Lesson Study

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NDSS
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The Story of Implementation

What did I do?
(I wanted students to get better at... So I...)

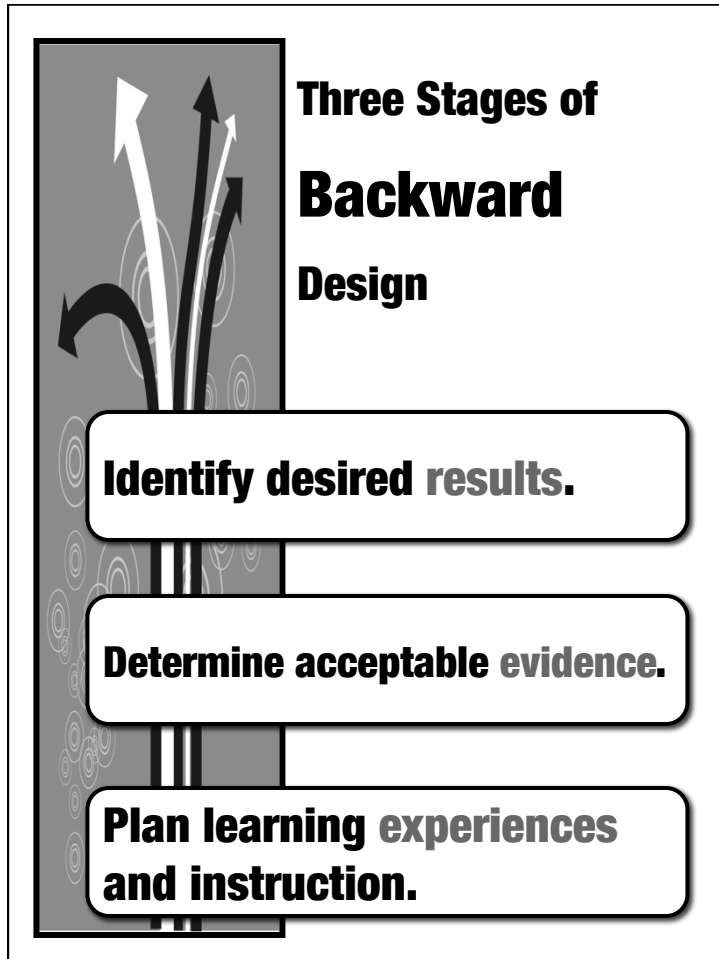### How did it go?

Successes
Challenges
Questions

How students integrate & apply what they learn

-Incorporate key concepts and relevant skills into product design

-Encourage student choice as part of the product design

-Products should involve students in relevant and valued activities

-Teach students skills necessary to successfully complete product

-Use multiple criteria to assess the product

-During and after product completion, encourage students
to reflect on their learning

Following up

- Tad's slides

Three Stages of

Backward

Design

Identify desired results.

Determine acceptable evidence.

Plan learning experiences and instruction.

What do my students need to know in this unit?

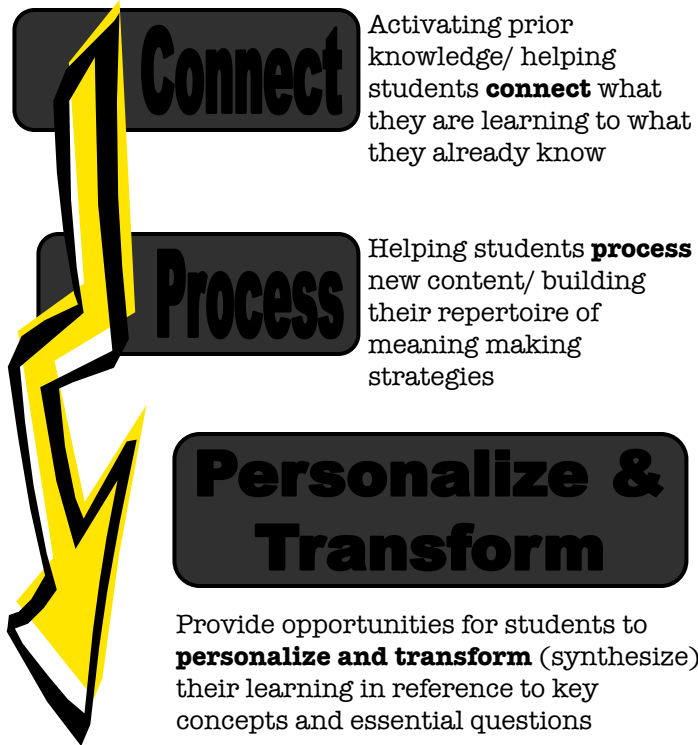What skills/ strategies will they use/ demonstrate by the end of the unit?

Where to Start?

- where is backward design naturally in use in your teaching?

- what knowledge is truly essential and enduring in a unit?

