SUPERCHARGED MATH

MATH PROGRAM

Curriculum Guide Packet

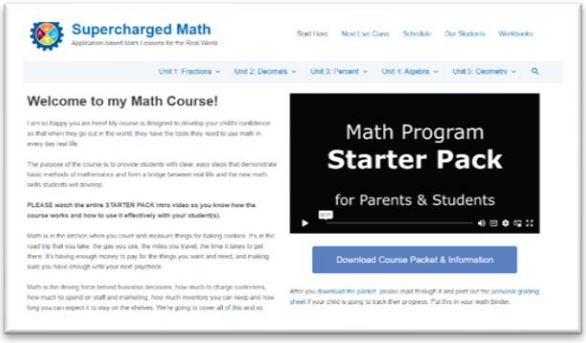
Academic Year 2024-25

by Aurora Lipper

This course is designed to develop the confidence in your child to go out and explore their world, and give them the tools they need to use math in every day real life. The purpose of the course is to provide students with clear, easy steps that demonstrate basic methods of mathematics and form a bridge between real life and the new math skills students will develop.

Welcome! This is your child's entry into the adventurous world of mathematics! Children are born explorers, naturally curious about the world and absolute experts at asking questions.

Mathematics is a wonderful playground for their imagination and creativity, there is such joy and excitement in their eyes with they figure out puzzles for themselves and discover solutions on their own!



To get started, please watch the *STARTER PACK* video on the math website here:

Quick Start Guide: (Not sure? Click for quick assessment!)

1. **Select an Area of Math** you want to do:
    a. Grades 4-6th: Fractions, Decimals, or Percent
    b. Grades 7-8th: Algebra or Geometry

2. **Start with a Math Lesson** After the lesson, students work on their math assignment (workbook pages, activities, games, or puzzles).

    Question: Are materials needed during class? Sometimes! Our math lessons often have handouts for students to take notes on, otherwise notes are taken in their journals as we walk through each example problem. Expect to have standard math tools ready (see next page) for all Geometry lessons.

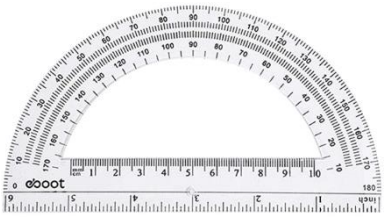
3. **Print Assignments & Do the Work:** Near the end of the math class, we will show kids where to find the assignments for the day so they can get started on their work.

How this course works: Students will watch a math lesson and then complete their workbook assignments and activities. If they have already mastered the skill we're covering, use the test at the back of each workbook to help you with placement in the program.

Please help your student keep up their personal grade sheet every for the first few weeks, until they find their rhythm with our classes and expectations. Each assignment is scored and recorded. If students have questions during the week, we have several opportunities for support including our small-group private tutoring in our weekly Study Hall.

Materials for the year:

- Pencil, eraser
- Paper
- Protractor
- Compass
- Ruler (both metric and standard)
- Measuring tape (10-25')
- Grid paper (¼" or ½ "squares)
- Index cards
- Paper clips
- Rubber bands
- Scissors
- Tape
- String
- Two dice (6 sided)
- OPTIONAL: 4-6 special dice: either 10 sided or 12 sided or Polyhedral Dice



Most of the materials are printable from our website. Please download the workbooks, handouts, labs, and projects you need for the week.

**Grades 7-8th Geometry requires special materials for the bonus project builds, find these items listed in Unit 5: Geometry.*

Who is this course for? Students are ready for our courses when they have their multiplication tables down *and* understand basic arithmetic with whole numbers (add, subtract, multiply and divide).

This course is for students that are serious about mastering the fundamental math concepts and understanding how those concepts are used by getting real hands-on practice with real engineering and science problems.

Quick FAQ about the Course

Welcome to our Math Class Series! For grades 4- 6th, we'll be covering fractions, decimals, percent, pre-algebra, geometry, measurements in both metric and standard, word problems, real world application and so much more. Grades 7th - 8th will focus primarily on algebra, geometry, statistics, and probability.

All instruction is provided in both a live and recorded format for math class sessions.

How does this course work? We will be starting out each week with a math concept, going over how to use it, and then focusing on the practical application for it. Emphasis for this course is on application more than skill drills.

Students watch a math lesson to start out each week; the first session introduces the math concept, the second is a deeper dive and opportunities for students to see several example problems. We have recordings of all live sessions so you can work asynchronously at your own pace, on your own schedule.

