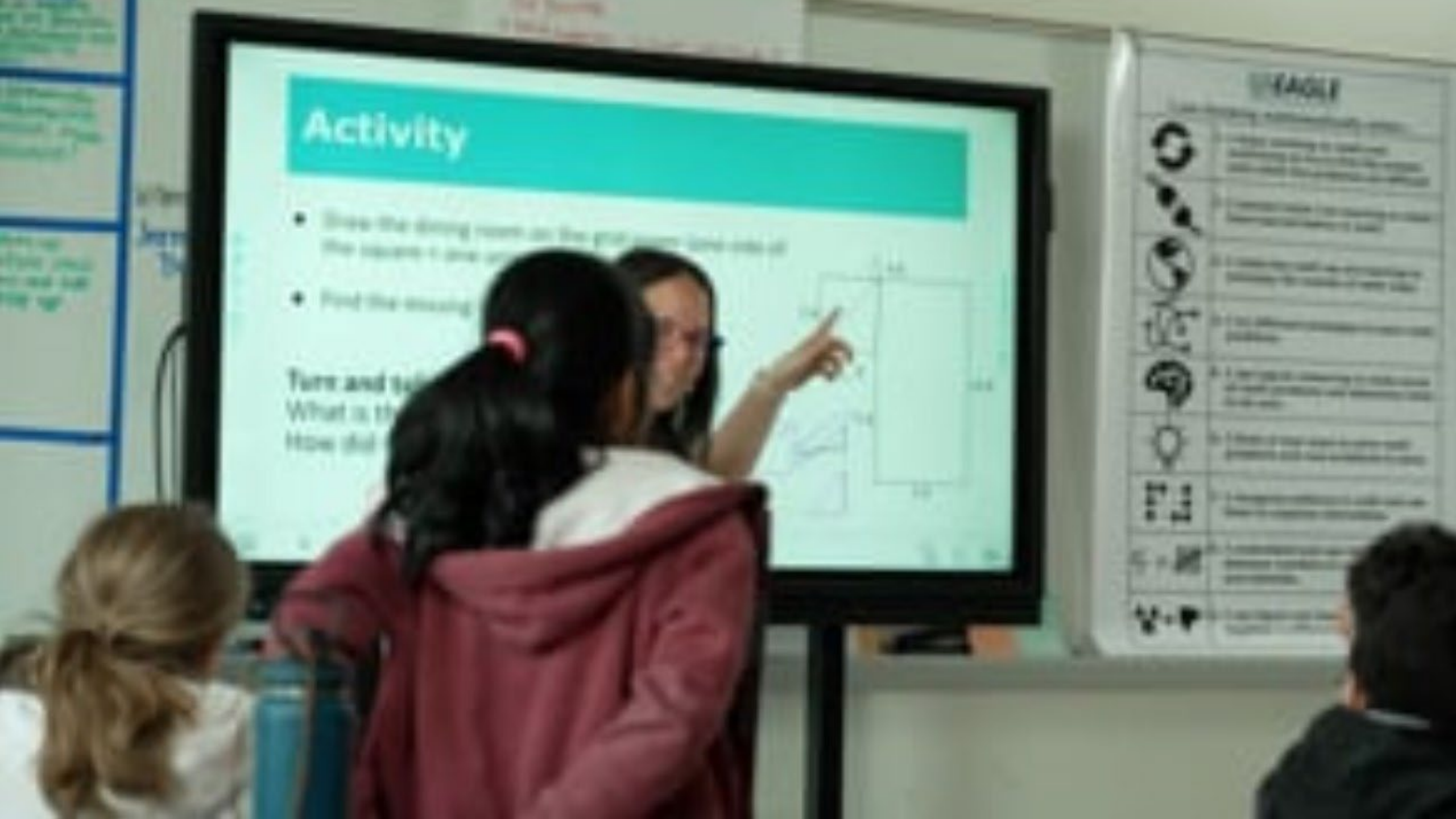
2. Learns new concepts easily by making connections

I connect what I am learning to what I have learned before in math.




Activity

- Mentally manipulates an object without physically touching it
- Solves problems using spatial representations
- Composes an object from component parts

9. Displays spatial abilities

I can figure out how shapes fit together in different ways.

