The Positive Power of Assessment in the Mathematics Classroom

Pat Lore

February 22, 2016

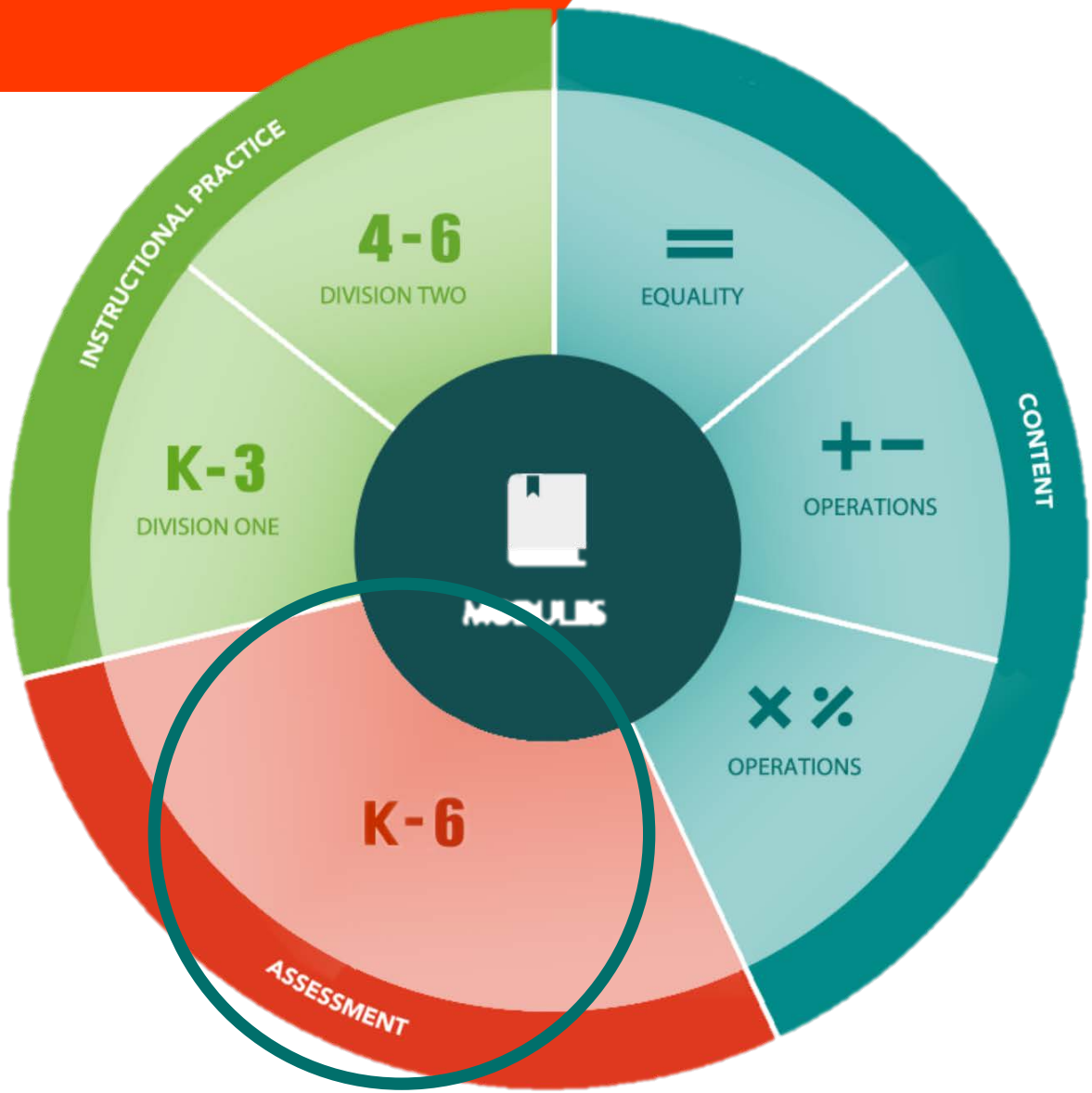
alberta assessment consortium

www.aac.ab.ca

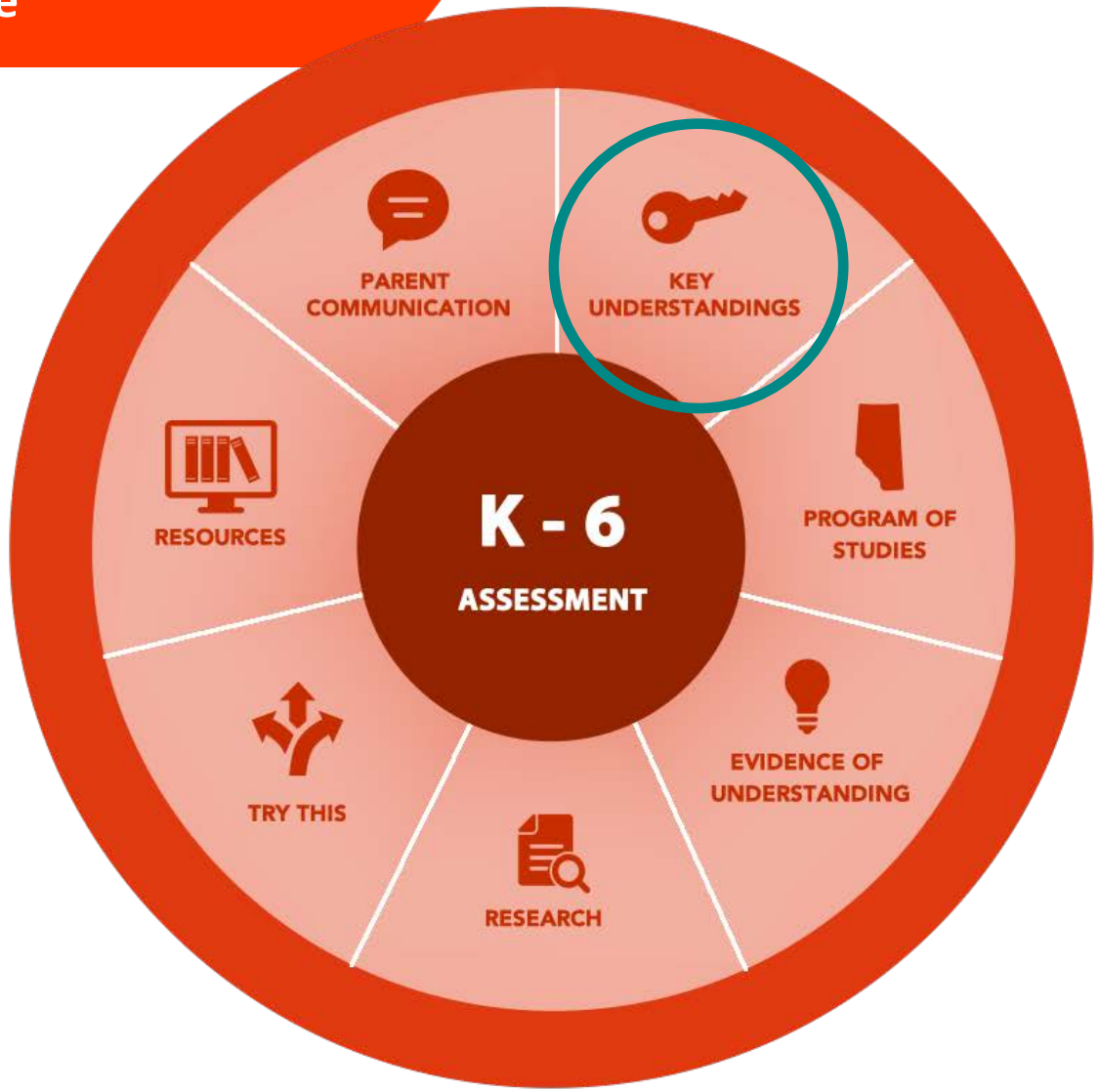
Webinar Goals

- Summarize key assessment principles
- Provide practical classroom assessment examples
- Familiarize participants with EMPL resources

Learning Guide



Tour of Learning Guide



Who's with us today?

Pre-Service Teacher	K – 2 Teacher	3 – 6 Teacher	Admin	Learning Coach	Other

Assessment in Action

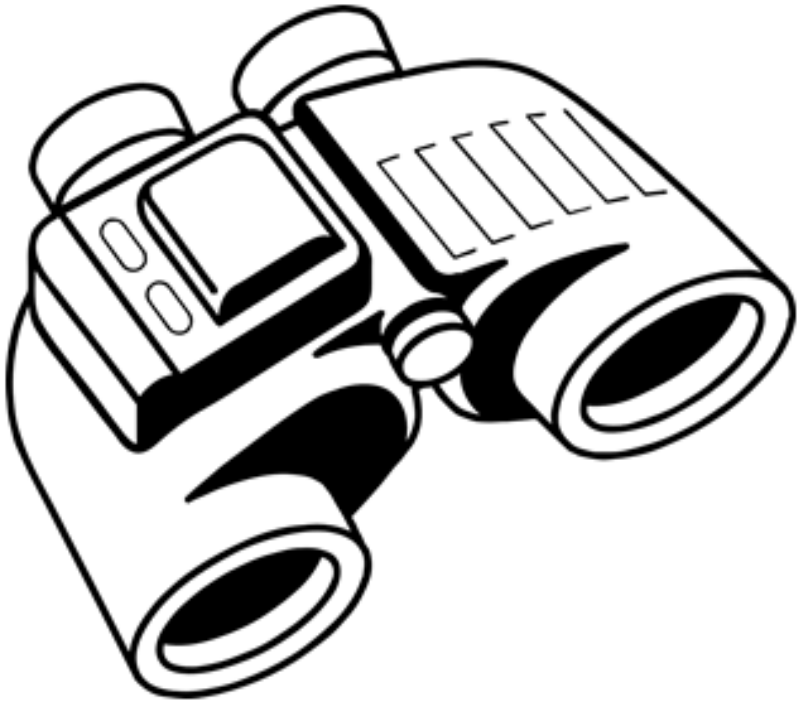
Big Ideas

The ultimate goal of assessment is to support student learning.

Big Ideas

The ultimate goal of assessment is to support student learning.

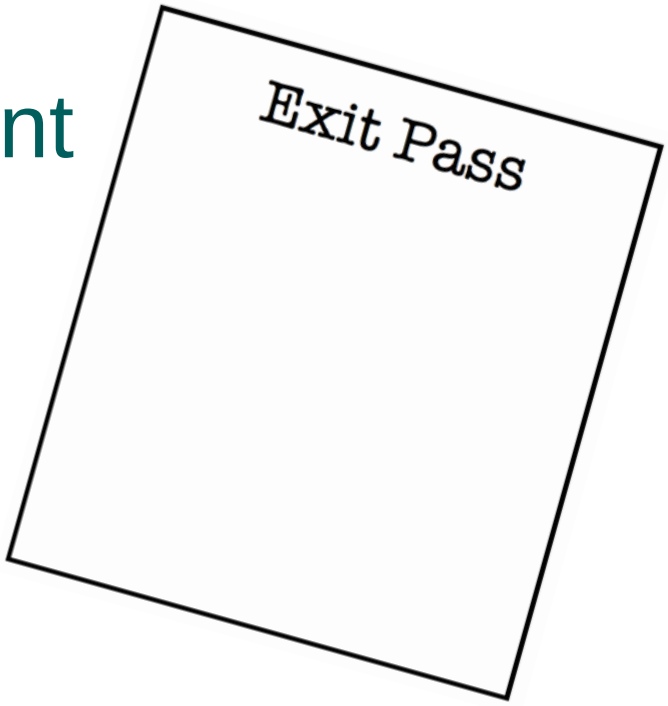
- Plan for assessment: begin with the end in mind.



Big Ideas

The ultimate goal of assessment is to support student learning.

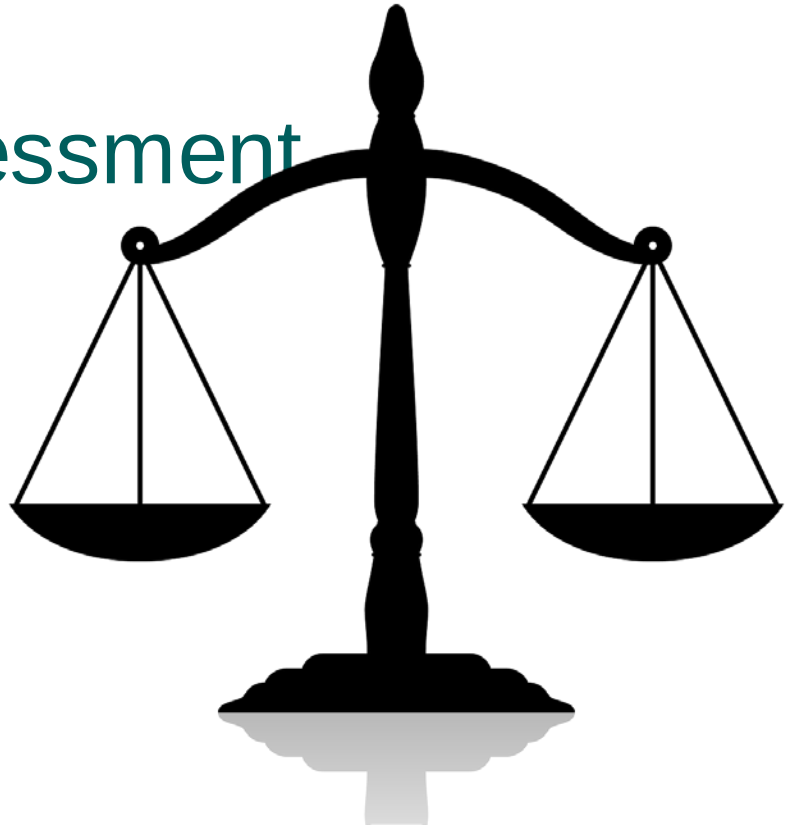
- Build formative assessment into every lesson.