Will my child be bored or fall behind? We have daily and weekly lessons for our students, and placing them in the right part of the program will take a little work initially.

Students work through the program at their own pace, so if they already know and understand a concept, skip to the more advanced math content and in-depth activities. If a concept is newer, take time with the workbooks and skill practice we provide.

Students watch a math lesson each day and complete their daily math work, which includes workbooks, activities, games, puzzles and projects. Advanced students that already understand the concepts will learn how to apply them to the real world. There will be plenty of content for all students to work with, no matter what level they are at.

Can kids do this by themselves? Most students will be able to do their work independently *after* you set them up with *how the course works* and what the *expectations* are. Expect your student to spend time with the math teacher each day before starting the day's math assignments.

Do kids study or do work outside of the live class?

The math lesson with the teacher is only the first step. We work hard to get kids interested and excited to learn more, and they need to do the work after class to make consistent, steady progress throughout the year. Students that passively watch the math classes without taking any notes or doing any assigned work will not make progress in math. The more time and effort students put into this course, the more they will achieve during the year.

Students must continue their explorations and discoveries with math on their own after class. In fact, once they get started in a regular rhythm of consistent daily practice, you'll find most students can't wait to do more all on their own!

How do I know where to start?
I have no idea what level my child should be at…

We have a quick assessment here to help place you within the program.

In addition, each workbook has a 2-page test at the back. If your student finds the workbooks too easy, take the test at the back to "test out" and move onto the next workbook. This will help place you within the program.

Students may move into the Advanced Math Labs once they have completed (or tested out of) the beginner/intermediate level content in ALL sessions for the unit.

What model do you use?

We use the University Model in our math classes. Each day, students watch a math lesson with a teacher (recorded or live). Students work on their daily homework assignments, which also include step-by-step instructional videos.

Treat our classes like a class at a University. After class is over, it is up to the students to work on what they need to learn in order to master it. If you only attend university lectures, you will not get very much out of the class. Students must study outside of class to get the full benefit of the learning experience.

We are behind, we can't keep up!

You are not behind in a self-paced program. You work through the program at your own pace, on your own schedule. This program is designed for you to work through either synchronously or asynchronously so you may work with our live class schedule or go through the program at your own pace, on your own schedule. Students also have the opportunity for live help from a teacher in our private small-group Study Hall sessions.

Students can work through at their own pace through the program. Sometimes they will progress quickly and other times, they will need extra time. Education is not a race, so please don't rush to "get through it" (if that's your goal with this course, we are not the right program for you.)

I missed a class!

All live math classes are recorded and published to the appropriate section every time we teach a class. You can start this program at any time, there is no rush to "catch up" or "keep up", you go at your own pace, on your own schedule.

How much math each week? Can kids do this by themselves?

We provide daily math lessons for students to watch before working on their math assignment for the day. Most students will be able to do their work independently after a little help from you, the parent, at the start. Please make sure you work alongside your student when they start our program, as it can be overwhelming to start a new class and not really understand what the expectations are or what they are supposed to do.

We want your student to have a happy, positive experience with math, and we want to observe steady, consistent math practice each week.

We just enrolled (mid-year). How do I start?

Welcome aboard! This program is self-paced, so you decide what you want to study and we'll help you get started. Please review the information on the Start Here page.

How long is my access?

Access is available on a yearly membership. Your enrollment starts the day you enroll and continues through 12 full months.

I want to enroll now but I want to wait until school year starts, can you pause my enrollment to start late?

Yes, please contact us so we can help you with your special request. Please understand that if you request your enrollment to start beyond the 30-day refund period, we are unable to extend this refund period (it's the refund policy of the credit card and banks, not ours).

We are not able to attend the scheduled live classes, can you change the schedule?

We have students participating worldwide, so I know you can appreciate how difficult it is to find a time that works for everyone on the planet. We always provide recordings so you can watch our math lessons at a time that is best for you. We also offer special math events at varying times throughout the year, so every student will have the opportunity to participate no matter where they live in the world. These are sent to you in our weekly emails.

When are you going to have the higher levels?

We offer math courses from grades 4^{th} – 8^{th} currently. We specialize in getting kids interested, excited and enthusiastic about math and really understanding how it relates to the real world. High school math courses are much more rigorous and require a lot more attention, time, and focus. We do have recommendations if you require high school math courses, please email us for these recommendations.