- avoid the pitfalls of activity-based planning and planning for coverage

- turn intentions into questions

- what strategies/skills do they need to develop to be successful learners in your unit assessment(s)?

- how can you mentor students to become more successful mathematicians/scientists/ historians/readers/writers/thinkers with all of these contextual factors in mind?

Open-Ended Learning Strategies

- Connect/activate

- Process/acquire

- Transform and personalize/apply

Phases of a lesson sequence

Connect

Activating prior knowledge/ helping students **connect** what they are learning to what they already know

Process

Helping students **process** new content/ building their repertoire of meaning making strategies

Personalize & Transform

Provide opportunities for students to **personalize and transform** (synthesize) their learning in reference to key concepts and essential questions

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The crux of successful lesson study is to plan, observe and discuss the research lesson in ways that strengthen the pathways of learning for teachers and students.

Lesson Study

In lesson study, teachers work together to...

Lesson Study

-form goals for **student learning** and long term development

-**collaboratively** plan a lesson designed to bring life to immediate and long term goals

-teach the lesson with one or two team member teaching and others gathering **evidence** of student learning

-discuss the evidence gathered during the lesson, using it to **improve** the lesson, the unit and overall instruction

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Big Ideas
key concepts/essential understandings

Essential question...

Student Outcomes
Important skills or processes

Students will be able to...

Connecting

Purpose: Engage/Activate prior knowledge/ Predict content/ Focus on a purpose:

Processing

Purpose: Construct meaning/Monitor understanding/ Process ideas

Transforming & Personalizing

Purpose: Synthsize ideas/ Apply knowledge/ Reflect on thinking and learning

Brownlie, Feniak & Schnellert, 2006

Essential question: How can we use patterns to understand polynomials?

Key concepts

Important skills or processes

Difference of squares:
-expression is a binomial.
-first term is a perfect square.
-last term is a perfect square.
- operation between terms is subtraction ("difference")
The two binomial factors will be the square roots of the squares, connected by a **+** and **-** signs.

Perfect Square Trinomial
-first term is a perfect square.
-last term is a perfect square.
-middle term is twice the product of the square root of the first term and the square root of the last term.

-Factor the difference of square
-Factor perfect square trinomials
-**assess** human impact
-**identify** the main points in a science related article or Illustration (determine importance, infer, compare, evaluate, make connections

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EQ: **How can we use patterns to understand polynomials?**

Key concepts   Important skills or processes

- Difference of squares
- Perfect square trinomials

Essential understanding:
When factoring, you can use the **pattern** that formed the products.

- **Factor** the difference of squares
- **Factor** perfect square trinomials
- **Identify** products within a trinomial
- **Expand** expressions
- **Multiply** expressions

Connecting (eg. Engage/Activate prior knowledge/ Predict content/ Focus on a purpose)

- Students complete warm-up (review questions).
- Debrief with a partner, how can you figure out the product of two expressions?
- Share out in large group and record responses

Processing (eg. Construct meaning/Monitor understanding/ Process ideas

- Students participate in "investigate" – factor using **algebra tiles**: "use the algebra tiles to factor these triomials" "Sketch what you did"
- Give up to 10 minutes for exploration and representation
- Teachers circulate and ask questions like, "what are you trying?" "what are you noticing" "how did you figure that out?"
- Partner Talk: "Compare what you did with a partner" (or two)
- Agree on defining characteristics of factoring
- Report out/debrief: What are defining characteristics of factoring these polynomials. Explain why they are special.

Transforming & Personalizing: (eg. Synthesize ideas/ Apply knowledge/ Reflect on thinking and learning)

- Try out what you know with two of the questions
- Students enter the main ideas and examples into **foldable**
Come back to EQ: How can we use patterns to understand polynomials?

How can you figure out the product of two expressions?

Use the algebra tiles to factor these triomials

Sketch what you did

Partner Talk:

**Compare what you did with
a partner**

Partner Talk:

What are defining
characteristics of
factoring these
polynomials?

Explain why these
polynomials special?

Try out…

Try out what you know with two of the questions

Foldables

Represent the main ideas and include examples in your **foldable**

Essential Question

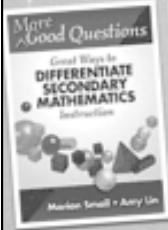**How can we use patterns to understand polynomials?**

Debrief...

What did the students do?

What did the teachers do?

Connections and applications...

A new resource

Open-ended tasks

▷ Using a total of 6 algebra tiles, represent a polynomial. What are the factors?...

When you model a certain algebraic expression with algebra tiles, it forms a square. What might the tiles be?

Small & Lin, Nelson Canada

Planning

GOALS

Goals: What do we want to develop/ explore/ change/ refine to better meet the diverse needs of diverse learners?

RATIONALE

Rationale: Why are we choosing this focus?

PLAN

Plan: How will we do this?