


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

**Instructional Practices:  
 Positive, Practical,  
 Purposeful...and  
 Priceless!**

<http://learning.arpd.ab.ca>





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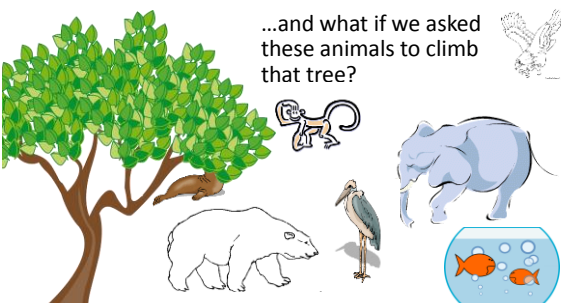
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 Instructional Practices  
 Elementary Mathematics Professional Learning

**Instructional Practices**

...and what if we asked these animals to climb that tree?



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 Instructional Practices  
 Elementary Mathematics Professional Learning

**Webinar Objectives**

- Develop participants' understanding of Instructional Practices
- Explore a variety of instructional strategies
- Provide strategies for responsive instruction
  - Parent Communication
  - Resource Selection

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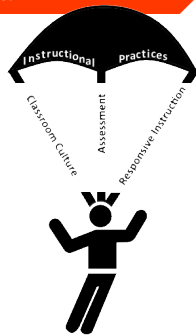
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Alberta Education

Instructional Practices

Elementary Mathematics Professional Learning

What is Instructional Practice?




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Alberta Education

Instructional Practices

Elementary Mathematics Professional Learning

Big Ideas

Teachers continuously use their professional judgement to

- ❖ foster a positive mathematical classroom culture,
- ❖ create opportunities for observations, conversations and other forms of assessment, and
- ❖ design and implement responsive instruction in order to develop students' conceptual and procedural understanding of mathematics.

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Alberta Education

Instructional Practices

Elementary Mathematics Professional Learning

Role of Alberta Education

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>❖ Provides a Program of Studies             <ul style="list-style-type: none"> <li>– The Front Matter</li> <li>– The 7 Mathematical Processes</li> <li>– The Outcomes</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>❖ Does NOT dictate             <ul style="list-style-type: none"> <li>– Order we teach</li> <li>– Time allotted</li> <li>– Instructional strategies</li> <li>– Resources</li> <li>– Day to day classroom assessment</li> </ul> </li> </ul> |
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Elementary Mathematics Professional Learning  
Apprentissage professionnel en mathématiques à l'élémentaire

Classroom Culture

Logos: NRLC, Regional Learning, Learning Network, Consortium, Central Alberta Regional Consortium, Calgary Region Consortium, and a group of five stars.

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Instructional Practices

Elementary Mathematics Professional Learning

Classroom Culture

### Big Idea 1

Teachers continuously use their professional judgement to foster a positive **classroom culture**.

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Instructional Practices

Elementary Mathematics Professional Learning

Classroom Culture

Why focus on developing a positive classroom culture?

- ❖ Student Engagement, Risk Taking, Collaboration and Participation is increased

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Instructional Practices

Elementary Mathematics Professional Learning

Classroom Culture




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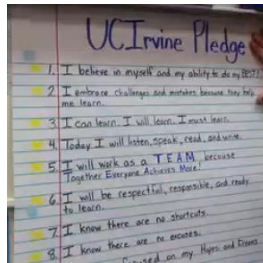


Instructional Practices

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Classroom Culture

Normalize error




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Instructional Practices

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Classroom Culture

When we make a mistake...



- A. Increased electrical activity
- B. Awareness of and attention to the error

Brain sparks and grows

~Moser et al. (2011)

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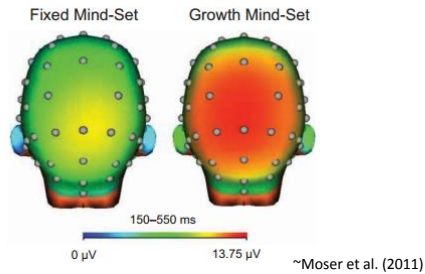
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Instructional Practices

Elementary Mathematics Professional Learning

Classroom Culture




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Instructional Practices

Elementary Mathematics Professional Learning

Classroom Culture




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Instructional Practices

Elementary Mathematics Professional Learning

Classroom Culture

"A learning environment will happen,  
whether intentional or not...so why  
not go about building a positive  
environment, intentionally?"

