

ENgagement and Achievement through Computational Thinking

Prompting and Pointing Out Abstraction and Decomposition Viewing Guide

Lesson 11

Topic and goals

In this Engagement and Achievement through Computational Thinking (ENACT) Abstraction/Decomposition 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.

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/highlighting (pointing out)** in a lesson. The examples in this video focus on fraction word problems, but the ideas can be applied to any type of word problem or to other situations in which students translate a contextual situation into a mathematical representation and strategy. The four chapters in this video are listed below:

- **Chapter 1:** Prompting abstraction (0:50–4:04)
- **Chapter 2:** Prompting decomposition (4:05–5:31)
- **Chapter 3:** Highlighting (pointing out) decomposition (5:32–7:27)
- **Chapter 4:** Highlighting (pointing out) abstraction (7:28–9:09)

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?



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: Prompting and pointing out abstraction and decomposition

In ENACT Lesson 11, a coach models how to use two strategies for integrating computational thinking (CT) into your classroom. These two strategies, called *prompting* and highlighting (*pointing out*), are designed to support students in taking ownership of CT practices.

The goals of the video are to support you to:

- **Prompt** students to use abstraction and decomposition to help them solve word problems.
- **Highlight (point out)** when you see students using abstraction or decomposition independently.

Timestamp	Topic	Notes
Chapter 1: Prompting abstraction		
03:07	 Mathematics	Support reasoning about division through repeated subtraction: Although subtraction cannot be used to solve this problem in a single step, repeated subtraction provides a meaningful way to reason about fraction division. Interpreting $1\frac{1}{4} \div \frac{1}{8}$ as “How many times can $\frac{1}{8}$ be subtracted from $1\frac{1}{4}$ before reaching 0?” helps students make sense of the division situation and connects procedural work to conceptual understanding.
Chapter 2: Prompting decomposition		
04:27	 Mathematics	Address interpretation of quantities in context: Some students may notice that the problem does not specify whether Kendall uses the same amount of potatoes each day, making the amount used during the half week in $3\frac{1}{2}$ unclear. Validating this observation acknowledges careful attention to the context. Encouraging students to think about the amounts as averages or estimates across weeks helps them continue reasoning productively while interpreting the quantities mathematically.

Timestamp	Topic	Notes
Chapter 3: Highlighting (pointing out) decomposition		
06:18	 Computational Thinking	Highlight abstraction through symbolic representation: Writing number sentences is an example of abstraction because the notation captures the essential ideas and relationships in the problem in a simplified form. Highlighting how number sentences represent key aspects of the situation helps students see how abstraction supports reasoning and problem solving.
07:02	 Pedagogy	Make CT practices explicit through questioning: Providing intentional question prompts can help students recognize and name the CT practices they are using. Questions such as <i>“Which CT practice are you using right now?”</i> or <i>“I noticed you focused on one part of the problem—how does that connect to a CT practice?”</i> support students in reflecting on their problem-solving processes and making connections between their strategies and CT language.
Chapter 4: Highlighting (pointing out) abstraction		
08:17	 Student Focus	Value student thinking and voice: Using students’ drawings rather than creating your own centers their ideas in the discussion and highlights their thinking as meaningful contributions to the work. Featuring student-generated representations helps reinforce that their approaches are valued and worth examining.
09:03	 Computational Thinking	Connects abstraction to pattern recognition: Using abstraction to represent parts of a problem can also support pattern recognition. When students create simplified representations, those representations may resemble ones that they have seen in earlier problems, helping them recognize familiar structures and apply similar reasoning strategies.

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