Adding Fractions

Add:

$\frac{2}{3} + \frac{1}{2}$

Teacher notes: These would be some typical examples of questions used to demonstrate the algorithm for adding fractions.

If students don't have a basis for understanding the need or purpose of a common denominator, then they are just memorizing a series of steps.

Add:

$1\frac{1}{6} + \frac{3}{4}$

The Importance of Sesame Street

I like to use two key ideas from show:

1) Sing the following song (listen to YouTube or iTunes to hear the melody):

> One of these is not like the other
>
> One of these things doesn't belong
>
> Can you tell which thing is not like the other by the time I finish this song...

Draw some shapes on the board for them to "re-live" the Sesame Street concepts.

This is a very important idea as it is the basis for the fraction addition operation (let alone all other mathematics...); the idea of having "like things" is fundamental.

2) Count Dracula

I introduce this character specifically by not saying his name but instead describing him: he has black hair (show a widow's peak), he wears a black cape, he has fangs, he ... someone will shout out "Count Dracula!" Talk about some basic examples such as counting boys vs. counting girls vs. counting students.

Draw interspersed mixes of triangles and squares on the board. Ask them to count the triangles. Talk about why you don't count the squares as well.

Then move to mathematical expressions: $4\square + 3\triangle + 7\square = ?$

It is key to get the students to understand that these two Sesame Street ideas underlie basic counting which form the need for a common denominator, i.e., a blue rhombus and a red trapezoid are not like things, hence they cannot be counted (added) together.

With grade 7s I've even gone so far as to do some grouping of like terms from high school curriculum:

$3m + 6n + 2m + m + 3n + p$

$3\cos x + 5\sin x + \cos x - 2\sin x$

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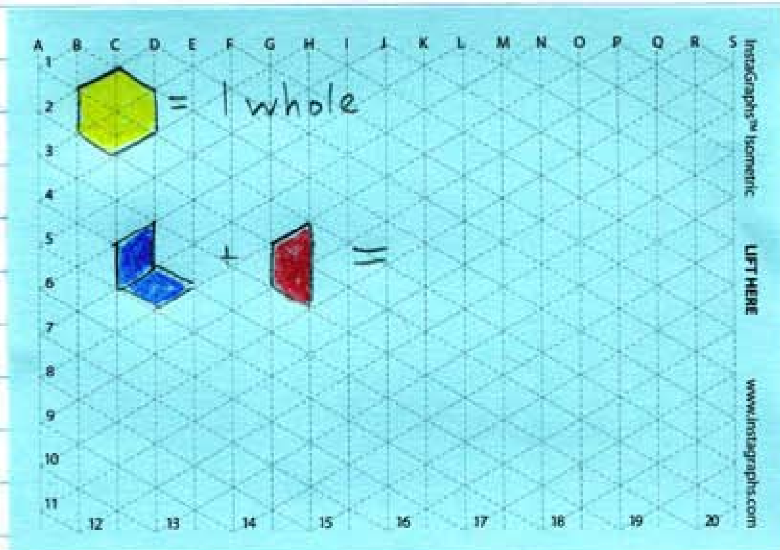

Teacher note: Prior to this lesson, be sure to spend some time going over what each of the pieces represent. Of course in order to do this you need to have a reference point of "what is a whole?"

Convenient sets to use are:

1 yellow hex = whole (red = 1/2)
2 yellow hex = whole (red = 1/4)
3 yellow hex = whole (red = 1/6)

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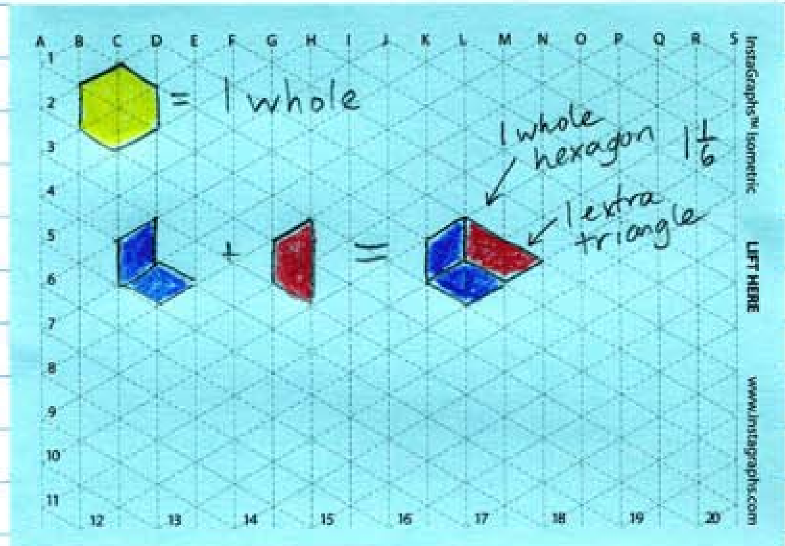


