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

AlbertaRegionalConsortium

The Positive Power of
Assessment
in the Mathematics Classroom

Pat Lore

alberta assessment consortium
www.aac.ob.ca

NRLC REGIONAL LEARNING

Learning Network Educational Services

Consortium provincial francophone

Central Alberta Regional Consortium

Cp Calgary Regiona Consort

Elementary Mathematics Professional Learning

Webinar Goals

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

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.

Slide 1

Assessment

Big Ideas

The ultimate goal of assessment is to support student learning.

- Build formative assessment into every lesson.

Exit Pass

Slide 2

Assessment

Big Ideas

The ultimate goal of assessment is to support student learning.

- Ensure summative assessment is fair and accurate.

Slide 3

AAC KEY VISUAL: ASSESSING STUDENT LEARNING IN THE CLASSROOM

Judging & Reporting
assessment of learning

How will we communicate assessment results to students and others who have a right to know?

How will we know learning has occurred?
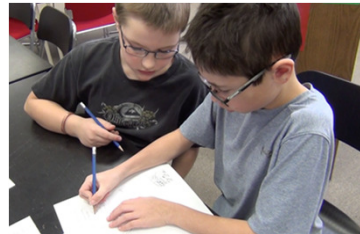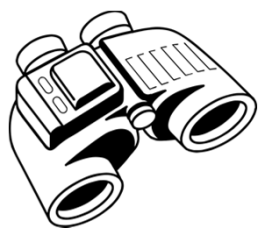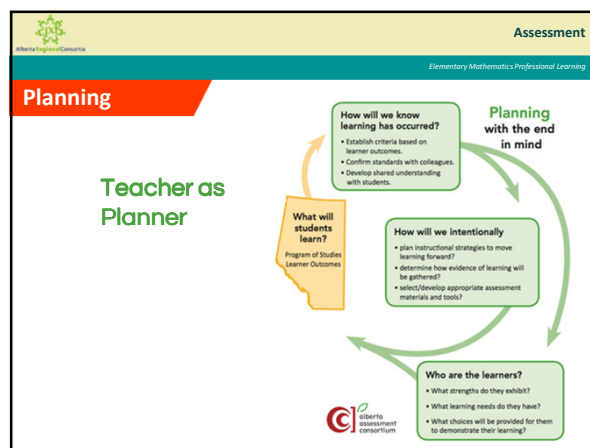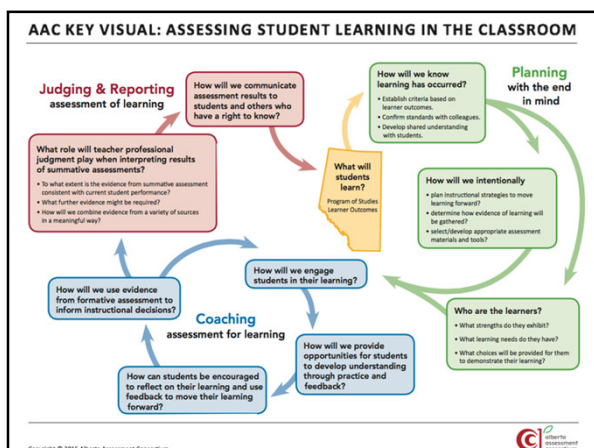- Establish criteria based on learner outcomes.
- Confirm standards with colleagues.
- Develop shared understanding with students.

Planning
with the end in mind

What role will teacher professional judgment play when interpreting results of summative assessments?
- To what extent is the evidence from summative assessment consistent with current student performance?
- What further evidence might be required?
- How will we combine evidence from a variety of sources in a meaningful way?

What will students learn?
Program of Studies Learner Outcomes

How will we intentionally
- plan instructional strategies to move learning forward?
- determine how evidence of learning will be gathered?
- select/develop appropriate assessment materials and tools?

How will we use evidence from formative assessment to inform instructional decisions?

How will we engage students in their learning?

