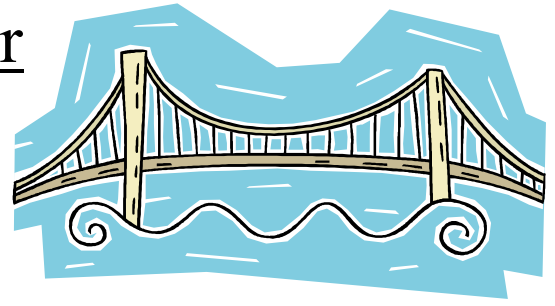


Bridge Over Troubled Water



Brief Description

Man has been making bridges for thousands of years. As technology advances so do the techniques we use to make bridges. There is a lot of math and science that goes into the construction of a bridge. Basically bridges are just a series of intersecting, parallel, and perpendicular lines and line segments arranged in such a way as to support heavy weights.

Product

You will have the task of building a bridge out of toothpicks, designing, buying the materials with your budget, and constructing a final product and seeing how much weight your structure can hold. You must also identify the different sorts of lines you used in your construction.

Content Area

Math

Learning Objective(s)

Identify, describe, and model intersecting lines, parallel and perpendicular lines and line segments. Use material to model lines.

Inspiration Starting Point

Watch PowerPoint presentation The History of Bridges

Estimated Time of Project

Two weeks

Suggested Materials

Toothpicks

Glue

Spreadsheets

Graph paper

Tape

Take Me Out to the Ballgame



Brief Description

Baseball is a game involving statistics, percentages, and decimals. This information is figured in a bunch of different ways through different mathematical formulas.

Product

You will follow a specific player or team for a period of time, figuring out things such as batting average, slugging percentage, on-base percentage, etc. You will keep track and chart the statistics of the player. Then you will analyze this information to determine potential performance for this player or team.

Content Area

Math

Learning Objective(s)

Recognize that division may be used to solve different types of problem situations and interpret the meaning of remainders.
Demonstrate fluency in adding and subtracting whole numbers and in multiplying and dividing whole numbers by 1- and 2-digit numbers and multiples of ten.

Inspiration Starting Point

Look at <https://www.baseball-reference.com> and look at different data

Estimated Time of Project

Three weeks to one month

Suggested Materials

Newspaper or internet with box scores
Graph paper or Microsoft Excel

Construct a Fort

Brief Description

Haven't you ever wanted to design and make the ultimate fort in your backyard for you and your friends to meet in?



Product

Here you will have the chance to design the perfect fort complete with everything you think you would need. You will first design the fort on paper and then create a model of the fort (if you are feeling really ambitious, you may build the fort itself under the supervision of your parents), making sure you include such things as area and perimeter. Make sure the design is structurally sound and mathematically correct before building.

Content Area

Math

Learning Objective(s)

Identify and select appropriate units to measure perimeter.
Identify and select appropriate units to measure area.

Inspiration Starting Point

Read about and look at the photos of the amazing treehouse in California. Then visit www.thetreehouseguide.com for more information.

Estimated Time of Project

Two to three weeks

Suggested Materials

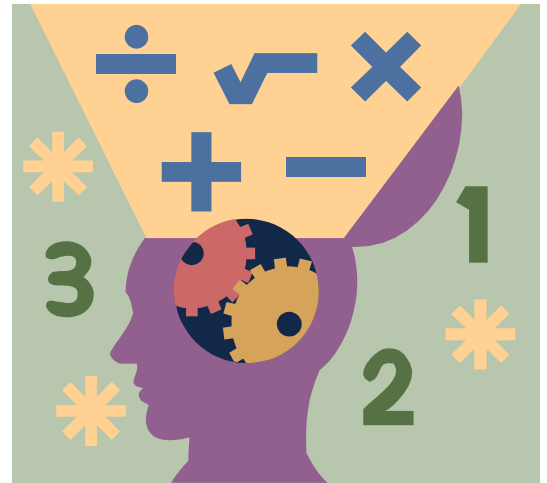
Graph paper

Materials such as Popsicle sticks or toothpicks to build model of fort

Math Course

Brief Description

Math occurs in our everyday life, sometimes without our even noticing it. It could be as simple as figuring out how much tax is on a candy bar to something more complex like figuring out how many miles it is to ride your bike to the swimming pool.



Product

You will journal a week in your life, looking for all the math you encounter. After recording your observations and insights, write an analysis with the thesis of “how important is math in your everyday life”. You should use specific examples from your week of observations and add your evaluation of the important or non-importance of math.