Teacher note: Here you can show them what it looks like to have the two pieces put together. Altogether it makes a bit more than a whole hexagon in area.

Ask the class, "Would Count Dracula count all of the pieces together and say there are three of the red-blue things?"

The point is "no" he would not as they are not alike, i.e., one of these things is not like the others...

*Start the get them into **language** that will help them think mathematically - specifically call it "two-thirds" and one-half."*

Relate it to two dogs and one cat. They are not the same so you can't add two + one.

Add:

$1\frac{1}{6} + \frac{3}{4}$

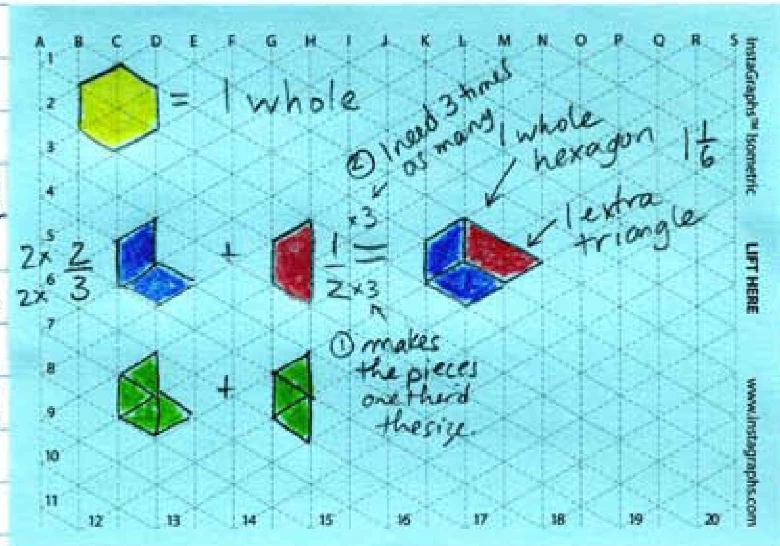
Adding Fractions

Add:

$\frac{2}{3} + \frac{1}{2}$

② so I need twice as many to stay equal

① makes the pieces half the size



Teacher note:
Ask the class if there is a solution to Count Dracula's problem of the unlike pieces. If someone doesn't suggest it, ask if we could change them into other pieces that would be alike.

Here you get a great opportunity to go over another familiar rule which is frequenty memorized.

Add:

$1\frac{1}{6} + \frac{3}{4}$

Said incorrectly: "what you do to the bottom, you must do to the top."

Said correctly: "what you multiply into the bottom, you must multiply into the top."
(An example being that adding 3 to the top and bottom does not give an equivalent fraction.)

Show the class that multiplying the bottom of the fraction makes the pieces half the size, so you need twice as many to be equivalent.

Relate it to making change with money, e.g., change for a dollar - a dime is worth one-tenth so you need 10 times as many. A quarter is worth one-fourth, so you need four times as many to remain equal to a dollar.

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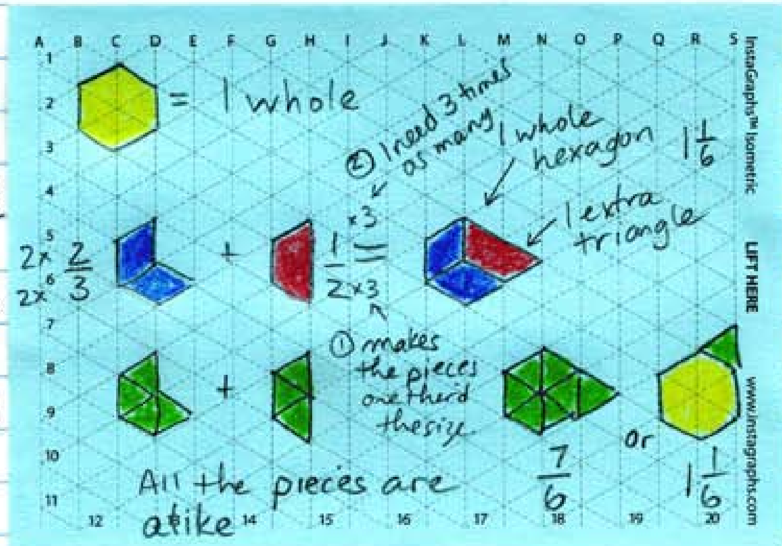