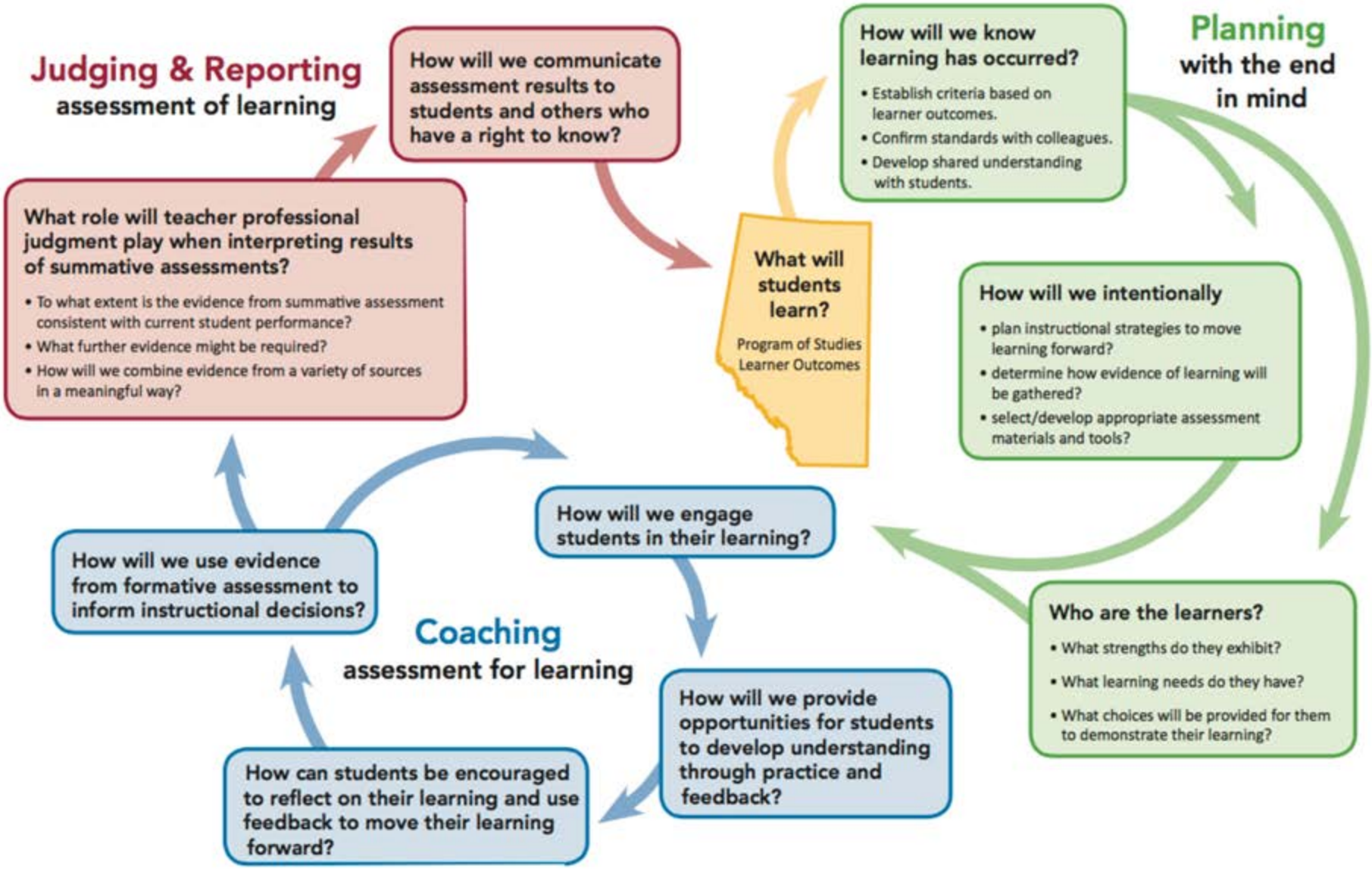
Big Ideas

The ultimate goal of assessment is to support student learning.

- Ensure summative assessment is fair and accurate.



