

ENgagement and Achievement through Computational Thinking

Structuring Opportunities for Abstraction Viewing Guide

Lesson 6

Topic and goals

In this Engagement and Achievement through Computational Thinking (ENACT) Abstraction 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 tables can be used as tools for abstraction. In the first part, the ENACT coach revisits ideas from a previous lesson and models how tables highlight key information in a problem. The coach also makes explicit that completing tables in the lesson provides opportunities for students to practice abstraction. In the second part, the coach models how to give students time to reflect on their abstraction during the lesson summary, following a discussion in which students share their strategies for completing the tables. Although the video uses rate tables to draw attention to proportional relationships, the same approach can be applied when discussing other types of tables, provided students have experience with problems suited to those representations.



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 abstraction

In ENACT Lesson 6, a coach models how to provide structured opportunities for students to use *abstraction* by foreshadowing the abstraction 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:

- Discuss tables as a tool for abstraction.
- Help students identify when they are using abstraction.

Timestamp	Topic	Notes
02:30	 Student Focus	Value student voice: Incorporating the ideas and strategies that students share during the discussion helps bring their thinking into the work. You might invite students to connect the situation to similar experiences—such as times when they have shared something with siblings or friends—to deepen the discussion and make space for their perspectives.
03:20	 Student Focus	Connect to student experiences: Referencing data tables that students have encountered in other settings can help them make sense of rate tables in this lesson. Examples such as class schedules or T-charts used in other subjects can remind students how they have previously organized or looked up information in a table. Showing a few familiar examples, when possible, can orient students to thinking about how tables structure information and support problem solving.

Timestamp	Topic	Notes
05:25	 Mathematics	<p>Highlight mathematical structure: Tables are a common and powerful mathematical representation because they clearly show patterns and relationships among quantities.</p> <p>Support abstraction through representation: This clarity is also what makes tables useful abstractions. They organize information in ways that help students notice structure and make connections across values.</p>
07:43	 Student Focus	<p>Value student voice: In the video, the coach demonstrates one strategy for finding the missing value in a rate table. When teaching this lesson, build on the reasoning your students share. Incorporating their ideas into the discussion helps bring their thinking forward and supports their engagement with the strategies being developed.</p>
08:22	 Computational Thinking	<p>Reinforce pattern recognition: Working with rate tables provides a strong context for practicing pattern recognition. As students look across rows and columns to identify how quantities change in relation to one another, they apply a core CT strategy that supports reasoning about proportional relationships.</p>
09:29	 Mathematics	<p>Connect mathematical representations to CT strategies: In addition to creating their own abstractions, students benefit from working with standardized representations—such as tables—that organize information clearly. Using these structured tools supports the CT practice of abstraction by helping students distill key relationships and patterns from a problem.</p>

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