Do you have a full math curriculum?

Yes! We have a full math curriculum for grades 4^{th} – 8^{th} grades.

Are you aligned with common core?

Yes and no. Yes, we more than cover *all* common core math skills and standards if you do *all* the content in its entirety, grades 4^{th} – 8^{th} level. No, the program is not aligned with common core, so skills are covered in a different order and sequence.

We cover so much more than common core. We have a complete common core index on the website (look in the footer for "Math Quick Checks"). Our math program is not aligned with common core, it is based on the math skills and way of thinking that is required for science and engineering students in college. It's more than a math curriculum – this program will teach your student how to think about real world problems, use math to analyze complex problems, and interpret their solutions back into the real world.

Is your program going to work if my child has learning disability?

Yes, we have many kids with various learning challenges that happily and successfully use our math program. Since the program is self-paced, this allows kids to spend the extra time they need or even taking an accelerated approach when needed. Our program is based on a hands-on approach to give kids a solid understanding of how to model the real world on paper, use math to solve complex problems, and then interpret your results so they make sense and you can use them in the real world.

How to download the workbook?

Click on the word "WORKBOOKS" in the upper right and scroll down to find the appropriate workbook. The workbooks are in PDF format.

I made a mistake of selecting the wrong level, how to switch levels?

Please contact our team by sending us an email so we can help:
aurora@superchargedscience.com

Do I have to print everything? There is a *lot*!

No. Only print out the materials you intend to use, your student will not be working through *all* the downloadable materials. Select only the ones that are appropriate for your student. If printing is too difficult, or you are unsure which downloads to print, use a plain notebook to record your work from viewing on a computer screen until you're ready to print.

What age does my child need to be to attend?

Students are ready for our course when they have their multiplication tables memorized and are comfortable adding, subtracting, multiplying and dividing whole numbers.

If your student needs additional help…

If your child is feeling lost during the live (or recorded) math lesson class, it's time to make use of our additional resources. We offer three different options for additional help:

1. Watch the math class live and ask your questions with the real teacher.
2. Participate in the (optional) live small-group private tutoring session. You can ask any questions you have about any part of the program.
3. Snap a photo of your child's work and send it to us in an email with an explanation as to what you are working on and what specifically you are feeling stuck about – what do you have a question about? Email: aurora@superchargedscience.com

   …or take a short video of your child explaining what they are working on and where they are getting stuck so we can be helpful to them.

Special Note to Parents! I've created a short video at the start of each set of lessons that will highlight what we will be covering so you can understand ahead of time what's happening in our classes with your child.

Who is this course for?

This course is for families that understand that learning doesn't happen in a vacuum. They expect mastery of a lesson to overflow into other areas, and are not surprised when *ah-ha!* moments happen when walking in nature, or when cooking dinner, or when doing science experiments. If that's you, welcome aboard and let's get started!

Do you collect student work?

Your student will evaluate their own work. Students are provided with answer keys so they can check their own work once completed. We recommend keeping all work in a binder with a simple cover sheet to easily keep track of your assignments and progress. There's a sample on the next page that you can print out, or make your own on a lined sheet of paper.

Date	Assignment	Points Earned	Points Possible	Total Earned	Total Possible	Average % $\frac{TotalEarned}{TotalPossible} \times 100$

Tracking Student Progress

If you would like to track your student's progress through our class together, then you may use a personal grading sheet like the one on the previous page.

Entering the information and calculating their work by hand (instead of using a computer) allows students to know their current average in our class at any time and really have a sense of how they are doing and what grades really mean.

Students that just "log in" to see their grades usually either don't check, don't care, or don't really understand their grades well enough to know how to spot progress.

By having students keep personal grade sheets, your child will know their averages in our classes all the time. It will take a few weeks of helping your student learn how to score their own work, record it on their grade sheet and recalculate their average. Please plan on assisting your child on a consistent (not nagging) basis at first to help them get the hang of it.

Grading Student Work

Students will grade their own work after they complete their assignments, checking answers with the provided key for each assignment (including workbooks).

Here's how to score work:

1. If a problem is correct, add a point. If there's more than one part to a problem, each part usually worth a point (unless specified)
2. Problems not done correctly, incomplete or omitted do not earn points
3. Add up the points and put it on your score sheet under "Points Earned"

But WAIT There's more!!