~Rodrick Lucero

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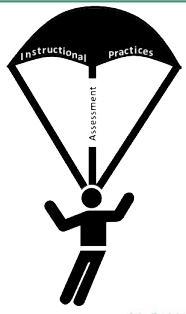
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Elementary Mathematics Professional Learning  
Apprentissage professionnel en mathématiques à l'élémentaire

Assessment



NRLC Regional Learning Consortium  
Regional Learning Consortium  
Learning Network  
Consortium  
Central Alberta Regional Consortium  
Calgary Region Consortium

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Instructional Practices

Elementary Mathematics Professional Learning

Assessment

## Big Idea 2

Teachers continuously use their professional judgement to create opportunities for observations, conversations and other forms of **assessment**.

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Instructional Practices

Elementary Mathematics Professional Learning

Assessment

Assessment informs our Instructional Practice.

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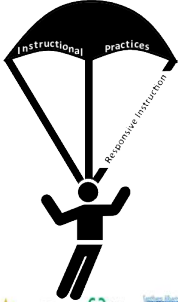
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Elementary Mathematics Professional Learning  
Apprentissage professionnel en mathématiques à l'élémentaire

# Responsive Instruction



Logos: NRLC, Regional Learning, Learning Network, Consortium, Central Alberta Regional Consortium, Calgary Region Consortium, and a group of five stars.

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Instructional Practices  
Elementary Mathematics Professional Learning

Responsive Instruction

## Big Idea 3

Teachers continuously use their professional judgement to design and implement **responsive instruction**.

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Instructional Practices  
Elementary Mathematics Professional Learning

Responsive Instruction




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Instructional Practices

Elementary Mathematics Professional Learning

Responsive Instruction – Instructional Strategies

How do you decide  
**HOW**  
you will teach a math outcome?




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Instructional Practices

Elementary Mathematics Professional Learning

Responsive Instruction – Instructional Strategies

Formative assessment guides choices regarding

- ❖ Instructional strategies
- ❖ Resource selection
- ❖ Assessment

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Instructional Practices

Elementary Mathematics Professional Learning

Responsive Instruction – Instructional Strategies

Fluency with Basic Facts

Students who learned through strategies  
achieved “superior performance” over those  
who memorized.

Delazer et al., 2005

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**Instructional Practices**  
 Elementary Mathematics Professional Learning

**Responsive Instruction – Instructional Strategies**

**Mathematical Processes**

There are critical components that students must encounter in a mathematics program in order to achieve the goals of mathematics education and embrace lifelong learning in mathematics.

Students are expected to:

- Communication [C]*
- Connections [CN]*
  - communicate in order to learn and express their understanding
  - connect mathematical ideas to other concepts in mathematics, to everyday experiences and to other disciplines
- Mental Mathematics and Estimation [ME]*
- Problem Solving [PS]*
  - demonstrate fluency with mental mathematics and estimation
- Reasoning [R]*
  - develop and apply new mathematical knowledge through problem solving
- Technology [T]*
  - develop mathematical reasoning
- Visualization [V]*
  - select and use technologies as tools for learning and for solving problems
  - develop visualization skills to assist in processing information, making connections and solving problems.

The program of studies incorporates these seven interrelated mathematical processes that are intended to permeate teaching and learning.

