Rod Trains
Grades 6-12

Introduction
We see this activity as an opportunity for students to explore and investigate patterns within numbers. We provided students extra time so they could figure out how to organize their observations and data.

Agenda

Activity	Time	Description/Prompt	Materials
Introduce	5 min	Introduce students to the question and the Cuisenaire rods.	• Cuisenaire Rods
Explore	30 min	Students explore the number of combinations of rod trains for different numbers and record their findings in their journal.	• Journal • Rod Trains handout • Pen/pencil • Colored pencils/ markers
Discuss	20 min	Have students share their thinking and conjectures on the white board. Use diagrams to understand and tables to organize their findings.	• White board

Activity
As we started this activity we told students we were going to think visually about numbers in this problem. We took some time to introduce the Cuisenaire Rods as a cool manipulative that is used in schools and one that Jo used a lot growing up.

We distributed the handout and pointed out that the three-rod train was already done and suggested that groups start by looking at the handout together in the middle of the table.

We gave lots of time and space to explore the patterns in the number of combinations of different rod trains using the Cuisenaire rods, color-coded diagrams, and numbers. As students worked we encouraged them to record all the combinations in their journals as they built them. We suggested they focus on rod trains four and five because it would lead to more connections and patterns. When we started the whole class discussion we started by organizing the students' findings in a table.

All students did not have the same findings so we used this as reason to invite students to share the combinations they found. We followed with a class discussion to see if we could agree on which numbers were accurate.
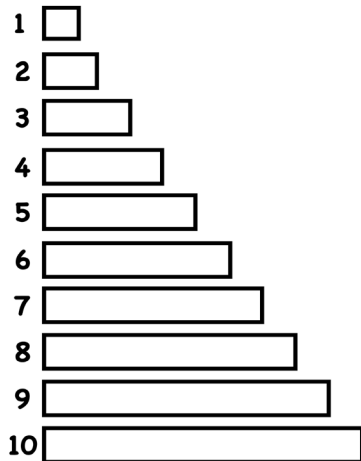
Extensions
- How many combinations would there be for a 10-length rod train?

Rod Trains
Handout

Imagine you have rods of unit lengths as in the following diagram.

Find out how many different rod trains can be made from any length of rod. For example, you can make these 4 trains for the 3-rod.