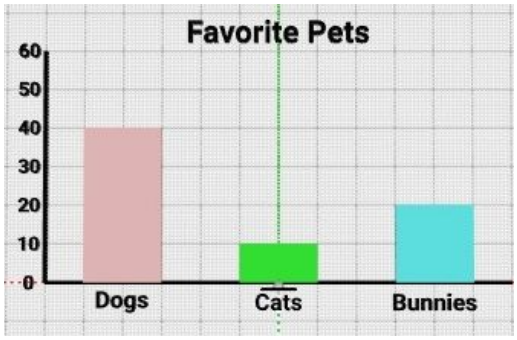
The following *Math Series* lessons are aligned with **Common Core and CSTA Standards**. Each lesson targets specific math/CS standards and BlocksCAD tools. All encourage standards-aligned creative design, organized program development, spatial reasoning, number sense, and problem solving.

3rd Grade

Bar Graphs: Data and variables



Description: Students will examine pre-build bar graphs on BlocksCAD and interpret the data presented. They will expand and edit code and adjust existing variables to create their own graphs. Students will create new variables for the height of each bar and incorporate them into their code so that their entire bar graph is quickly customizable.

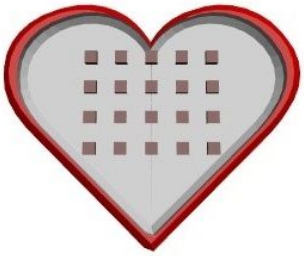
Math Alignment: 3.MD.B.3 CSTA Alignment: 1B-AP-09

Telling Time: Reading analog clocks

Description: Students will use **cylinders** and the BlocksCAD **difference** block to create the face, rim, and center post of an analog clock. They will then use a model in BlocksCAD to see where hands go at certain times. They will practice **reading clocks** and **drawing hands**, and will then answer questions about durations of time.

Math Alignment: 3.MD.A.1

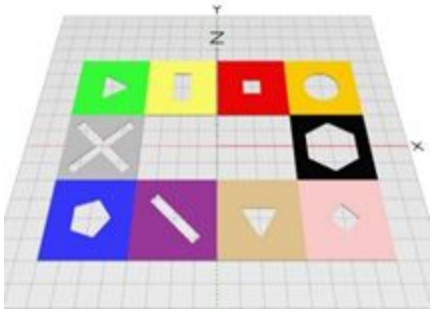
Box of Chocolates: Visualizing multiplication using variables



Description: Students will experiment with a chocolate machine that creates arrays of chocolate pieces using adjustable **variables**. They will visualize how the two dimensions **multiply** to yield the total number of chocolates. They'll adjust their code to create different shapes and colors and will try to fit arrays into different-sized boxes.

Math Alignment: 3.OA.A.1 CSTA Alignment: 1B-AP-09

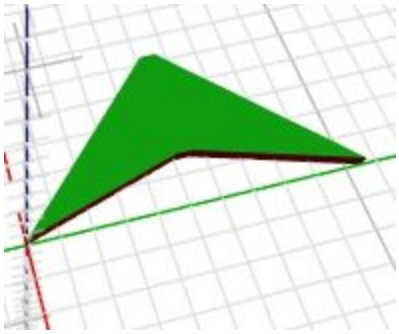
Shape Silhouettes: Shapes, translations, and rotations



Description: Students will build **shapes** that will fit into various missing puzzle piece spaces. They will use basic 3D shape blocks and **translations** and **rotations** to orient and arrange their shapes correctly.

Math Alignment: 3.G.A.1, 4.MD.C.5.B

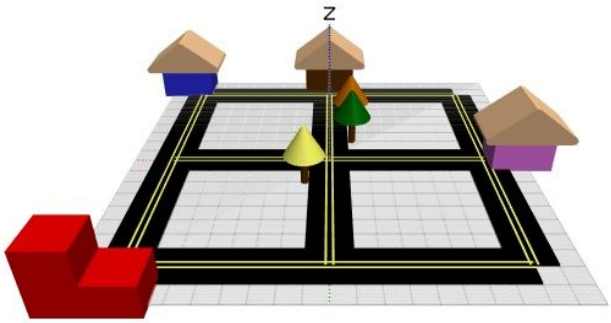
Shape Sorter: Properties of four-sided figures



Description: In this lesson students will draw varied **quadrilaterals** and compare figure sides and angles to help **classify figures** into different groups based on their properties.

Math Alignment: 3.G.A.1 CSTA Alignment: 1B-AP-09

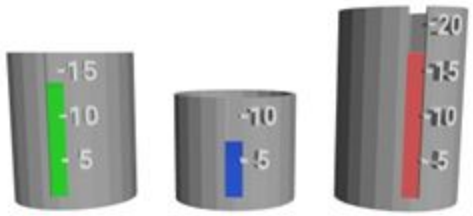
My Neighborhood: Measurement and fractions



Description: Students will complete a neighborhood map by estimating **distance**. They will identify site locations and position sites at set locations using adjustable **variables**.

Math Alignment: 3.MD.B.4 CSTA Alignment: 1B-AP-09

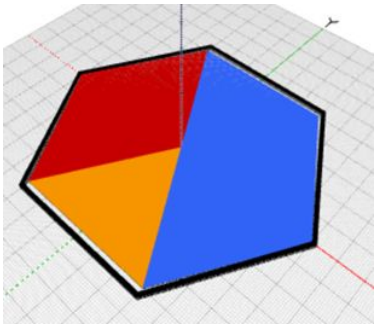
Chemistry Assistant: Measurement and volume



Description: Students will write code that would help a “chemistry robot” fill up beakers in the lab. They will use **cylinders**, **translations**, and pre-built **modules** and to solve chemistry challenges about **amounts of liquid** required for certain experiments.

Math Alignment: 3.MD.A.2 CSTA Alignment: 1B-AP-12

What is the whole?: Fractions

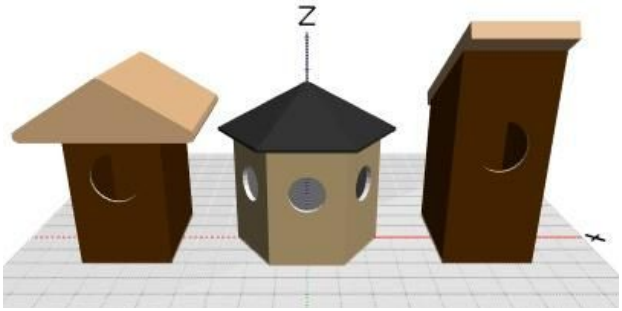


Description: Students will examine mosaic tiles and use **fractions** to describe the size of the different pieces. They will use **translations** and **code organization** to create their own tile in BlocksCAD and then sketch and describe a tile on graph paper.

