Equivalent Proportions

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Equivalent proportions demand attention for a variety of reasons. One special reason is truer in a time of emphasis on cooperative learning.

> Example problem: Given the ratio of three apples to five pears, how many apple are there if there are 120 pieces of fruit?

While setting up this example, one student might write apples above pears, and another might order them the other way. One may choose to organize by writing the "actual" column first and the "ratio" column later. Yet another might decide to make the "ratio" and "actual" columns be rows instead -- all of which is good "bookkeeping" and will produce the same correct result.

BUT! The initial proportions may not look the same, and unless they are familiarized with equivalent proportion ideas, students working in cooperative groups may be inclined to question themselves or their classmates where no question is necessary. In this light, familiarity with equivalent proportions is urged.

One approach might be as follows. ***If the proportion shown here as GIVEN is true, then the other four statements are also true.***

GIVEN	FLIP	DIAL	SWITCH	CROSS ×
$\frac{a}{b}=\frac{c}{d}$	$\frac{b}{a}=\frac{d}{c}$	$\frac{c}{a}=\frac{d}{b}$	$\frac{d}{b}=\frac{c}{a}$	$ad=bc$
$\frac{3}{4}=\frac{6}{8}$	$\frac{4}{3}=\frac{8}{6}$	$\frac{6}{3}=\frac{8}{4}$	$\frac{8}{4}=\frac{6}{3}$	$3\bullet 8=6\bullet 4$

The names "flip", "switch", and "dial" are original with this writer, and are useful for helping students focus on distinctions. Introduction of these "transformations" is helped by performing these transformations with a specific arithmetic proportion such as $\frac{3}{4}=\frac{6}{8}$. Transformations performed on such a proportion yield results that are obviously true.

Again, **The Need: to help sensitize to several correct setups.**

Students must be cautioned that cross-multiplication only occurs across an equal sign, and the resulting products are set **equal** to each other.