Coaching
assessment for learning

Who are the learners?
- What strengths do they exhibit?
- What learning needs do they have?
- What choices will be provided for them to demonstrate their learning?

How will we provide opportunities for students to develop understanding through practice and feedback?

How can students be encouraged to reflect on their learning and use feedback to move their learning forward?

Copyright © 2015 Alberta Assessment Consortium

Slide 4

Assessment

Elementary Mathematics Professional Learning

Planning

Teacher as Planner

How will we know learning has occurred?
- Establish criteria based on learner outcomes.
- Confirm standards with colleagues.
- Develop shared understanding with students.

Planning
with the end in mind

What will students learn?
Program of Studies Learner Outcomes

How will we intentionally
- plan instructional strategies to move learning forward?
- determine how evidence of learning will be gathered?
- select/develop appropriate assessment materials and tools?

Who are the learners?
- What strengths do they exhibit?
- What learning needs do they have?
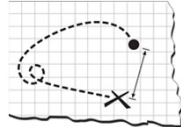- What choices will be provided for them to demonstrate their learning?

Slide 1:

Assessment

Elementary Mathematics Professional Learning

Planning — Step-by-Step

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

Slide 2:

Assessment

Elementary Mathematics Professional Learning

Planning

Step 1:

Begin with learner outcomes

Slide 3:

Assessment

Elementary Mathematics Professional Learning

Planner — Begin with learner outcomes

Grade 2, Shape and Space

7. Describe, compare and construct 3-D objects, including:
   - cubes
   - spheres
   - cones
   - cylinders
   - pyramids
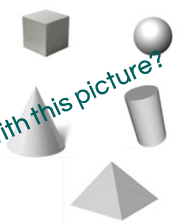   [C, CN, R, V]

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?

Slide 4: (blank lined note table)

Slide 5:

Assessment

Elementary Mathematics Professional Learning

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

Slide 6: (blank lined note table)

Slide 1

Planning — Begin with learner outcomes

Find the answer.

1. 17 + 24 = _____   6. 29 + 42 = _____

2. 36 + 14 = _____   7. 8 + 37 = _____

3. 65 + 9 = _____   8. 51 + 43 = _____

4. 52 + 10 = _____   9. 67 + 30 = _____

5. 78 + 16 = _____   10. 85 + 7 = _____

Slide 2

Planning

Step 2:

Establish learning goals

Slide 3

Planning — Establish learning goals

Specific Outcomes	Achievement Indicators
It is expected that students will:	*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.

Link to Achievement Indicators:
https://education.alberta.ca/mathematics-k-6/program-supports/everyone/support-documents/

Slide 4

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?

Slide 1:

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 = _____

Slide 2:

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

28 + 38

50 I add the tens
+16 I add the ones
66 I add the answers

Slide 3:

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**."

Assessment

Elementary Mathematics Professional Learning

Planning

Step 3:

Consider your students

Assessment

Elementary Mathematics Professional Learning

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?

Assessment

Elementary Mathematics Professional Learning

Planning   Consider your students

What choices will they have to demonstrate their learning?

- Oral explanations written?   instead of

Assessment

Elementary Mathematics Professional Learning

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.

Assessment

Elementary Mathematics Professional Learning

Planning — Consider your students

What choices will they have to demonstrate their learning?

- Access to manipulatives or scaffolding?

Assessment

Elementary Mathematics Professional Learning

Planning

Step 4:

Plan for instruction and assessment

Assessment

Elementary Mathematics Professional Learning

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!

Assessment

Elementary Mathematics Professional Learning

Planning — Plan for Assessment

How will we gather evidence of learning for this outcome?

- Products and performances

Assessment

Elementary Mathematics Professional Learning

Planning — Plan for Assessment

How will we gather evidence of learning for this outcome?

- Products and performances

This is how I would figer it out. So I would multiply 5×19 witch = 95

Assessment

Elementary Mathematics Professional Learning

Planning — Plan for Assessment

How will we gather evidence of learning for this outcome?

