

ENgagement and Achievement through Computational Thinking

Structuring Opportunities for Pattern Recognition Viewing Guide

Lesson 9

Topic and goals

In this Engagement and Achievement through Computational Thinking (ENACT) Pattern Recognition Lesson video, a teacher models how to integrate computational thinking (CT) strategies into your classroom. Framing, prompting, and highlighting are designed to empower students to take ownership of CT strategies.

The goals of the video are to support you in:

- **framing** a lesson or task that provides students with an opportunity to apply one or more CT strategies.
- **prompting** students (either verbally or using resources) as they work on a problem by applying CT strategies.
- **highlighting** examples of when and how students used CT strategies to complete their work.

Questions to consider when planning:

- What are some strategies my students could use to solve the problems in this lesson?
- How might a CT strategy already be part of or add to what they are already doing?
- How might I recognize when my students are using CT strategies?
- How might I identify when it would be helpful to prompt a student to use CT strategies?

As teachers become comfortable with framing, prompting, and highlighting, students will feel more empowered to take ownership of the CT strategies and integrate them into how they solve math problems.

Context

The examples in this video demonstrate **prompting/structuring** a lesson on how students can use pattern recognition to make sense of related problems. In the first part, the ENACT coach models how to encourage students to look for and describe patterns across multiple solutions, using both visual and numeric representations to explain why the patterns hold. In the second part, the coach models how to facilitate a summary discussion that builds on students' work from the lesson, ensuring that all students hear a complete explanation of the pattern and understand how it works.

The video focuses on using visual models to explain patterns in fraction multiplication. However, the same approach—connecting visual representations to numeric patterns and using explanations to justify shortcuts—can be applied to any set of related problems in which students use patterns to reason and problem solve more efficiently in the future.



Video notes: As you view the video, icons (below) will appear, indicating content related to CT strategies, student-focused practices, pedagogy, and/or mathematics. When an icon appears, you may want to pause the video to read the associated notes in exhibit 1.



Computational Thinking

When this icon appears, the focus will be on CT strategies that are being modeled through framing, prompting, and/or highlighting. The focus is on the strategy.



Student Focus

When this icon appears, the focus will be on student-focused practices that are being used: connecting to student experiences, supporting student choice by enabling multiple approaches to problems, valuing student thinking and voice, supporting student collaboration.



Pedagogy

When this icon appears, the focus will be on the teaching techniques that use interactive teaching and student learning, and/or assessing formatively.



Mathematics



When this icon appears, the focus will be on specific math concepts that are needed for solving the problem and connecting them to previous learning, and/or observing student work.



Exhibit 1. Notes for ENACT video: Structuring Opportunities for pattern recognition

In ENACT Lesson 9, a coach models how to provide structured opportunities for students to use *pattern recognition* by foreshadowing the pattern recognition opportunities early in the lesson and supporting student reflection at the end of the lesson.

The goals of the video are to support you to:

- Encourage students to look for and describe patterns in the solutions to related problems.
- Lead a concluding discussion that builds on work students did during the lesson.

Timestamp	Topic	Notes
00:47	 Computational Thinking	Highlight abstraction through representation: When students draw simple representations of the brownie pans, they are engaging in abstraction by simplifying the situation and focusing on the information that is most important for solving the problem.
01:12	 Pedagogy	Support strategy awareness and ownership: Compiling and displaying student-generated strategies helps students take ownership of the problem-solving process and see multiple approaches side by side. If students developed a list of strategies for solving fraction-of-a-fraction problems in a previous lesson, revisiting that list can support their current work. Alternatively, generating the list together during the discussion allows student ideas to guide the problem-solving process.

Timestamp	Topic	Notes
01:57	 Student Focus	Elicit and refine student reasoning: Inviting students to explain why specific information is needed or how it connects to the problem helps surface their thinking. This practice also supports targeted feedback that moves students' reasoning forward. When explanations are incomplete or imprecise—for example, when students are unclear about why the number of parts matters—you can restate their ideas or ask follow-up questions to support more precise communication and reasoning.
04:26	 Mathematics	Connect pattern recognition to algorithm development: Some students may already have noticed patterns when solving similar problems in earlier lessons—for example, that the numerator of the product is found by multiplying the numerators, and the denominator by multiplying the denominators. In this lesson, the focus is on using visual models to explain <i>why</i> this pattern works and why it holds across all fraction multiplication problems. Making this connection helps students see how consistent patterns in reasoning form the basis for the fraction multiplication algorithm.
05:27	 Student Focus	Support student collaboration: Providing opportunities for meaningful cooperative work allows students to share their ideas with peers and hear multiple perspectives on how to approach a problem. Working together in this way helps students learn from one another and broadens the range of strategies considered during problem solving.
05:49	 Pedagogy	Encourage articulation of student thinking: In the video, the coach restates ideas she hears as students work to make their thinking public. In your classroom, you might extend this practice by inviting students to explain their own reasoning to the class, allowing them to articulate and reflect on their problem-solving processes.
08:16	 Student Focus	Value student thinking and voice: In the video, the coach highlights student ideas by restating what she hears during their work. Providing students with opportunities to explain their own thinking to the class helps ensure their reasoning is heard and supports active participation in the problem-solving process.
10:13	 Computational Thinking	Highlight abstraction through representation: Moving from a visual representation to an equation is an example of abstraction, as the equation captures the essential information from the visual in a more concise form. Connect abstraction to algorithmic thinking: In this example, translating the visual model into an equation also supports identifying the standard algorithm for fraction multiplication, showing how abstraction can lead to more general and efficient solution strategies.

This viewing guide is part of a series of training resources related to REL Midwest's ENACT partnership.