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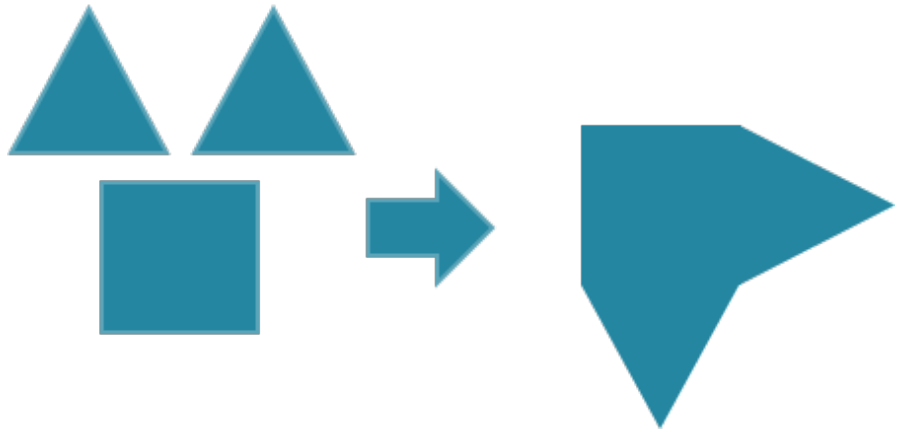

- Draws logical conclusions from key ideas
- Generalizes based on specific examples
- Can think a few steps ahead
- Utilizes relational thinking

6. Makes inferences based on logical reasoning

I use logical reasoning to make sense of math problems and determine what to do next.

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Can I just, we know that that equals twelve

1. Is motivated and persists in solving difficult math problems.			
Persistence of effort	Student continues on despite making mistakes	Makes meaningful, sustained progress on a challenging task	Is curious, intrigued by, or interested in math
2. Learns new concepts in mathematics easily by making connections.			
Sees connections between new material and past material	Connects ideas to other concepts	Makes relationships between different mathematical ideas	Picks up concepts quickly
3. Applies mathematical concepts to real-world situations.			
Identifies real-world problems where math might be useful	Connects mathematical concepts to personally meaningful experiences	Recognizes patterns in real-world phenomena or experiences	
4. Shows flexibility in using a variety of thinking or problem-solving strategies.			
Changes strategies to a more efficient approach	Restructures a problem to find a more workable form		
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Draws logical conclusions from key ideas	Generalizes based on specific examples	Can think a few steps ahead	Utilizes relational thinking
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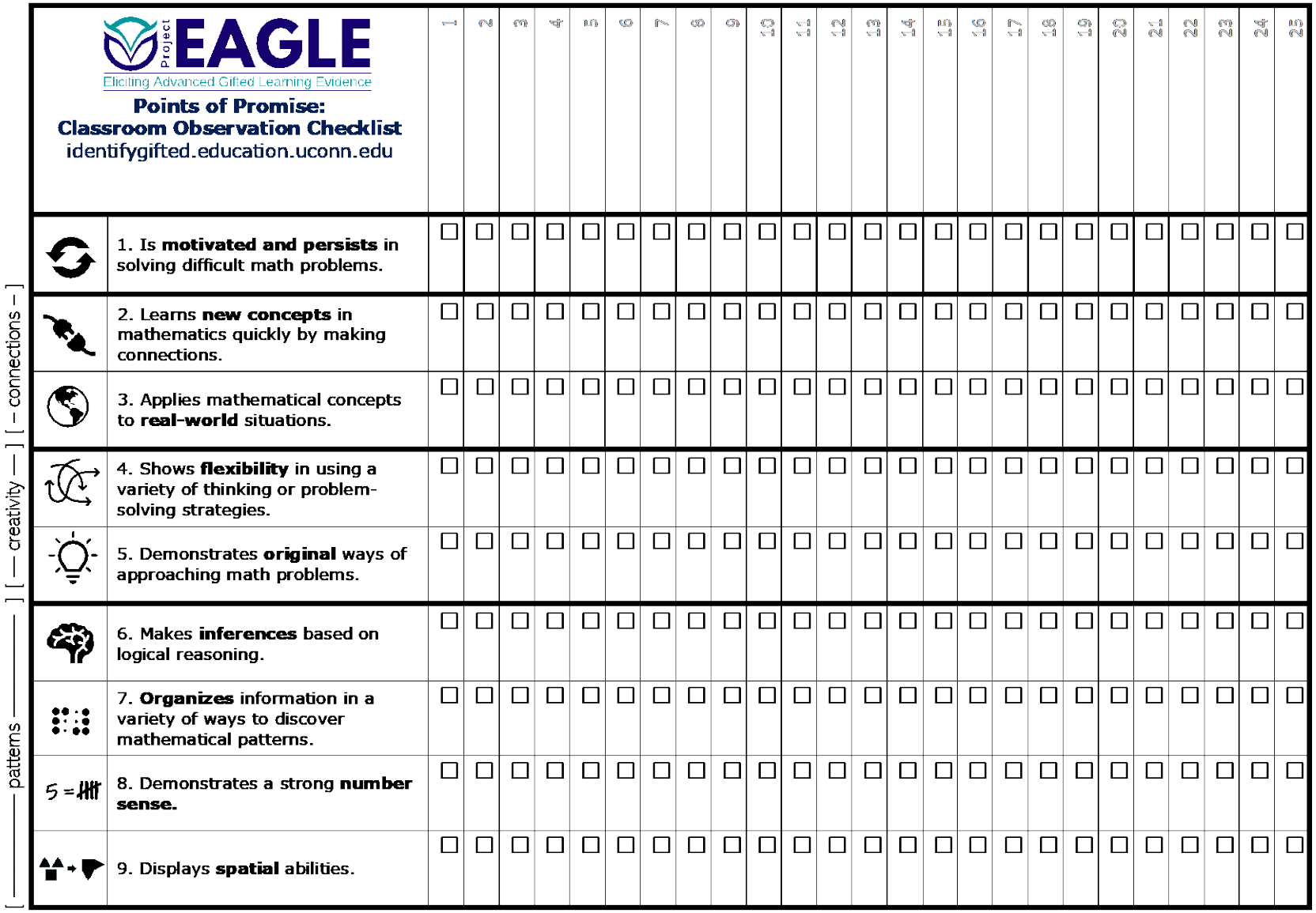
Draws inferences from recognizing patterns	Recognizes and uses patterns to solve problems	Groups multiple pieces of information together	
8. Demonstrates a strong number sense.			
Understands and can represent place value	Uses mental computations easily	Uses appropriate numerical operations intuitively	Compares and orders large numbers or fractions easily
9. Displays spatial abilities.			
Mentally manipulates an object without physically touching it	Solves problems using spatial representations	Composes an object from component parts	