- Products and performances
- Observations of students as they work

Assessment

Elementary Mathematics Professional Learning

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.

Slide 1

Assessment

Elementary Mathematics Professional Learning

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

ALMO

NOT YET!

Slide 2

Assessment

Elementary Mathematics Professional Learning

Planning — Plan for Assessment

How will you use that evidence?

- As part of a grade?
- To adjust instruction?
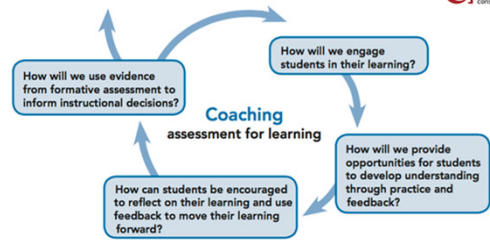
Summative Assessment

Formative Assessment

Slide 3

Assessment

Elementary Mathematics Professional Learning

Coaching

How will we use evidence from formative assessment to inform instructional decisions?

How will we engage students in their learning?

Coaching
assessment for learning

How can students be encouraged to reflect on their learning and use feedback to move their learning forward?

How will we provide opportunities for students to develop understanding through practice and feedback?

Formative Assessment: Teacher as Coach

Slide 4

Assessment

Elementary Mathematics Professional Learning

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.

Slide 1

Assessment

Elementary Mathematics Professional Learning

Coaching | **5 Key Assessment for Learning Strategies**
Dylan Wiliam

Slide 2

Assessment
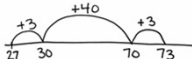
Elementary Mathematics Professional Learning

Coaching

1. Help your students understand the learning goals.

$$27+46$$

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.*

Slide 3

Assessment

Elementary Mathematics Professional Learning

Coaching

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

Assessment

Elementary Mathematics Professional Learning

Coaching

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

Assessment

Elementary Mathematics Professional Learning

Coaching

3. Provide opportunities for practice and feedback
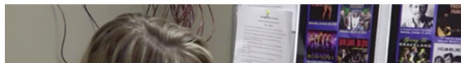
Assessment

Elementary Mathematics Professional Learning

Coaching

Assessment

Elementary Mathematics Professional Learning

Coaching

4. Create ways for students to support one another

Assessment

Elementary Mathematics Professional Learning

Coaching

Row Games

A What's the answer? How do you know?	B What's the answer? How do you know?
38 + 17	24 + 31
25 + 66	79 + 12
54 + 19	41 + 32
38 + 28	8 + 58

Assessment

Elementary Mathematics Professional Learning

Coaching

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

Slide 1

Coaching

28 + 38
What are some different ways you could solve this question using mental math?

Slide 2

Judging

Judging & Reporting
assessment of learning

How will we communicate assessment results to students and others who have a right to know?

What role will teacher professional judgment play when interpreting results of summative assessments?

- To what extent is the evidence from summative assessment consistent with current student performance?
- What further evidence might be required?
- How will we combine evidence from a variety of sources in a meaningful way?

alberta assessment consortium

Summative Assessment: Teacher as Judge

Slide 3

Judging   Interpreting Results

Slide 4

Judging   Interpreting Results

Summative Assessment → verbs in the outcomes

→ mathematical processes

→ instructional practices

Think back to our planning…

Slide 1

Assessment

Elementary Mathematics Professional Learning

Judging — Interpreting Results

Summative Assessment →
- observations
- conversations
- products and performances

Think back to our planning…
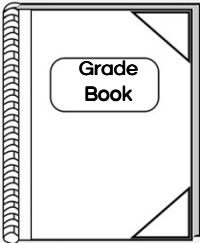
Slide 2

Assessment

Elementary Mathematics Professional Learning

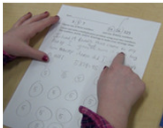**Judging** — Interpreting Results

Grade Book

?

Slide 3

Assessment

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.