

Manipulatives

tools for mathematical reasoning

Cuisenaire Investigations

- ▶ What can you find out about these toys?
- ▶ What do you wonder?

Cuisenaire rods

Hide 'em!



Number families



**How many ways can you make
the yellow rod?**

How would a mathematician show this?

Cuisenaire rods



**Which single rods can you make
with doubles of another?**

How many ways can you find?



One Is a Snail Ten Is a Crab




1 is a snail.



(This is a snail's foot.)





A colorful illustration of a young boy with brown hair, wearing a white t-shirt and red and blue striped shorts, standing on a yellow sandy beach. He is leaning forward, touching a purple snail with his hand. The snail has two small eyes on its head. Three white arrows point upwards from the bottom of the page towards the boy's feet and the snail. The background shows a blue sky and a blue body of water. There are also some small seashells scattered on the sand.

3 is a person
and a snail.

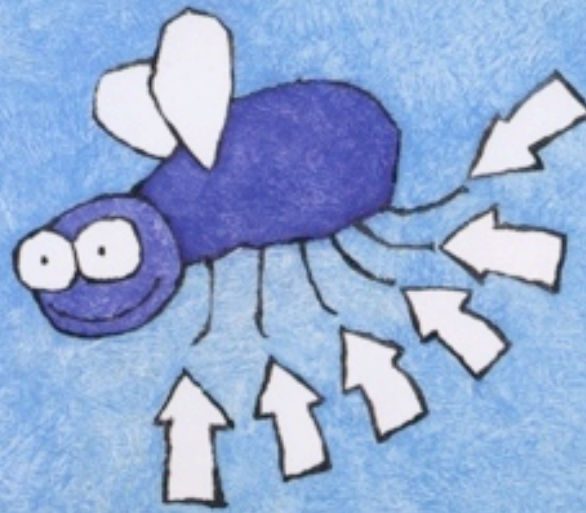
4 is a dog.





5 is a dog and a snail.



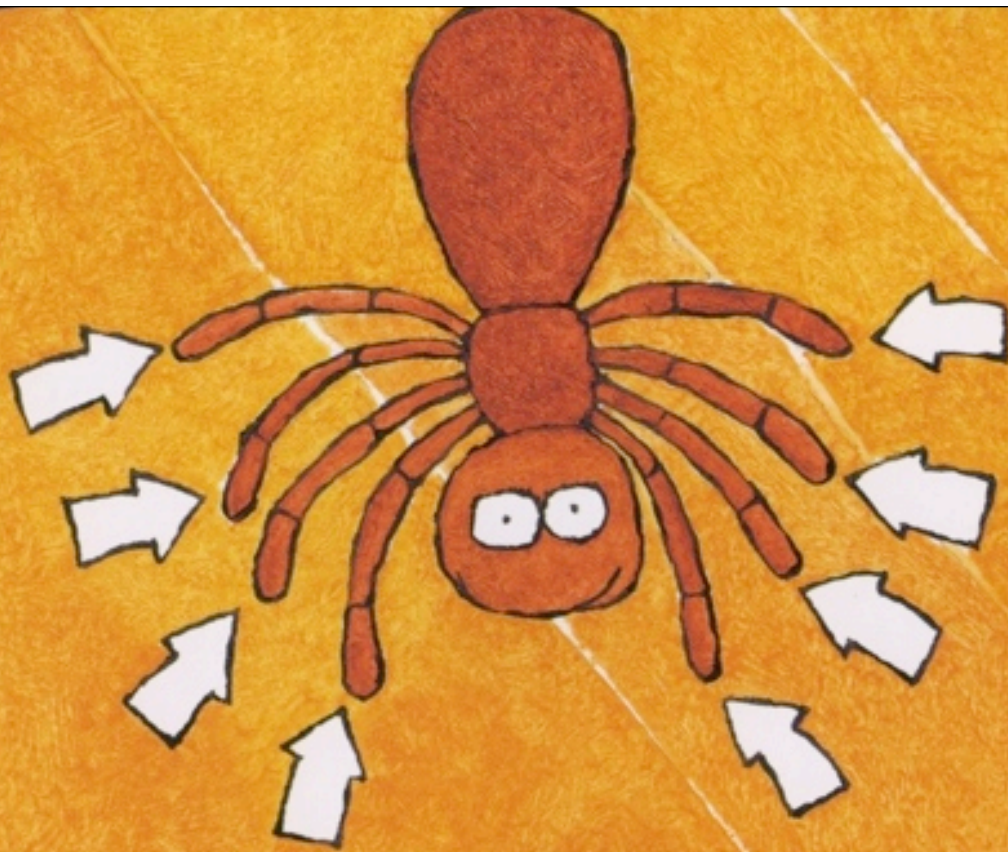


6 is an insect.



7 is an insect and a snail.