Math Alignment: 3.NF.A.1

4th Grade

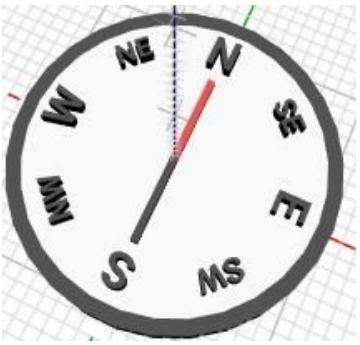
Birdhouses: Area, perimeter, and variables



Description: Students will play the role of consultant and engineer for a neighbor's birdhouse business. They will help to **convert measurements** from inches to feet and will **calculate perimeters** of particular pieces of the birdhouses. Students will also store **scale factors** as **variables** in order to quickly adjust the size of each birdhouse.

Math Alignment: 4.MD.1, 4.MD.3 CSTA Alignment: 1B-AP-09

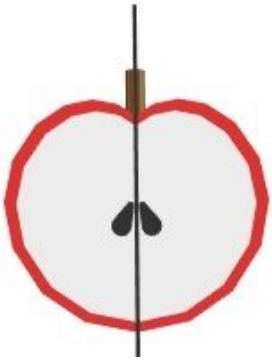
Compass Construction: Angles and rotation



Description: Students will create a standard compass by orienting labels around a circle using **rotations**. They will answer questions about **degree measure** and navigation and use their own creativity to build details to add to their design.

Math Alignment: 4.MD.C.5

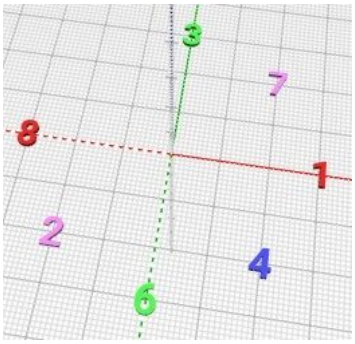
Fair Share: Symmetry, rotation, and reflection



Description: Students will first draw **lines of symmetry** on simple shapes to learn how to recognize when there are one, multiple, or zero lines. They will then use **rotations** in BlocksCAD to spin a line until it marks symmetry on different items of food that the student and a friend are trying to split. Students will also experiment with **reflections** and consider how they create symmetry.

Math Alignment: 4.G.A.3

Pattern Puzzles: Analyzing number and shape patterns



Description: Students will use BlocksCAD to complete **shape and number patterns**. They will decide what shape or value they need and use **translations** to move it to the correct position. Then they will create their own pattern with a missing piece to share with a classmate.

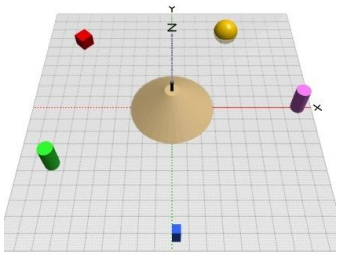
Math Alignment: 4.OA.C.5

Cake Cutter: Using modules and adding fractions

Description: Students will run a cake company that operates a new 3D cake printer. They will build a cylindrical cake using the **difference** block and then use a **module** to help them make **fractional** cake slices. They'll add these slices together to calculate how much total cake different customers order.

Math Alignment: 4.NF.B.3 CSTA Alignment: 1B-AP-12

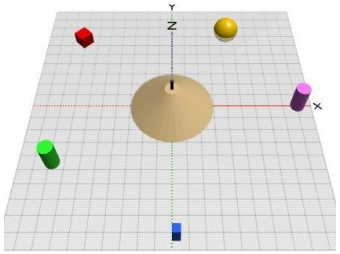
Mountain Views: Rotations away from the origin and angle measure



Description: Students will model the view from the top of a mountain. They will use **translations and rotations** to place cities on the horizon and will then answer questions about the views by reading and creating **angle measure** diagrams.

Math Alignment: 4.MD.C.5.A, 4.MD.C.7

Tee Off: Angle measurement

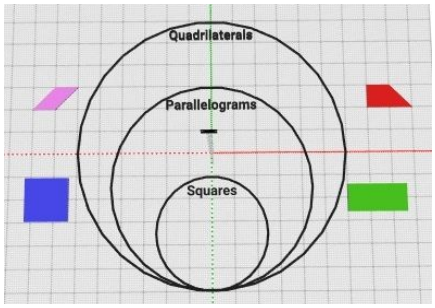


Description: Students will explore angles and distance traveled by golf balls on a driving range. They will use **translations** and **rotations** to drive golf balls, add holes, and navigate a course with multiple hazards. They will then answer questions about the course by measuring angles with a **protractor**.

Math Alignment: 4.MD.C.5., 4.MD.C.6 CSTA Alignment: 1B-AP-12

5th Grade

Shape Up (4th/5th): Translations and shape properties



Description: In this lesson students will use **translations** to move shapes into different categorical bins based on **shape properties**. The five levels cover triangles, quadrilaterals, and other polygons, and students have a chance to create their own categorization system by recognizing similarities and differences among many shapes.

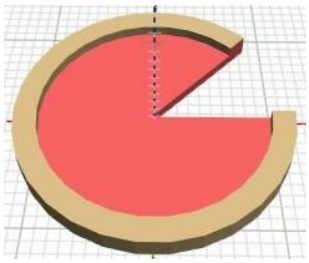
Math Alignment: 5.G.2, 5.G.3, 5.G.4

Dinner Robot: Coordinates, translations, and modules

Description: In this lesson students will “set” dinner tables by building and moving plates around using a **first-quadrant 2D coordinate system**. They will understand that **translations** from the origin define the x- and y-positions of a point in the plane. Students will create **modules** that allow them to quickly tell a “robot” where they would like a plate set so they can get out of doing the chore themselves!