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**Instructional Practices**  
 Elementary Mathematics Professional Learning

**Responsive Instruction – Instructional Strategies**

**Grade 2 Number**

9. Demonstrate an understanding of addition (limited to 1- and 2-digit numerals) with answers to 100 and the corresponding subtraction by:
- using personal strategies for adding and subtracting with and without the support of manipulatives
  - creating and solving problems that involve addition and subtraction
  - using the commutative property of addition (the order in which numbers are added does not affect the sum)
  - using the associative property of addition (grouping a set of numbers in different ways does not affect the sum)
  - explaining that the order in which numbers are subtracted may affect the difference.
- [C, CN, ME, PS, R, V]

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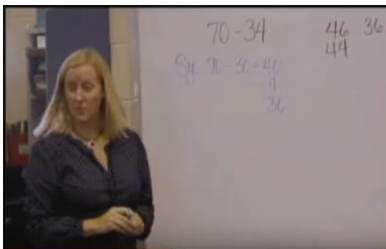
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**Instructional Practices**  
 Elementary Mathematics Professional Learning

**Responsive Instruction – Instructional Strategies**



Kimberly Moore

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Instructional Practices

Elementary Mathematics Professional Learning

Responsive Instruction – Instructional Strategies

Mathematical strategies must be

- ❖ Effective
- ❖ Efficient
- ❖ Explainable



For that student

- ❖ At that point in time

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Instructional Practices

Elementary Mathematics Professional Learning

Responsive Instruction – Instructional Strategies

#### Grade 2 Number

9. Demonstrate an understanding of addition (limited to 1- and 2-digit numerals) with answers to 100 and the corresponding subtraction by:
- using personal strategies for adding and subtracting with and without the support of manipulatives
  - creating and solving problems that involve addition and subtraction
  - using the commutative property of addition (the order in which numbers are added does not affect the sum)
  - using the associative property of addition (grouping a set of numbers in different ways does not affect the sum)
  - explaining that the order in which numbers are subtracted may affect the difference.
- [C, CN, ME, PS, R, V]

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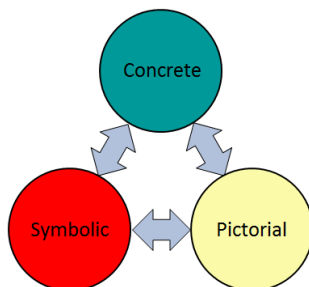
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Instructional Practices

Elementary Mathematics Professional Learning

Responsive Instruction – Instructional Strategies




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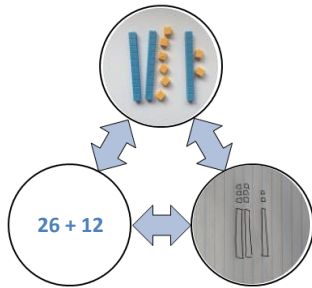
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Instructional Practices

Elementary Mathematics Professional Learning

Responsive Instruction – Instructional Strategies




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Instructional Practices

Elementary Mathematics Professional Learning

Responsive Instruction – Instructional Strategies

Math learning and performance are optimized when the two sides of the brain are communicating – “brain crossing”



~Park & Brannon, 2013

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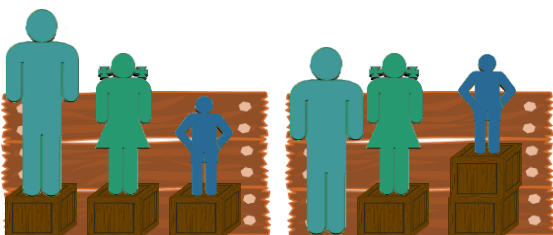
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Instructional Practices

Elementary Mathematics Professional Learning

Responsive Instruction – Instructional Strategies

Differentiated Instruction




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 **Instructional Practices**  
Elementary Mathematics Professional Learning

**Responsive Instruction – Instructional Strategies**

**Grade 4 Number**

11. Demonstrate an understanding of addition and subtraction of decimals (limited to hundredths) by:
- using personal strategies to determine sums and differences
  - estimating sums and differences
  - using mental mathematics strategies to solve problems.
- [C, ME, PS, R, V]

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
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 **Instructional Practices**  
Elementary Mathematics Professional Learning

**Responsive Instruction – Instructional Strategies**

**Open Ended Questions**

Mathletics Bites with Marian Small

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 **Instructional Practices**  
Elementary Mathematics Professional Learning