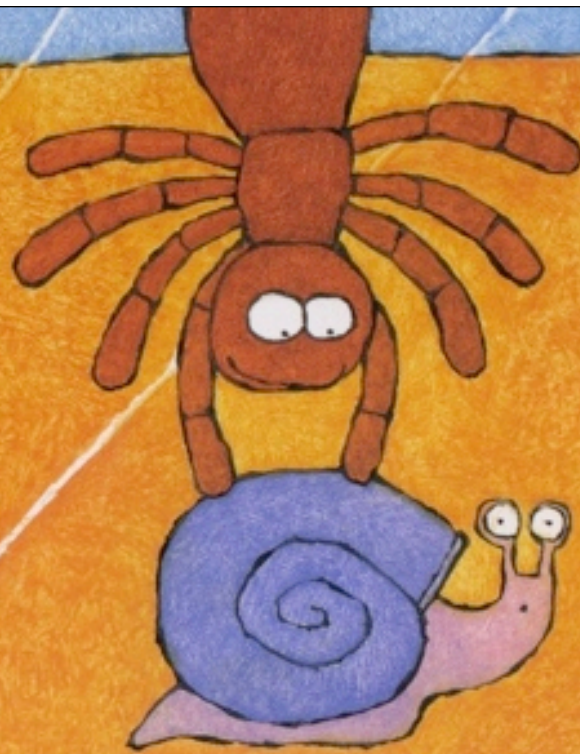




8

is a spider.





9 is a spider and a snail.

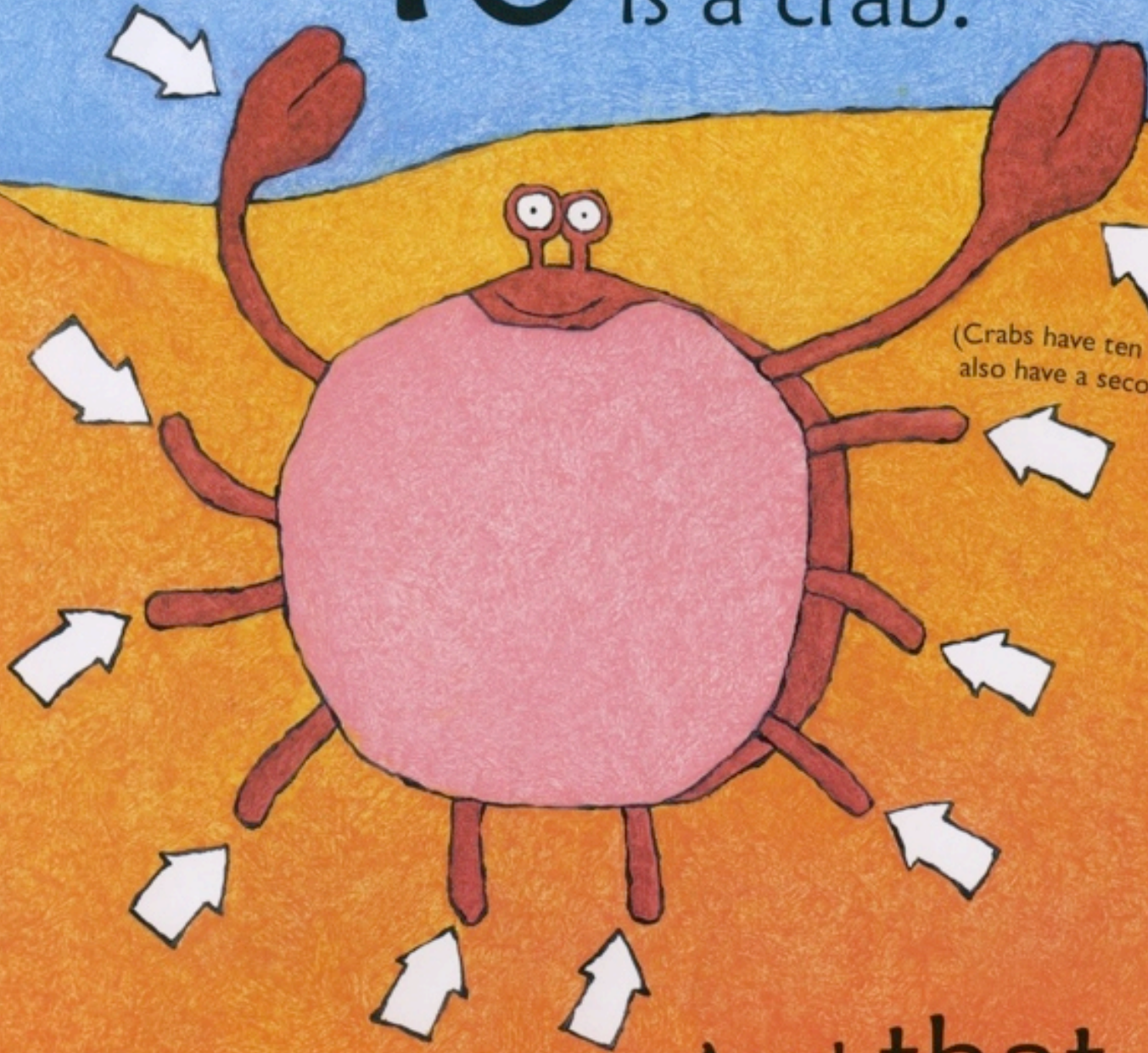
Cuisenaire rods



Howe can you show the odd numbers with your materials?