1. Go back and notice - what happened with the problems you did not earn points on?
2. If you can fix it, you can earn *a half point back* for each problem (after you fix it)
3. Recalculate your score and adjust your score on your grade sheet
4. Finish calculating the rest of the row through percent
   (Omitted problems do not generate fix-it points.)

PARENTS: *Don't get too fixated on that grade sheet.* Understand what the grade sheet tells you and what is doesn't. What we're looking for is *effort* and *progress*. If you notice near the start of the year your student only completed half the assignments and averaged a 60%, but after the second month, you notice that they've completed every assignment but are still hovering around a 65% average, celebrate that success! This is also true for students that do all the

assignments, but in the beginning only average about 50%, but then as the weeks go by, you notice that their points earned per assignment is closer to 80%. That's a huge win, even if their average still reports a 70%. Celebrate your student for a job well done!

We want students to mark the problems that earned points, and focus on what worked and what went well. Celebrate the ones they tackled successfully, and then go back and see what can be fixed or improved. (Don't jump straight to corrections, celebrate success first!)

How to use the Personal Grade Sheet

For all assignments, students record the date, the name or type of assignment, the number of points both possible and earned, and then they will add up the total that they've earned to date for all the work we've covered.

From my experience, it typically takes students 5-8 assignments to get the hang of it, and after that they have no problem keeping track of their grades for the rest of the year.

Example:

- On September 5th, Ben earned 13 out of 15 points on a homework assignment
- On September 12th, Ben earned 22 out of 25 points on a quiz
- On September 19th, Ben earned 85 out of 100 points on a test

Ben's grading sheet would look like this:

Date	Assignment	Points Earned	Points Possible	Total Earned	Total Possible	Average % $\frac{Total\,Earned}{Total\,Possible} \times 100$
9/5	Fractions 1, p 1-5	13	15	13	15	87%
9/12	Car Quiz	22	25	35	40	88%
9/19	Domino Test	85	100	120	140	86%

Calculators

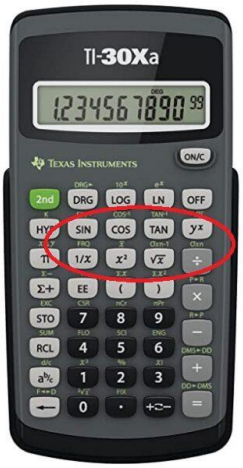
Most students don't think twice about pulling out a calculator (or cell phone) when it comes to calculations, so here's how we'll use these in our math sessions.

Please don't use a calculator until you complete Unit 2: Decimals for grades 4-6th.

Students in Grades 7-8th , you will need a calculator for Algebra 1 and Geometry.

Calculators are great devices, as they skip the tedious calculations that bog down many students. However, your child needs to develop a feeling and understanding of number relationships, and using a calculator will short change this development.

Your child is ready for a calculator when they can easily ballpark their answer and know what to expect their answer to be. This will begin to happen for some students after we finish fractions and decimals. Students need to develop a practical sense of how numbers are related and how they interact.



Need a calculator recommendation?

Here's an inexpensive option if you need a recommendation:
Texas Instruments TI-30Xa Scientific Calculator

Your calculator should have these features:

- Easy for your child to READ THE DISPLAY
- Screen shows at least 10 digits
- Must-have buttons: inverse (labeled as 1/x or x^{-1}), exponents (labeled as y^x or x^y or 'EXP')
- Your calculator must have the ability to do square roots (if it doesn't have a square root button, you can use the exponent button)
- Intermediate and Advanced students must have the ability to do trig functions (SIN, COS, and TAN)

Special Note for Parents who Struggle with Math

As a parent, you may feel that that math isn't your thing, or that you really don't know much about it and even less confident about how to answer their math questions. Here's a couple of tips if you also struggle with math:

1. Avoid saying things like *"Here comes a tricky part…"* You'll be amazed at how many times your child will do things easily that you thought might be hard.

2. If you do not have happy memories about a particular math area, avoid saying *"That's ok, I was never very good at math either".* You are tempting your child to follow your lead. You wouldn't say, *"That ok to no learn to read… I was never good at it either."*

Let your student discover things for themselves, rather than describing how it is to be done in advance. In science, no scientist in their right mind would do an experiment they already know the answer to! Math is the same way. Let your child find different ways of doing things, different from what you were expecting. Discuss (without pointing out right or wrong) the many ways things can be done.