POP Checklist



POP Matrix

Project EAGLE: POP Matrix

Lesson: As a Rule | Fraction Memory | Is It Worth It? | Keep Your Balance | Measuring Up **Date:** _____ **Time:** _____

connections	1. **Motivated and persists:** *Perseverance, growth-mindset, grit, curiosity, interest*	
connections	2. **New concept**s in mathematics **quickly** by making connections: *Connects to concepts or operations.*	
connections	3. Applies mathematical concepts to **real-world** situations: *Applies math to own life or other situations.*	
creativity	4. Shows **flexibility** in using a variety of thinking or problem-solving strategies: *Changes conceptualization or strategies.*	
creativity	5. Demonstrates **original** ways of approaching math problems: *Novel strategy, unique insight, alternate solution.*	
patterns	6. Makes **inferences** based on logical reasoning. *Thinks ahead, relational thinking, uses reason/logic*	
patterns	7. Organizes information in a variety of ways to discover mathematical **patterns:** *Strategic grouping, pattern-spotting*	
patterns	8. Demonstrates a strong **number sense.** *Place value, operations, number fluency*	
patterns	9. Displays **spatial** abilities. *(De)composes shapes, manipulates mentally, represents spatially*	

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Which POP do you think would be…

Easy to spot?

Challenging to spot?

Project EAGLE Approach

Emphasis on encouraging participation and eliciting thinking to spot potential

Turn and Talk –
Share a time from each column when you have had the chance to…

Column A

- Encourage
- Provide language supports
- Model
- Reassure
- Teach in the moment
- Provide a hint

Column B

- Determine understanding
- Ask to justify
- Ask to elaborate
- Challenge to solve another way
- Probe for deeper thinking
- Seek connections in thinking

(Adapted from Source: Lobato, 2015; Tzuriel, 2017)

Project EAGLE's Two-Step Dynamic Approach

- Encourage
- Provide language supports
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Project EAGLE's Two-Step Dynamic Approach

IN

- Encourage
- Provide language supports
- Model
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- Teach in the moment
- Provide a hint

OUT

- Determine understanding
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- Ask to elaborate
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From the teacher to the student