What do you notice?

10 is a crab.

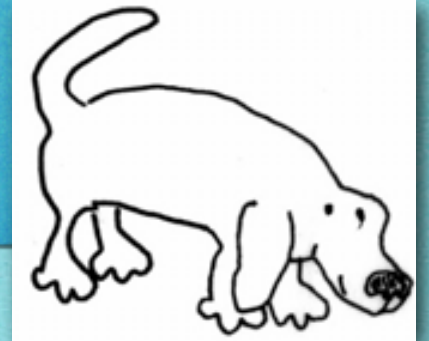


(Crabs have ten feet. Their front two feet also have a second job, as claws.)



And that means...

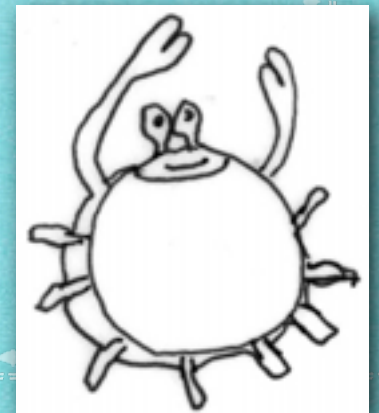
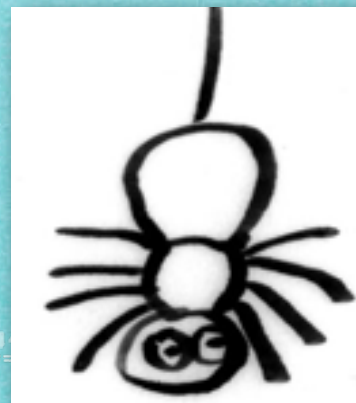
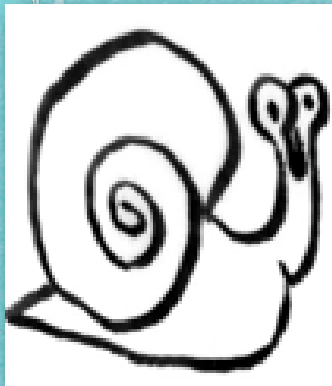
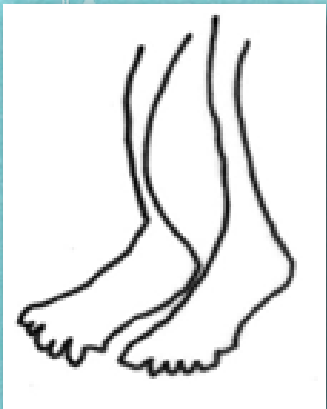
How many ways...



There are 10 feet on the beach.

What might the creatures be?

How many ways can you find?

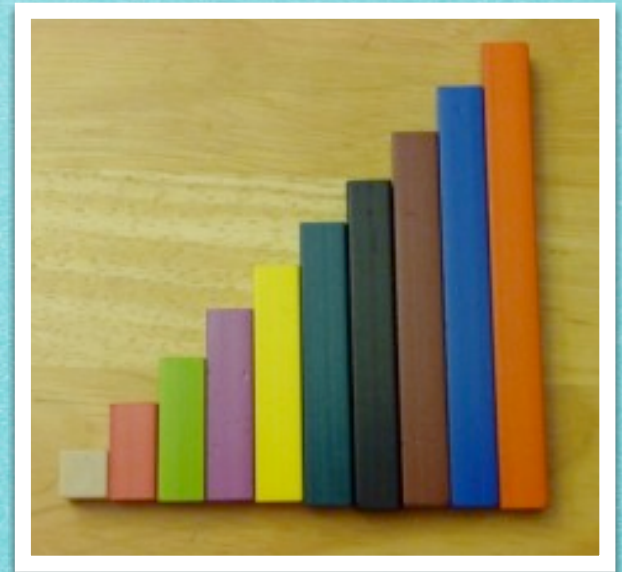


What's missing?

Two rods make a brown.

One of them is yellow.

What's missing?

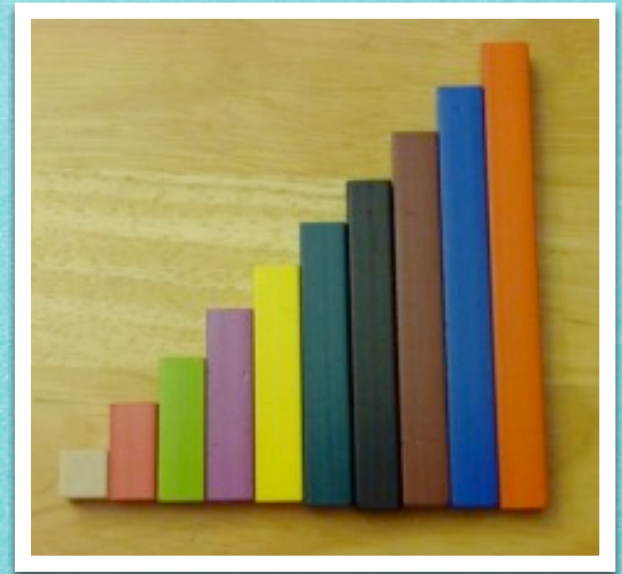


Find it!