**Responsive Instruction – Instructional Strategies**

**Other Instructional Strategies**

- |                           |                          |
|---------------------------|--------------------------|
| ❖ Math Centres            | ❖ Cooperative Learning   |
| ❖ Understanding By Design | ❖ Group Work             |
| ❖ Project-Based Learning  | ❖ Journaling             |
| ❖ Flipped Classroom       | ❖ Problem-Solving        |
| ❖ Inquiry                 | ❖ Non Permanent Surfaces |
| ❖ Games                   | ❖ Performance Tasks      |




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Instructional Practices

Elementary Mathematics Professional Learning

Responsive Instruction – Instructional Strategies

"Given the choice between two techniques, choose the one involving the learners in the most active participation"

~Knowles, 1980, p. 240

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

Parent Communication



NRLC Regional Learning Consortium Central Alberta Regional Consortium Calgary Region Consort

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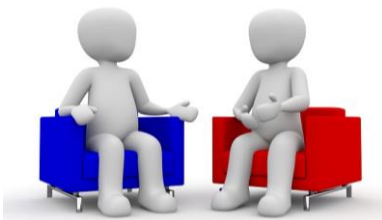
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Instructional Practices

Elementary Mathematics Professional Learning

Responsive Instruction – Parent Communication

"Why did you teach the lesson that way?"




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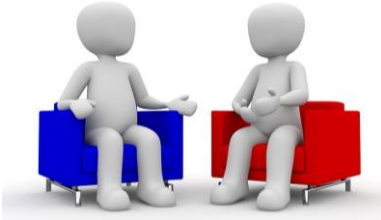


## Instructional Practices

Elementary Mathematics Professional Learning

## Responsive Instruction – Parent Communication

“It helps your child understand the math at the level they are at.”




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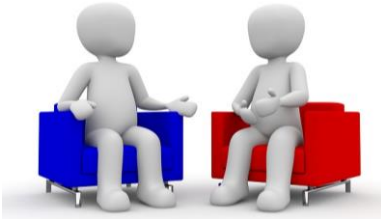


## Instructional Practices

Elementary Mathematics Professional Learning

## Responsive Instruction – Parent Communication

“It offers a nice progression from where they are at and where they need to get to.”




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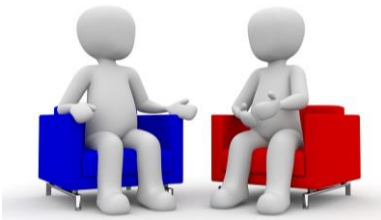


## Instructional Practices

Elementary Mathematics Professional Learning

## Responsive Instruction – Parent Communication

“This helps them connect to and understand the way you may have learned it in school.”




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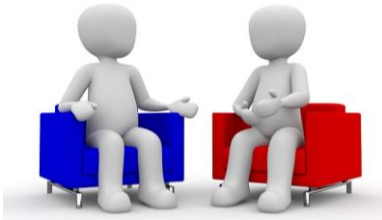


Instructional Practices

Elementary Mathematics Professional Learning

Responsive Instruction – Parent Communication

“They are active learners.”




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Elementary Mathematics Professional Learning

Apprentissage professionnel en mathématiques à l'élémentaire

Resource Selection





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Instructional Practices

Elementary Mathematics Professional Learning

Responsive Instruction – Resource Selection

How do you decide  
**WHICH**  
resources you will use in your math class?




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**Instructional Practices**  
 Elementary Mathematics Professional Learning  
**Responsive Instruction – Resource Selection**

### ❖ Choosing Resources

- Appropriate reading level
- Because my school/school division makes me
- Easily modifiable
- I found it on Pinterest / Teachers Pay Teachers
- Matches the outcome
- Electronic and/or online version is available
- Supports the instructional strategy I have chosen
- Someone told me it was great
- Visually aesthetic

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**Instructional Practices**  
 Elementary Mathematics Professional Learning  
**Responsive Instruction – Resource Selection**


**When is a resource a good resource?**

**What the resource should do for me, as a teacher:**  
 Does this resource...  
 effectively support learning outcome(s) I want to focus on?  
 deliberately and meaningfully incorporate at least one mathematical process?  
 help provide insight into the student's level of understanding?

**What the resource could do for me, as a teacher:**  
 Is this resource...  
 easily modifiable?  
 available in multiple formats?  
 visually appealing?

