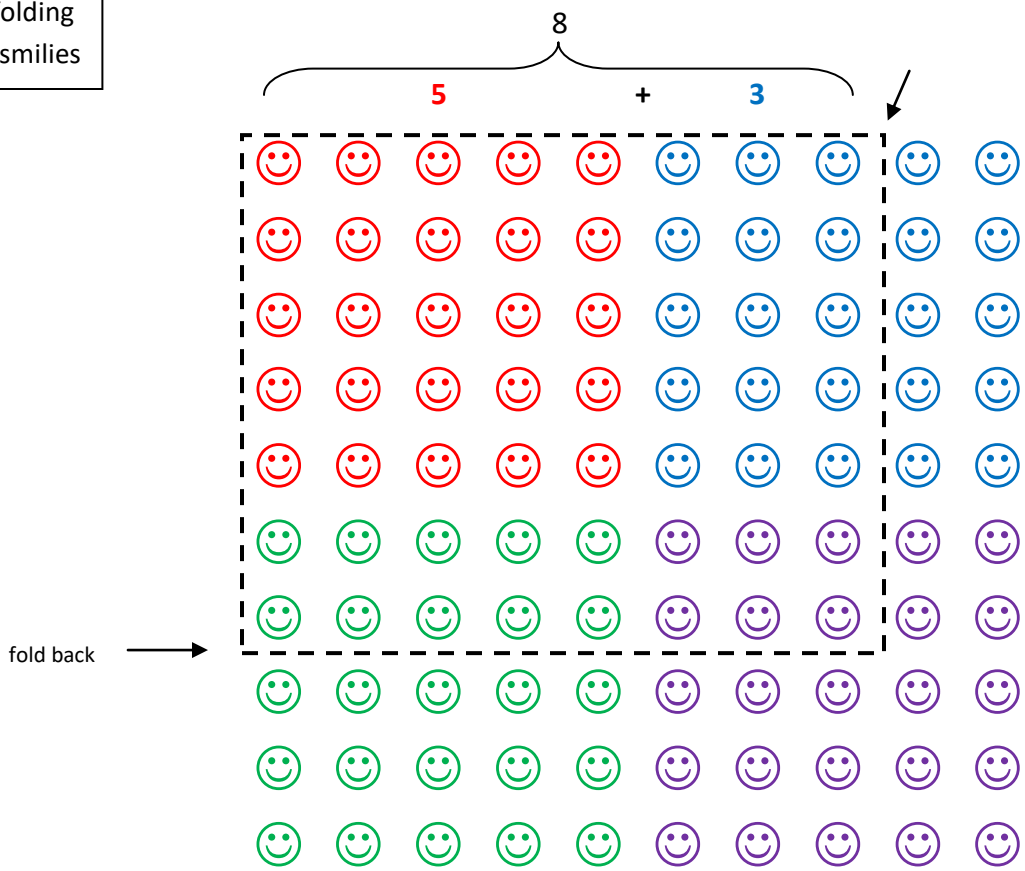
Happy Hundred and Tweaky Twelve foldable multiplication template

Example: find 7 x 8 by folding an array of 7 rows of 8 smilies



Goals: - connect multiplication to the five times table,
- learn to decompose factors for multiplication,
- become familiar with counting different groups: groups of 5, later groups of 10
- understand the box method of multiplication to use it with extended notation,
- show the relationship with multiplication of mixed numbers and polynomials (FOIL) in algebra.