Find a rod that is...

longer than dark
green, but shorter
than orange.

What could it be?

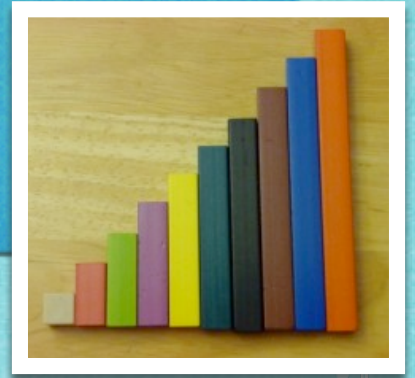


Which is longer...?



Which is longer...
brown or black?
...by how much?

Which is longer...?

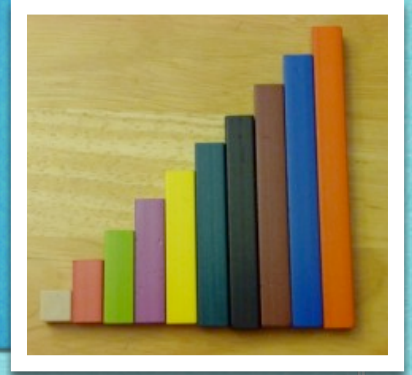


Which is longer...

2 light greens or one black?

...by how much?

More number riddles



Which rod is 3 times longer than a red?

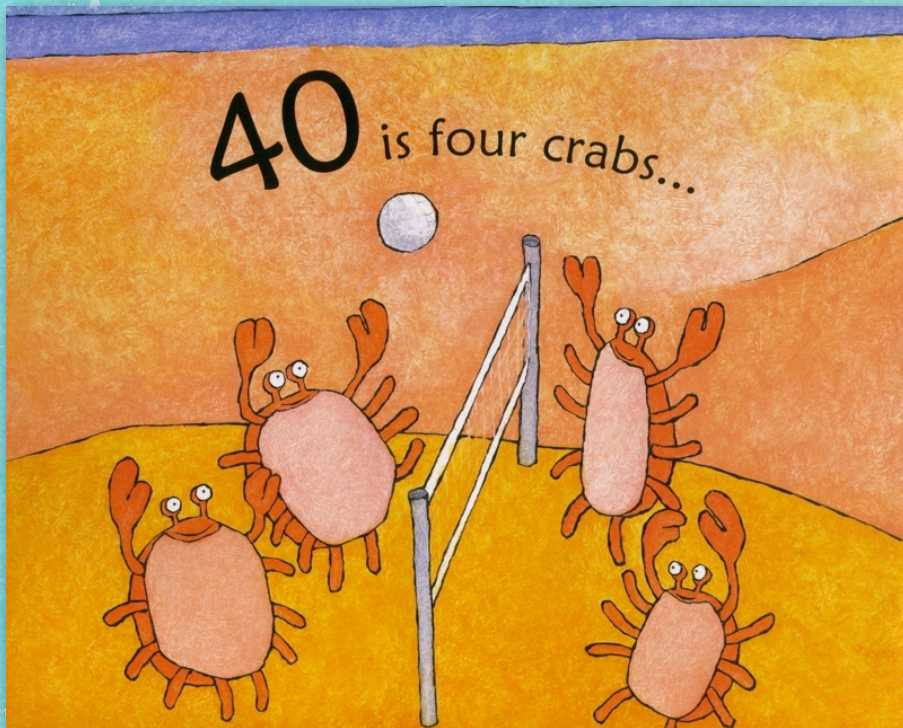
Which rod is 3 times longer than a light green?

Which rod is 3 times longer than white?

How would a mathematician show this?

How can you...?

How can you show this relationship with your Cuisenaire rods?



How can you...?

How many times does yellow fit into orange?

How many times does light green fit into orange?

How many times does black fit into orange?

How would a mathematician show this?

It's all about relationships

What can you find out...??



Fractions



The blue rod is one whole.
What's $\frac{1}{3}$?

The green rod is $\frac{2}{3}$. Which
single rod is one whole?

The orange rod is $\frac{5}{4}$.
What's one whole?

