



**SAXON**  
MATH

**BETTER RESULTS.  
BRIGHTER FUTURES.**

**STUDENT MOTIVATION**





## Student Motivation

Staying Motivated: *Saxon Math* Provides Students a Path to Results.

**Exercise is hard work.** Many people find it difficult to follow through with the resolution to attain better health through physical exercise. Even knowing the benefits of exercise, far too many Americans do not possess the motivation necessary to consistently engage in activities that exercise their hearts, lungs, or muscles. In a similar manner, math is hard work. In far too many American classrooms, students do not possess sufficient motivation to consistently engage in activities that bring about mathematical literacy and develop the concepts and knowledge needed for success at the next level of education or in the workforce. The goal of this paper is to incorporate the parallels between exercise and math education to highlight *Saxon Math's* unique approach to student motivation.

The bench press is a great way to build upper body strength. However, few individuals spend their entire workout doing just that one exercise. That one movement, after many repetitions, would become tiresome, both in terms of muscle strain and the monotony of the movement resulting in boredom. Instead, most choose to break up their workouts.

One might spend a few minutes at the bench press before moving on to the elliptical machine, the speed bag, the leg curl machine, and the stair climber. Similarly, students can become bored and exhausted with math when they spend extended periods of time within the same strand. After too many repetitions of the same lesson, students become frustrated and simply want to move on to anything other than what they are currently learning.

SECTION 4 Lessons 31–40, Investigations 4A and 4B		Page
Overview	Lessons 31–40, Investigations 4A and 4B	209A
Lesson 31	Lesson Preparation • Pairs of Lines • Angles Activity Parallel and Perpendicular Segments	209G 209
Lesson 32	Lesson Preparation • Polygons	215A 215
Lesson 33	Lesson Preparation • Rounding Numbers and Estimating	223A 223
Lesson 34	Lesson Preparation • Division with Zeros in the Quotient	229A 229
Lesson 35	Lesson Preparation • Word Problems About Comparing and Elapsed Time	235A 235
Cumulative Assessment	Power-Up Test 6, Cumulative Test 6, Test-Day Activity 3	
Lesson 36	Lesson Preparation • Classifying Triangles	241A 241
Lesson 37	Lesson Preparation • Drawing Pictures of Fractions	247A 247
Lesson 38	Lesson Preparation • Fractions and Mixed Numbers on a Number Line	253A 253
Lesson 39	Lesson Preparation • Comparing Fractions by Drawing Pictures	259A 259
Lesson 40	Lesson Preparation • Writing Quotients with Mixed Numbers	265A 265
Investigation 4	Lesson Preparation • Pattern Recognition	273A 273
Cumulative Assessment	Power-Up Test 7, Cumulative Test 7, Performance Task 4	

The *Saxon Math™* method takes the content that would typically be included within a chapter of a traditional textbook, slices that information into small increments of learning, and spreads them out over the course of the entire school year. This lowers student fatigue toward any particular math topic and promotes a more holistic mathematical experience.

**Can you imagine being a member of a fitness center where the equipment is replaced with new machines every day?**

Although the varying machines might please those accustomed to using many types of exercise machines, novice exercisers, who are accustomed to their routine using the machines they are used to, would be more focused on how to use the new machine than on the primary goal of fitness. Likewise, math classrooms need established routines. Without these routines students can become frustrated or confused. Not only are the students trying to learn new mathematical ideas, they also have to understand new classroom practices on an almost daily basis. Their minds are not free to think at deeper mathematical levels because they are preoccupied with, and anxious about, their learning environment. *Saxon Math* is engaging, student-centered, and full of activity. However, the activities are formed with a repeated, expected routine and an explicit instructional approach.<sup>1</sup>

The same cannot be said regarding programs overly reliant on constructivist, discovery, problem-based, experiential, or inquiry-based techniques.

**4. Guided and Written Practice**

Teacher-facilitated Guided Practice helps prepare students to work independently on their written practice homework.

**1. The Meeting**

Daily whole-group activities promote content and practice skills through meaningful discussion and problem-solving activities.