**What the resource could do for the student:**  
 Is this resource...  
 at an appropriate reading level?  
 appropriately color-coded to support learning?  
 appropriate for the different learning styles?  
 available in multiple formats?  
 available in multiple languages?  
 visually appealing?

\*This resource was developed by the Alberta Education Professional Learning team for the purpose of providing a template for the development of resources that support the learning outcomes of the Alberta Mathematics Curriculum (2016).




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**Instructional Practices**  
 Elementary Mathematics Professional Learning  
**Responsive Instruction – Resource Selection**

### What the resource should do for me, as a teacher:

<b>Does this resource...</b>
support the learning outcome(s) I want to focus on?
deliberately and meaningfully incorporate at least one mathematical process?
help provide insight into the student's level of understanding?

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	Instructional Practices
Elementary Mathematics Professional Learning	
Responsive Instruction – Resource Selection	

What the resource could be for me, as a teacher:

Is this resource...
easily adaptable for differentiation purposes?
easily modifiable?
reusable/reproducible?
reasonably priced?

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	Instructional Practices
Elementary Mathematics Professional Learning	
Responsive Instruction – Resource Selection	

What the resource could be, for the students:

Is this resource...
at an appropriate reading level?
self-explanatory and/or user-friendly with some instruction?
supportive of the different learning styles?
available in electronic and/or online version?
respectful of all (culture, FNMI, etc.)?
visually aesthetic and appealing?

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	Instructional Practices
Elementary Mathematics Professional Learning	
Responsive Instruction	

You **must not** use  
any resource that is not on Alberta Education's  
"Authorized Resource List"




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Instructional Practices

Elementary Mathematics Professional Learning

Responsive Instruction – Resource Selection

- ❖ Authorized Resources
- ❖ Additional Support Resources
- ❖ Required Resources




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Instructional Practices

Elementary Mathematics Professional Learning

Responsive Instruction – Resource Selection

Where can teachers find resources?

- ❖ EMPL website
- ❖ AB ED's website
  - Authorized Resources list
  - Additional Support Resource list
- ❖ LearnAlberta.ca
- ❖ Other websites
- ❖ Library Bookshelf / Learning Commons
- ❖ Other teachers
- ❖ ...

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Instructional Practices

Elementary Mathematics Professional Learning

Responsive Instruction – Designing a lesson




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Instructional Practices

Elementary Mathematics Professional Learning

Responsive Instruction – Designing a lesson

“Teaching practices will vary because each teaching situation is different and in constant change. Reasoned judgement must be used to determine whether the Teaching Quality Standard is being met in a given context.”

TEACHING QUALITY STANDARD APPLICABLE TO THE PROVISION OF BASIC EDUCATION IN ALBERTA (1997)

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Elementary Mathematics Professional Learning

Apprentissage professionnel en mathématiques à l'élémentaire

## Key Messages




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Instructional Practices

Elementary Mathematics Professional Learning

Key Messages

As outlined in the Teaching Quality Standard, **teachers are responsible for deciding how to best meet the needs of their students.**

Teaching Quality Standard Document:  
[https://education.alberta.ca/media/1626523/english-tqs-card-2013\\_3.pdf](https://education.alberta.ca/media/1626523/english-tqs-card-2013_3.pdf)

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Instructional Practices

Elementary Mathematics Professional Learning

Key Messages

The **selection of resources** for use in the classroom **is the responsibility of school jurisdictions and teachers** as per the School Act, and is not determined by the Program of Studies.

The School Act:  
<http://www.qp.alberta.ca/documents/Acts/s03.pdf>

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Instructional Practices

Elementary Mathematics Professional Learning

ARPDC



[www.crcpd.ab.ca](http://www.crcpd.ab.ca)



[www.learning-network.org](http://www.learning-network.org)



[www.carcpd.ab.ca](http://www.carcpd.ab.ca)



[www.nrlc.net](http://www.nrlc.net)



[www.cpfpp.ab.ca](http://www.cpfpp.ab.ca)



[www.sapdc.ca](http://www.sapdc.ca)



[www.erlc.ca](http://www.erlc.ca)

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