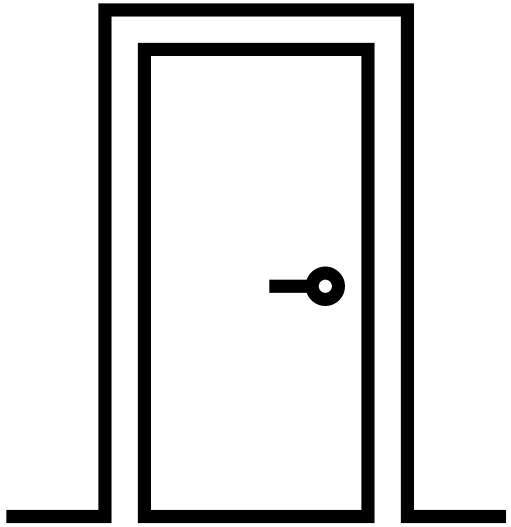
IN

- **I – Inspire**
  - emotional/affective supports
- **N – Nudge**
  - Task supports

IN: Continuum of Encouraging

Student is not yet engaging

- Language
- Directions
- Purpose
- Background



(Chaffey et al., 2013; Kazemi and Stipek, 2001; Lobato et al., 2005; Turner & Celedon-Pattichis, 2011)

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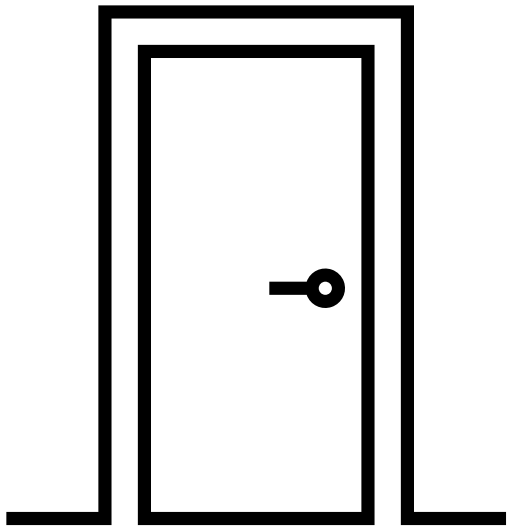


Inspire:

- Demonstrate significance of activity
- Build confidence
- Assure/reassure

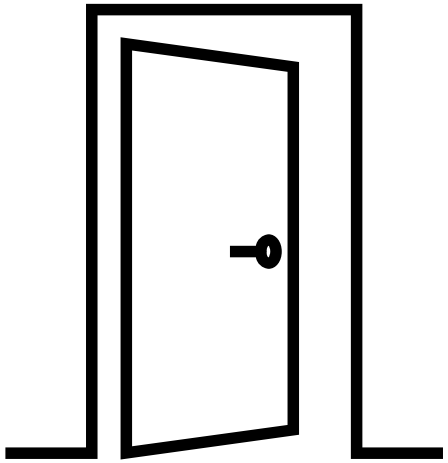
***Nudge*:**

- Clarify directions; purpose
- Model
- Remind them of similar info
- Make a connection
- Language supports
- Hint Cards

IN: Continuum of Encouraging

Student is engaging

- Communicating ideas in the current modality/choosing another
- Motivation to continue
- Support explaining thinking



IN: Continuum of Encouraging

Inspire:

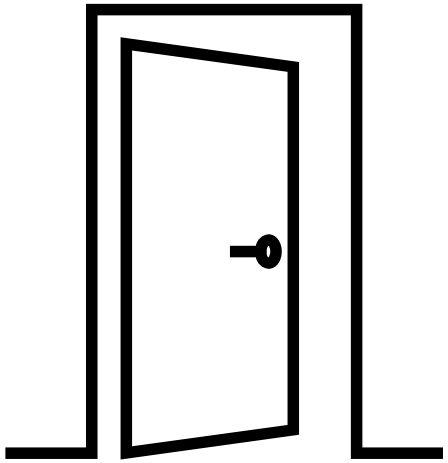
- Errors as opportunities; part of the learning process
- Build confidence

***Nudge*:**

- Provide other ways of showing thinking
- Sentence frames to support verbalization
- Encourage thinking extensions

