

Math Magic: Proportional Reasoning

Issue #15:

2-4 Activities using Proportion

(grades 7-9)

February, 2017

An Index of All Math Magic Activities

PROPORTION: ONE OF THE MOST USEFUL TOOLS IN BASIC MATH

In its simplest form proportionality can be expressed as the equality of two ratios: $a/b = c/d$. A concrete example would be: $1/2 = 5/10$. First, one has to understand the concept and ways of [writing ratios](#). For that see Salman Kahn's (kahnacademy.com) or other online videos starting [here](#) and/or look at my [online worksheet2](#). Fractions are ratios, but every ratio is not a fraction.



Sal Kahn, online math instructor

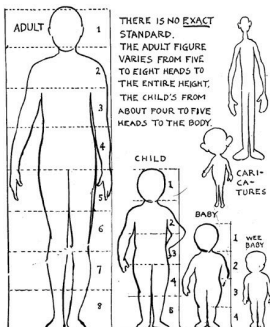
([more here](#)) Percents are ratios and fractions, but every fraction is not in percent form. More on this to follow. (keys: [1](#) & [2](#))

Once one knows how to set up two ratios to make a proportion (R&P), a whole world of solving many, if not most, of life's practical problems involving math. My wife used R&P most in her nursing career, and as cook and homemaker. I have found it invaluable in my teaching, for myself and my students, and an invaluable aid in carpentry, remodel and design work I have done on our house over the years.

The purpose of this issue is not explaining how to setup and solve a proportion. That can be found in many excellent online videos, past issues here, and/or on worksheets to be given here. Rather, this issue is to show some of the many ways proportion can be used in math applications and/or to create models to help us better understand our world as presented by scientific observations and/or measurement.

PROPORTION UNIFIES DISJOINTED CURRICULUM FOR MIDDLE SCHOOL

Some students have great memories and can memorize seemingly unrelated facts. Others, myself included, want to know the reason why something works or how it is associated with what one already knows. Here's a list of basic math concepts which can be solved and understood



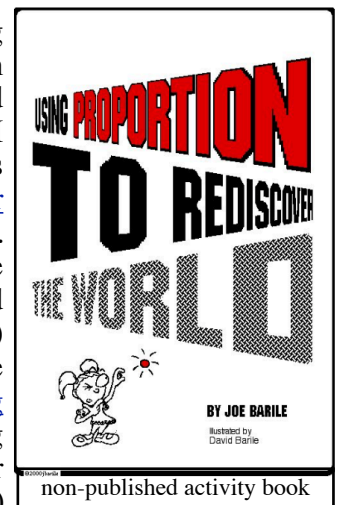
by proportion: 1) equivalent fractions; 2) finding common denominators for adding or subtracting fractions, 3) simplifying fractions, 4) for all sorts of conversions: dollars to pesos, meters to cm, etc. 5) for solving the three types of percent problems using the "is over of" method, 8) solving best price problems, and any problems extending comparisons between numbers. 9) Probability 10) Slope in coordinate geometry and algebra.

USING PROPORTION TO MAKE MODELS TO BETTER UNDERSTAND OUR WORLD

In previous issues, I have used proportion to make models to help students understand the relative sizes of the planets and sun in our solar system, as well as the distances between them. (If the earth shrunk to the size of a ping pong ball, the sun would be reduced to the size of a circle with a diameter of 9 feet, and be a football field away from each other.)

OTHER INTERESTING TESTED ACTIVITIES USING R&P (RATIO AND PROPORTION)

Some other interesting activities which explain science concepts and relationships--for which I have developed activities are: 1) [pulse rate under various conditions](#). (Interesting spike in pulse when boys and girls tested each other radial (wrist) pulse. 2) Measuring the [height of the school flag pole](#) indirectly by setting up a proportion of similar triangles and shadows. 3)



Lifting various weights with levers. 4) [Making a scale model](#) of your bedroom or house. 5) Making a time chart of how much time you spend sleeping, at school, eating, watching TV/video, etc., and converting this into various graphs. 6) Figuring out baseball batting averages. 7) calculating your grade percent from every or any assignment or test in this class. etc.

I hope to share 2-3 worksheets and keys per issue on many of these topics which use proportion.