Math Alignment: 5.G.1, 5.G.2 CSTA Alignment: 1-AP-09, 2-AP-14

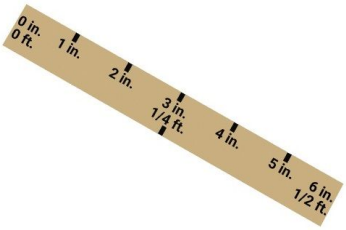
Pie Pieces: Fractions and modules



Description: In this lesson students will operate a pie shop that sells by the slice. They will learn the BlocksCAD **difference block** to help them build a basic pie, and then they will create different fractional-sized pieces of pie using a **module with a parameter**. They will have to **add their fractional** slices and multiply by a unit price to calculate the cost of each order.

Math Alignment: 5.NF.1, 5.NF.2, 5.NF.4 CSTA Alignment: 2-AP-14

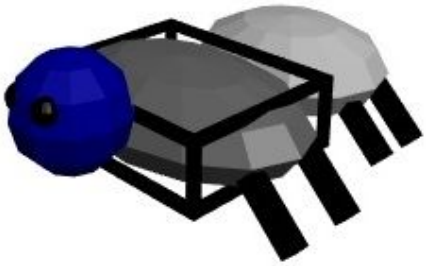
Ruler Construction: Unit conversion and fractions



Description: Students will design a six-inch ruler in this lesson. They will use the BlocksCAD **difference block** to inscribe measurement labels and notches, and they will **convert** inch measurements into **fractional measurements** in feet. They will use what they learn to answer questions about measurements in different units.

Math Alignment: 5.MD.A.1

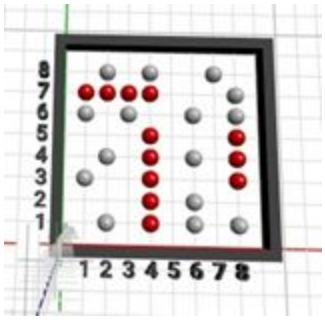
Thinking Inside the Box: Rectangular prism volume and modules



Description: In this lesson students will help to program a robot to study alien bugs! They will use a **module** that lets them create **rectangular prism boxes** of any size. They'll use these prisms to estimate **volumes** of non-rectangular shapes so that their robot can report back initial sizing information about these new species.

Math Alignment: 5.MD.C.5.B, 5.MD.C.5.C

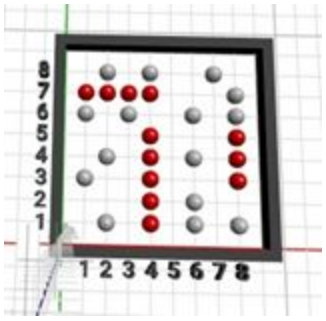
Building Battleship: Coordinates and modules



Description: Students will create and then play a BlocksCAD version of the classic game Battleship. They will **create a module** that plots hits and misses based on input **x- and y- coordinates**. They will keep track of their own ship locations using a **table** and will use BlocksCAD to plot their guesses of where their opponent's ships are.

Math Alignment: 5.G.1, 5.G.2 CSTA Alignment: 1-AP-09, 2-AP-14

Playing Battleship: Coordinates



Description: Students will use a pre-built module to help them play a virtual version of the classic game Battleship. They will guess **coordinate points** to track down their opponent's ships and will keep track of their guesses using colored spheres in BlocksCAD. This lesson is an abbreviated version of the "Building Battleship" lesson, which is also available and has students create more of the interface themselves.

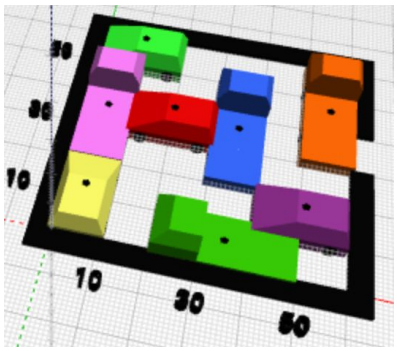
Math Alignment: 5.G.1, 5.G.2

Tic Tac Toe: Coordinates and the difference block

Description: Students will create and then play a BlocksCAD version of the game Tic Tac Toe. They will create a playing board using the **difference block** and will plot game pieces using **x- and y- coordinates**. They will analyze the symmetry of moves in the tic tac toe game and anticipate player moves.

Math Alignment: 5.G.1, 5.G.2

Rush Hour: Translations



Description: Students play a BlocksCAD version of the traffic jam puzzle game *Rush Hour*. Three scenarios challenge students to get the red car out of gridlock using the fewest number of **translations** of other cars along the x- and y-axes.

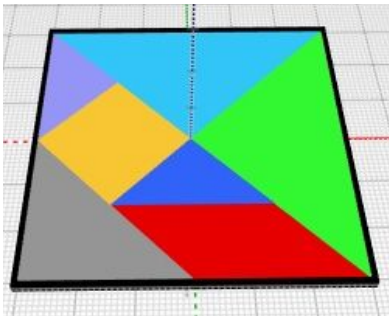
Math Alignment: 5.G.1, 5.G.2

Transformation Target Practice: Translations and Rotations

Description: Students will test and hone their intuition for how to move a shape in 2D and 3D using translations and rotations. Their task will be to “hit” a series of targets by selecting transformations that will move a starting triangle onto the target. This is a simpler variation of the 8th grade Lesson “Triangle Target Practice” and is great as a summary of early BlocksCAD skills.

6th Grade

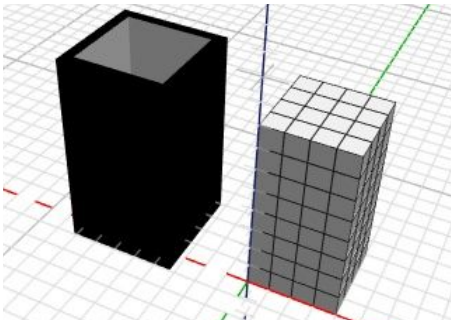
Tangram Level 1 (6th/7th/8th): Areas of polygons and translations



Description: In this lesson students will play a virtual version of the popular Tangram game. They will **calculate the areas** of different blocks and then use **translations** to move the blocks around the 2D plane and arrange them into specific shapes. The second level of this activity focuses on 8th grade students by incorporating rotations and discussing similarity and congruence.