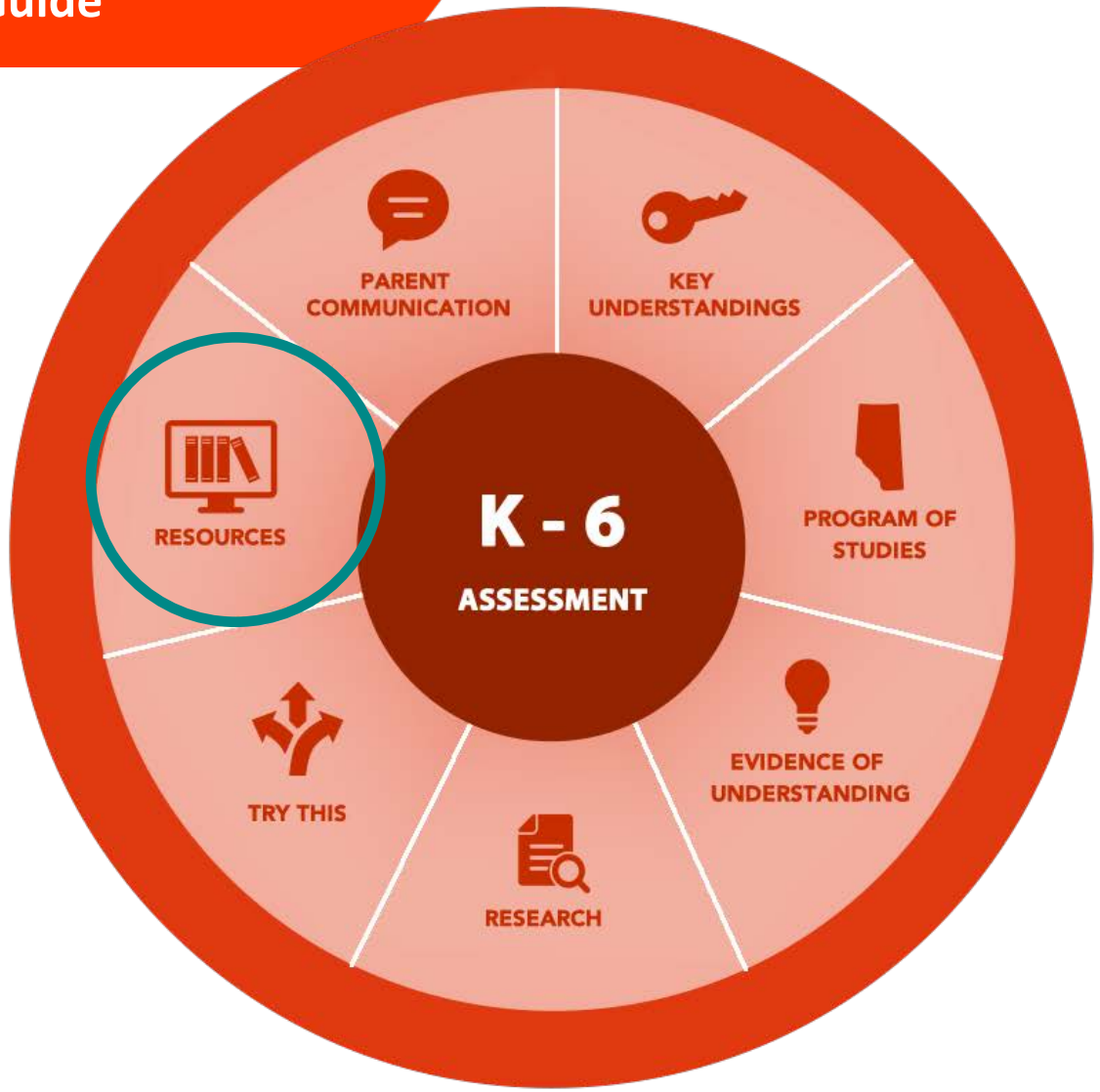
AAC KEY VISUAL: ASSESSING STUDENT LEARNING IN THE CLASSROOM



Copyright © 2015 Alberta Assessment Consortium

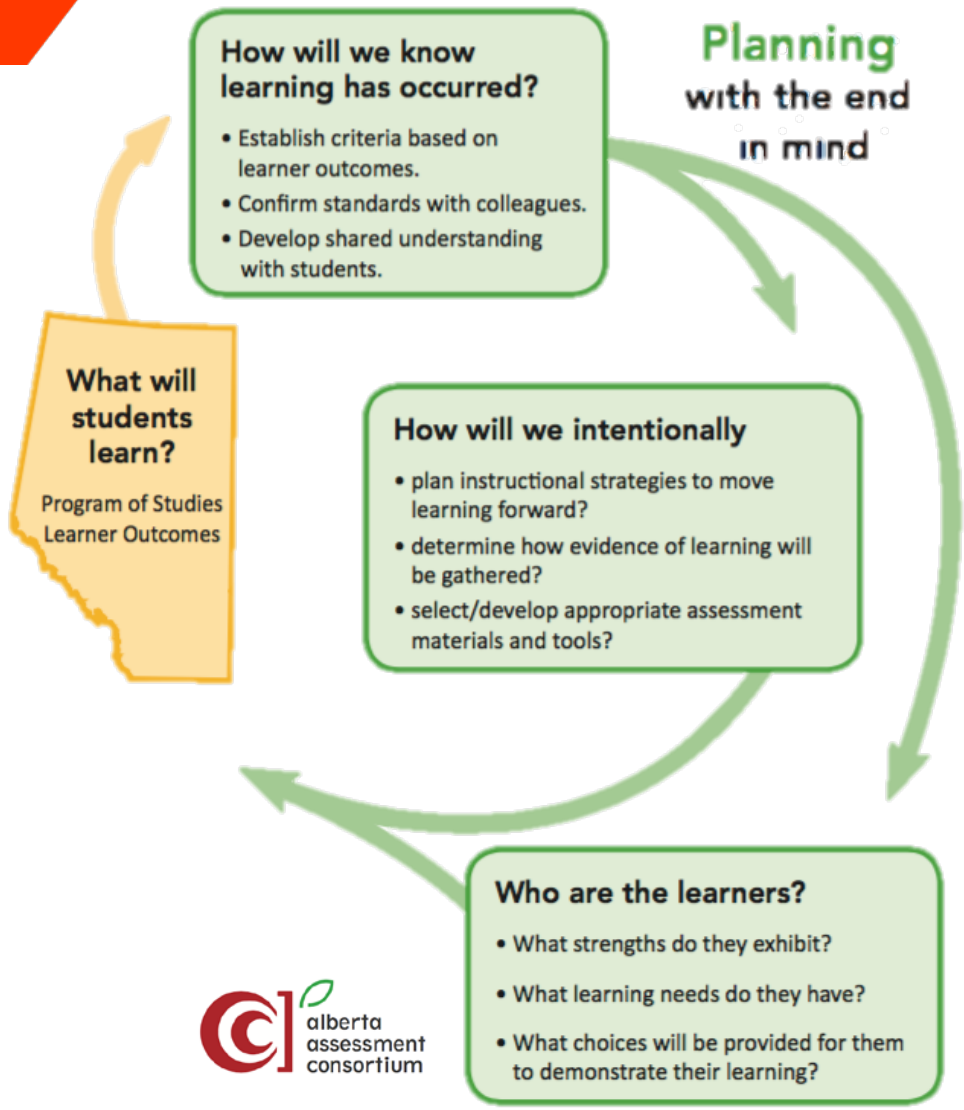
alberta assessment consortium

Tour of the Learning Guide



Planning

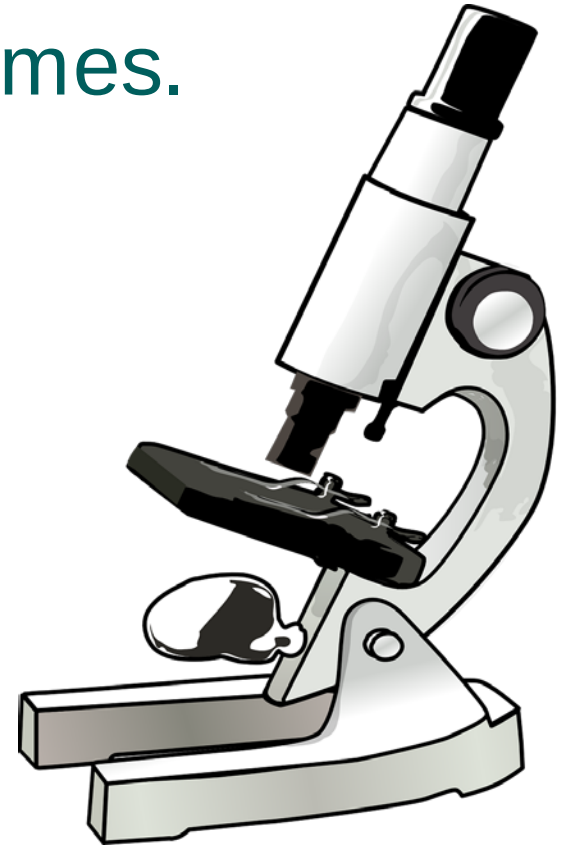
Teacher as Planner



Planning

Step-by-Step

1. Begin with learner outcomes.



Planning

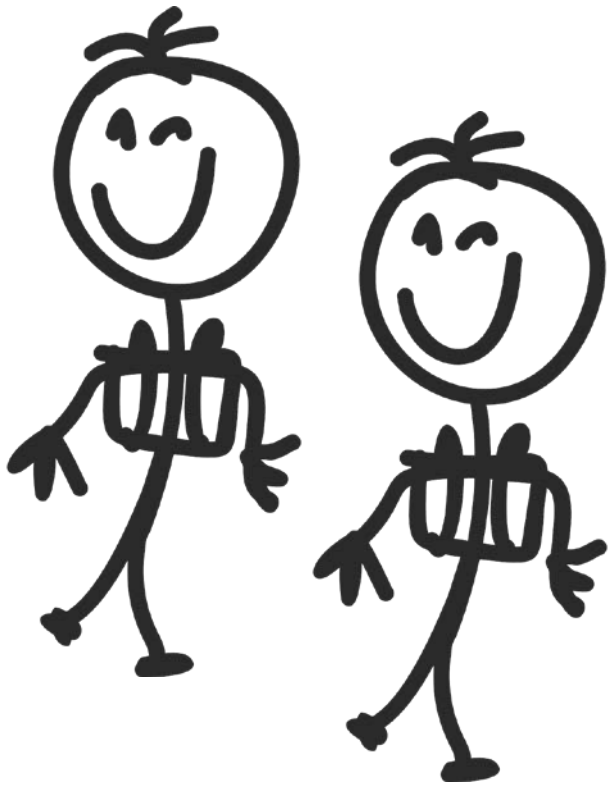
Step-by-Step

1. Begin with learner outcomes.
2. Establish learning goals.

Planning

Step-by-Step

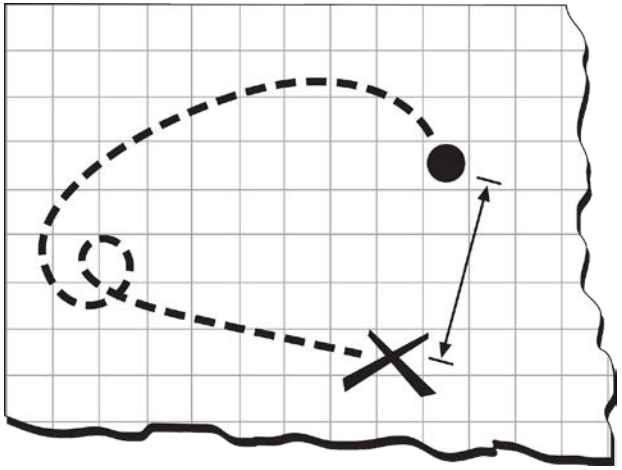
1. Begin with learner outcomes.
2. Establish learning goals.
3. Consider your students.



Planning

Step-by-Step

1. Begin with learner outcomes.
2. Establish learning goals.
3. Consider your students.
4. Plan for instruction and assessment.



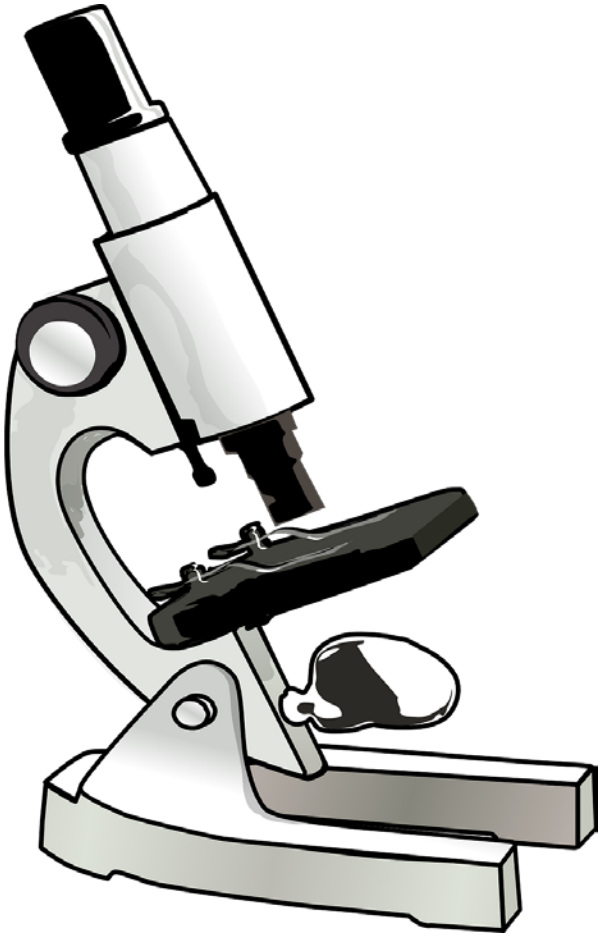
Planning

1. Begin with learner outcomes.
2. Establish learning goals.
3. Consider your students.
4. Plan for instruction and assessment.

Planning

Step-by-Step

1. Begin with learner outcomes.
2. Establish learning goals.
3. Consider your students.
4. Plan for instruction and assessment.



Step 1:

Begin with learner outcomes

Planning

Begin with learner outcomes

Grade 2, Shape and Space

7. Describe, compare and construct 3-D objects, including:
   - cubes
   - spheres
   - cones
   - cylinders
   - pyramids

[C, CN, R, V]

Connect each name to the correct 3-D object.

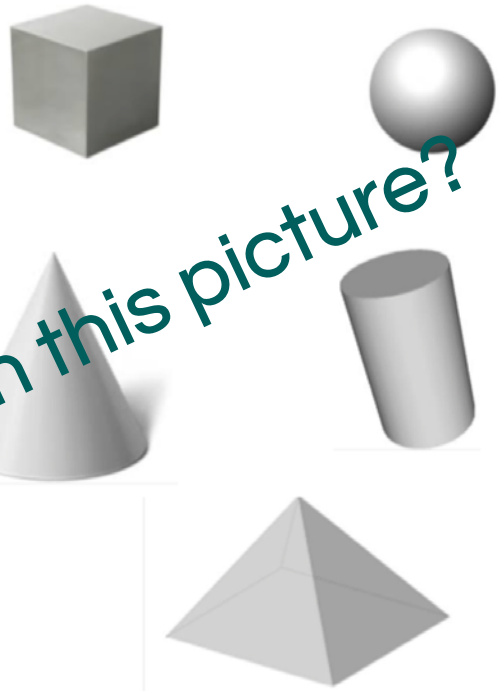
A. Cylinder

B. Cone

C. Sphere

D. Cube

E. Pyramid



What's wrong with this picture?

Planning

Begin with learner outcomes

6. Describe and apply mental mathematics strategies for adding two 2-digit numerals, such as:
   - adding from left to right
   - taking one addend to the nearest multiple of ten and then compensating
   - using doubles.

   [C, CN, ME, PS, R, V]

Grade 3 Number

Planning

Begin with learner outcomes

Find the answer.

1. 17 + 24 = _____

2. 36 + 14 = _____

3. 65 + 9 = _____

4. 52 + 10 = _____

5. 78 + 16 = _____

6. 29 + 42 = _____

7. 8 + 37 = _____

8. 51 + 43 = _____

9. 67 + 30 = _____

10. 85 + 7 = _____

Planning

Begin with learner outcomes

6. Describe and apply mental mathematics strategies for adding two 2-digit numerals, such as:
   - adding from left to right
   - taking one addend to the nearest multiple of ten and then compensating
   - using doubles.

   [C, CN, ME, PS, R, V]

Planning

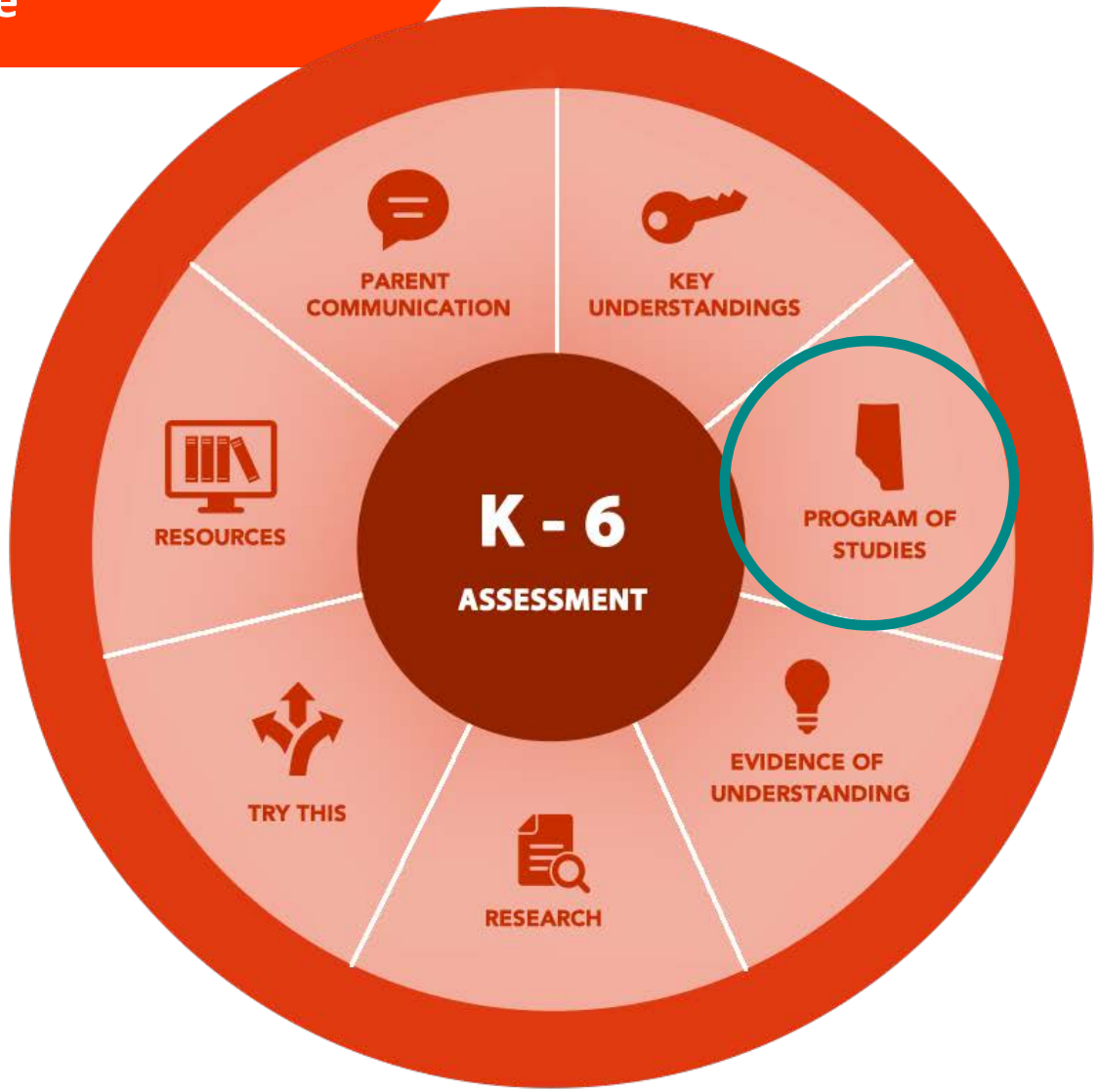
Begin with learner outcomes

6. Describe and apply mental mathematics strategies for adding two 2-digit numerals, such as:
   - adding from left to right
   - taking one addend to the nearest multiple of ten and then compensating
   - using doubles.

   [C, CN, ME, PS, R, V]

Communication, CoNnections, Mental math and Estimation, Problem Solving, Reasoning, Visualization

Tour of Learning Guide



Step 2:

Establish learning goals

Planning

Establish Learning Goals

Specific Outcomes *It is expected that students will:*	**Achievement Indicators** *The following set of indicators **may** be used to determine whether students have met the corresponding specific outcome.*
6. Describe and apply mental mathematics strategies for adding two 2-digit numerals, such as: • adding from left to right • taking one addend to the nearest multiple of ten and then compensating • using doubles. [C, CN, ME, PS, R, V]	(Students investigate a variety of strategies and become proficient in at least one appropriate and efficient strategy that they understand.) ➢ Add two given 2-digit numerals, using a mental mathematics strategy, and explain or illustrate the strategy. ➢ Explain how to use the "adding from left to right" strategy; e.g., to determine the sum of 23 + 46, think 20 + 40 and 3 + 6. ➢ Explain how to use the "taking one addend to the nearest multiple of ten and then compensating" strategy; e.g., to determine the sum of 28 + 47, think 30 + 47 – 2 or 50 + 28 – 3. ➢ Explain how to use the "using doubles" strategy; e.g., to determine the sum of 24 + 26, think 25 + 25; to determine the sum of 25 + 26, think 25 + 25 + 1 or doubles plus 1. ➢ Apply a mental mathematics strategy for adding two given 2-digit numerals.

Planning

Establish Learning Goals

Describe and apply mental mathematics strategies for adding two 2-digit numerals…

What would you see students able to do when they are meeting this outcome?

Planning

Establish Learning Goals

Describe and apply mental mathematics strategies for adding two 2-digit numerals…

- Add given 2-digit numerals mentally

Find the answer.

1. 17 + 24 = _____

2. 36 + 14 = _____

3. 65 + 9 = _____

4. 52 + 10 = _____

5. 78 + 16 = _____

6. 29 + 42 = _____

7. 8 + 37 = _____

8. 51 + 43 = _____

9. 67 + 30 = _____

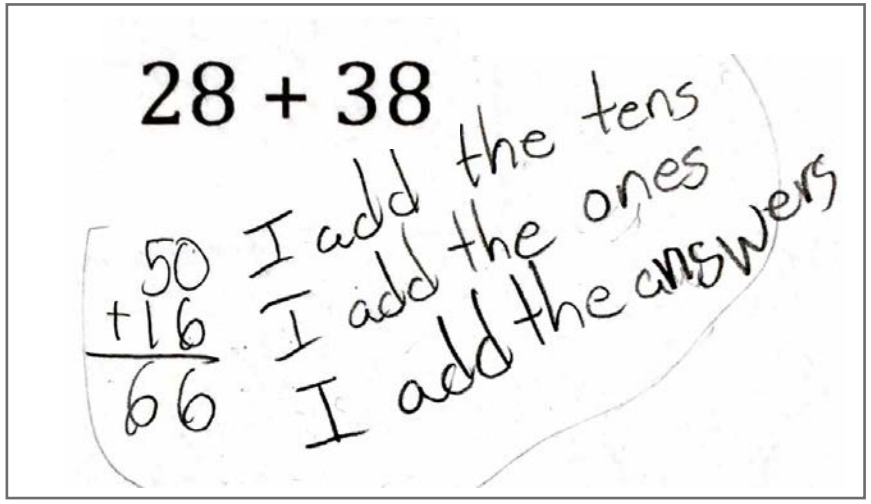
10. 85 + 7 = _____

Planning

Establish Learning Goals

Describe and apply mental mathematics strategies for adding two 2-digit numerals…

- Add given 2-digit numerals mentally
- Explain strategy used to add given numerals
- Record strategy



Planning

Establish Learning Goals

Describe and apply mental mathematics strategies for adding two 2-digit numerals…

- Add given 2-digit numerals mentally
- Explain strategy used to add given numerals
- Record strategy
- Refine strategies to improve efficiency

"Students investigate a variety of strategies and become proficient in at least one **appropriate** and **efficient** strategy that they **understand**."

