

ENgagement and Achievement through Computational Thinking

Prompting and Pointing Out Abstraction and Algorithms Viewing Guide

Lesson 14

Topic and goals

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

This video demonstrates **prompting/highlighting (pointing out)** in a lesson. The examples in this video focus on problems involving the surface area of three-dimensional figures and will be most effective if students are familiar with area formulas for triangles and rectangles. Although the mathematical context centers on surface area, the strategies demonstrated—such as applying algorithms and using abstraction to organize information—can be applied more broadly to other area or surface area problems.

The four chapters in this video are listed below:

- **Chapter 1:** Prompting algorithms (0:58–2:06)
- **Chapter 2:** Prompting abstraction (2:07–3:39)
- **Chapter 3:** Highlighting (pointing out) algorithms (3:40–6:41)
- **Chapter 4:** Highlighting (pointing out) abstraction (6:42–9:14)



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 algorithms

In ENACT Lesson 14, a coach models how to use two strategies for integrating computational thinking (CT) into your classroom. These two strategies, called *prompting* and *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 abstraction to help them solve problems about surface area.
- **Highlight (point out)** when you see students using abstraction or algorithms independently.

Timestamp	Topic	Notes
Chapter 1: Prompting algorithms		
01:58	 Mathematics	Supports transition from informal to formal strategies: Some students may initially rely on counting squares rather than applying a formula. Highlighting how a new strategy can be more efficient than a familiar one can support students in recognizing the value of algorithms. Drawing attention to these advantages encourages students to try more efficient approaches and develop new mathematical skills.
Chapter 2: Prompting abstraction		
03:22	 Mathematics	Support understanding of surface area through physical models: Providing opportunities for students to unfold and reconstruct cardboard boxes can help them make sense of package plans. These hands-on explorations support students in visualizing how two-dimensional representations connect to three-dimensional objects, deepening their understanding of how surface area describes the amount of material used and how volume relates to what can fit inside the package.

Timestamp	Topic	Notes
Chapter 3: Highlighting (pointing out) algorithms		
03:58	 Student Focus	Value student thinking and voice: Displaying student work using a projector or document camera—after asking for the student’s permission—helps center student ideas in the discussion. Highlighting student examples also creates opportunities for timely feedback, allowing students’ thinking to guide the conversation and support continued growth.
04:11	 Pedagogy	Support whole-class engagement: Inviting students to give nonverbal feedback—such as a thumbs-up to signal agreement or understanding—while reviewing work as a whole class allows all students to participate. This strategy helps teachers quickly gauge understanding and keeps students engaged as different algorithmic approaches are examined.
Chapter 4: Highlighting (pointing out) abstraction		
07:42	 Computational Thinking	Highlight decomposition within an abstraction: In this example, students also engage in decomposition by focusing on one face of the rectangular prism at a time. Drawing attention to how students break the figure into individual faces helps illustrate how decomposition can support abstraction by allowing students to consider complex structures one component at a time.
08:26	 Computational Thinking	Highlight how tables function as abstractions: As discussed in the ENACT Lesson 6 video, tables are powerful tools for abstraction because they organize a large amount of important information in a compact and efficient way. Tables communicate meaning not only through the values they include, but also through how those values are positioned relative to one another, helping students notice relationships and structure more easily.
09:10	 Pedagogy	Support monitoring of multi-step problem solving: Redirecting students’ attention to the overall problem can help them recognize how individual steps fit together. In this example, students need to determine the areas of all faces of the figure and then combine those values to find the total surface area. Making this connection explicit supports students in keeping track of multi-step reasoning within an abstract representation.

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