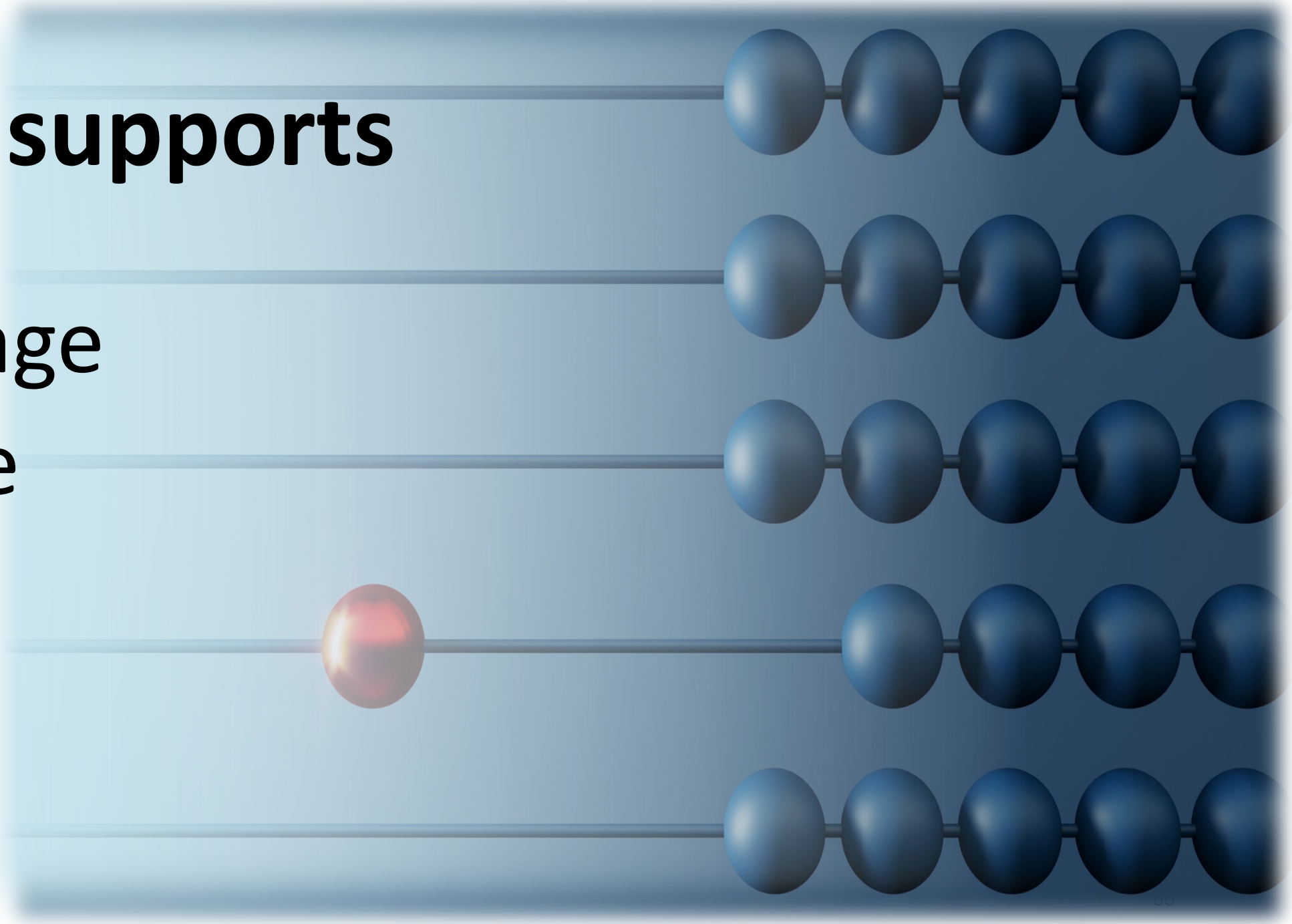
Student is engaging

- Communicating ideas in the current modality/choosing another
- Motivation to continue
- Support explaining thinking