When your child makes mistakes, use this as an opportunity to explore what happened and see if something got confused somewhere, or needs to be reinforced. If your child tries several times to grasp something and it still isn't happening, **STOP**. *Your child is not failing.* They are giving you a message that either (a) they are not ready or (b) the approach needs to change or (c) some background information is missing.

It's best for your child to seek out their own readiness level naturally and on their own. Most children have different physical and mental timetables for development, and pushing a child with hopes of speeding things up or catching up will not only frustrate and discourage your child, but it also sends the message that they are not good enough at the level they currently are at.

…and MOST IMPPORTANTLY…

Most important of all, our learning should be enjoyable and fun. Learning and "math work" should be indistinguishable from play time. I sincerely hope that your child will share many happy hours with mathematics that are as rewarding and memorable as their experiences on the playground with their best friends.

FOR PARENTS: How a Child Learns (Four Levels of Learning)

This math course provides a structure and a methodology for understanding numbers and developing a number sense, using those skills, and applying them to the real world. In this course, there are demonstrations, explanations, examples, skill practice, activities, games, and real-life applications in science and engineering.

This approach to learning mathematics allows students to progress through the four levels of learning easily. Here they are:

1. Rote memorization (being able to repeat something back, like multiplication tables, which is learned but not understood)
2. Understanding (comprehending or grasping the nature or meaning of something, as through teacher demonstrations and explanations)
3. Application (the act of putting something to use that has been learned and understood, as using math skills to build a house)
4. Correlation (associating what has been learned, understood, and applied with previous or subsequent learning; new connections made that were never there before.)

(If you'd like more information on the levels of learning, please click here.)

As a parent, you should not be concerned about repeating or preempting what your child is learning in our math classes, as many kids benefit from repetition and reinforcement in different contexts before they fully grasp a concept. Most of these concepts your child can practice using everyday things in life.

Children's learning is rarely predictable and tidy. Every child will have opportunities or needs that will suggest going through things at different speeds or in a particular order. For the most part, your child will be able to do this math course on their own, but there may be times when they'll need a little help. You know your child best, and by taking a little extra time to work individually with your child up front, this will really set them up for success long-term because you're helping them when they need it most.

Most of the time, your child will be working on more than one skill simultaneously. It is easier for students to have more than one area to work with at a time, as they can work on one area while letting the more difficult idea have time to sink in. Remind your student that it's ok if things don't seem to be presented in a controlled or logical way.

It's best for your child to seek out their own readiness level naturally and on their own. Most children have different physical and mental timetables for development, and pushing a child with hopes of speeding things up or catching up will not only frustrate and discourage your child, but it also sends the message that they are not good enough at the level they currently are at.

We already have more than enough stressed, anxious, overwhelmed, and discouraged children in the world. Please be willing to switch to a different step and drop an activity entirely if your child does not seem ready or interested. You may be surprised at how perfectly suited they are within a week or month for that very same activity or skill.

If your student does not like math, usually it's because they had an experience with math being hard, unpleasant, boring, and useless.

Our math curriculum focuses on making math a fun, natural part of their everyday life by showing the students that mathematics is a part of things that happen all around us, every day.

Making Math Practical and Useful in Everyday Life

Math is in the kitchen when you count and measure things for baking cookies. It's in the road trip that you take; the gas you use, the miles you travel, the time it takes to get there. It's having enough money to pay for the things you want and need, and making sure you have enough until your next paycheck.

Math is the driving force behind business decisions; how much to charge customers, how much to spend on staff and marketing, how much inventory you can keep and how long you can expect it to stay on the shelves.

Students will be learning through problem solving throughout this course. When your child figures out how something works, new connections are being make in ways that aren't possible teach just by *watching* something. By learning through *active* problem solving, students are more engaged in the learning process. This breaks your child out of the passively watching to taking an *active* role in their own education. Problem solving is a critical skill for life, even outside of mathematics. There are problems everywhere you look, and being able to tackle them is a *learned* skill we teach our kids.

Resist the temptation to have your child memorize something that they are struggling with. It is not *true* learning when you simply memorize a rule or process. Make the extra effort to understand *why* the ideas work, and learn how to apply those ideas. The material is more interesting and easier to remember and use in the future because it becomes integrated with their experience of the world.

If your child doesn't see how to go about solving a problem, use this as an opportunity to work on those problem-solving skills. Ask them if there are any ways to turn that problem into something they've seen before, something they already have experience with.