**3. New Concepts**

New concepts, or increments, are introduced through hands-on group activities and discussions.

**2. Fact Practice**

Procedural skills and fluency are built through Fact Practice.

Daily lesson structure in the Saxon K–3 program.

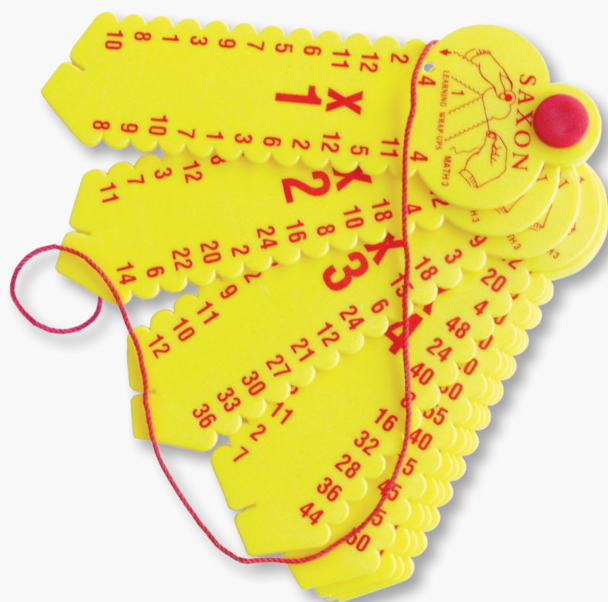
1. Note: From "Why Minimal Guidance During Instruction Does Not Work: An Analysis of the Failure of Constructivist, Discovery, Problem-Based, Experiential, and Inquiry-Based Teaching," by Kirschner, Sweller, and Clark, *Educational Psychologist* v4 n2, pp.75–86. Copyright 2006.

**Are there modes of exercise that you avoid at almost any cost?** Does your sense of rhythm make aerobics a source of entertainment for onlookers? Does running on a treadmill make you feel like a rodent on a wheel? How about skis, blades, and rollers? Is there a sense of hesitancy before strapping any of them to your feet?

Every student has a mode of learning that is optimal for them; but they also have avenues of learning that make them feel embarrassed, frustrated, anxious, or disengaged. For this reason, *Saxon Math* offers multiple learning opportunities and choices so that learning is differentiated toward the benefit and preference of individual students. A prime example is found in the many ways in which fact fluency is attained in the *Saxon Math* kits:

- Logical-mathematical—use of linking cubes and skip counting
- Linguistic—teacher and student fact cards and oral fact practice sheets
- Visual—teacher fact cards and written practice
- Spatial—linking cubes, multiplication tables, and color tiles
- Bodily-kinesthetic—fact practice games, Learning Wrap-Ups™, student fact cards, and written practice
- Personal—fact practice games and oral fact practice sheets

Alternative approaches are replete within the *Saxon Math* textbook levels for students who struggle with initial modes of instruction.



#### ALTERNATIVE APPROACH: USING MANIPULATIVES

To help students understand the concept of multiplying a fraction by a fraction, have them make a model to find the product of  $\frac{1}{3} \times \frac{3}{4}$ . Give each student a piece of white copy paper, and have them fold it vertically into 4 equal sections. Ask the students to color three sections of the paper yellow to represent  $\frac{3}{4}$  of a whole. Then have the students fold the paper horizontally into 3 equal sections so that each of the fourths is divided into 3 equal parts. Use a green color to shade one of the third rows to represent  $\frac{1}{3}$ . The overlapped shading shows the product. Since 3 of the 12 parts are shaded both colors,  $\frac{1}{3} \times \frac{3}{4} = \frac{3}{12}$  or  $\frac{1}{4}$ . Have students model examples of other problems.



Manipulatives, electronic learning experiences (online Student Activities, Manipulatives in Motion software, TI® Resources CD, and Instructional Presentations), and Alternative Instruction Tips in the Teacher's Manuals all recognize and accommodate the most successful modalities for each student.