Math Alignment: 6.G.1, 6.G.3, 7.G.6, 8.G.1

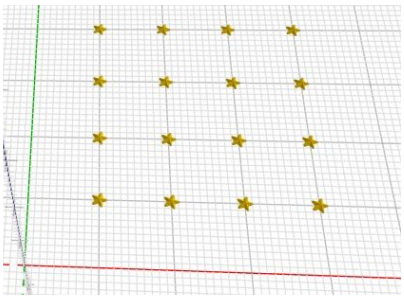
Sugar Cube (5th/6th): Area formulas and variables



Description: In this activity students will solve problems about **volumes** of sugar created with their "sugar-cubing machine". They will see why the volume formula accounts for all the unit cubes that make up a larger shape. They will also practice using BlocksCAD **variables**, **math blocks**, and the **difference block** as they try to create a container that can hold any shape of stacked sugar cubes.

Math Alignment: 6.G.2 CSTA Alignment: 2-AP-11

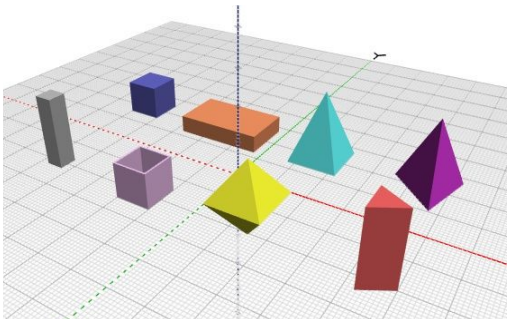
Starry Night: Areas of polygons and the hull block



Description: Students will practice identifying the **coordinates** of points in the plane and using those coordinates as the **vertices of different 2D figures** as they create “star charts” like those used by early navigators. They will also **calculate the areas** of the maps they create by decomposing shapes like trapezoids and octagons into triangles and rectangles. This activity also emphasizes **code organization** and introduces the BlocksCAD **hull** feature.

Math Alignment: 6.G.1, 6.G.3

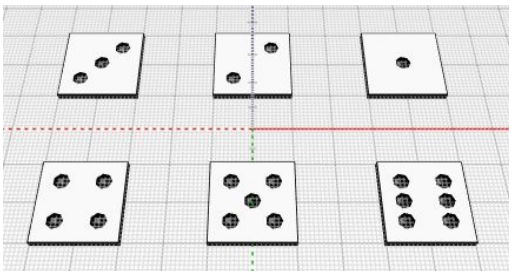
Cardboard Recycling: Surface areas and nets



Description: In this activity students will practice **relating 3D figures to their 2D nets** and vice versa. They will use their nets to help them calculate the **surface areas** of different cardboard containers that their company is trying to recycle for a rebate. They’ll then work backwards to build containers in BlocksCAD based on nets that they are given.

Math Alignment: 6.G.4

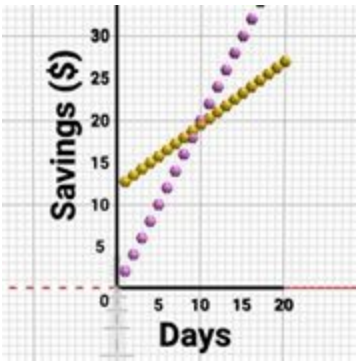
Dice Nets: Surface areas, nets, and probability



Description: Students will use **translations** to arrange the faces of a die into a **2D net** that could theoretically be folded into a 3D die. They will use paper models to help them test the nets they arrange in BlocksCAD, and then they will calculate the **surface area** of their die. They will create **weighted dice** by duplicating certain faces and will practice expressing **probabilities in three different forms**. Students will then think creatively about how to create the net for a tetrahedral four-sided die. This activity would partner well with the BlocksCAD dice-creation activity if you have access to 3D printers.

Math Alignment: 6.G.4, 7.SP.5

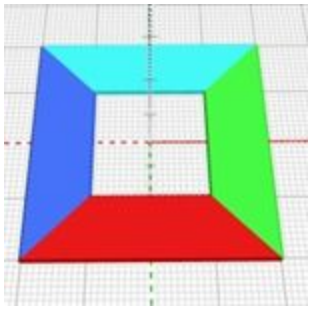
Saving Up: Linear relationships, graphing, and loops



Description: Students will consider offers from YouTube to monetize their popular videos. They will work with equations, tables, and BlocksCAD **graphs** to visualize linear **functions** with positive slopes and y-intercepts. They will use **loops** with function inputs to plot their points.

Math Alignment: 6.EE.C.9 CSTA Alignment: 2-AP-12

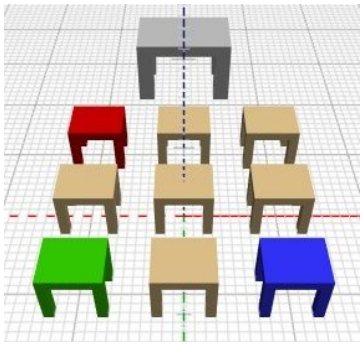
Professional Printer: Coordinates and reflections



Description: Students will learn to use the **hull** block to help them expand their 3D printing company's repertoire. They will write a **module** that places points at specific **coordinate points** where they want vertices of their shapes. They will have to decompose concave shapes into multiple shapes that they can create with hull blocks.

Math Alignment: 6.G.A.3 CSTA Alignment: 2-AP-14

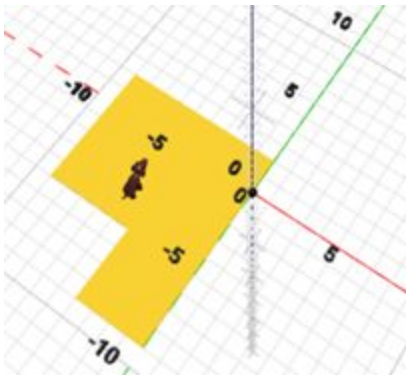
Opposite Day: Coordinates and reflections



Description: Students will use positive and negative **coordinates** to describe the locations of desks in a classroom. On "Opposite Days", desks will either **reflect** across the x-axis, the y-axis, or a combination of the two and students will have to keep track of these changes by adjusting the coordinates.

Math Alignment: 6.NS.C.6, 6.NS.C.6.A, 6.NS.C.6.B

Go Dog Go: Coordinates and area

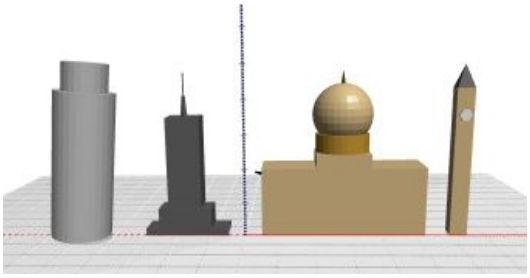


Description: Students will practice identifying the **coordinates** of points on a grid and will use those coordinates as the vertices of different figures as they explore a map of a backyard dog run. They will also calculate the **area** of the yard by decomposing compound shapes into simple non-overlapping shapes. This lesson also emphasizes **code organization** and introduces the BlocksCAD **hull** feature.