Fractions to decimals

- ▶ **Build the orange rod.**
- ▶ **Use only whites.**

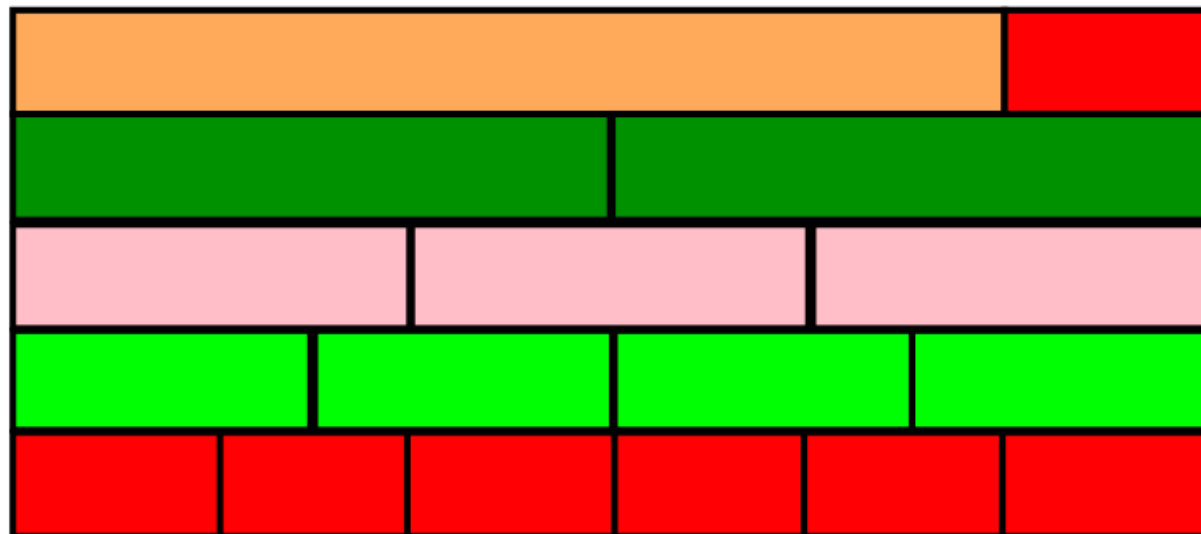


Fractions

Orange and red together makes 1.

How many ways can you show 1 using all the same colour?

What fractional names do they have?



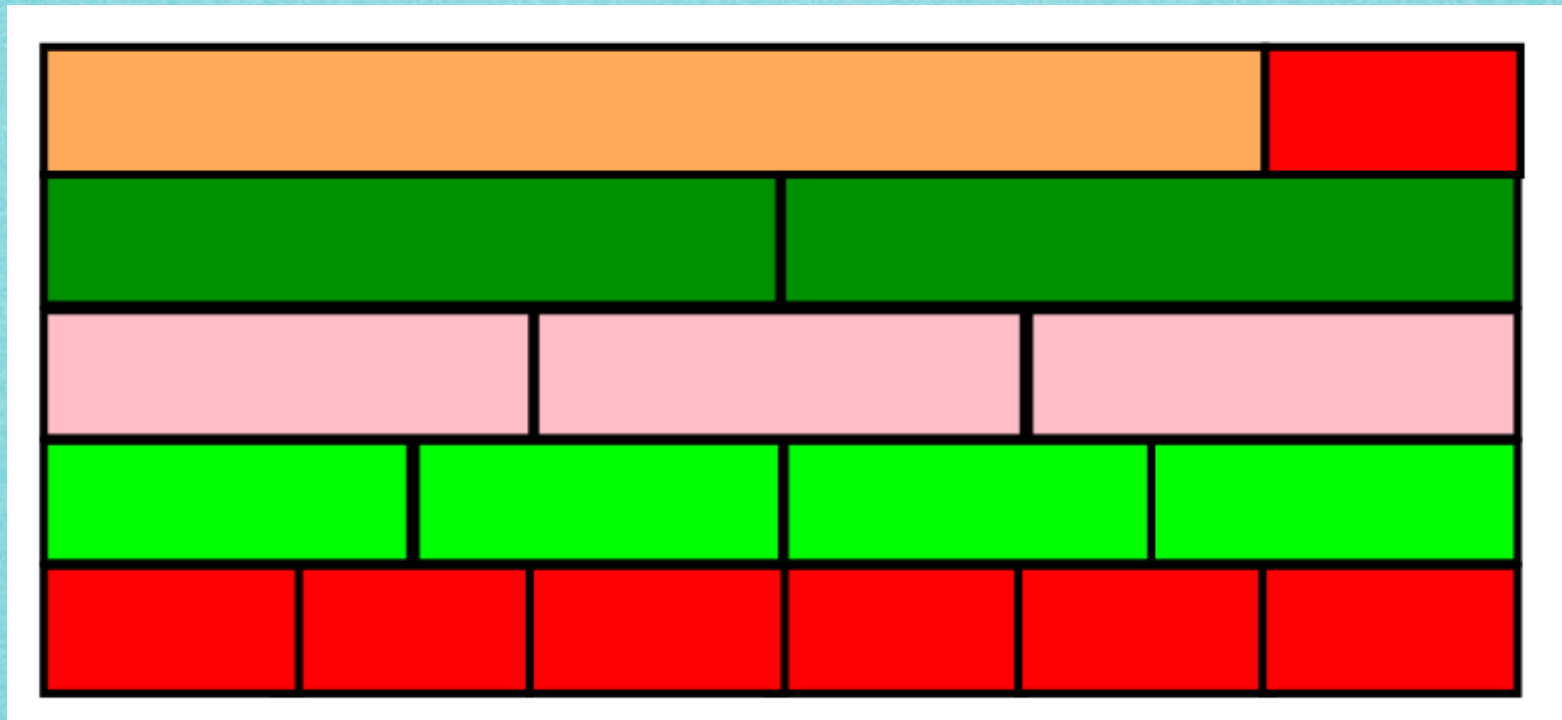
Fractions

What colour is $\frac{1}{2}$?