EL/ML supports

- Language
- Culture



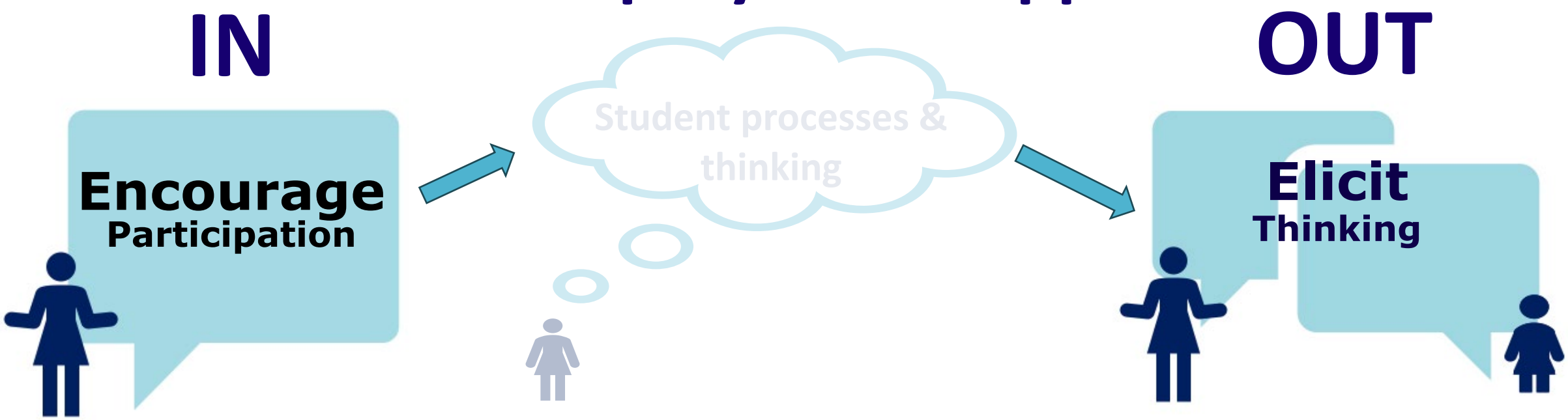
Language

What is needed?	What can I do?	How might this look in a lesson?
Building background	Determine what information is needed and discuss	Show and discuss how lesson items work (e.g., balance scales).
Student's language level	Consult student records and EL/ML specialists	Simpler sentence structures when speaking; avoid/reduce figurative speech (metaphors, similes, idioms).
Language support	Sentence starters or frames	○ I notice/wonder _____. ○ The rule is _____. ○ It is important because _____. ○ An example is ____ because ____.
Visuals and manipulatives	Provide pictures, videos, or actual items	Show pictures or videos of items referenced in lessons (e.g., show and discuss machines before demonstrating an input/output machine).
Real-world examples	Connect or adapt the lesson to students' lives	Ask students about machines they have seen and how they work.
Vocabulary support	Word wall vocabulary with images	Introduce, discuss, and post word wall cards with definitions and images/ examples of relevant terms (e.g., rule).
Processing time	Build in wait time, allow peer-peer practice, let students draw/write before responding	Allow students to turn and talk with a partner to hear and practice responses.
Modalities of expression	Offer a range of options for answering questions	Include opportunities to speak, write, draw, or model with choices as often as possible.

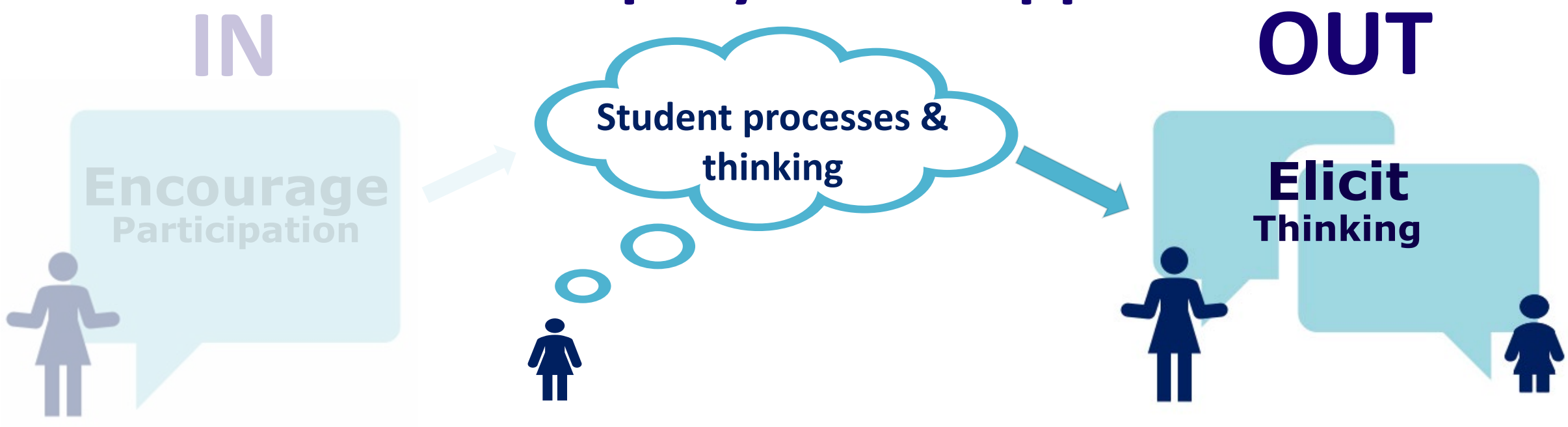
What is needed?	What can I do?	How might this look in a lesson?
Consider students' cultures	Check lesson context that may/may not be ubiquitously known	Use soccer rather than basketball for math tasks.
Honor prior experience (Funds of Knowledge)	Tap into a student's experiences	Relate a fraction task to recipes from students' cuisine or calculate percentages from data relevant to students' lived experiences.
Respect communication preferences	Check comfort with asking/answering questions.	Provide multiple pathways for individual versus collaborative work and answering to honor students' preferences
Be mindful of body language and gestures	Check thumbs up, pointing, eye contact, etc.	Do not use thumbs up as a gesture of understanding/agreement if their culture finds it offensive.