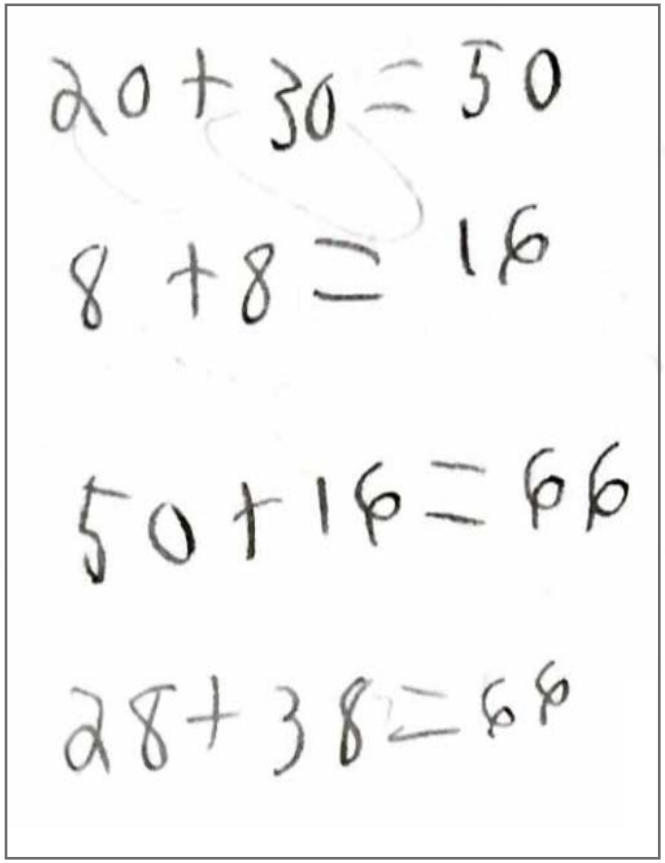
Planning

Establish Learning Goals

Planning

Establish Learning Goals

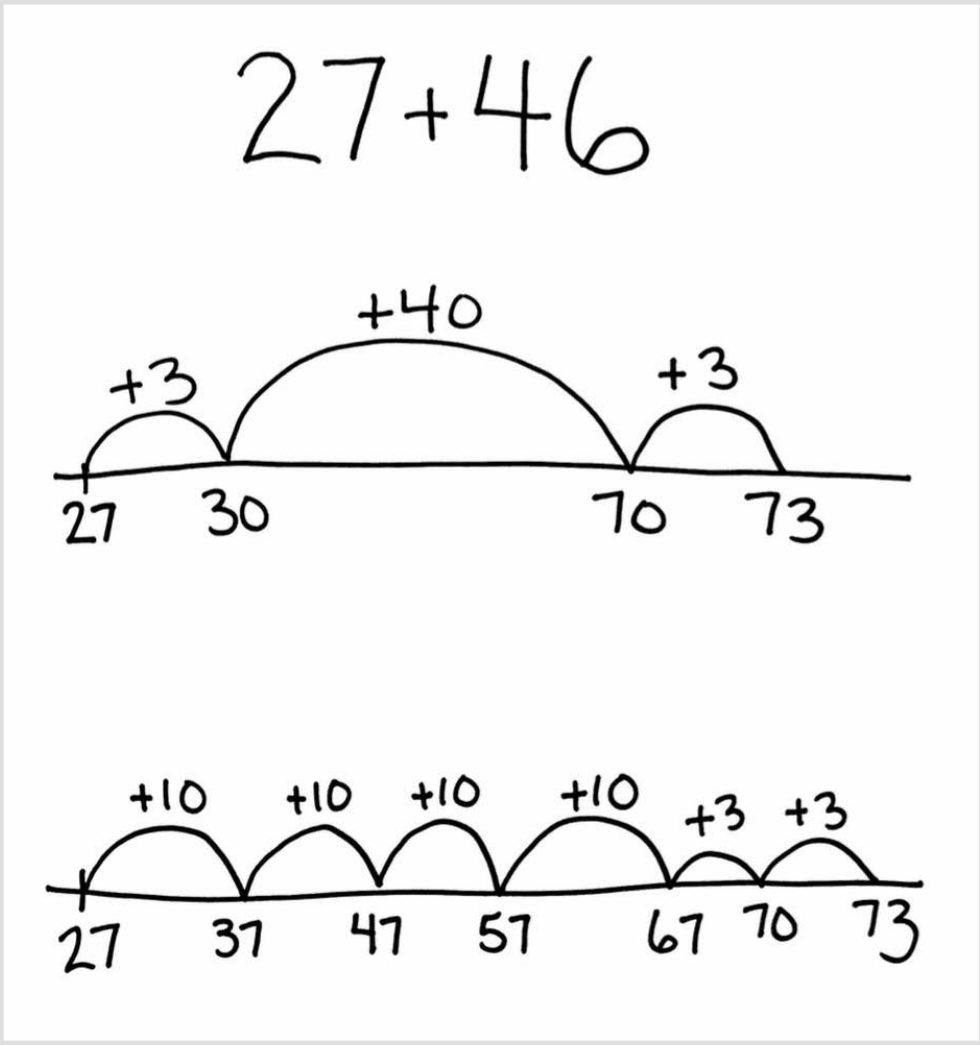
- Add given 2-digit numerals mentally
- Explain strategy used to add given numerals
- Record strategy
- Refine strategies to improve efficiency



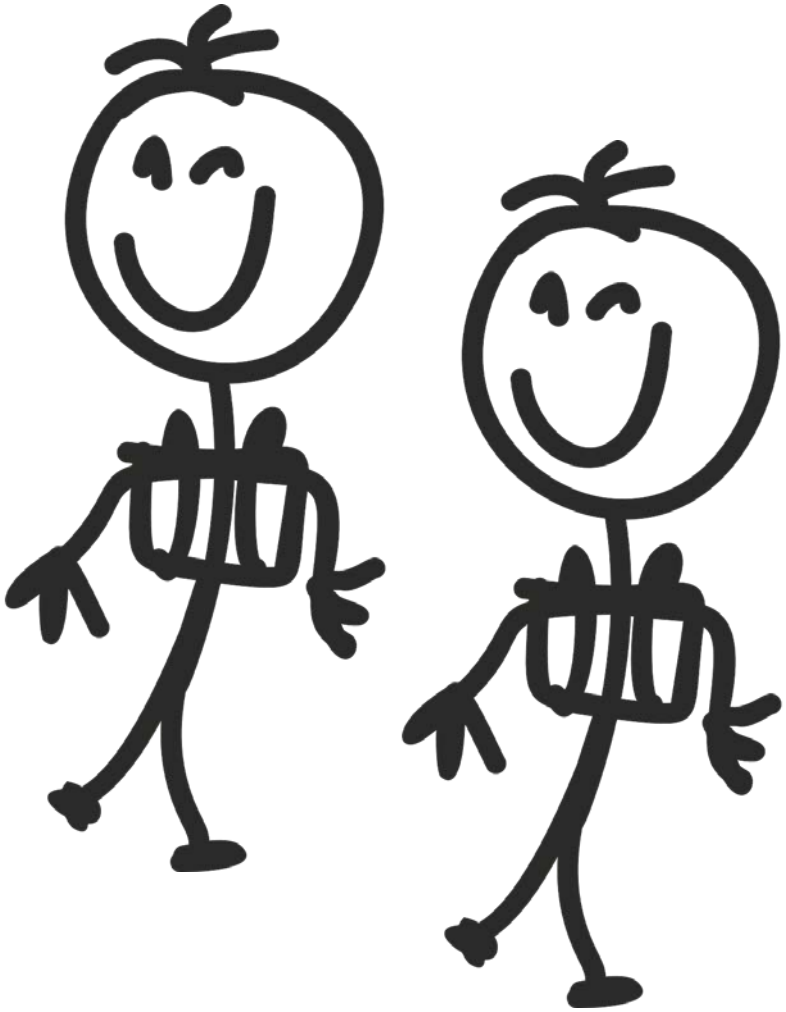
Planning

Establish Learning Goals

"Students investigate a variety of strategies and become proficient in at least one **appropriate** and **efficient** strategy that they understand."



Planning



Step 3:

Consider your students

Planning

Consider your students

What are their strengths? Their learning needs?

Who might need additional challenge?

Who might need supports or scaffolding to reach the goal?

Planning

Consider your students

What choices will they have to demonstrate their learning?

- Oral explanations instead of written?

Planning

Consider your students

What choices will they have to demonstrate their learning?

- Open-ended questions?
- Choice of strategy?

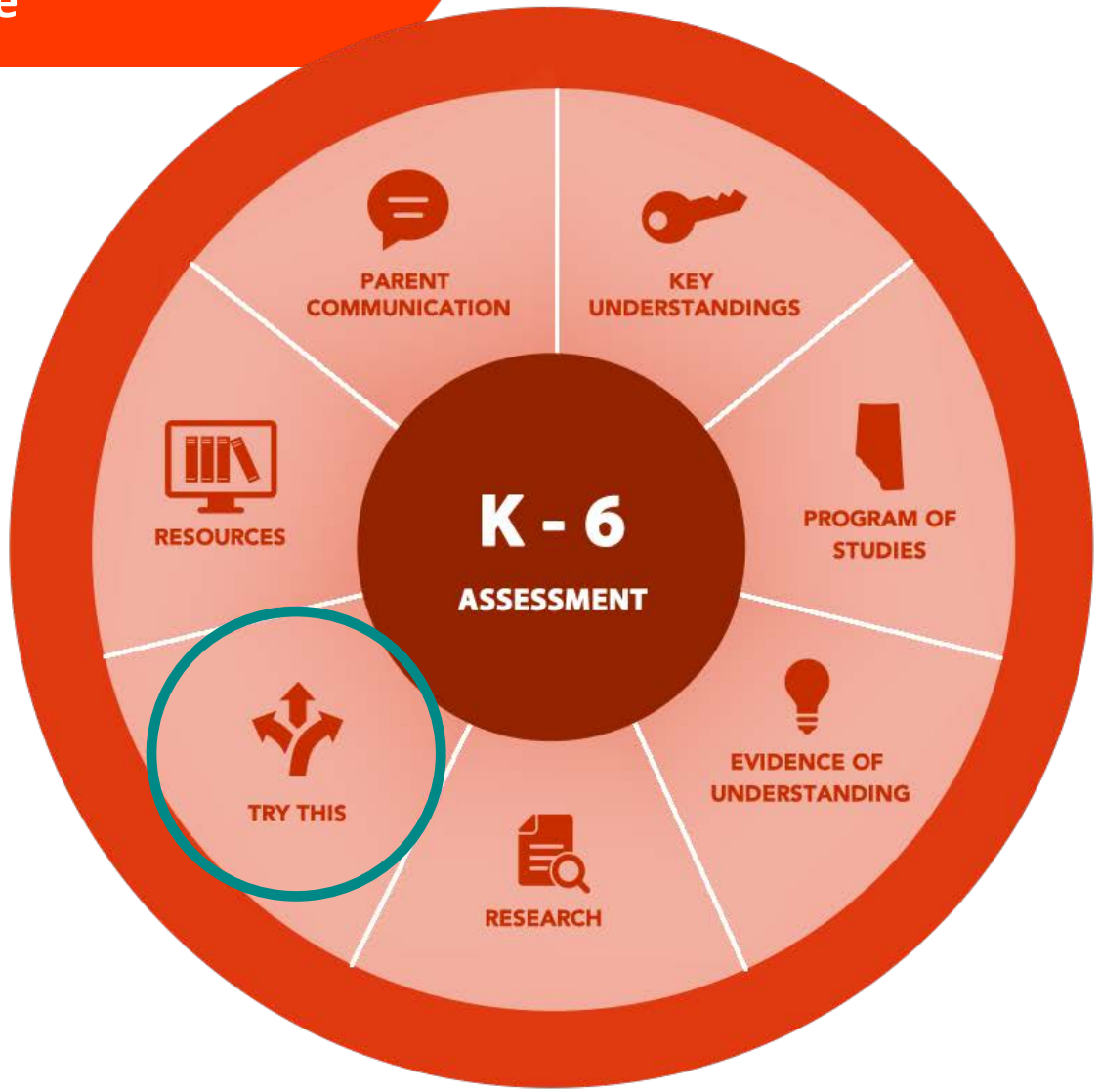
3 5 7

19 26 325

Choose one of these numbers and one of these numbers.

Create and solve a multiplication problem using your two numbers.
Use numbers, words, and/or drawings to make your strategy clear.

