ENgagement and Achievement through Computational Thinking

Modeling Decomposition Viewing Guide

Lesson 3

Topic and goals

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

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 Lesson 3 video shows an ENACT coach **framing/modeling** several elements of decomposition that can help students begin working on a challenging problem. These include starting with the parts of the problem that feel familiar, building on intermediate steps, and noticing that most problems can be broken down in more than one way. The example in the video uses prime factorization to illustrate how a complex task can be decomposed, but the same approaches can apply to many different kinds of problems. These strategies will be most effective if students have had some experience writing numbers as products of their factors in various forms (for example, 100 as 50 × 2, 25 × 4, or 25 × 2 × 2) and working with prime factorizations.

This material was prepared under Contract 91990022C0011 by Regional Educational Laboratory Midwest, administered by American Institutes for Research. The content does not necessarily reflect the views or policies of IES or the U.S. Department of Education, nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government.

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: Modeling decomposition

In ENACT Lesson 3, the coach models the use of *decomposition,* one of ENACT's five computational (CT) practices.

The goals of the video are to support you to:

- Help students use decomposition to break down complex problems into smaller parts.
- Demonstrate multiple ways to break down a problem into smaller components.

Timestamp	Topic	Notes
00:33	 Student Focus	**Connect to student experiences:** This section of the video refers to an earlier experience students had using factors to solve problems. You can substitute or include any other contexts your curriculum uses to explore factors, or choose examples that connect more closely to situations your students are familiar with.
01:04	 Student Focus	**Value student thinking and voice:** Ask students to restate their thinking and strategies from earlier explorations. This helps ensure that their voices are part of the discussion from the start of the lesson. Bringing students' ideas forward in this way also supports their continued growth as mathematical thinkers.
02:19	 Computational Thinking	**Connect decomposition to abstraction:** Although the lesson highlights decomposition, the factor trees students create also illustrate abstraction by simplifying the problem and focusing attention on essential information. **Highlight relationships through representation:** These factor trees serve as CT-aligned representations that make key numerical relationships more visible, supporting students in breaking down the problem and identifying useful structure.

Timestamp	Topic	Notes
02:59	 Student Focus	**Support student choice:** Allowing students to **help guide the lesson** can give them agency over their learning. One strategy to do this is to listen to your students' ideas and let the ideas about decomposition listed in the video come from or be built on their voices.
05:46	 Mathematics	**Connect decomposition to prior mathematical learning:** In mathematics, students often decompose numbers into factors or addends. This lesson extends that familiar work by showing how decomposition of numbers supports decomposition of more complex problems. **Build understanding of problem structure:** Drawing on students' existing experience with breaking numbers apart helps them consider how a problem itself can be broken into manageable parts, supporting flexible problem-solving approaches.
06:18	 Student Focus	**Value student voice:** Consider incorporating a student-suggested number during this part of the discussion. Using a number offered by students allows their ideas to shape the work and supports their active participation in the problem-solving process.
7:27	 Student Focus	**Support collaboration:** Acknowledging how students may feel when approaching a complex problem—such as feeling unsure or overwhelmed—can validate their experiences and reinforce that they are working together as part of a collaborative community of problem solvers.

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