**Many individuals never seem to reach their desired level of fitness through exercise because they burn out.**

They want to lose 30 pounds, lift 50% more weight, and bring their cholesterol level down to an acceptable range in a matter of weeks. Instead, after a few days, their muscles ache, they have sustained a serious injury, or they no longer have the motivation to carry on. The daily exercising is sheer pain and drudgery. Each day they are met with more failure than success. Because they do not see results immediately, they give up. Unfortunately, many students do the same. Initially, intrinsic motivation (or parental influence) has them committed and focused.



**iTools:** These Digital Math Manipulatives reinforce the lessons that are being taught. They help model and demonstrate concepts and can even be used as extra practice at home.

Each lesson within *Saxon Math* contains practice that is cumulative. There are a vast number of problems each day that students can solve with confidence. Nothing breeds self-esteem and motivation more than success. With *Saxon Math's* distributed and incremental format, students are afforded the time and practice each day to master math concepts.

Written Practice

1. Alberto paid \$30.00 for  $2\frac{1}{2}$  pounds of cheese that cost \$6.60 per pound and 2 boxes of crackers that cost \$1.79 each. How much money should he get back?

2. The face of this spinner is divided into fifths.

a. What is the probability that the spinner will not stop on a prime number on one spin?

b. **EXPLAIN** If the spinner is spun twice, what is the probability that it will stop on a prime number both times? Explain how you found the answer.

3. What is the average of the first 10 counting numbers?

4. At an average speed of 50 miles per hour, how long would it take to complete a 375-mile trip?

Use ratio boxes to solve problems 5–7.

5. The Johnsons traveled 300 kilometers in 4 hours. At that rate, how long will it take them to travel 500 kilometers? Write the answer in hours and minutes.

6. The ratio of children to adults at the museum was 1 to 15. If there were 800 visitors at the museum, how many children were there?

7. The population of a colony of birds decreased 30 percent over one winter. If the population the next spring was 350, what was the population before winter came?

8. Three fourths of Genevieve's favorite number is 36. What number is one half of Genevieve's favorite number?

# BETTER RESULTS. BRIGHTER FUTURES.

However, if each lesson is confusing and full understanding is never in sight, they begin to lose hope and become disengaged in the learning process. Struggling students often feel that as soon as one idea is somewhat understood, another brand-new concept is right on its heels. Their mental “muscles” are strained; they can barely lift the lightest denomination of weight on the math bar. These students will never progress if they do not have sufficient time to practice the skills they have attained, or to do math with which they are comfortable and at ease.

Yet, just like in weightlifting, the amount lifted needs to be gradually increased over time, to attain optimal strength. This is precisely the method found in *Saxon Math*. There will be problems within each practice set that require higher-ordered thinking and that cover newly introduced ideas and skills—just enough weight for attaining maximum strength in mathematics.

Even if you are fully devoted to exercise, you might not be physically fit. How could this be? If an individual spends an hour a day exercising the 18 muscles in their toes, they would have uniquely strong feet, but how much does this increase their overall health? Their cardiovascular system could still be in an unhealthy state. In like manner, if the

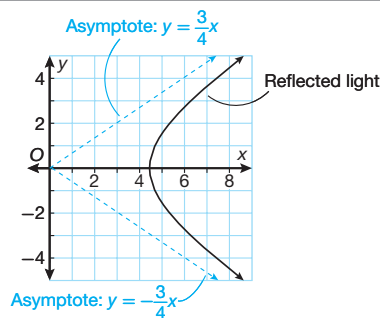
math curriculum used in a classroom is disconnected from the topics needed for numeracy and is not applicable to real life, there will be little benefit for the learner. The *Saxon Math* program ensures that students are ready for high-stakes national and state assessments without needing weeks of review.





15. **Cell Phones** You pay \$10 a month plus \$0.30 per minute for your cell phone. You budget \$20 each month for your bill. To find the maximum minutes you can use your phone, solve the inequality  $10 + 0.3m \leq 20$ .  $33\frac{1}{3}$ ; You can talk at most 33 minutes.