Tour of Learning Guide

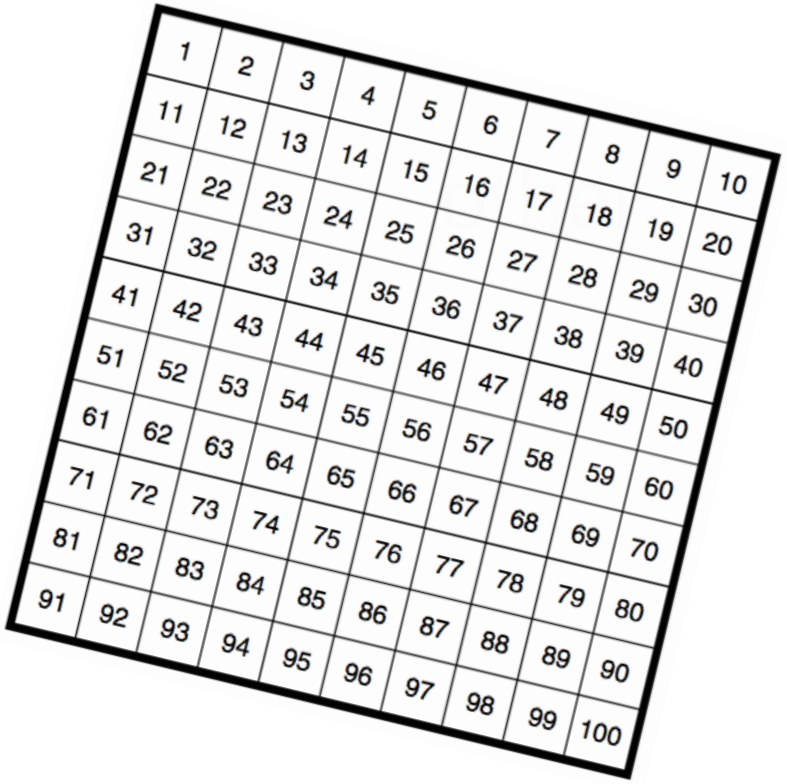


Planning

Consider your students

What choices will they have to demonstrate their learning?

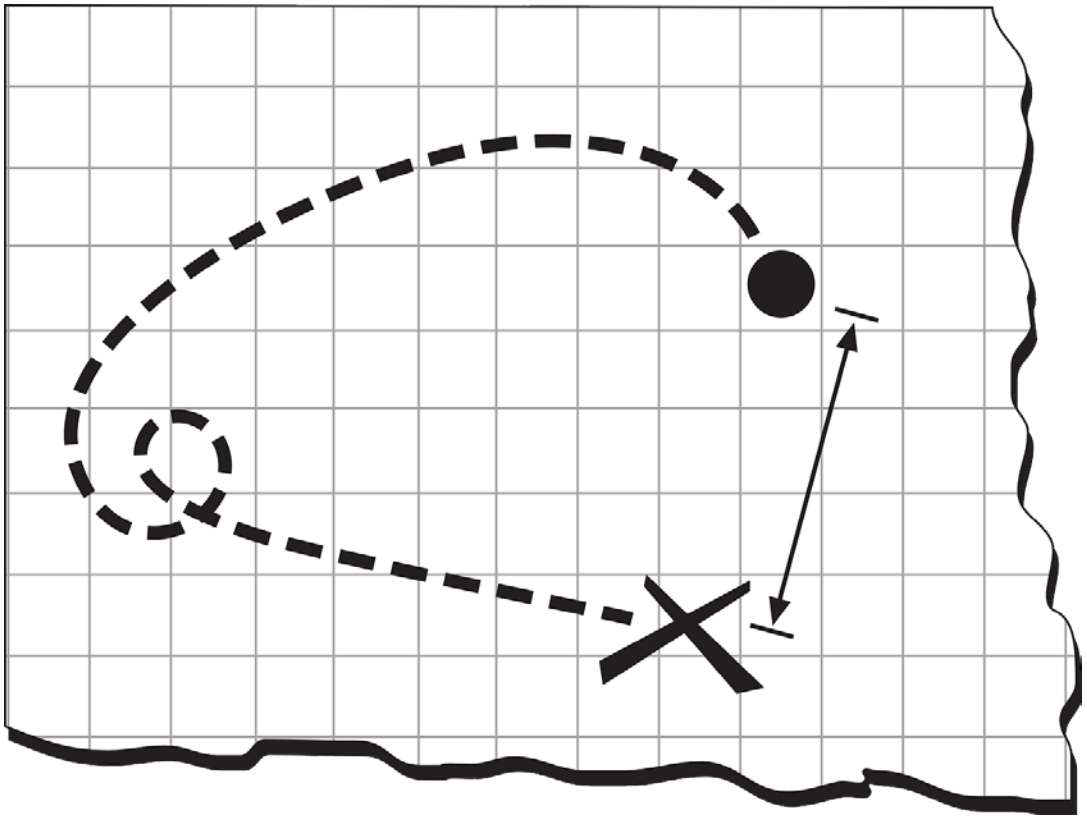
- Access to manipulatives or scaffolding?



1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Planning

Plan for Assessment



Step 4:

Plan for instruction and assessment

Planning

Plan for Assessment

How will we gather evidence of learning for this outcome?

6. Describe and apply mental mathematics strategies for adding 2-digit numerals, such as:
   - adding from left to right
   - taking one addend to the nearest multiple of ten and then compensating
   - using doubles

   [C, CN, ME, PS, R, V]

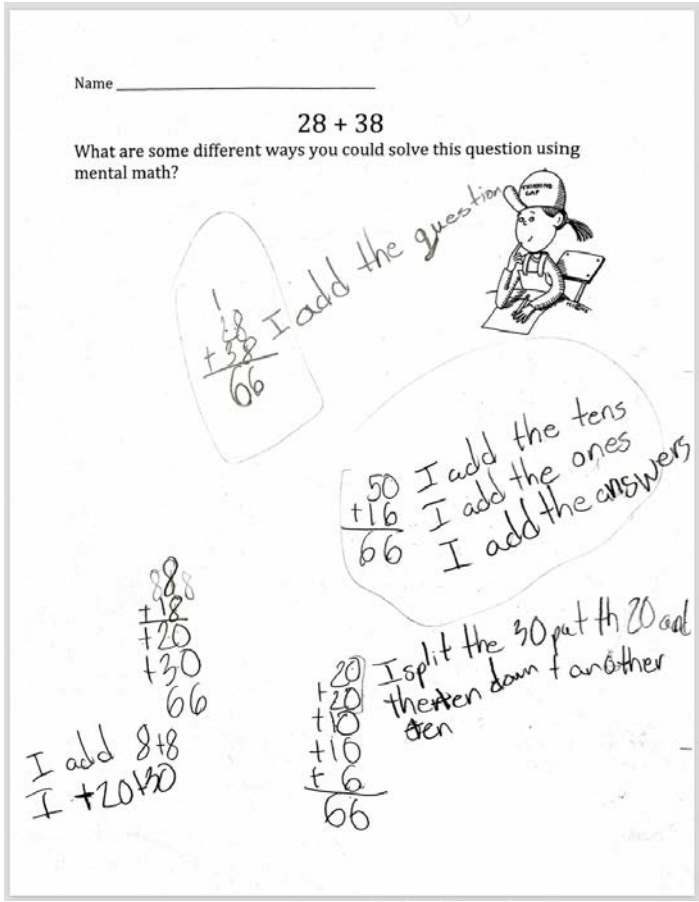
Remember to consider the verbs in the outcome!

Planning

Plan for Assessment

How will we gather evidence of learning for this outcome?

- Products and performances

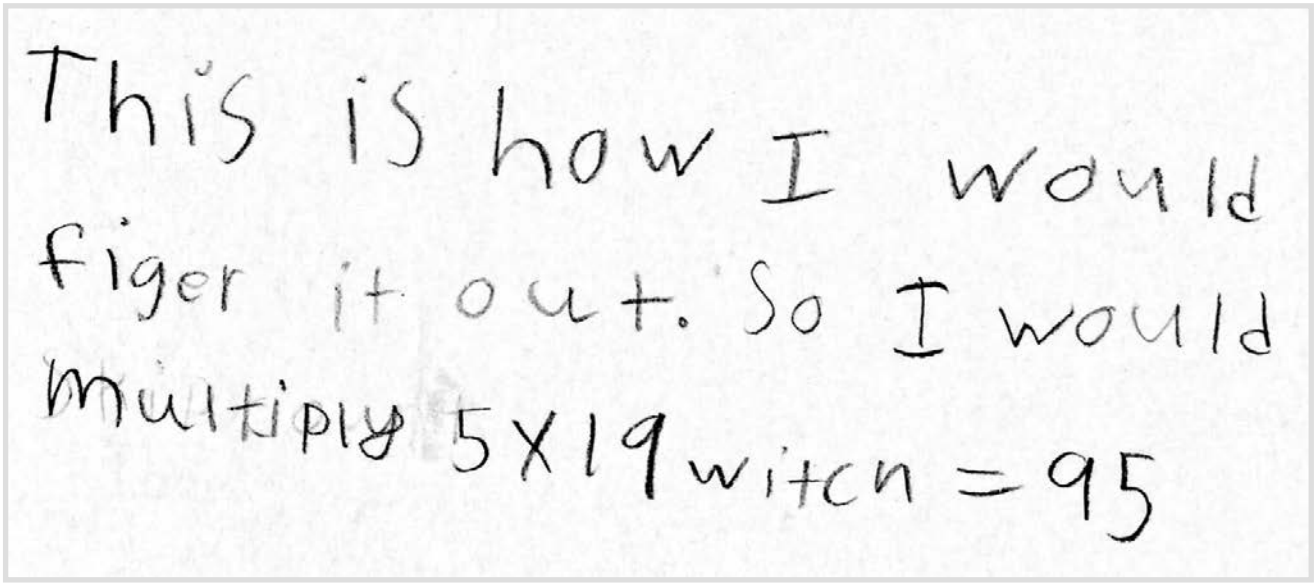


Planning

Plan for Assessment

How will we gather evidence of learning for this outcome?

- Products and performances



Planning

Plan for Assessment

How will we gather evidence of learning for this outcome?

- Products and performances
- Observations of students as they work

Planning

Plan for Assessment

How will we gather evidence of learning for this outcome?

- Products and performances
- Observations of students as they work
- Conversations with students about their work

Planning

Plan for Assessment

How will we gather evidence of learning for this outcome?

- Products and performances
- Observations of students as they work
- Conversations with students about their work.
- Student self-reflection

Planning

Plan for Assessment

How will you use that evidence?

Planning

Plan for Assessment

How will you use that evidence?

- As part of a grade?

Summative Assessment

Planning

Plan for Assessment

How will you use that evidence?

- As part of a grade?

Summative Assessment

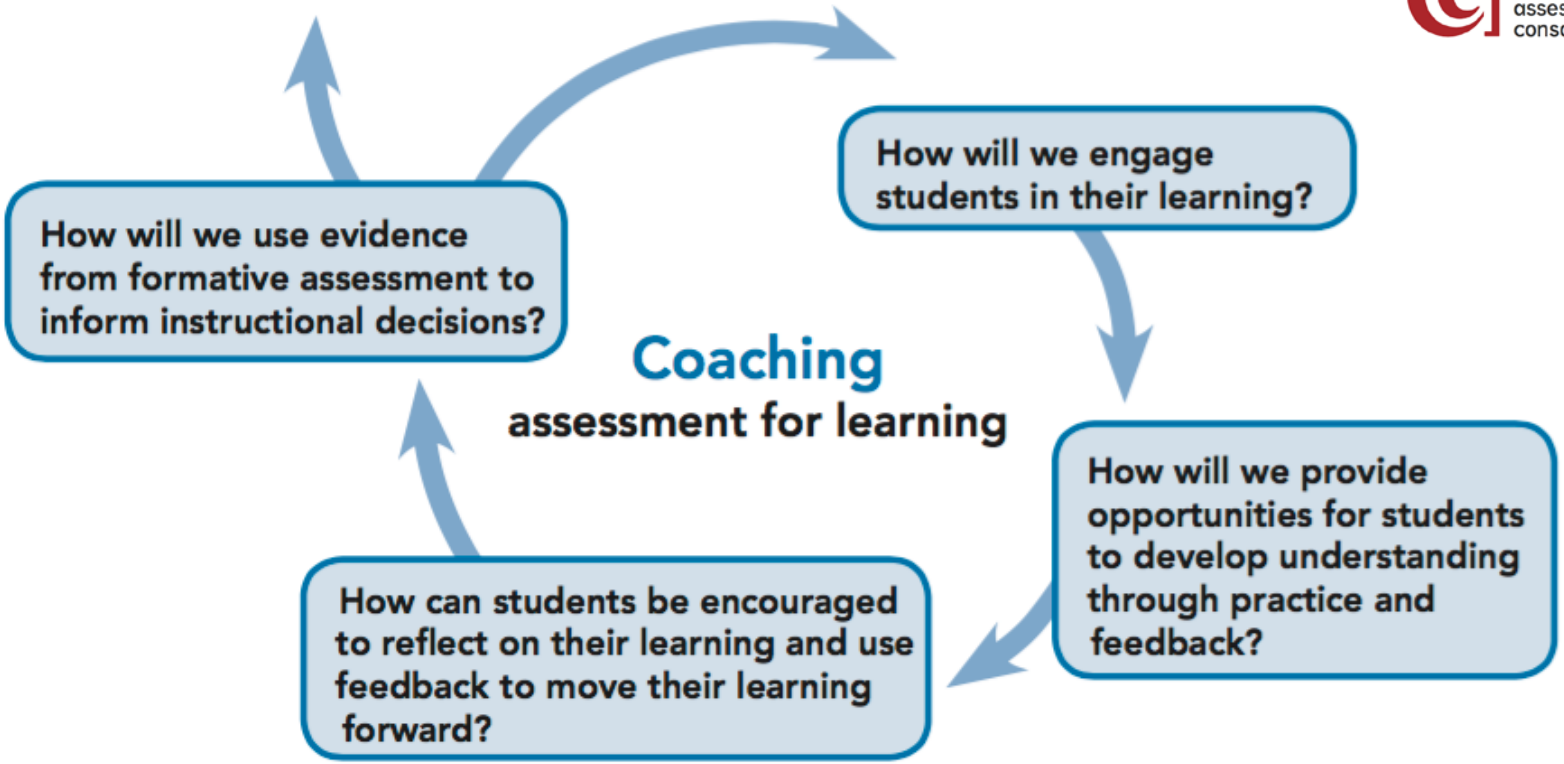
- To adjust instruction?