How else can you show $\frac{1}{2}$?

What other names does it have?

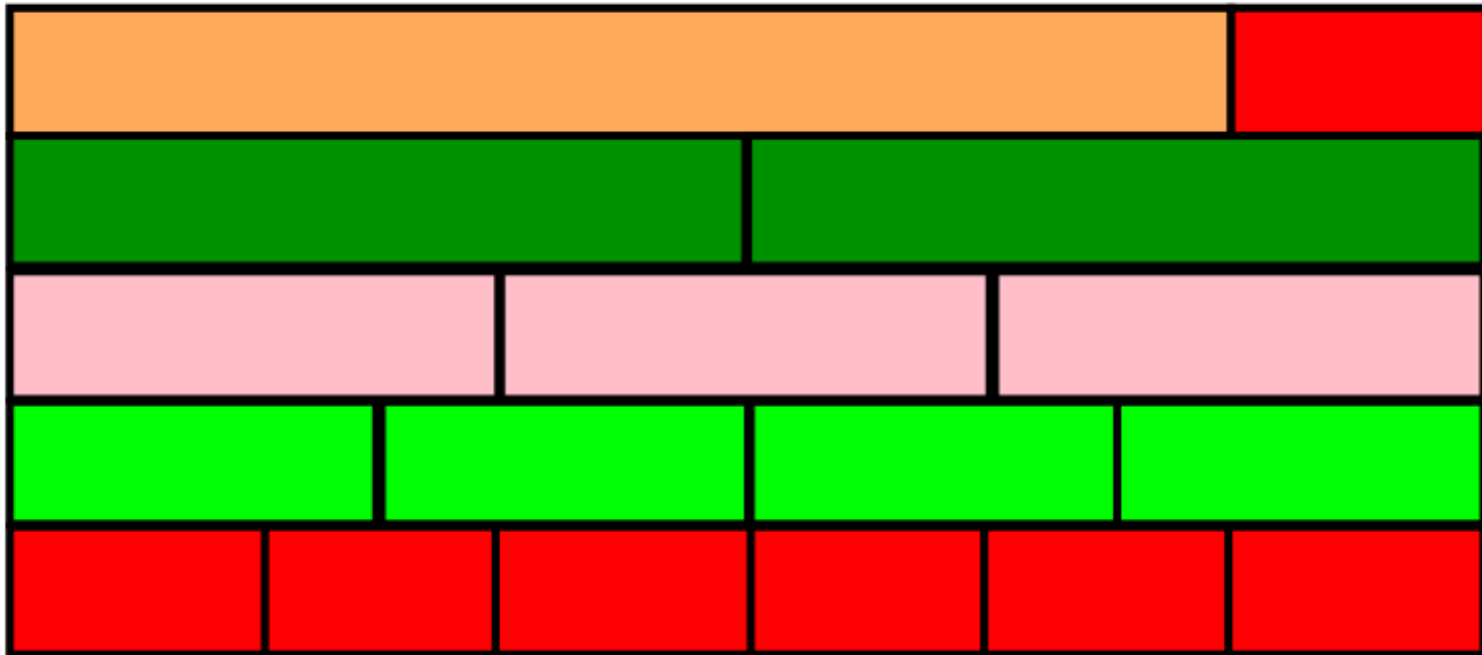
Fractions



What's bigger - $\frac{1}{3}$ or $\frac{1}{4}$?

How do you know?

Fractions



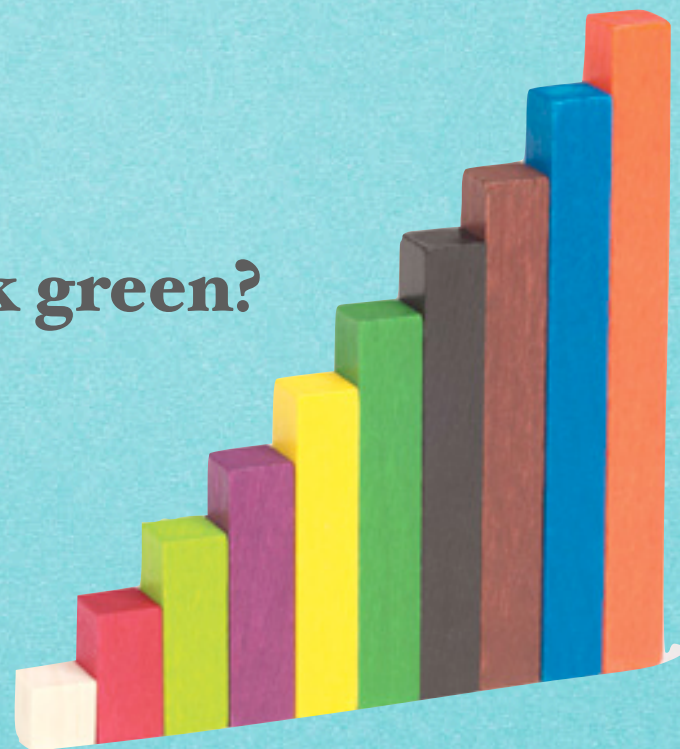
What's the sum of $\frac{1}{3}$ & $\frac{1}{4}$?