Content Area

Math/English

Learning Objective(s)

Whichever math standards you see in your observations
Produce informal writings such as journals.

Inspiration Starting Point

Math Course by Jon Scieszka and Lane Smith

Estimated Time of Project

Two weeks

Suggested Materials

Notebook to journal in

What If You Paid the Bills?



Brief Description

Eventually you will have to move out of your parents' house to get a job and pay for bills yourself. How do you budget for this? What do you buy and what services do you get that won't cause you to be overbudget and in debt?

Product

Here you will see what exactly your parents pay for in a month including utilities, vehicles, and recreational activities. You will be given a budget and expected to buy yourself an apartment, groceries, and other necessities, seeing if you can stay under budget. You will have to balance your checkbook at the end of the month to see if you have been successful or gone into debt. You will keep your budget and expenses over a month-long period.

Content Area

Math

Learning Objective(s)

Describe how a change in one variable affects the value of a related variable (i.e. as one increases the other decreases).

Inspiration Starting Point

Figure out Mary Jo's financial problems

Estimated Time of Project

One month

Suggested Materials

Checkbook

Apartment book

Grocery checklist

Budget

What Are the Odds?

Brief Description

Cards games have become very popular but there is a science to them, a mathematical equation for making a smart move and a not so smart one. Players will go with the higher percentage play or the play that is most likely to happen rather than taking chances on low percentage probability.



Product

What are the odds that a certain card will appear, or a combination of cards? Using charts and trial and error, go through a deck of regular play cards and see what the chances of certain specifics, cards, number, or suits of cards being drawn. Figure the odds and report the likelihood of a card coming at a certain time.

Content Area

Math

Learning Objective(s)

Represent and analyze patterns and functions using words, tables, and graphs.

Conduct simple probability experiments and draw conclusions from the results.

Inspiration Starting Point

Roll the dice and see how often you can predict what will come up

Estimated Time of Project

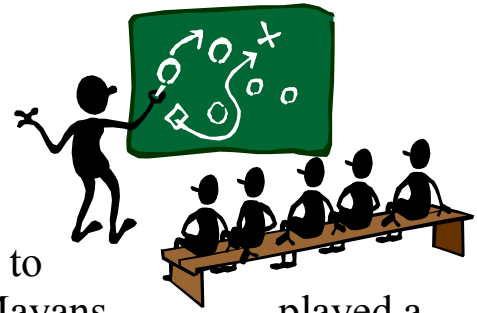
One week

Suggested Materials

Deck of cards

Paper to record observations

Everyone is Playing It



Brief Description

Baseball was invented by Abner Doubleday for soldiers to pass the time. Basketball used to shoot the ball into a peach basket. Ancient Mayans played a game very similar to soccer and basketball where they had to kick small ball through an elevated hoop.

Product

Create your own sport including a scoring system that uses whole numbers, fractions, and decimals. Then design a playing field with dimensions in the appropriate measurement finding the perimeter and area. This needs to be a completely original sport. Included in this will be how you will market it to others to get them to play. The sport should be original and not a variation of a sport that already exists.

Content Area

Math

Learning Objective(s)

Estimate the results of computations involving whole numbers, fractions, and decimals, using a variety of strategies.

Develop and use strategies to find perimeter using string or links, area using tiles or a grid.

Inspiration Starting Point

Read about Invented Team Sports

Estimated Time of Project

Two weeks

Suggested Materials

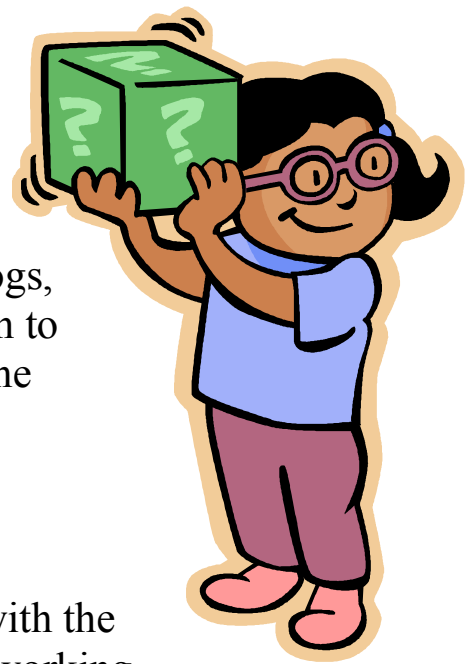
Graph paper

Ruler

Build It

Brief Description

Lots of toys teach the mathematical skill of construction. Leggos, erector sets, Lincoln Logs, and the more modern Magnetix allow children to construct three-dimensional objects that use the principles of math to allow them to stand.