Formative Assessment

Coaching

Assessment for Learning

alberta assessment consortium



Formative Assessment: Teacher as Coach

Coaching

Assessment for Learning

…provides **feedback** to both the student and the teacher.

Coaching

Assessment for Learning

…provides **feedback** to both the student and the teacher.

- The student's focus is on improving the quality of the work.

Coaching

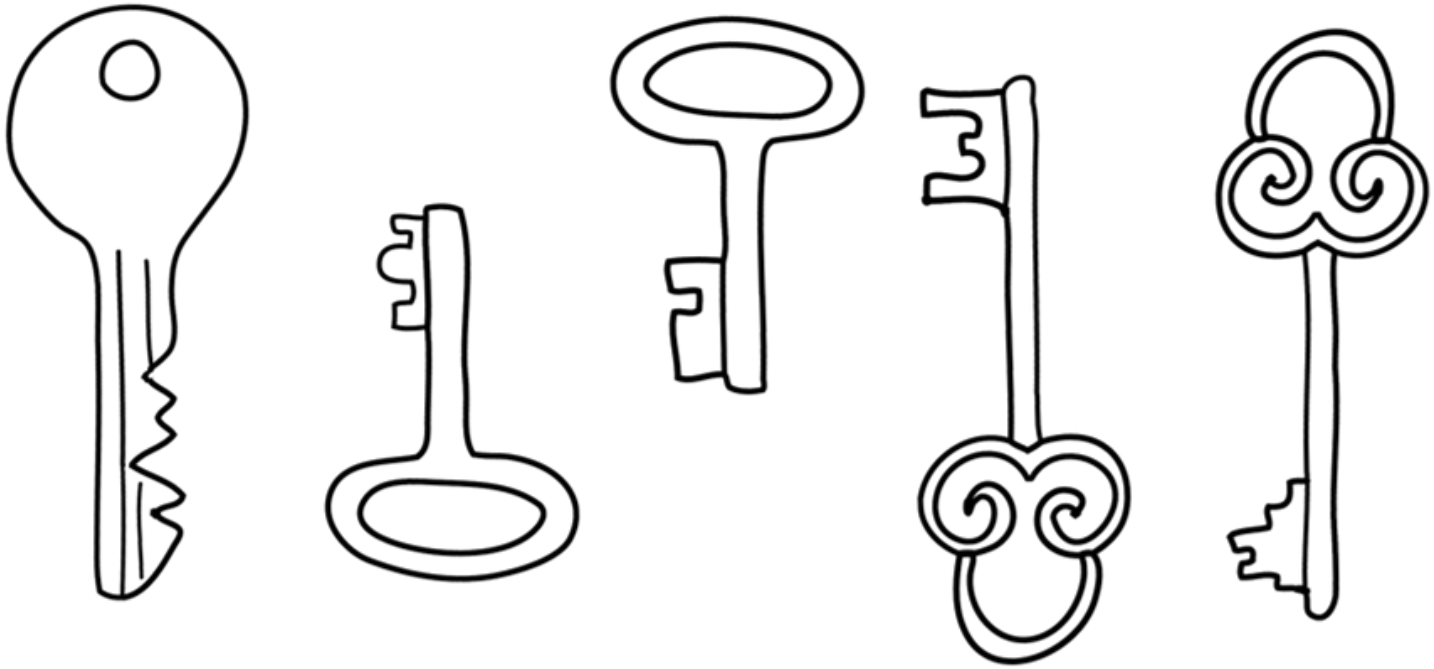
Assessment for Learning

…provides **feedback** to both the student and the teacher.

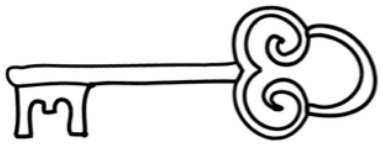
- The student's focus is on improving the quality of the work.
- The teacher's focus is on adjusting instruction to meet student needs.

Coaching

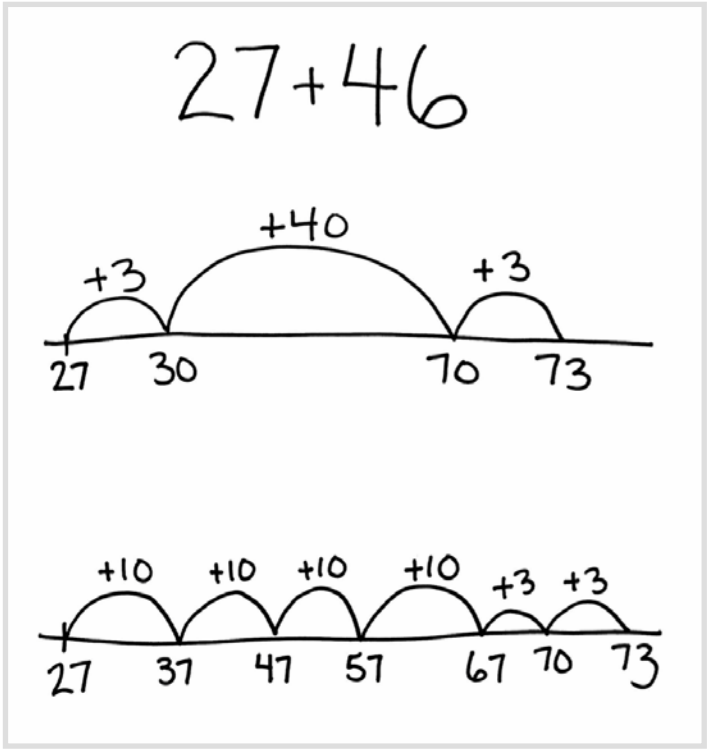
5 Key Assessment for Learning Strategies – Dylan William



Coaching



1. Help your students understand the learning goals.



What are the qualities of a "Great Strategy"?

It is reliable.

- *It works every time.*

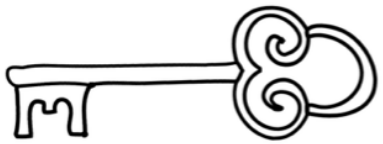
It is efficient.

- *I can find the answer quickly.*

I understand it.

- *It makes sense to me.*

Coaching

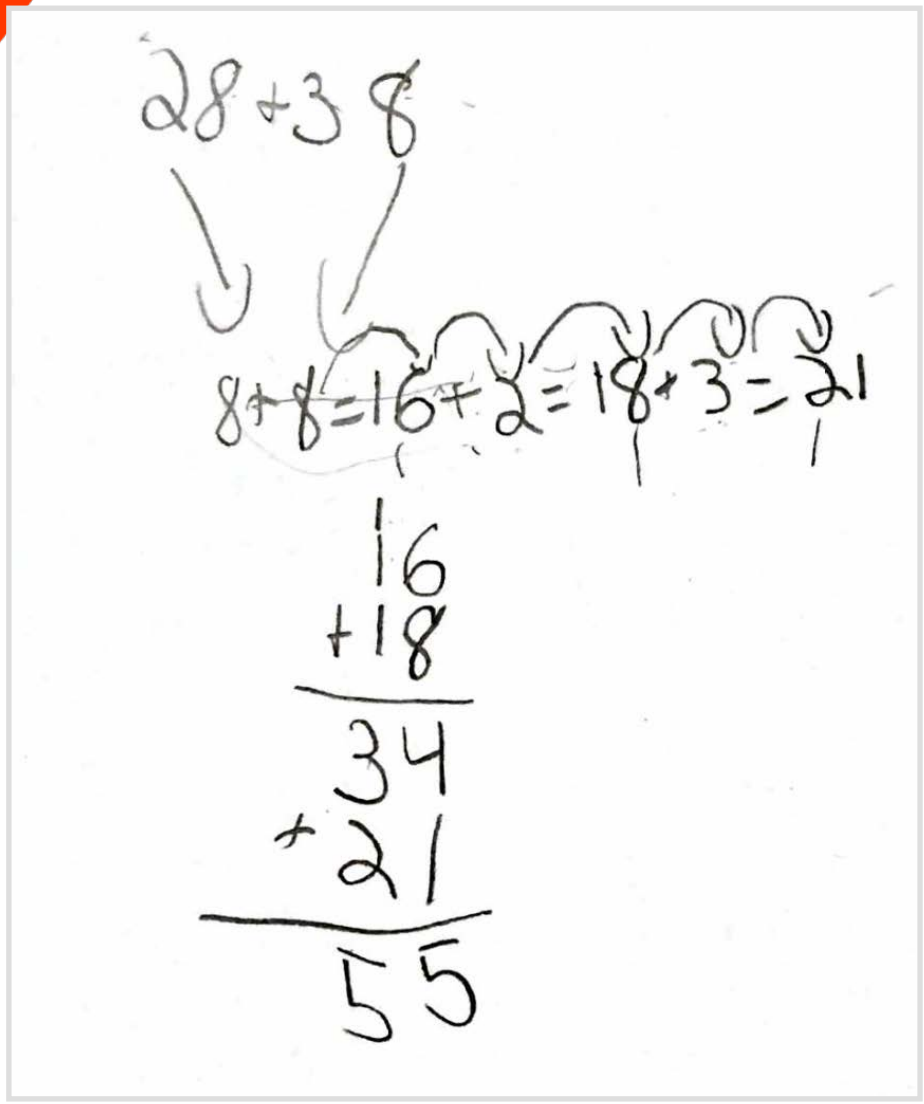


2. Plan discussions and activities that will give you on-going evidence about your students' learning.

Coaching

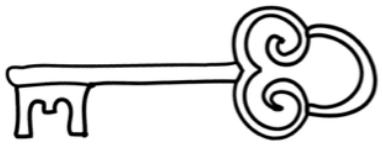
Exit slip

- What does this student understand?
- What misconceptions do you see?
- What might your next steps be for this student?



Tour of Learning Guide

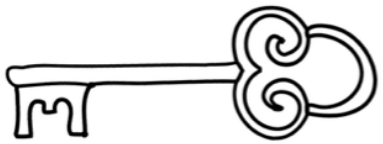
Coaching



3. Provide opportunities for practice and feedback

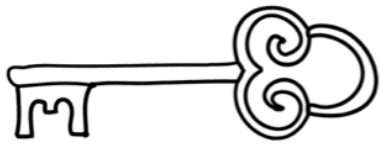
Coaching

Coaching



4. Create ways for students to support one another

Coaching



Row Games

A

What's the answer? How do you know?

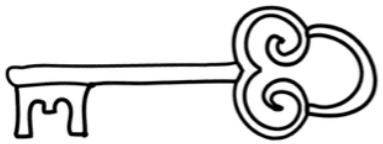
38 + 17
25 + 66
54 + 19
38 + 28

B

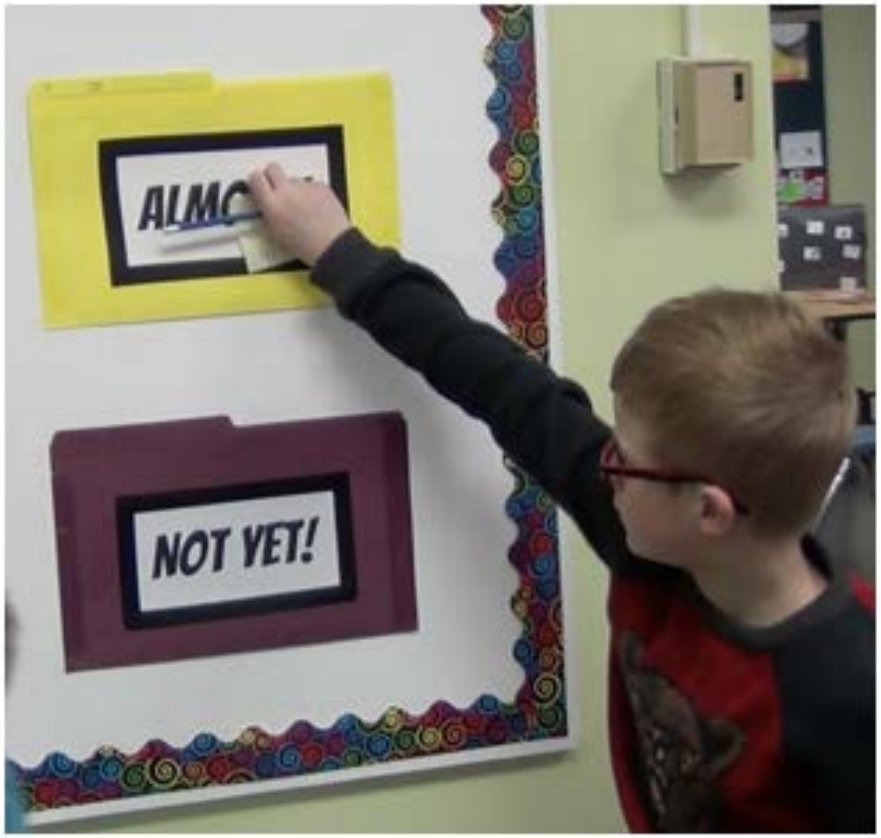
What's the answer? How do you know?

