

Rod Trains

Level A

You have 10 different rods, each a different color and a different length.

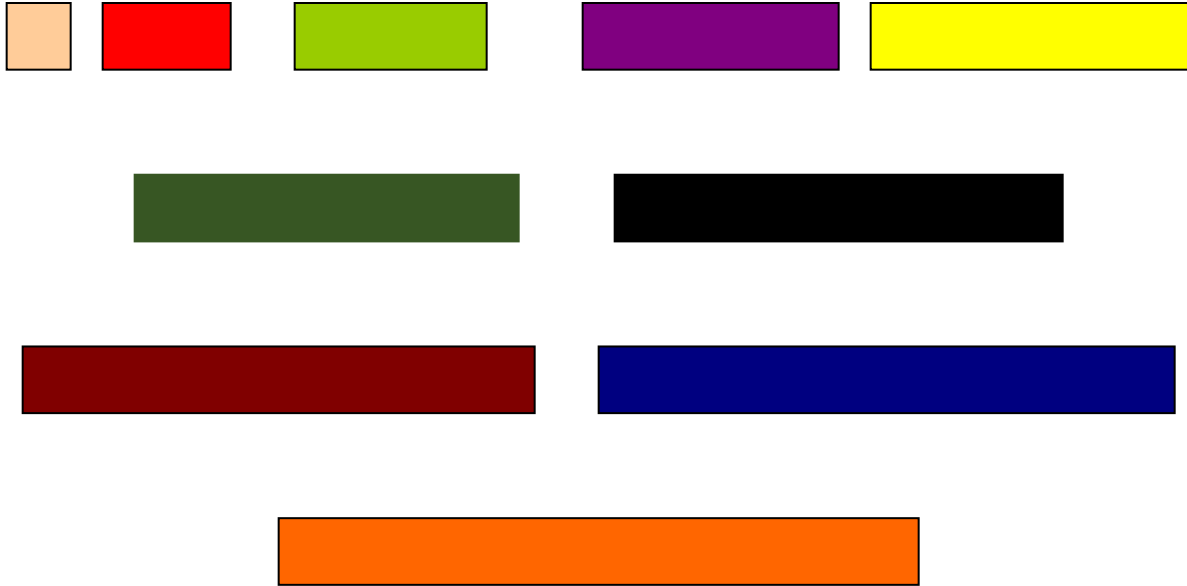
If you had multiple red rods and put them together in a train (one after another), what other length rods could you make? List the other rods by color. Explain why only some rods work.

If the light-green rod is 3 units long, determine the length of each of the other rods.

Explain the method you used to figure out the lengths.

Organize the rods in order from smallest to largest and draw each of them. Write the length next to each of your drawings.

Cuisenaire Rods



Rod Trains

Level B

You have 10 different rods, each a different color and a different length. A rod train can be made with different sizes of rods. A rod train with a red rod first and a purple rod second is different from a purple rod first and a red rod second. Which color rod is the same length as a red rod next to a purple rod? What is the length of that rod if the white rods are equal to 1 unit?

How long is the brown rod?

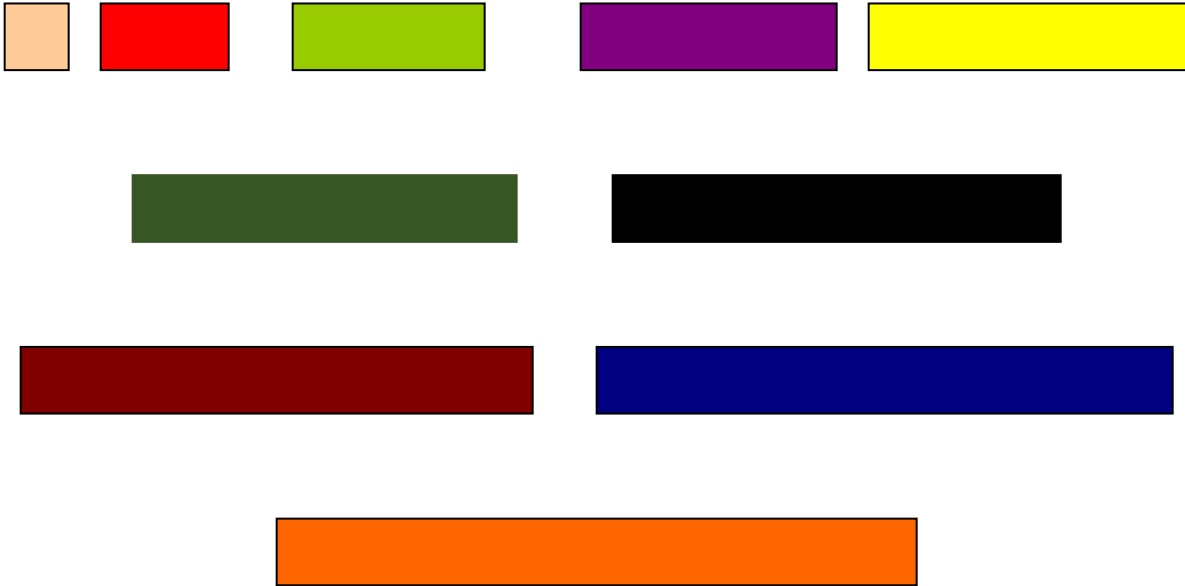
Suppose you put two smaller rods together to make a rod train the same length as the brown rod. How many different ways (order matters) can you put two rods together and make it the same length as the brown?