Product

You will design, create, and market a new construction toy of your own design. Along with the designing of the toy you will need to make a working model for people to play with. This toy should allow people to create three-dimensional structures such as pyramids, buildings, and other shapes. You will also create a commercial for the toy to be used when advertising on television and what math skills they will learn by using them.

Content Area

Math

Learning Objective(s)

Describe, classify, compare, and model two- and three-dimensional objects using their attributes.

Inspiration Starting Point

Construct something using the Magnetix

Estimated Time of Project

Two to three weeks

Suggested Materials

Graph paper

Materials to make model of toy

Blank videotape to shoot commercial

What's Your Sign?

Brief Description

The idea of horoscopes and your birth date being able to determine the sort of person you are has been around for thousands of years. Some base it on months using the stars naming them after constellations while the Chinese assign an animal to each year while the Mesoamericans had a sign for every day of the month.



Product

Create your own horoscope on a table or graph using either days, months, or years, assigning each one of them something to represent. Include a description of what qualities a person of this sign represent. You can interview people from that sign to come up with the qualities so that it is based on reality.

Content Area

Math

Learning Objective(s)

Represent and interpret data using tables.

Inspiration Starting Point

Look at the Chinese Zodiac and figure out what animal you are. Does the description fit you? Try it with family and friends as well to see how accurate the descriptions are.

Estimated Time of Project

Two weeks

Suggested Materials

Calendar

Calculator

You Are What You Eat



Brief Description

Counting calories has become a general practice among those trying to watch their weight. It also is a chance to use some math skills, adding the calories together and subtracting them from your allotment for the day.

Product

You will count your calorie intake for your meals for a period of three weeks, keeping a log of what you eat followed by the amount of calories. At the end of the three weeks, you will write an analysis of your food habits, what you eat that is low or high in calories and other patterns that you notice. You will need to display your calorie intake on a chart, graph, or other graphic organizer.

Content Area

Math

Learning Objective(s)

Compare different representations of the same data and evaluate how well each representation shows important aspects of the data, and identify appropriate ways to display the data.

Inspiration Starting Point

Read the chart of breakfast foods and figure out what you could eat if you were limiting your calorie intake to 400 calories.

Estimated Time of Project

Four weeks

Suggested Materials

Journal to log your calorie intake

Food

Calculator

What's In Your Wallet?

Brief Description

The stock market is where people can make lots of money, but how does it really work? And what causes certain stocks to go up and others to go down?



Product

You will research the stock market and how it works. You will present a basic understanding of the stock market and the definitions of major terms. You will also follow a handful of stocks for a period of three weeks to see how the stock goes up and down, charting its progress. You will show profits or losses and try to analyze why the stock did well or not. You will also predict where the stock might be in a year based on how it did over the three-week period using a chart or graph.

Content Area

Math

Learning Objective(s)

Propose and explain interpretations and predictions based on data displayed in tables, charts, and graphs.

Use rules and variables to describe patterns and other relationships.

Inspiration Starting Point

Look at the business section of the newspaper

Estimated Time of Project

Two weeks to a month

Suggested Materials

Daily newspaper or internet access to stocks

Research on the stock market

Creating the 21st Century Slide Rule

Rule



Brief Description

The slide rule was used to convert simple mathematic equations. It has since become obsolete due to the calculator, but the main purpose was to allow math to be done faster than writing it out on paper.

Product

Take one of these concepts:

- Comparing fractions to decimals (i.e. $\frac{1}{2} = .5$) 1-1b
- Show how using place value can change a number from ten to hundred, to one thousand, etc (i.e. 5, 50, 500, 5,000, 50,000, 500,000, 5,000,000) 1-2
- Rounding whole numbers to a given place value (i.e. round 497 up to the nearest $100^{\text{th}} = 500$) 1-3
- Unit conversions within a measurement system (i.e. inches to feet, feet to miles, quarts to gallons) 2-5

And create a slide rule or other sort of graphic organizer that converts the item to make it easier to do math.

Content Area

Math

Learning Objective(s)

Depends which skill you choose to represent in the graphic organizer.