24 + 31
79 + 12
41 + 32
8 + 58

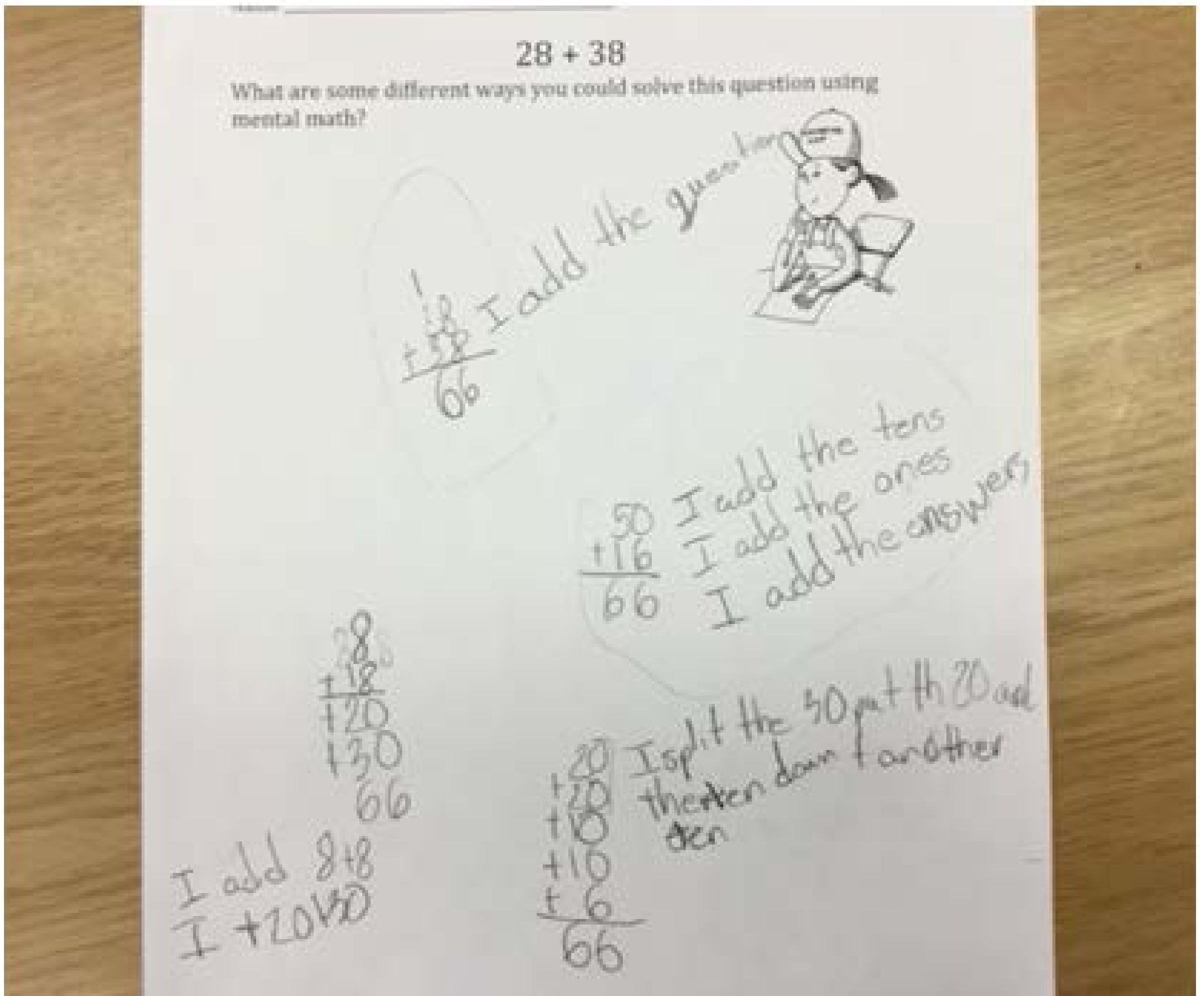
Coaching



5. Encourage your students to become owners of their own learning

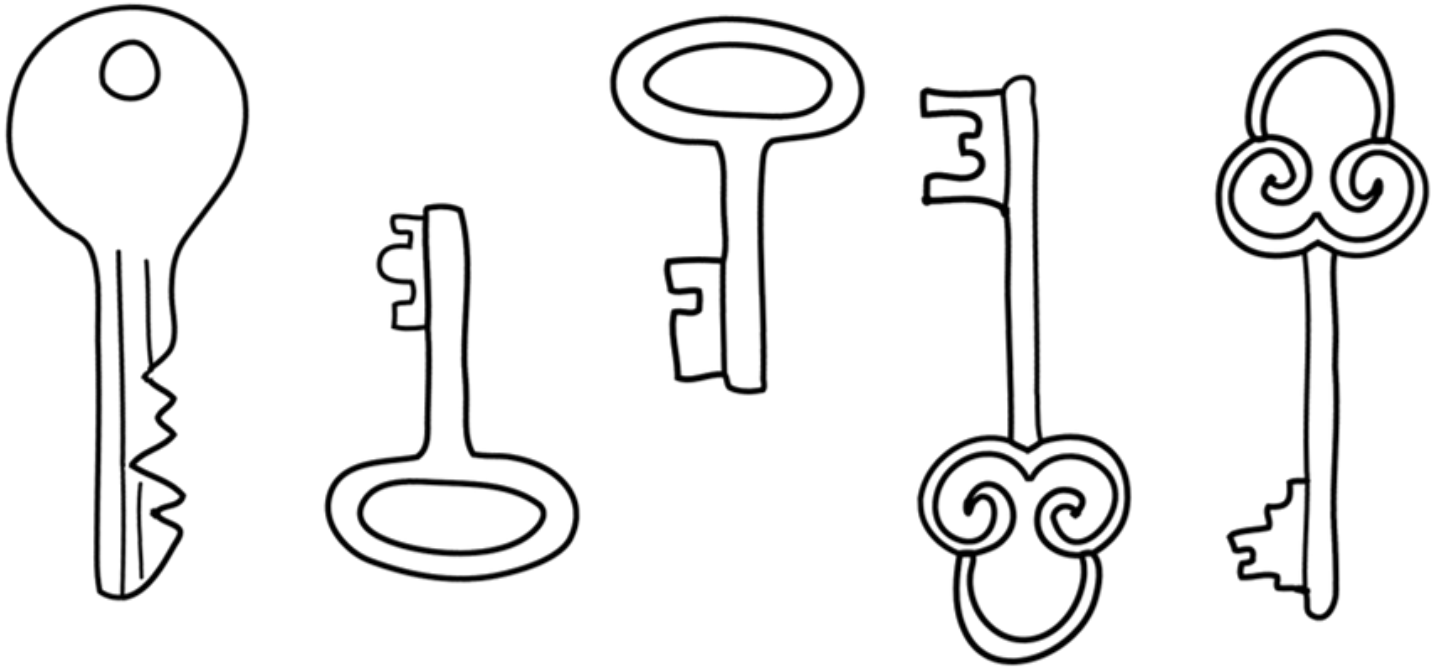


Coaching


28 + 38
What are some different ways you could solve this question using mental math?
I add the question
I add the tens
I add the ones
I add the answers