Teacher note: Now Count Dracula is happy to count because all the pieces are alike. Do the vampire voice and count out loud with the class - one green triangle, two green triangles, three...

Again - go back to language and double check that they know why they denominators do not add together.

Add:

$1\frac{1}{6} + \frac{3}{4}$

Ask them: 4 cats + 3 cats =?? 7 cats. They are still cats!

4 sixths + 3 sixths = 7 sixths. They are still sixths. All you are doing is "counting" them together.

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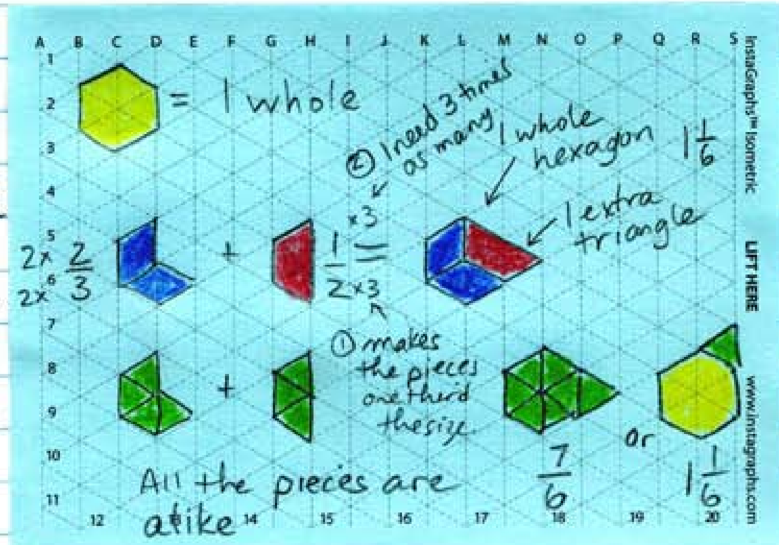
② so I need twice as many to stay equal

① makes the pieces half the size

$\frac{2 \times 2}{2 \times 3}$



Add:

$1\frac{1}{6} + \frac{3}{4}$

$\frac{7}{6} + \frac{3}{4}$

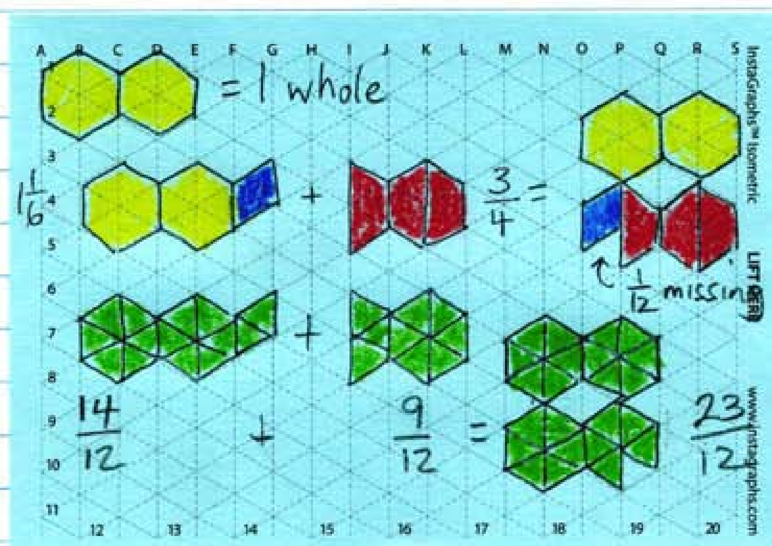
3×2 2×2

LCD = 3×2×2 = 12

$\frac{2 \times 7}{2 \times 6} + \frac{3 \times 3}{4 \times 3}$

$\frac{14}{12} + \frac{9}{12}$

$= \frac{23}{12}$



so $1\frac{11}{12}$ should be the answer