

# “Teaching” The Junior High and High School Sciences At Home

by Dr. Jay L. Wile, Ph.D.

## Qualifications

- University Professor From 1990 - 1995
- Helped Develop Indiana’s Only Residential High School for Gifted and Talented Students
- NSF-Sponsored Scientist with More Than \$200,000 In Research Grants
- Became Interested in Homeschooling Because of Excellent University Students Who Were Homeschooled
- Currently writes junior high school and high school science courses for homeschooled students

“Nature has some perfections to show that she is the image of God... and some defects to show that she is only His image.”

-Blaise Pascal

“...when, in a word, by the help of anatomical knives, and the light of chymical furnaces, I study the book of nature, I find myself oftentimes reduced to exclaim with the Psalmist, How manifold are Thy works, O Lord! In wisdom hast Thou made them all!”

-Robert Boyle

“I saw the infinite, all-knowing and all-powerful God from behind...I followed His footsteps over nature’s fields and saw everywhere an eternal wisdom and power, an inscrutable perfection.”

-Carolus Linnaeus

“The significance and joy in my science comes in the occasional moments of discovering something new and saying to myself, ‘So that’s how God did it!’ My goal is to understand a little corner of God’s plan.”

-Henry F. Schaefer, III

But now ask the beasts, and let them teach you; And the birds of the heavens, and let them tell you. Or speak to the earth, and let it teach you; And let the fish of the sea declare to you. Who among all these does not know That the hand of the LORD has done this, In whose hand is the life of every living thing, And the breath of all mankind?

-Job 12:7-10

## Can I teach high school science? ---- *NO*

As your student gets older, your role changes from teacher to fellow learner.

## But can I help my child learn science? --- YES

- IF YOUR KIDS CAN LEARN IT-YOU CAN TOO!!!!
- LEARNING FROM READING IS THE MOST PRODUCTIVE KIND OF LEARNING
- IF OTHERS CAN DO IT - YOU CAN TOO !!!!!

NOTE: According to the American Institute of Physics, 2 out of 3 high school physics teachers have neither a major nor a minor in the field!

## Even at the High School Level, homeschoolers are better at science than publicly and privately schooled students

- In the ACT, homeschooled students scored 21.9 in science compared to the national average of 21.1. This is equivalent to about 10 percentage points.
- Several large studies in Montana, Oklahoma, Washington state, Canada and across the USA report homeschoolers at the high school level score from 68 to 88 percent on standardized science tests, compared to the national average of 50%.

## MATHEMATICS: A NECESSARY TOOL FOR LEARNING THE SCIENCES

“Diplomacy without arms is like music without instruments”

-Alexander the Great

“Science without math is like music without instruments”

-Jay Wile the Not-So-Great

## MATH TOOLS NECESSARY FOR LEARNING THE SCIENCES

**BIOLOGY:** Metric Units

**CHEMISTRY:** ARITHMETIC and ALGEBRA: (*Algebra 1, Saxon*)

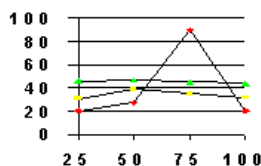
Fraction Manipulation:  $\frac{7}{64} \times \frac{64}{13} = \frac{7}{13}$

Positive and Negative Numbers:  $-122.45 + 567.3 = 454.85$

Manipulating exponents:  $10^2 \times 10^3 = 10^5$

Algebraic Manipulation:  $PV = nRT \rightarrow n = \frac{PV}{RT}$

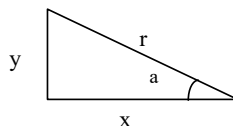
Reading Graphs and Understanding trends:



# MATH TOOLS NECESSARY FOR LEARNING THE SCIENCES

PHYSICS : Should have finished Algebra II and be at least starting Trigonometry (*Algebra II*, Saxon)

Using Trig in Triangles:



$$y = r \sin a$$

$$x = r \cos a$$


$$y/x = \tan a$$

ADV. CHEMISTRY : Should have finished Algebra II

Logarithms:  $\log(x) = 3 \rightarrow x = 1,000$

$$\log(xy) = \log(x) + \log(y)$$

ADV. PHYSICS: Should have finished Precalculus (*Advanced Math*, Saxon)

	Not Science-Oriented	Science-Oriented	MathPrerequisite
Seventh Grade	General Science	General Science	None
Eighth Grade	Physical Science	Physical Science	None
Ninth Grade	Biology	Biology (Supplement I)	None
Tenth Grade	Chemistry	Chemistry (Supplement II)	Algebra I
Eleventh Grade	Physics	Physics (Supplement III) 	Algebra II; At least beginning trig
Twelfth Grade	Supplements	Advanced Biology OR Advanced Chemistry OR Advanced Physics	None Algebra II Precalculus

## **A Word About the Timeline**

- Your student's math level should drive this time line, especially if the student is science-oriented. When the student *begins* Algebra I, that's when Biology begins.
- Prior to junior high, you can do all manner of things, because the elementary years are not content specific when it comes to science.

## **What About Experiments?**

1. Fun and Interesting, but not absolutely necessary
2. Most universities want to see three sciences, two of which are lab based. (Keep a notebook!)
3. The labs don't have to be attached to the curriculum.

## **The Science Curriculum I Recommend**

*Science in the Atomic Age*

-Dr. Jay L. Wile

*Discovering Design with Earth Science*

- Dr. Jay L. Wile

*Discovering Design With Biology*

*Discovering Design With Chemistry*

-Dr. Jay L. Wile

*Discovering Design With Physics*

-Dr. Jay L. Wile

*The Human Body: Fearfully and Wonderfully Made!*

- Marilyn Shannon and Rachel Yunis

*Advanced Chemistry and Creation*

-Dr. Jay L. Wile

*Advanced Physics and Creation*

-Dr. Jay L. Wile

*Exploring Creation with Marine Biology*

-Sherri Seligson

## **Other Options**

### Eternity Science

Phone: (800) 831-3570

<http://www.eternityscience.com>

They have a great 2-year junior high program that is very hands-on (more than mine).

They also have a good high-school chemistry course if your student is not university-bound.

### The “In Your Home” series:

This is a research-based series in which the students are asked questions that they must find answers for.

<http://www.scienceforhighschool.com/>

### The 101 Series

Video based, but the last DVD has a PDF for the “book work”

<http://www.the101series.com/>