15. **Optics** A diagram of a hyperbolic mirror is shown. The property of a hyperbolic mirror is that if you shine a beam of light from the mirror, the light is reflected toward the focal point. For this mirror, where should you place a view lens to see the converging light? At (5, 0)



22. **Machinery** Two gears are interlocked. One has a radius of 10 centimeters and for each complete rotation, it rotates the second gear 0.77 of a full turn.
- What is the relationship between the circumferences of the two gears?
  - What is the second gear's radius, to the nearest centimeter?

Students are more apt to learn if they can relate math content to their real-life experiences. Accordingly, special emphasis in the *Saxon Math* kits is given to scenarios involving money, time, and food. As students become older, their experiences expand across more domains. In the high school editions of *Saxon Math*, special attention is paid to presenting problems that interest older students and help them more clearly envision the type of math required within various careers.

**For some, the motivation to work out comes from within; but for many, motivation comes from an outside source.** Some people only exercise when it


involves the fun and camaraderie of a team sport. The popularity of softball, basketball, volleyball, and bowling leagues all support this truth. Others need a fitness coach, advisor, or exercise partner to provide them with the encouragement, advice, and admonition to follow through with the hard work of exercise. Many math students need encouragement as well. *Saxon Math's* unique incremental design promotes more of a team approach to the mathematics classroom than other traditional methods.

Whether it is the whole group, interactive instruction found in the daily Math Meeting, the discussions that arise during Mental Math activities, or the collaboration afforded by the classroom time devoted to cumulative practice, *Saxon Math's* approach emphasizes teamwork. The use of hands-on/mind-on activities and games allows math learning to be both rigorous and fun. The engaging math instruction encourages students to help other students, while still allowing student to receive individual support and encouragement from their teacher.



*Saxon Math* is also a parent-friendly program, providing an educational format and support features geared especially for the significant adults in a child's life.

**There is much to be gained through exercise.** Physical activity can improve your quality of life and extend your days on Earth with family and friends. But exercise is hard work. It takes a great deal of motivation to find the time and the drive to work out every day. *Saxon Math* provides students with the motivation needed to attain the benefits that come with deep mathematical understanding and fluency. This carefully constructed and time-tested program delivers meaningful math content to students through a consistent classroom structure that promotes variety, collaboration, engagement, and fun. Setting realistic expectations and increasing those expectations incrementally, *Saxon Math* teaches math in a way that fosters success rather than frustration and allows students to learn mathematics in inviting ways. *Saxon Math* helps your students find a new level of enjoyment, success, and confidence in the hard work of mathematics.



**SAXON**

School-Home Connection

**MATH 2 NEWS**

No. 8

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**What is your child learning in Math?**  
In Lessons 71-80 we practiced:


- measuring objects to the nearest half inch
- naming containers that hold liquids (gallon, half-gallon, quart, and liter)
- reading time to five-minute intervals
- ordering three-digit numbers


321	114	259	170
114	170	259	321
least <span style="margin-left: 100px;">greatest</span>			


**Math at Home**

Here are some activities you can do to help your child practice the math he or she is learning at school.

- Remove the face cards and aces from a deck of playing cards. Shuffle the cards. Deal three cards to yourself and three to your child. Each of you will make the largest possible three-digit number using your cards. The person with the largest three-digit number takes all six cards. The game ends when all the cards have been used. The person with the most cards at the end of the game is the winner.








- Take a walk with your child to a park or place where you can collect some twigs to take home. Have your child arrange the twigs from shortest to longest, then measure each twig with a ruler to the nearest half inch. He or she may wish to tape the twigs on paper and write the measurements below each or make a picture with the twigs.

**Looking Ahead**

**New Math Words (Lessons 81-90)**

**expanded form:** a number represented by showing the value of each digit; for example,  $173 = 100 + 70 + 3$

**tangrams:** a square that has been cut into seven specific shapes (2 large triangles, 2 small triangles, 1 middle-size triangle, 1 parallelogram, and 1 square)



Visit the Saxon website for more activities.  
[www.SaxonMath.com/Math2Activities](http://www.SaxonMath.com/Math2Activities)

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