Encourage your child to wrestle with complex and difficult problems, and celebrate their partial answers and ideas, even if they are wrong or don't quite solve the problem. We're going for enthusiasm and effort more than accuracy, especially if they have not had a positive, happy experience with mathematics.

Most students have already had some math classes before coming to this course. Typical skills covered are: various types of numbers (whole, integer, mixed, negative, fraction, improper, decimal, percent), how to convert between these types of numbers, and how to add, subtract, multiply and divide any combination of them.

Most math courses over-focus on calculation skills. This makes math dry, boring, and full of procedures. It feels isolated and useless with endless problems that all look the same. Students lose all sense of numbers, and have no idea how to have fun playing with math. And one of the primary purposes of math, using math to ask questions and figure out answers, is completely lost.

Calculation skills are important, but they are not the whole deal. It's more like saying if you know how to spell, then you can write literature. There's so much more that goes into writing a book, or in our case, learning mathematics. However, it's not always straightforward to teach, so most math teachers focus on what they know and what is easily testable on an exam: how to calculate.

We will spend time mastering the mechanics of calculation skills, and also learn how to apply these to the real world. We will have a lot of fun discovering how exciting math can be when you really know how to use it!

Common Core? Standards?

Our math program is not aligned with common core, it is based on the math skills and way of thinking that is required for science and engineering students in college. It's more than a math curriculum – this program will teach your student how to think about real world problems, use math to analyze complex problems, and interpret their solutions back into the real world.

However, **this course exceeds ALL common core** standards and required skills. We cover so much more than common core. We have a complete common core index on the website here: Math Quick Checks

Our program is based on a hands-on approach to give kids a solid understanding of how to model the real world on paper, use math to solve complex problems, and then interpret your results so they make sense and you can use them in the real world.

Here's what you can expect your student to be able to do by the end of our course together:

Operations and Algebraic Thinking

- Use the four operations with whole numbers to solve problems.
- Learn how to use factors, multiples, decimals, and percent when solving real world problems.
- Generate and analyze patterns.
- Interpret the real world and write down numerical expressions to solve.
- Analyze patterns and relationships.
- Gain a working understanding of numbers and what they represent.
- Understand and use ratios, including rational numbers (ratio of numbers) to solve real problems.
- Be comfortable with negative numbers, absolute value, exponents (positive, negative, and fractional), and order of operations.

Number and Operations in Base Ten

- Generalize place value understanding for multi-digit whole numbers.
- Perform operations with multi-digit whole numbers and with decimals to millionths.
- Be able to compute multi-digit numbers and find common factors and multiples.
- Be comfortable with both scientific (6.02×10^{23}) and engineering notation 6.02 E23) when working with large numbers.

Number and Operations—Fractions, Decimals & Percent

- Be able to add, subtract, multiply and divide both fractions and decimals.
- Understand decimal notation for fractions, and be fluent in both.
- Understand percent, what it means, and how scientists make effective use of it

Measurement and Data

- Solve problems involving measurement and conversion of measurements.
- Represent and interpret data from the real world.
- Convert measurement units within a given measurement system (ex: km to cm).
- Be fluent in both standard and metric system and be able to use both interchangeably.
- Be able to analyze data and make specific recommendations based on numerical analysis (example: was your business profitable this month?).

Algebraic Expressions and Equations

- Apply understandings of arithmetic to algebraic expressions.
- Write and solve linear equations and inequalities.
- Represent and analyze quantitative relationships between dependent and independent variables.
- Writing slope-intercept equations and graphing two-variable inequalities.
- Solving polynomials using different methods, including factoring, and the quadratic equation
- For grades 7-8th, this is a full Algebra 1 course! By the time you are done with our algebra course, you will be more than ready for Algebra 2.

Geometry

- Identify and work with shapes by properties of their lines and angles.
- Understand concepts of angle and measure angles.
- Graph points on the coordinate plane to solve real-world and mathematical problems.
- Solve real-world and mathematical problems involving area, surface area, and volume.
- Model the real-world using geometry, and then solve problems using geometric knowledge (examples: when analyzing properties of triangles, students might use Pythagorean theorem, similar triangles, etc.. to work toward a solution). We will be covering basic shapes such as spheres, ellipses, triangles, and curves.
- For grades 7-8th, this is a full geometry course! By the time you are done with our geometry course, you will be more than ready for a high school geometry course.