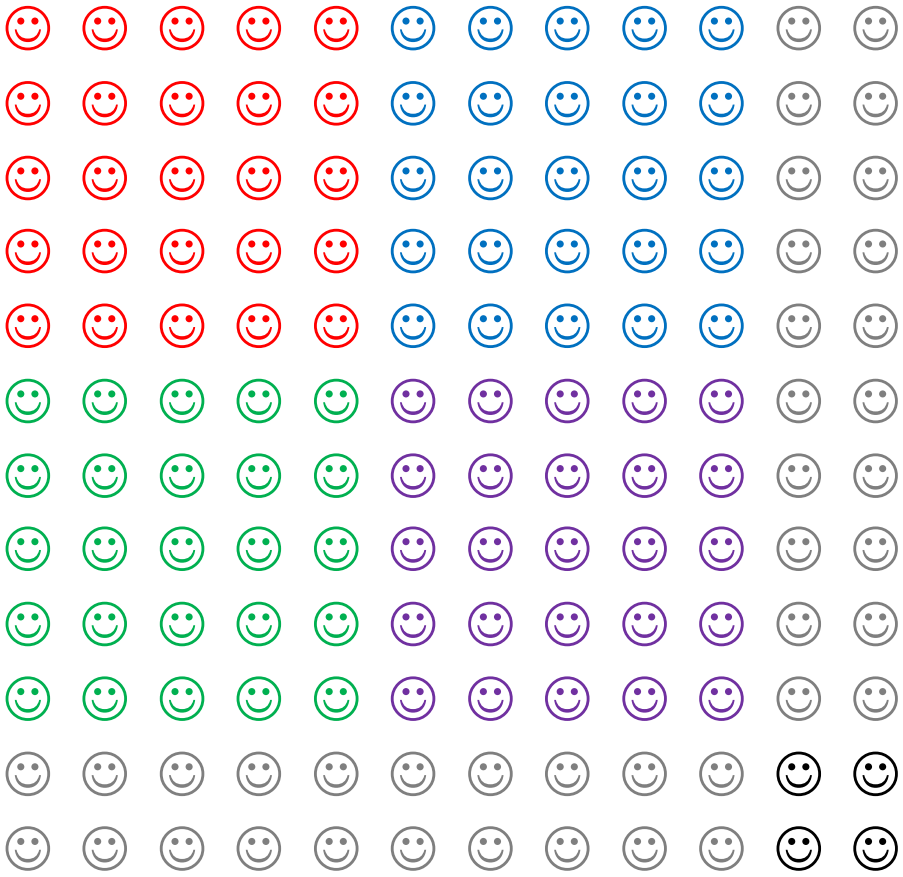
How to multiply with the Happy Hundred and Tweaky Twelve Basically we use the easy five times table to do other multiplications. Example: what is 7 x 8 or 7 rows of 8, see the dotted rectangle above. Student folds back on the dotted lines, so you see the 7 x 8 array. Ask: "How many groups of five do you see? Remember: the fives can be horizontal and vertical." Shapes that show 5 such as the yellow 5-rods (Cuisenaires) help count groups of 5. Fill up the whole array with rods and ones, a rods track shows total.

You see **5 red vertical columns of five, 3 blue vertical columns of five**, and **2 green horizontal groups of five**, so 5 + 3 + 2 = 10 groups of 5 = 50. There are **2x3 = 6 purple smilies**.Total = 50 + 6 = 56, so 7 x 8 = 56.

Decompose factors: decompose 7 into 5 + 2, draw a box around the colors, do 5 x 8 = 40 first and then 2 x 8 = 16. Ask: "what is 5 eights + 2 eights together?" Yes, that's 7 eights, or 40 + 16 = 56, so 7 x 8 = 56.

Hands-on multiplication of mixed numbers and polynomials Come back to this familiar model to teach multiplication of mixed numbers and polynomials: decompose mixed number in whole number + fraction, model one whole with a square that covers 25 smilies and 1/5 that covers 5 smilies, write the factors on the outside. After student has worked with the hands-on model, use the box method for more combinations. FOIL: Model X^2 with a square that covers 25 smilies and model X with a rectangle that covers 5 smilies, write factors on the outside and introduce different color algebra tiles for positive and negative, such as blue/green for pos. vs. red for neg. After hands-on, use the box method for FOIL.

Tweaky Twelve multiplication



Find groups of ten, groups of five, and ones

Multiply ..... rows of ..... smilies each:

there are ..... groups of 10 = ... ones

..... groups of 5 = ... ones

and ..... ones

total: .....