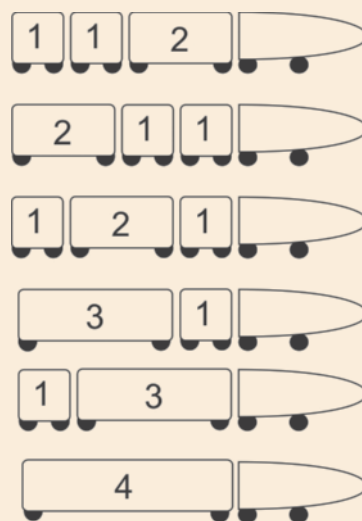


Trains of Thought

A train is composed of an engine and cars of various sizes, ranging in length from 1 unit to 10 units. The cars are placed end to end following the engine of the train. The train is described by the total length of the cars, not counting the engine. For example, the trains below are all 4-unit trains.

Note: Although all cars of the same length are indistinguishable from one another, the different arrangements of the cars make different trains.



- In how many ways can you create a 6-unit train?
- In how many ways can you create a 10-unit train?
- Determine the number of different ways that you can create a train of unit length n , using an unlimited number of cars of length 1 through length n .

Teacher's tip: To represent the cars of length 1 to 10, ask students to use Cuisenaire rods, copies of the template (see the template on the next page), or grid paper to outline cars of various lengths. The template can be printed and cut into separate "train cars" to help students count the possible trains.

We encourage classroom teachers to pose this problem to your students and share their creative solutions. Please include a brief analysis of the specific strategy; examples of original students' work or high-quality digital images; and your name, the school name and address, and your e-mail address. E-mail submissions to **Sherry Bair** at slbair@ilstu.edu, or send to her at Illinois State University, Campus Box 4520, Normal, IL 61790-4520, by **July 1, 2012**. Published solutions will be credited.

(Solutions on page 510)

Solve it! Trains of Thought Template