How do you know?

Cuisenaire rods

* **Line 'em up...**

* **Is blue a multiple of dark green?**



Cuisenaire rods

* How long before
brown lines up with
dark green?



Cuisenaire rods

* How long before yellow lines up with black?



Cuisenaire rods

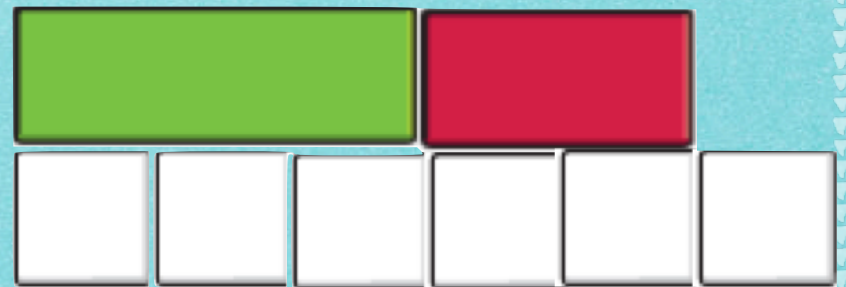
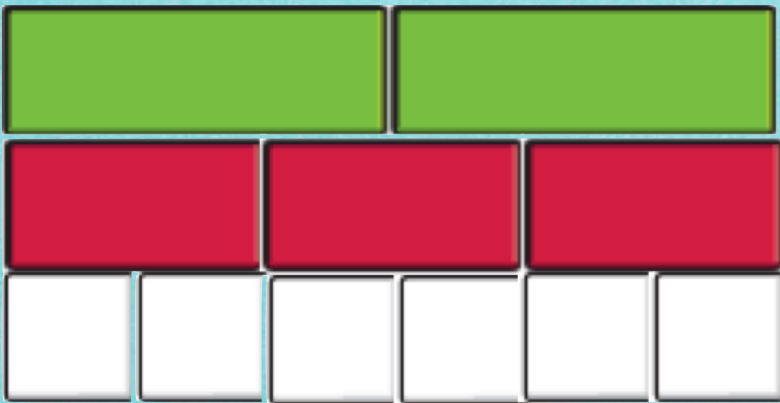
* What is the lowest common multiple of 10 and 4?



Fractions

What's the sum of $\frac{1}{3}$ & $\frac{1}{2}$?

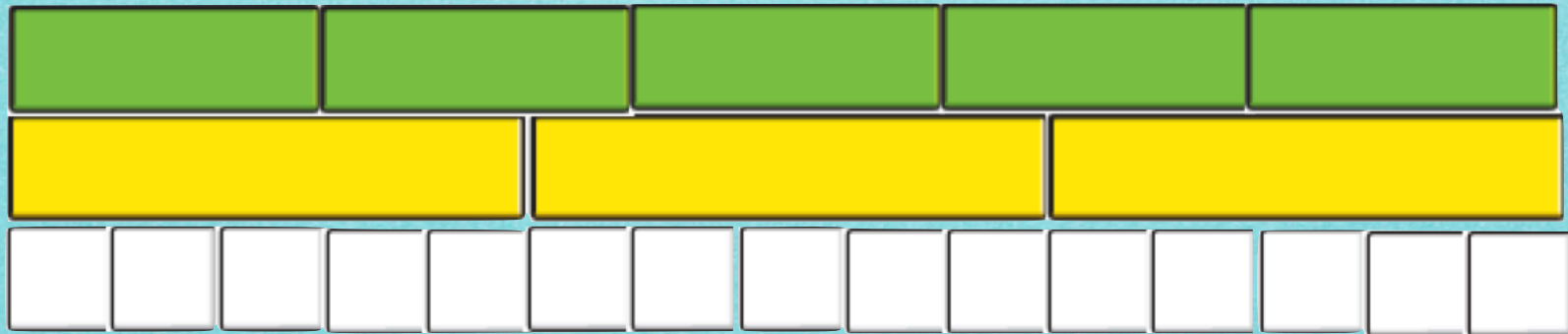
How do you know?



Fractions

What's the sum of $\frac{3}{5}$ & $\frac{1}{3}$?

How do you know?