Math Alignment: 6.G.A.3 CSTA Alignment: 2-AP-14

7th Grade

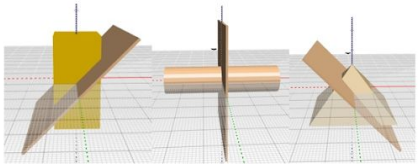
Scale City: Similar models and scale factors



Description: Students will create their own scaled replicas of famous buildings from around the world. They will compute **scale factors** and convert actual dimensions in meters to BlocksCAD units so that they will have a model of a desired size. They will use **3D shapes** and **transformations** to arrange the pieces they need for their buildings. Students will then answer questions about the lengths and volumes of the real structures based on information provided about the scaled models.

Math Alignment: 7.G.1

Sous Chef: 2D cross-sections and loops



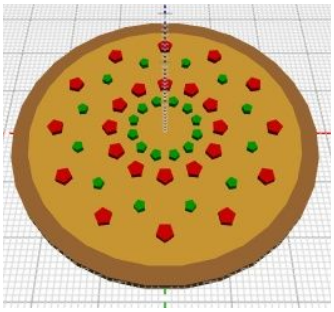
Level 2 CSTA Alignment

Concept: Control
Standard: 2-AP-12: Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals

Description: Students will play the role of Sous Chef in a kitchen, cutting **3D shapes** representing different foods into **2D slices** using the **intersection block**. They will think about the different shaped slices that they can create from different 3D shapes, and then they will work backwards to think about what 3D shapes could have produced particular 2D slices. They will then have the chance to write a program that will slice their objects into many different slices using **loops**.

Math Alignment: 7.G.3 CSTA Alignment: 2-AP-12

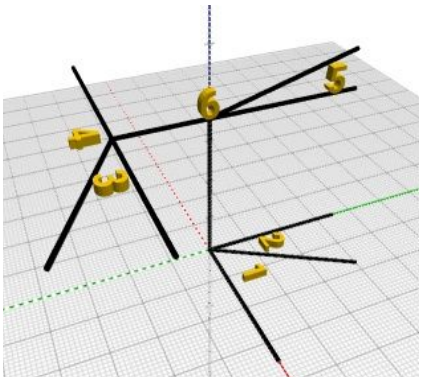
Pizza Printer: Circle equations, modules, and loops



Description: Students will code a **module** that can create a pizza, and then will incorporate a **variable** for size so that their "recipe" is adaptable to different pizza orders. They will answer questions about customers' orders that have them calculate **circumference** and **area** of their pizzas. They will use **loops** and other creative design to add toppings to their pizza.

Math Alignment: 7.G.4 CSTA Alignment: 2-AP-11, 2-AP-12, 2-AP-14

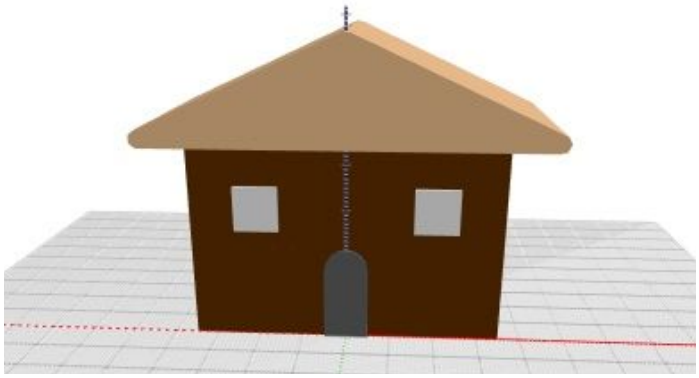
Angle Deduction: Angle Properties and Proof-Writing



Description: Students will practice **deductive reasoning** to solve for unknown angles in multi-step 3D problems. They will write pseudo-proofs, first filling in the blanks for given statements, premises about **supplementary, complementary, and vertical angles**, and sub-conclusions, before writing their own arguments.

Math Alignment: 7.G.5

Model Home: Area, volume, and logic

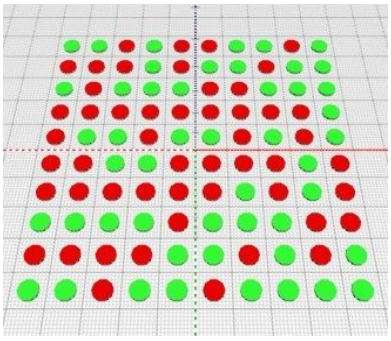


Description

Students will calculate **surface areas** and **volumes** for the different parts of a model home. They will code **conditional statements** that allow them to quickly customize the doors and windows of the home per customers' requests.

Math Alignment: 7.G.6 CSTA Alignment: 2-AP-11, 2-AP-12

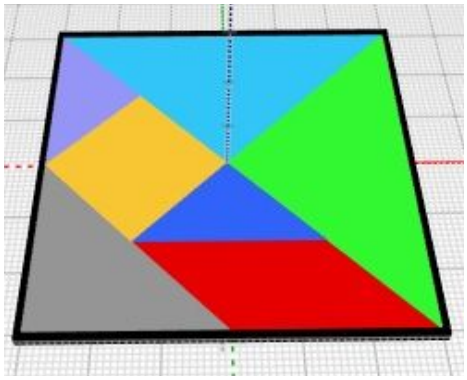
What are the Chances?: Probability, logic, and loops



Description: Students will use a random number generator and a BlocksCAD **logic** block to create a coin-flipping simulator. They'll record the results of their trials and calculate **probabilities** from their data. They will then use **loops** to scale their simulator up to ten and then 100 coin-flips to see first-hand the Law of Large Numbers.