Culture

Project EAGLE's Two-Step Dynamic Approach



Project EAGLE's Two-Step Dynamic Approach



Between Teacher and Student

OUT

*Help students share **OUT** their thinking*

O – Orient – Where?

U – Understand – Depth?

T – Transfer – Breadth?

Adapted from Lobato et al., 2005

O-Orient

Finding where the student is in the process

- A sense of student thinking
- Start general and focus as needed

Eliciting in general: "Tell me about…"

For students who have a difficult time articulating, teacher might elicit more specifically:

"I notice you drew 4 circles. Tell me about that."

(Franke, 2007; Hogan et al., 2000; Lobato et al., 2005; Turner and Celedon-Pattichis, 2011; Webb, 2009)

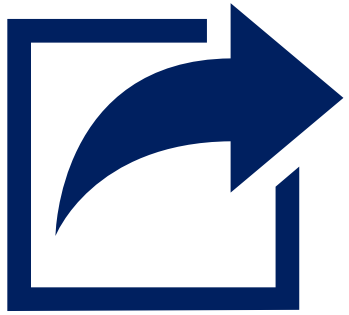
U-Understanding

Zooming in on student thinking

- Explain
- Justify
- Elaborate
- Decide
- Reflect

(Baroody, 2003; Franke, 2007;Hogan et al., 2000; Howe et al., 2020; Kazemi and Stipek (2001); Turner and Celedon-Pattichis, 2011; Webb, 2009)

T-Transfer
Delving for breadth



- Other mathematical concepts
- Other strategies
- Other situations

Baroody, 2003;Hogan et al., 2000; Lobato et al., 2005

Eliciting to draw out students' thinking via…

- Images
- Ideas
- Strategies
- Conjectures
- Conceptions
- Ways of viewing mathematical situations

(Adapted from Lobato et al., 2005)

Eliciting thinking involves . . .

1. Allowing a student's thinking to unfold.
2. Guiding a student's use of tools.
3. Asking open-ended questions.

(Jacobs et al., 2014)

Project EAGLE's Two-Step Dynamic Approach

1. Alessia is at Level 1 EL. She is intently watching the lesson introduction but has written the word “Help” and a sad face on her white board to her turn-and-talk partner.

Is this an opportunity for the teacher to get them INvolved or find OUT their thinking?

Encourage Participation (IN)

- **Inspire** – Emotional/affective supports
- **Nudge** – Task supports

Elicit Thinking (OUT)

- **Orient** – Determine where a student is in the task.
- **Understand** – Zoom in on student thinking in the task.
- **Transfer** – Elicit for breadth of student thinking in the task.

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2. Carlos is working on the area and perimeter activity. He is getting the correct answers, but you do not see any work and are not sure how he got them.

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3. In *As a Rule*, **Anton** would not guess a rule in front of his group members. This was unusual for Anton who likes—and is good at—math. The teacher realized he was reluctant to guess as he could not be sure an accurate rule would be the "correct" rule.

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4. The teacher was not surprised to see **Lucia** excel at building the shapes in *Is It Worth It* but wondered how far her thinking could extend.

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Thank you!

projecteagle@uconn.edu

Project EAGLE Webpage

identifygifted.education.uconn.edu/

Contact

projecteagle@uconn.edu

Interested in sharing what your district does for subject-specific acceleration?

- The National Center for Research on Gifted Education is conducting a research study to document and disseminate information on how school districts implement subject acceleration. We would like to conduct online interviews (~ 1 hour) with knowledgeable administrators from **school districts** who have systematic procedures in place for subject acceleration. **Scan the QR code** or contact Catherine Little at catherine.little@uconn.edu to learn more.

UConn IRB Protocol X23-0389 Approved October 30, 2023

NATIONAL CENTER FOR RESEARCH ON GIFTED EDUCATION

Seeking schools interested in doing acceleration better?

