



Youcubed has joined with Polyup to create interactive lessons where students use Poly, their AI sidekick, to explore mathematical relationships. The student goal is to modify (mod) the poly machines. Each Machine contains 1 or more Chips that are representations of the problems posed in the Machine. In each case we have thought about learning goals that are important steps in a path towards deeper understanding of mathematical concepts. It is our goal for students to explore, create and make mistakes as they help Poly learn to solve problems.

Hi, I'm Poly your AI sidekick!



## Addition and Subtraction 1 & 2

In these lessons we ask students to help Poly learn more about addition and subtraction. The goal is for students to help Poly represent different situations based on student interpretation of text. We are excited about these lessons because students are often focused on key words which they then translate into a mathematical operation. In Addition and Subtraction 1 and 2 we have created word situations where the student interprets the wording and has different choices they can use to help Poly solve the problem. If you would like more information about text and operation for young learners we recommend chapter 6 in *"Adding It Up" (2001)* and *"Children's Mathematics" (1999)*.

### Important Concepts:

#### Addition and Subtraction 1

- The wording in these activities is focused on action where the story in the problem involves the act of giving. This is a good beginning for sentence structure when students are learning to interpret information and apply mathematical operations
- Chips 1 and 2 are "join" problems
- Chips 3 and 4 are "separate" problems

#### Addition and Subtraction 2

- Chips 1 and 2 are "Part-Part-Whole" problems
- Chips 3 and 4 are "Compare" problems

### Student Engagement:

When engaging students in these lessons we recommend they interact with the content in many different ways. Interacting across representations makes the learning greater. Ideas for lesson engagement could be...

- drawing to visualize the problem
- justifying/proving their thinking through drawing, speaking and writing
- color coding words to symbols to drawings
- making up another problem
- creating a similar problem

National Research Council, & Mathematics Learning Study Committee. (2001). Adding it up: Helping children learn mathematics. National Academies Press. 185

Carpenter, T. P., Fennema, E., Franke, M. L., Levi, L., & Empson, S. B. (1999). Children's mathematics. Cognitively Guided Instruction. Portsmouth, NH: Heinemann.