Explain how you figured it out.

Write an addition number sentence for each of the combinations that you found.

What do you notice from the number sentences? Explain.

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Rod Trains

Level C

You have 10 different rods, each a different color and a different length. Rod trains can be just one rod, several rods of equal size, or several rods of differing sizes. The order of the rods matters, making rod trains unique from one another.

For example:

a rod train made up of a red on the left side and a purple on the right



is a different rod train from one that has a purple on the left side and a red on the right.



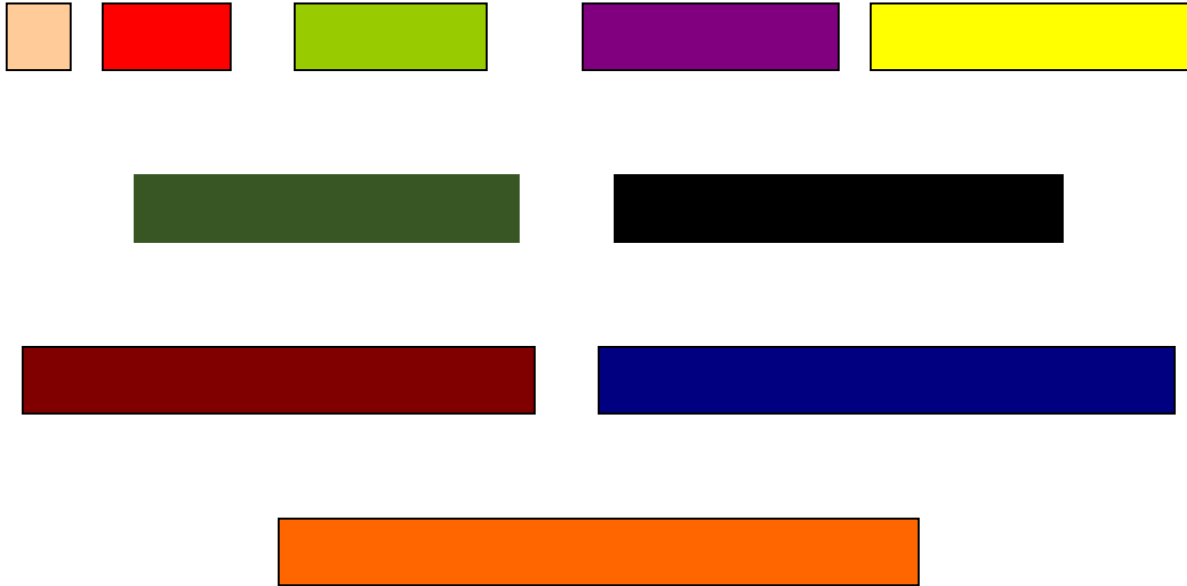
Consider the yellow rod. Determine all the different combinations of rods that can be arranged so that you have a rod train that is equal to the length of the yellow rod.

How many possible rod trains are equal in length to a yellow rod?

Explain your solution method.

How do you know you have all the combinations?

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Rod Trains

Level D

The longest rod you have is the orange rod, which is 10 units in length.

Determine the number of trains of 10 units that can be made, when order matters.