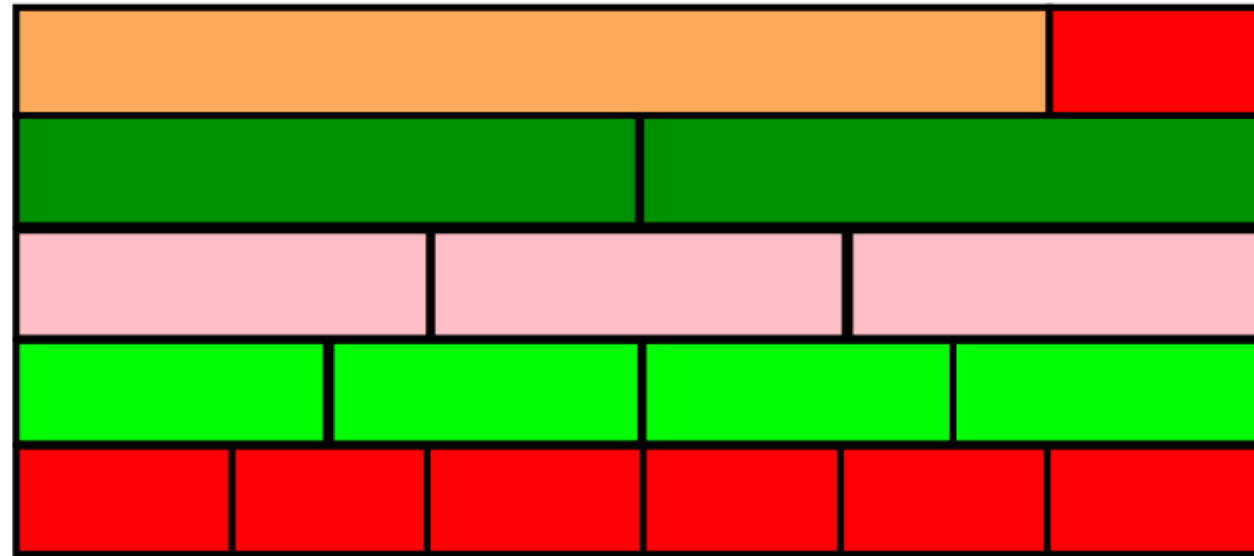
Fractions



What colour is $\frac{1}{2}$?

What colour is $\frac{1}{2}$ of $\frac{1}{2}$?

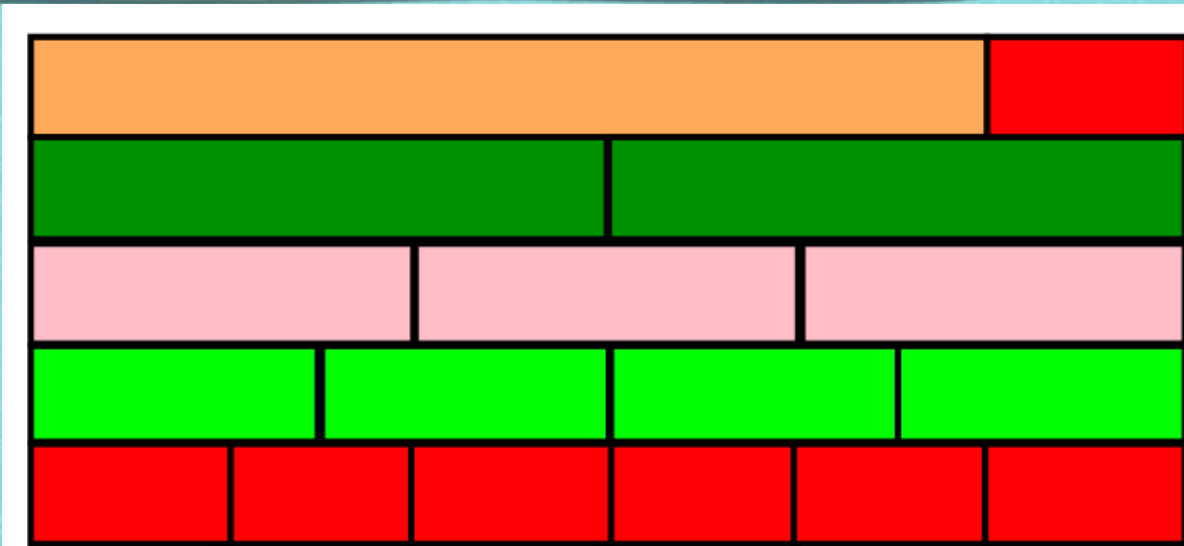
Fractions



What colour is $\frac{1}{3}$?

What colour is $\frac{1}{2}$ of $\frac{1}{3}$?

Fractions



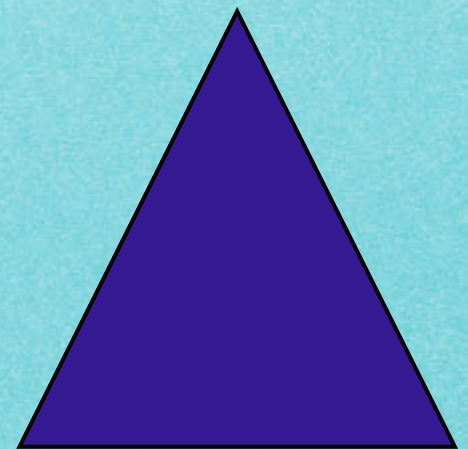
What is $\frac{2}{3}$ of $\frac{1}{2}$?

What is $\frac{2}{3}$ of $\frac{3}{4}$?

Triangles

The perimeter of my
triangle is 9 units.

What might the measures of
the sides be?



carole fullerton

mindfull.consulting@gmail.com

blog: <http://mindfull.wordpress.com>