

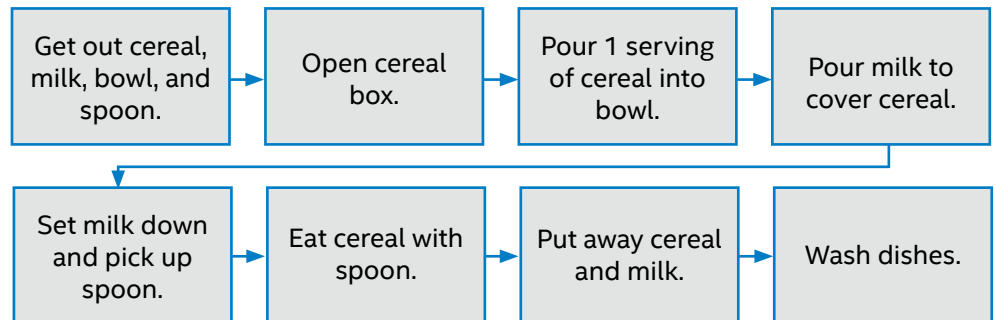


EXPLORING COMPUTATIONAL THINKING WITH DECOMPOSITION

In biology, decomposers, such as worms, fungi, or soil bacterium, break down organic matter into smaller parts. However, as computational thinkers, we are all decomposers breaking down complex processes and problems into smaller, more manageable steps. Decomposition is a skill that comes naturally, in all aspects of our lives.

Consider the number of small steps we go through to complete a simple task, like preparing a bowl of cereal for breakfast.

In this activity, you'll think analytically about how you can leverage decomposition skills to help solve problems such as the logic puzzles.



GET READY: EXPLORE RIVER CROSSING PUZZLES

The River Crossing Puzzle is a common logic challenge—you may have even solved some before. Explore three digital challenges and think about the small steps you complete along the way.



Scan to visit the River Crossing Challenge.

Open Transum.org's [River Crossing Challenges](#) and try to solve Level 1, Level 2, and Level 3 variations. As you explore, consider:

1. What are the unique constraints of each of the three levels?
2. How are the three levels similar?

ACTIVITY CARD 1





TRY IT: DECOMPOSE THE CHALLENGES

1. If your instructions to complete a challenge were "Solve Level 1," would someone else be able to pass the level. Why or why not?
2. Choose one of the River Crossing Levels, and copy the table below on a separate sheet of paper. List the constraints, then decompose the process of getting all the characters across the river into small steps.

River Crossing Challenge Level	
Goal	
Constraints	
Step #1	
Step #2	
Step #3	

3. Share your notes with a peer. Can you solve each others' puzzles using only notes?
4. If you took notes on the same challenge, compare and contrast your steps. Which set of steps is more helpful? Why?

GO FURTHER



Explore more puzzles on the [Transum.org](https://www.transum.org) site.

Try one of the following challenges to extend your understanding of decomposition.

Solve other math puzzles	Make your own puzzle	Decomposition in everyday life
Explore some of the other challenges on the transum.org website. While you solve the puzzles, think about how you are using decomposition to help.	Sometimes you understand challenges more completely when you try to make your own. Make your own river crossing puzzle and share it with a classmate.	Decomposing processes and problems aren't just useful in mathematical puzzles. Pick a problem you've worked on recently in real life and make a web or flow chart of all the details and/or smaller problems.

EXPLORE COMPUTATIONAL THINKING: DECOMPOSITION