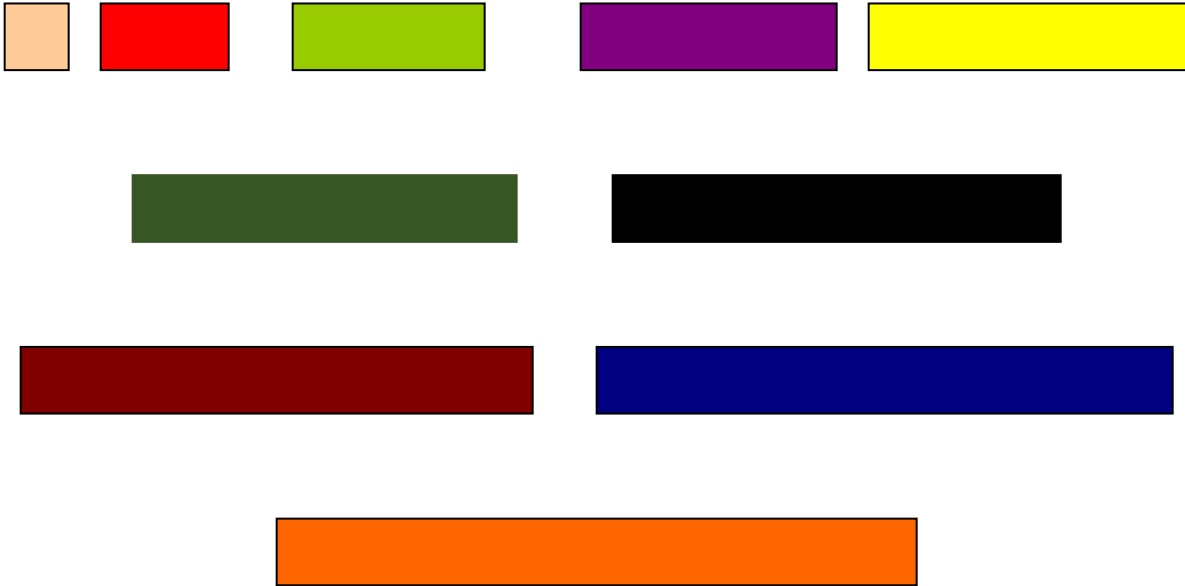
Illustrate or list all of the 10-unit rod trains.

Explain your method for finding each set of rod trains.

How do you know you have them all?

What patterns or relationships do you see in the list of the sets of rod trains?

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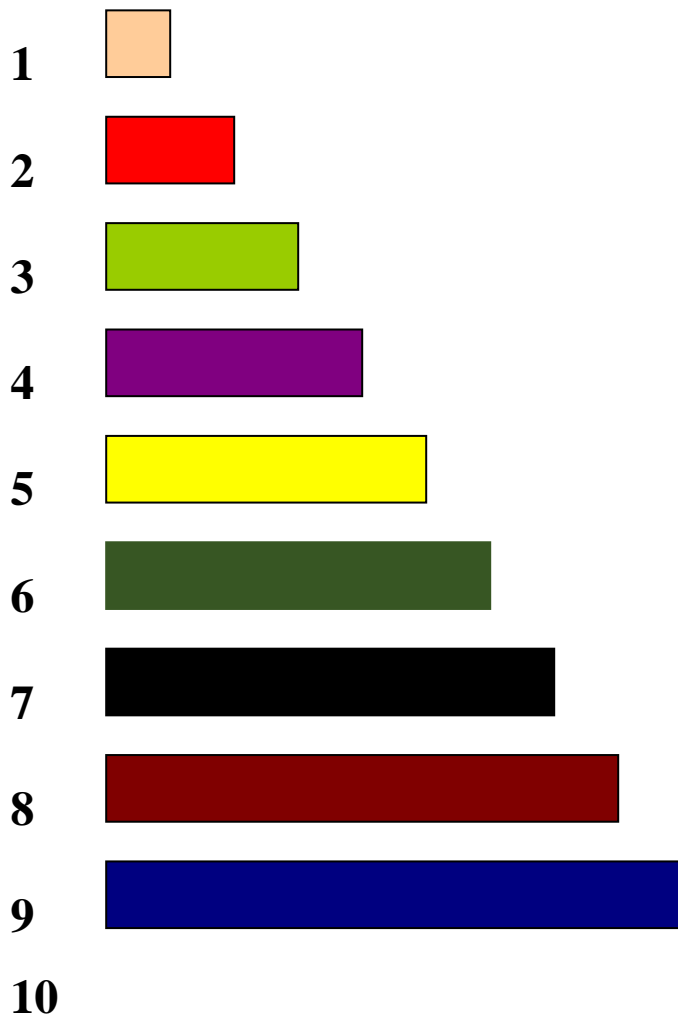


Rod Trains

Level E

A rod train can be made with different-sized rods, by putting the rods end to end. Rod trains can be just one rod, several rods of equal size, or several rods of differing sizes. The order of the rods matters. For example, a rod train made up of a two-unit rod on the left side then a four-unit rod on the right is a different rod train from one that has a four-unit rod on the left side and a two-unit rod on the right.

You have a rod of every natural number length. For example, you have a rod with a length of one unit, a rod with a length of two units, etc. You have an infinite number of rods in each size.



Determine the number of rod train combinations needed for a train of length n . Justify mathematically how you got your answer.

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