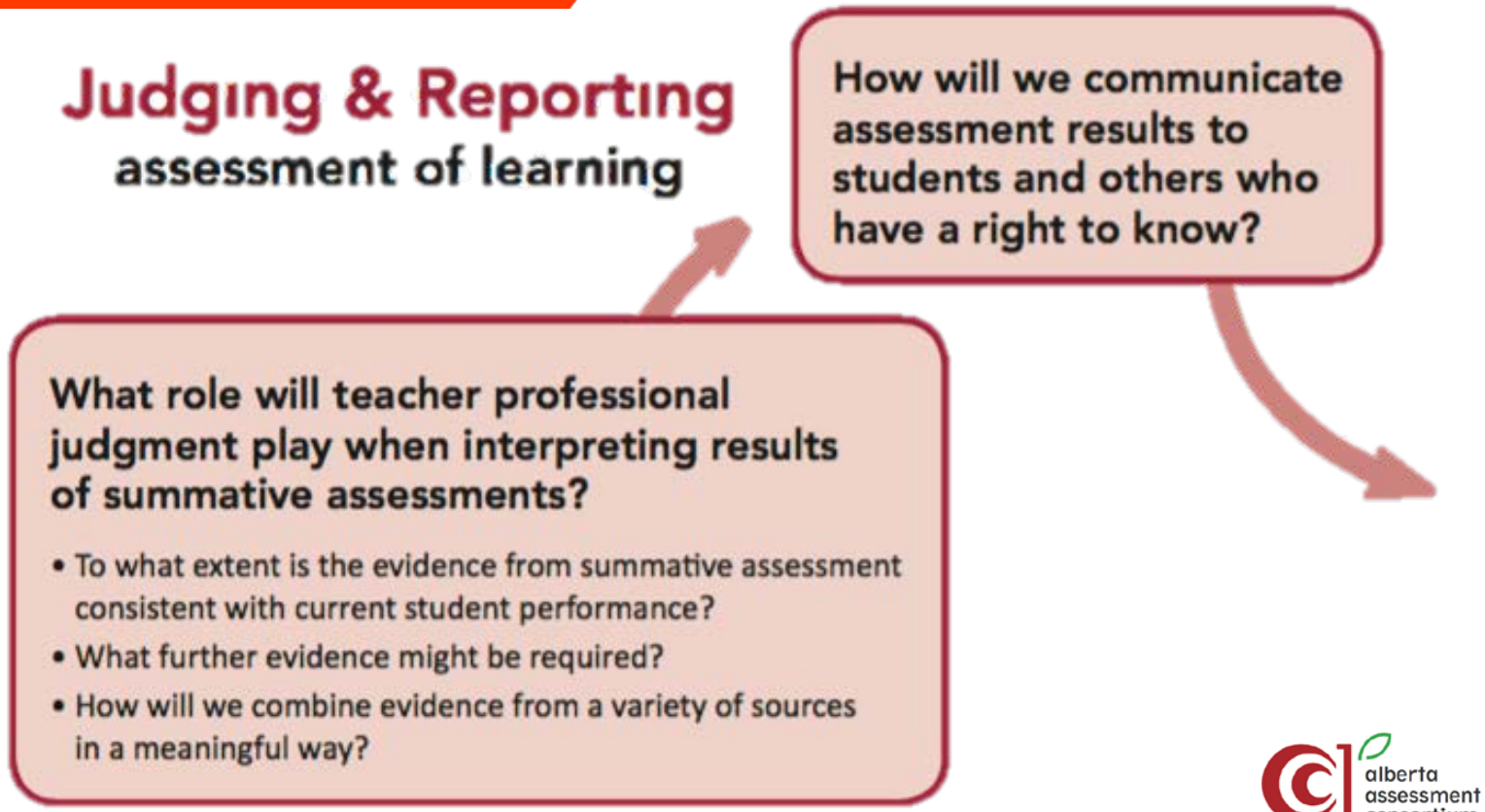
Coaching

5 Key Assessment for Learning Strategies – Dylan Wiliam



Coaching

Assessment for Learning

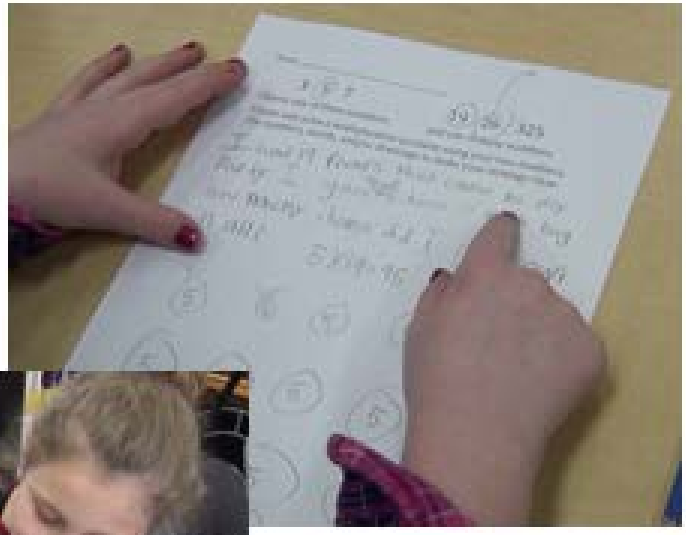


alberta assessment consortium

Summative Assessment: Teacher as Judge

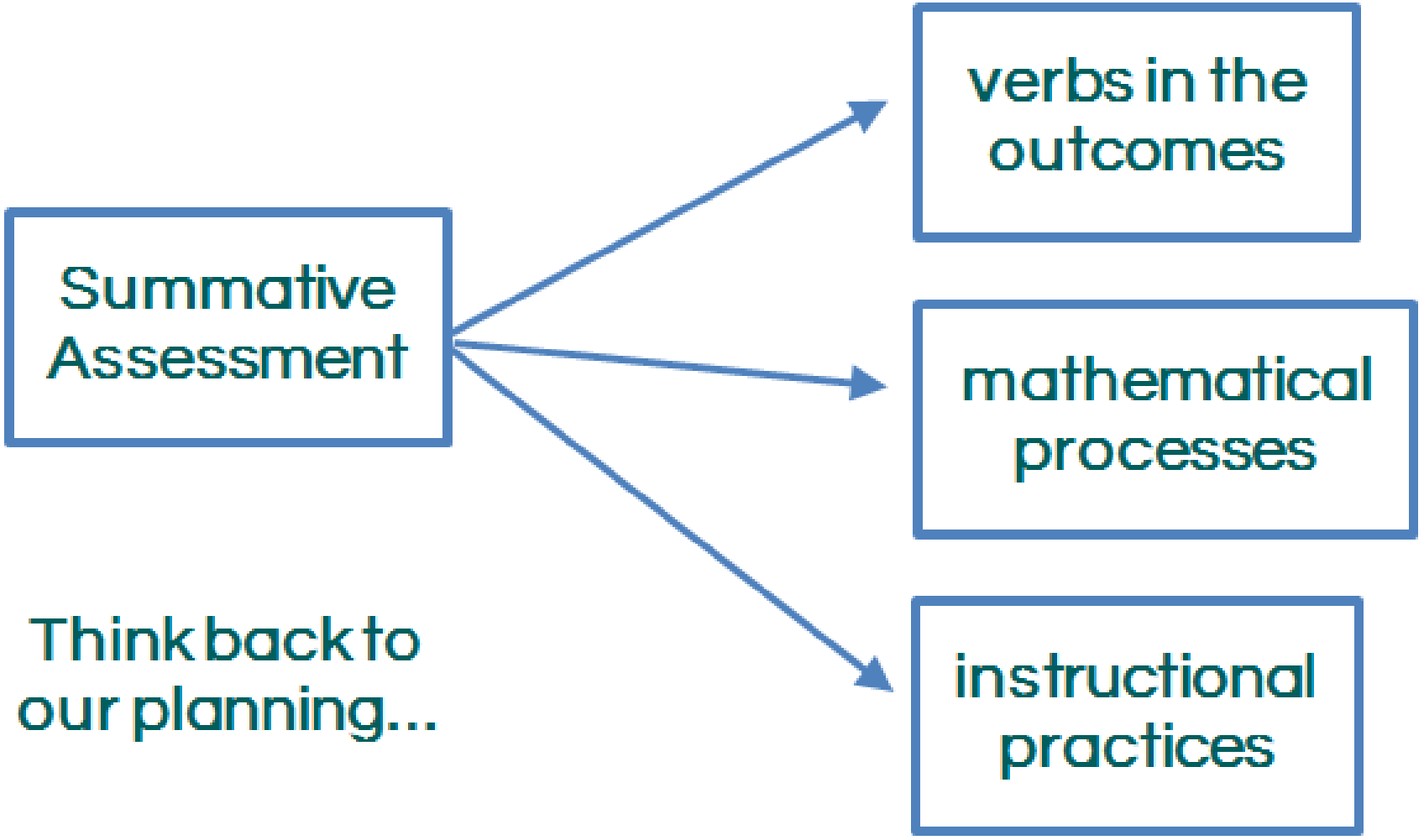
Coaching

Interpreting Results



Coaching

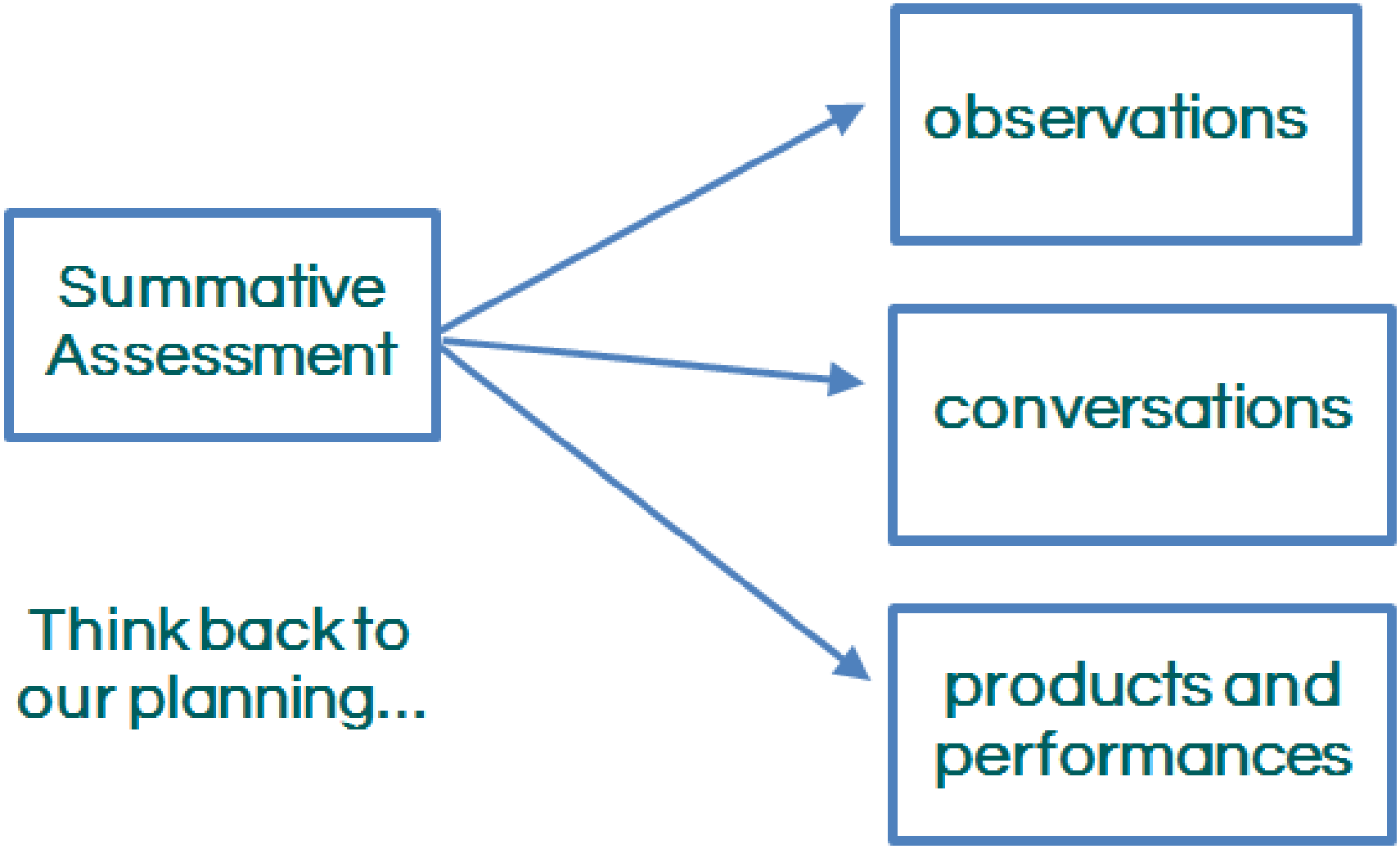
Interpreting Results



Think back to our planning...

Coaching

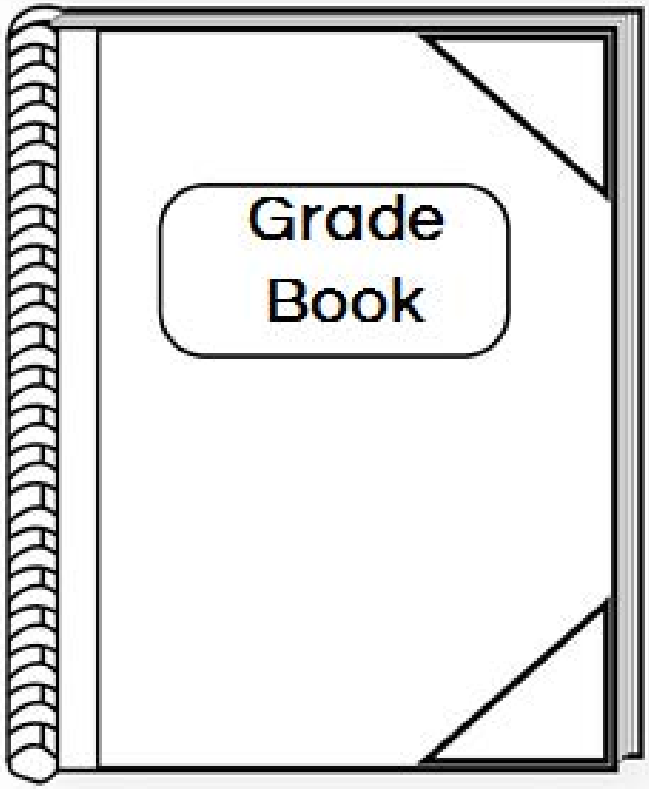
Interpreting Results

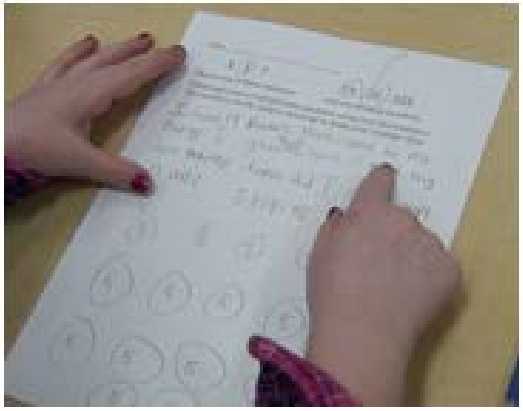


Think back to our planning...

Coaching

Interpreting Results





?

Coaching

Interpreting Results

6. Describe and apply mental mathematics strategies for adding two 2-digit numerals, such as:
   - adding from left to right
   - taking one addend to the nearest multiple of ten and then compensating
   - using doubles.

   [C, CN, ME, PS, R, V]

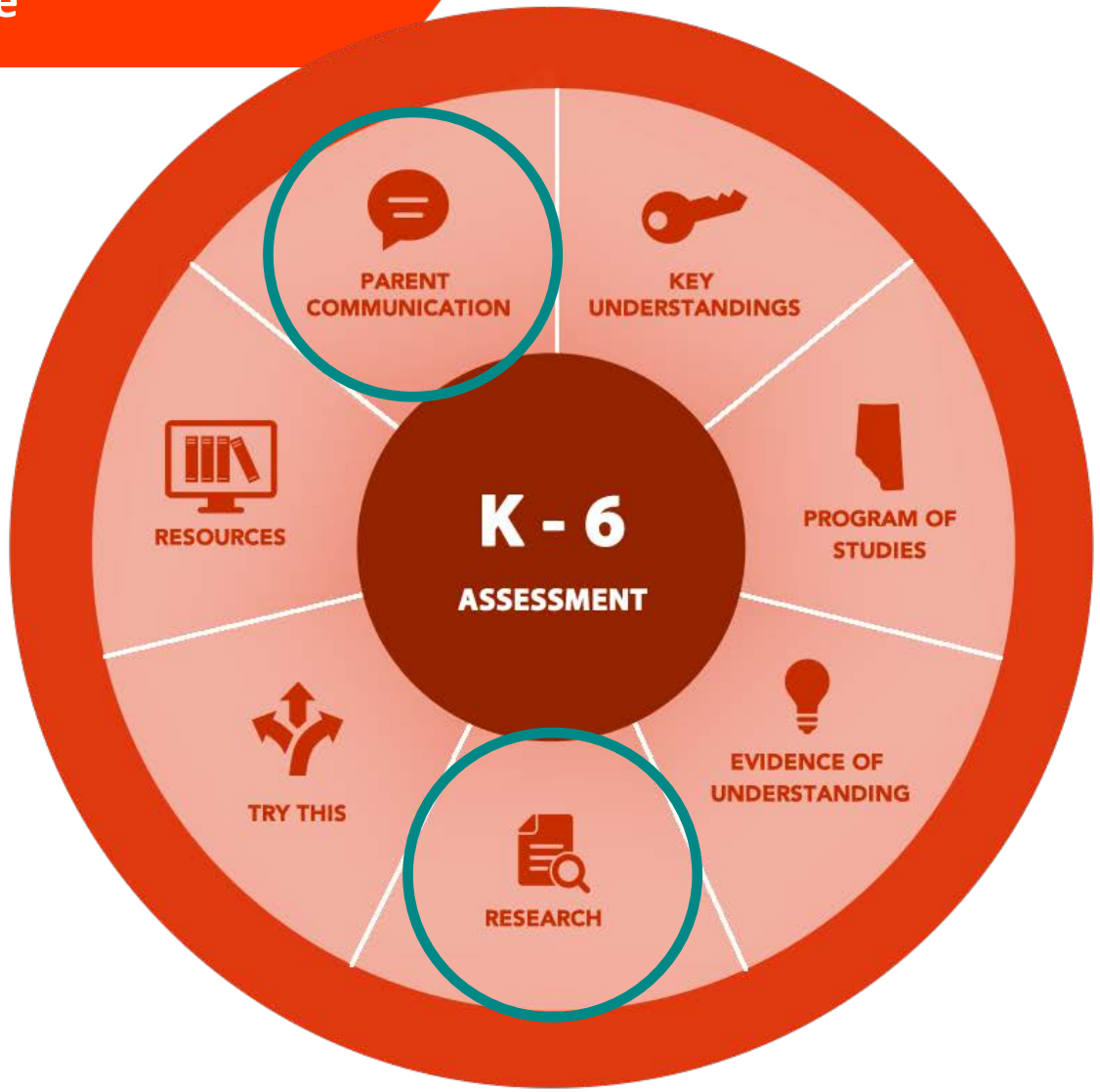
- Add given 2-digit numerals mentally
- Explain strategy used to add given numerals
- Record strategy
- Refine strategies to improve efficiency

Big Ideas

The ultimate goal of assessment is to support student learning.

- Plan for assessment: begin with the end in mind.
- Build formative assessment into every lesson.
- Ensure summative assessment is fair and accurate.

Tour of Learning Guide



Upcoming Webinar

Instructional Practices

May 2, 2016
1 pm - 2 pm
4 pm - 5 pm

Elementary Math Professional Learning Opportunity
Register at: http://arpdc.ab.ca

ALBERTA REGIONAL PROFESSIONAL DEVELOPMENT CONSORTIA

LOGIN

Username

Password

Remember username

Create new account
Lost password?

Log in

Adobe® Connect™
Tutorials

Elementary Mathematics Professional Learning
Apprentissage professionnel en mathématiques à l'élémentaire

Elementary Mathematics Professional Learning

Equality Webinar

English: November 2, 2015 at 1:00pm or 4:30pm

French: November 3, 2015 at 1:00pm or 4:00pm

Courses that require a login are indicated in the top menu with an asterisk (*).

For steps on how to create an account on the ARPDC Learning Portal, please click here.

Welcome to the ARPDC Learning Portal

You will find a variety of resources, strategies and ideas all based in the Alberta Education context.

To facilitate access to additional PD resources, educators are invited to explore the links available by clicking on the image below:

Survey


Thank You !