Math Alignment: 7.SP.C.5, 7.SP.C.6 CSTA Alignment: 2-AP-12

Tangram Level 2 (7th/8th): Area, similarity, and transformations

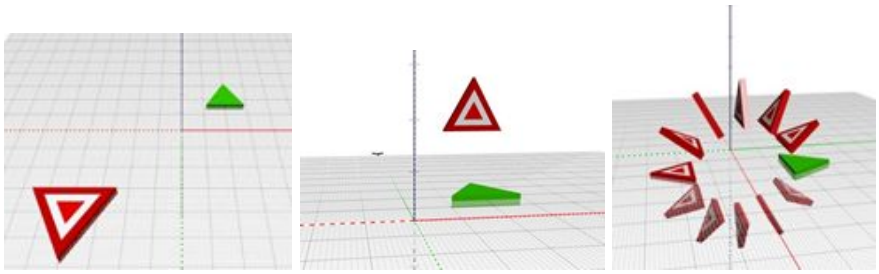


Description: In this lesson students will play a virtual version of the popular Tangram game. They will **calculate the areas** of different blocks and consider **similar and congruent** pieces. They will then use **translations and rotations** to move the blocks around the 2D plane and arrange them into specific shapes. The first level of this activity has a lower-level Part I and only uses translations in Part II.

Math Alignment: 6.G.1, 6.G.3, 7.G.6, 8.G.1

8th Grade

Triangle Target Practice: Congruence, transformations, and loops



Description: Students will test and hone their intuition for how to move a shape in 2D and 3D using **translations, dilations, and rotations**. Their task will be to "hit" a series of targets by selecting transformations that will move a starting triangle onto the target, eventually using **loops** and assessing **congruence.**

Math Alignment: CC.8.G.2 CSTA Alignment: 2-AP-12

Bikini Bottom City Planning: Effect of transformations on coordinates

Description: Students will play the role of city planner for Spongebob's iconic Bikini Bottom neighborhood, moving houses to meet the needs of their residents. They will explore the effect of basic transformations on the "addresses" (**coordinates)** of the houses of Bikini Bottom as they **translate**, **reflect**, and **rotate** them around the plane. Students will have the opportunity to add blocks to the environment to incorporate extra features to the neighborhood.

Math Alignment: CC.8.G.3

Witch's Cauldron: Volume of cylinders, variables, and conditionals

Description: Students will help a haphazard witch organize her cylindrical cauldrons after a spell goes awry. They will work with the **cylinder volume formula** and BlocksCAD **variables** to help determine which duplicates of an original cauldron are still usable and use it to investigate the relationship between **volume** and **congruence**. Students will then explore the functionality of **logic** in BlocksCAD and practice coding an **"IF" statement**.

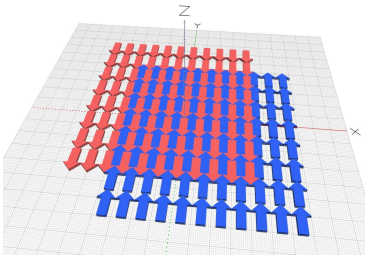
Math Alignment: CC.8.G.9 CSTA Alignment: 2-AP-11, 2-AP-12

Ice Cream Machine: Volume of spheres, variables, and modularity

Description: Students will program an ice cream machine to print ice cream cones with different numbers and sizes of ice cream scoops. They will work with v**ariables and modules** so that they'll be ready to print any order that comes their way. They will also use a **function** that calculates the cost of a particular ice cream cone based on the **volume** of the spherical ice cream scoops.

Math Alignment: CC.8.G.9 CSTA Alignment: 2-AP-11, 2-AP-13, 2-AP-14

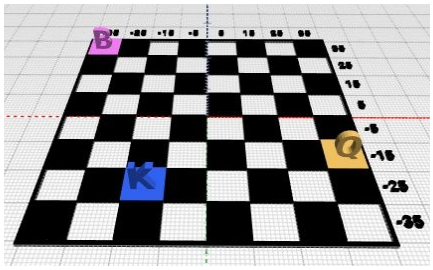
Tessellations: Angle sum of triangles and nested loops



Description: This lesson gives students the chance to arrange triangles as a “picture proof” of the **interior angle sum theorem** for triangles. They will examine the analogous result in the case of quadrilaterals, and will then tie their work into the geometric art of MC Escher’s famous tessellations. In guided steps, students will use **nested loops** and their own creativity to create tessellations of their own.

Math Alignment: CC.8.G.5 CSTA Alignment: 2-AP-12

Chessboard Triangles: Pythagorean Theorem



Description: In this activity students will move three different pieces around a chess board using translations and their knowledge of the **2D coordinate system**. They will create **triangles** and use the **Pythagorean Theorem** to determine distances that pieces travel around the board, and will think creatively as they solve problems related to the pieces.

Math Alignment: CC.8.G.7, CC.8.G.8

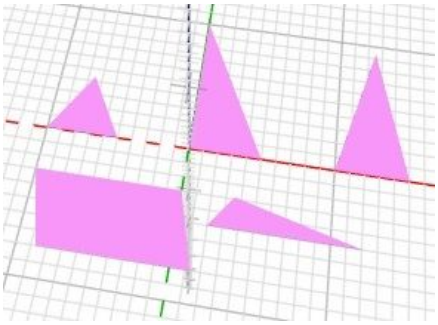
Pythagoras on TV: Pythagorean Theorem, variables, and modularity

Description: In this activity students will use the **Pythagorean Theorem** to calculate the diagonal size of TVs based on lengths and widths. They will store information as **variables** and write a **function** that calculates and prints the size of the TV for them. They will also apply the Pythagorean Theorem in 3D to solve a problem about old fashioned box TVs.

Math Alignment: CC.8.G.7, CC.8.G.8 CSTA Alignment: 2-AP-11, 2-AP-14

High School

Transformations Challenge: Triangles, transformations, and trigonometry



Description: Students will work through a series of 2D constructions challenges in which they try to build specific shapes. They will use **transformations**, **trigonometry**, and BlocksCAD **hull, difference,** and **intersection** blocks.

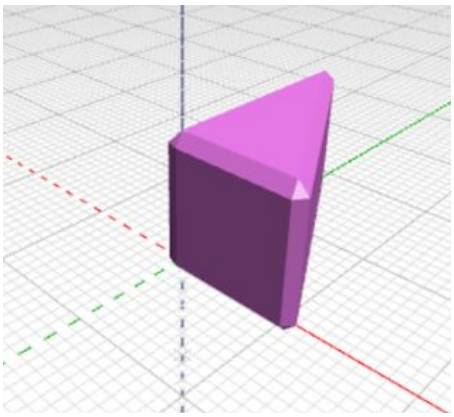
Math Alignment: HSG.CO.A.2, HSG.SRT.C.8

Analog Clock: Geometric modeling and loops

Description: Students will build an analog clock from scratch that orients its hands based on input minute and hour **variables**. Students will have to use a series of **translations, rotations,** and **loops** to orient the clock's numbers around the circle. They will have to write **functions** using **math blocks** to rotate the hands the appropriate number of degrees depending on the time.