NCRGE is seeking schools serving grades 2-5 interested in ***FREE PROFESSIONAL LEARNING OPPORTUNITIES*** and ***assistance in making acceleration decisions***.

ncrge.uconn.edu/acceleration

You can assist in the creation of the new

Renzulli Executive Functioning Scale

- *Grade 4-8 students will assess their…*
  - ability to start tasks (e.g., I like starting new things),
  - ability to stay on task (e.g., I finish what I start)
  - organization (e.g., My desk is cleaned and organized)
  - awareness of strengths and weaknesses (e.g., I know what I can do well)
  - self-advocacy (e.g., I am not afraid to stand up for myself)
  - ability to collaborate (e.g., I work well with others)
  - awareness of ability to manage emotions (e.g., I can calm myself down when I am upset.)

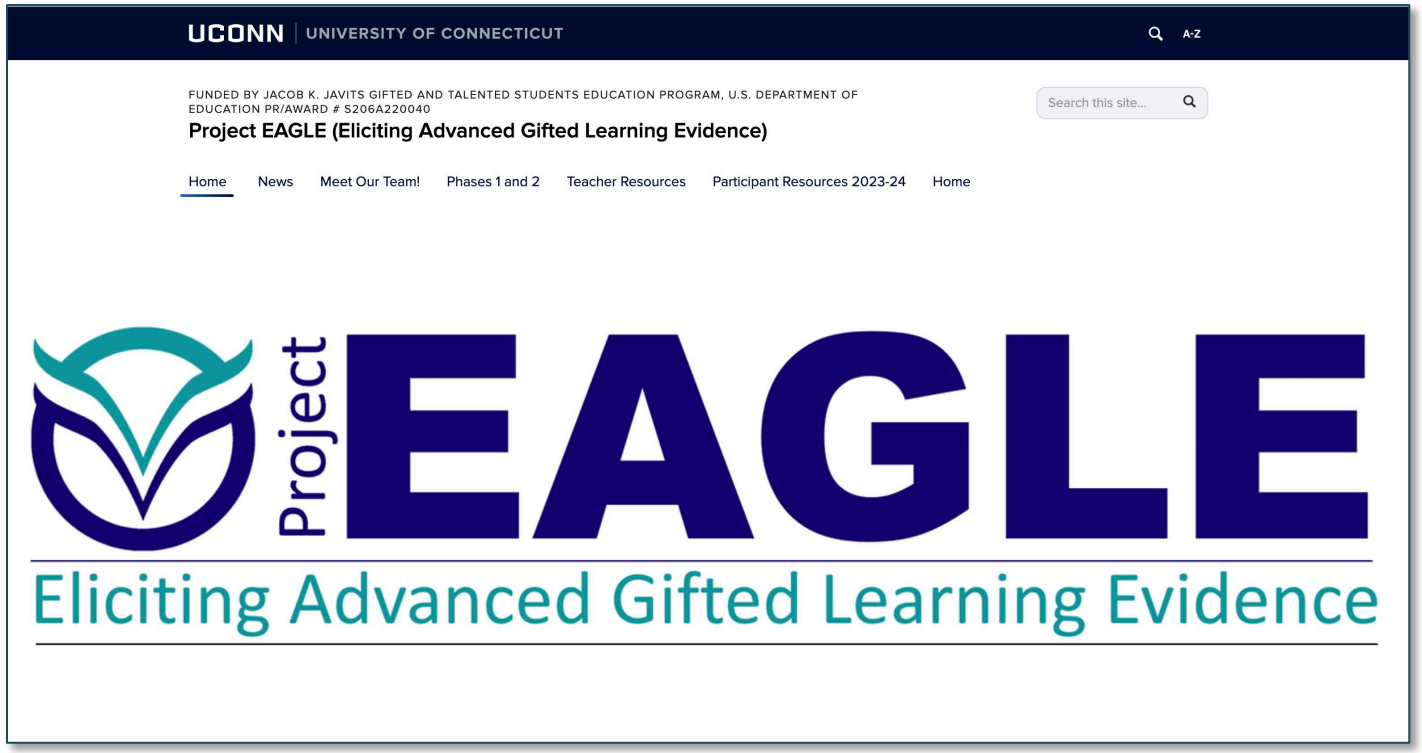
Parents – **s.uconn.edu/refs**

Teachers – **s.uconn.edu/renzulliscale**

Links…

- This presentation https://identifygifted.education.uconn.edu/conference-presentations/ (coming soon)
- Project EAGLE https://identifygifted.education.uconn.edu/
- Renzulli Center for Creativity, Gifted Education, and Talent Development https://gifted.uconn.edu/
- Renzulli Center Events https://gifted.uconn.edu/events/
- Confratute https://confratute.uconn.edu/
- Renzulli Center Webinar Recordings https://gifted.uconn.edu/events-2021-22/

Project EAGLE



https://identifygifted.education.uconn.edu/

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