Math Alignment: HSG.MG.A.1, HSG.MG.A.3 CSTA Alignment: 2-AP-12

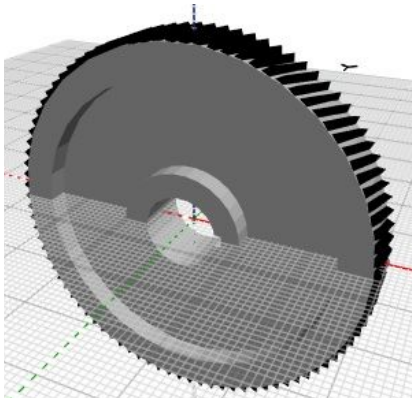
Triangular Prism: Trigonometry, dilations, and variables



Description: Students will use **translations** and the **hull** block to create specific types of special triangles. They will introduce a **variable** to create a customizable design based on the ratios of **30-60-90 triangle** legs, and then they will use this base to create a right triangular prism.

Math Alignment: HSG.SRT.C.8, HSG.SRT.C.6 CSTA Alignment: 2-AP-11

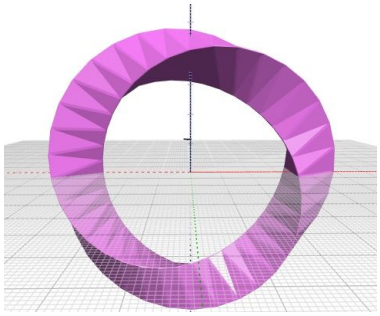
Helical Gear: Geometric modeling and loops



Description: Students will build a helical gear from scratch. They will use **translations** and the BlocksCAD **difference block** to design the main body of the gear. They will then create a triangular prism that they will **loop** around their gear to make helical teeth.

Math Alignment: HSG.MG.A.1, HSG.MG.A.3 CSTA Alignment: 2-AP-12

Surfaces of Revolution: Rotation and loops



Description: Students will visualize how 2D shapes can be **revolved around an axis** to create a **3D surface**. They will use **loops** to iterate rotation and create specific surfaces, and then they will experiment with their own surfaces that include twists.

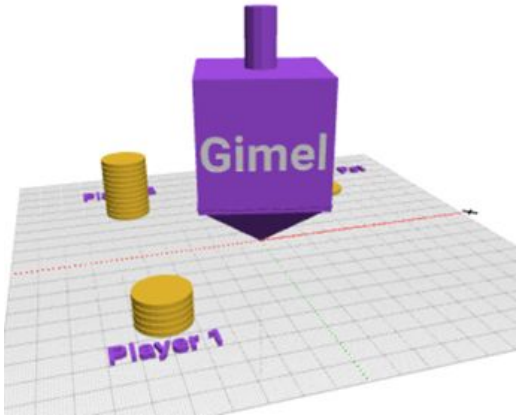
Math Alignment: HSG.GMD.B.4 CSTA Alignment: 2-AP-12

Calendar Cubes: Transformations and the difference block

Description: Students will design and build decorative calendar cubes using the BlocksCAD **difference** and text blocks. They'll use **translations** and **rotations** to orient their labels and will use **code management** techniques to organize and reuse their code. They can also use the dimensions of their cubes to create two possible calendar cube holders.

Math Alignment: HSG.MG.A.1, HSG.MG.A.3 CSTA Alignment: 2-AP-13

Dreidel Dreidel: Transformations and the difference block

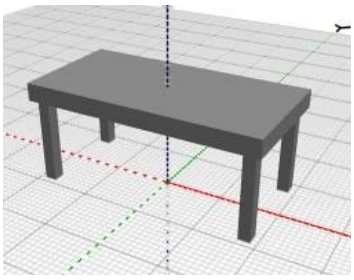


Description: Students will create a dreidel in BlocksCAD by orienting and engraving text onto the four sides of a dreidel using the **rotate**, **translate,** and **difference** blocks. Students will play a BlocksCAD version of the game dreidel.

Math Alignment: HSG.MG.A.1

Augmented Reality Lessons

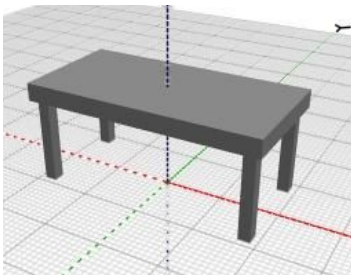
Class Table 4th: Area and perimeter




Description: Students are tasked with creating a new table to get for their classroom. They will first determine the cost of some prototypes by **calculating the areas and perimeters** before designing their own table in BlocksCAD. They will then use **augmented reality** technology to see what their table would actually look like if they had it in their classroom.

Math Alignment: 4.MD.3

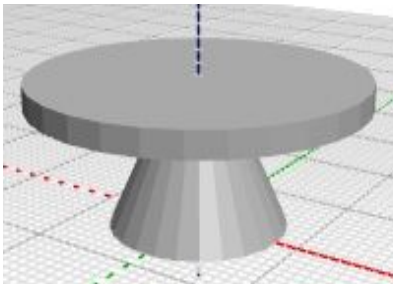
Class Table 5th: Rectangular prism volume




Description: Students are tasked with creating a new table to get for their classroom. They will first determine the cost of some prototypes by **calculating the volumes** before designing their own table in BlocksCAD. They will then use **augmented reality** technology to see what their table would actually look like if they had it in their classroom.

Math Alignment: 5.MD.5

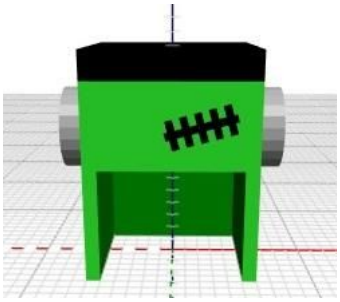
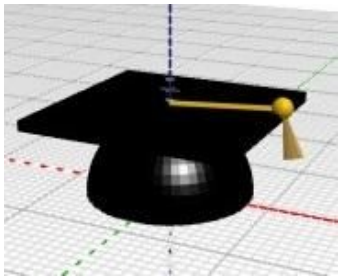
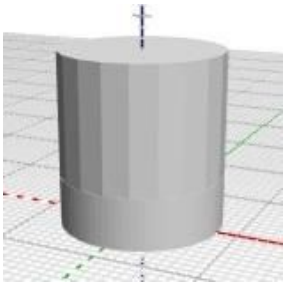
Class Table 7th/8th: Volume




Description: Students are tasked with creating a new table to get for their classroom. They will first determine the cost of some prototypes by **calculating the volumes** of the different pieces before designing their own table in BlocksCAD. They will then use **augmented reality** technology to see what their table would actually look like if they had it in their classroom.

Math Alignment: 7.G.6, 8.G.9

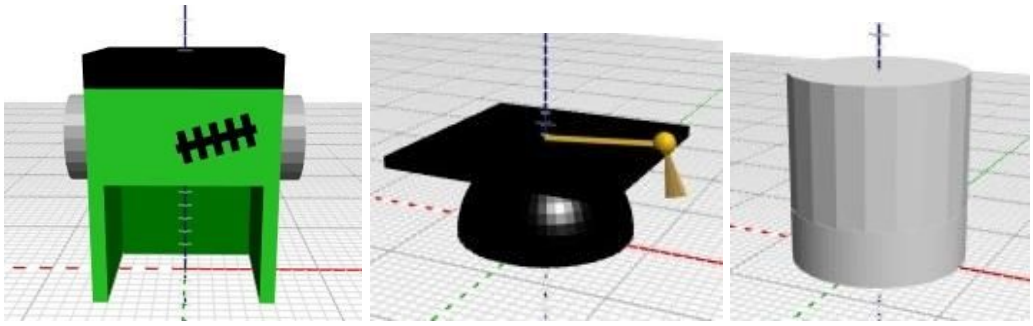
Halloween Hats 4th: Rectangle areas and transformations

Description: Students will play the role of costume store owner and build 3D models of their hats that customers can “try on” at home using **augmented reality**. They use the **rectangular area formula** to determine important sizing information about existing hats for their manufacturer before using **3D shapes** and **transformations** to design their own hats.

Math Alignment: 4.MD.3

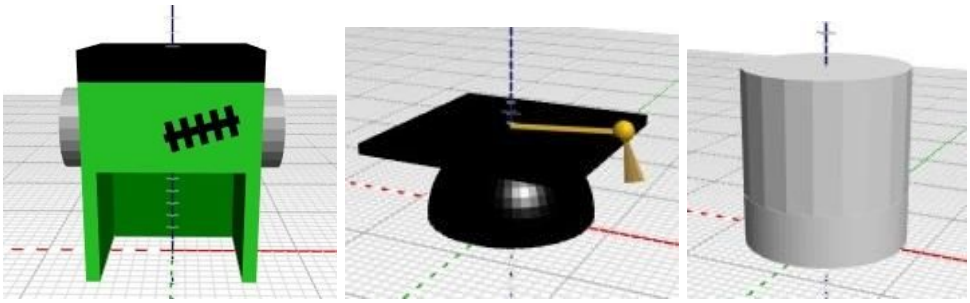
Halloween Hats 5th: Rectangular prism volume and translations



Description: Students will play the role of costume store owner and build 3D models of their hats that customers can “try on” at home using **augmented reality**. They use the **rectangular prism volume formula** to determine important sizing information about existing hats for their manufacturer before using **3D shapes** and **transformations** to design their own hats.

Math Alignment: 5.MD.3, 5.MD.5

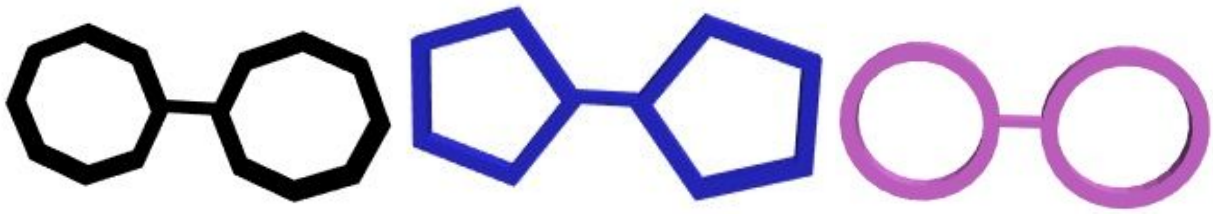
Halloween Hats 7th/8th: Circumference, area, and volume



Description: Students will play the role of costume store owner and build 3D models of their hats that customers can “try on” at home using **augmented reality**. They will build the hats in BlocksCAD by calculating the dimensions they need using **circumference, area, and volume formulas** and by using the BlocksCAD **difference block**.

Math Alignment: 7.G.6, 8.G.9

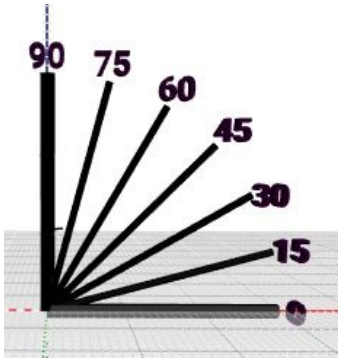
New Glasses 6th: Areas, translations, and difference block



Description: Students will use BlocksCAD to build four different types of frames for glasses using **translations** and the **difference block**. They will then decompose pentagons and octagons into smaller triangles so that they can **calculate the area** of glass required for each pair. Students will then use **augmented reality** technology to take pictures of their classmates wearing each of the frames to decide which they like best.

Math Alignment: 6.G.1

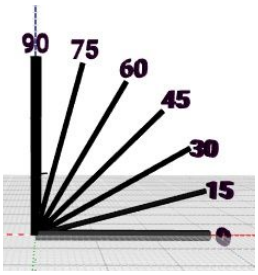
Protractor 4th: Rotations and angles



Description: Students will create a labeled 3D model of a protractor using **rotations**. They will then render their model using **augmented reality** technology and use it to **measure angles.**

Math Alignment: 4.MD.5, 4.MD.6

Protractor 7th/8th: Translations, rotations, and triangles



Description: Students will create and label a 3D model of a protractor using **translations and rotations**. They will then render their model using **augmented reality** technology and use it to **measure the angles of different triangles.**

Math Alignment: 7.G.2, 8.G.5