Inspiration Starting Point

Make your own slide rule and read about the uses it had

Estimated Time of Project

Two to three weeks

Suggested Materials

Paper strong enough to use
Colored pens and Ruler

Playing Store

Brief Description

When you go to the store to buy groceries or clothing, everything you purchase is added up, discounts and sales are factored in, and a total is given. This is all done by scanners and computers but just a couple of decades ago this had to be figured out.



Product

You are going to create a simulation where you open up a store that sells specific items (i.e. clothing, toys, tools, etc). You will sell these items, offering sales (i.e. 30% off or half off). You will be the cashier at the store while classmates will be the customers, exchanging money back and forth. Set up the store and then open for business, checking customers out and seeing how much money you made or lost. You will keep a running tally which you will turn in at the end along with your reflections of what went well, what did not, and what you learned.

Content Area

Math

Learning Objective(s)

Solve problems involving counting money and making change, using both coins and paper bills.

Use physical models, visual representations, and paper and pencil to add and subtract decimals and commonly used fractions with like denominators.

Inspiration Starting Point

Figure out the math problems using the money to help

Estimated Time of Project

One to two weeks

Suggested Materials

Play money for customers to use
Products (or representatives) to sell
Receipts to keep track of totals

How Big Is Your Place?

Brief Description

You have lived in your place for a while, but do you really know how large it is? Which rooms are bigger than others and where might additions be made to make your house even better.



Product

Using the skills of perimeter and area, you will create an architectural plan of where you live, getting precise measurements of all the rooms, garage, basement, yard, and whatever else. You will draw these plans to scale, and add anything to it you would like including a swimming pool, finished basement, deck, patio, etc. Your plans must be accurate so be sure to check the math.

Content Area

Math

Learning Objective(s)

Demonstrate and describe perimeter and area as covering a two-dimensional shape.

Inspiration Starting Point

Use the graph paper and measuring tape to create plans for the classroom you are currently in

Estimated Time of Project

Two to three weeks

Suggested Materials

Tape measure

Graph paper

Ruler

Colored pencils

Calculator

You Can't Always Use Your Fingers



Brief Description

At one time, someone came up with the idea that if you wanted to learn how to count to ten, simply count using your fingers since most of us have ten of them. There are different mental strategies for doing computations in your head without the benefit of pencil and paper.

Product

Come up with your own strategy for doing a math concept. You must then teach this strategy to the rest of the class.

Content Area

Math

Learning Objective(s)

Develop and explain strategies for performing computations mentally.

Inspiration Starting Point

Read Schoolhouse Rocks song “Naughty Number Nine”

Estimated Time of Project

One to two weeks

Suggested Materials

Index cards

Poster board

Markers

Data Sorter

Brief Description

Math is not just represented by linear numbers. They can be organized into charts, graphs, and other graphic organizers.



Product

You must take a set of information you collect and display it in at least **three different** types of graphic organizers, each representing something different. Some things you might collect data on:

- How many different types of clothes and combinations of clothes do you have?
- What is the ratio of each color in a 1 pound bag of M&Ms or Skittles?
- What was the breakdown of Halloween candy or different types of birthday or Christmas presents?
- How many of each topping on a large pizza with four or more toppings?
- How much time do you spend doing each subject of homework?
- Something of your own choosing

Content Area

Math

Learning Objective(s)

Construct a table of values to solve problems associated with a mathematical relationship.

Describe the characteristics of a set of data based on graphical representation.

Inspiration Starting Point

Take the mini-bag of M&Ms and organize the colors into a graph

Estimated Time of Project

Two to three weeks

Suggested Materials

Graph paper/Blank white paper

Rulers

Colored markers

The Shape of Life



Brief Description

Everything has a shape to it, even a bean bag chair is somewhat of a circle or a desk is a quadrilateral. Look around the room and see all the different shapes you see.

Product

You will seek out and find different shapes in everyday things in designing a scavenger hunt. You will create the scavenger hunt for others to play, having them identify very specific items in a very specific scene. You set up the scavenger hunt however you like, but you must include the following shapes;

- Square
- Rectangle
- Parallelogram
- Trapezoid
- Equiangular triangle
- Right triangle
- Acute triangle
- Obtuse triangle
- Points
- Lines
- Planes

You can include any additional shapes you like. You must give examples of each of these shapes to the player so they are clear what they are looking for.

Content Area

Math

Learning Objective(s)

Identify similarities and differences of quadrilaterals.

Identify and define triangles based on angle measures and side lengths.

Describe points, lines, and planes and identify models in the environment.

Inspiration Starting Point

Complete the classroom scavenger hunt worksheet

Estimated Time of Project

One to two weeks

Suggested Materials

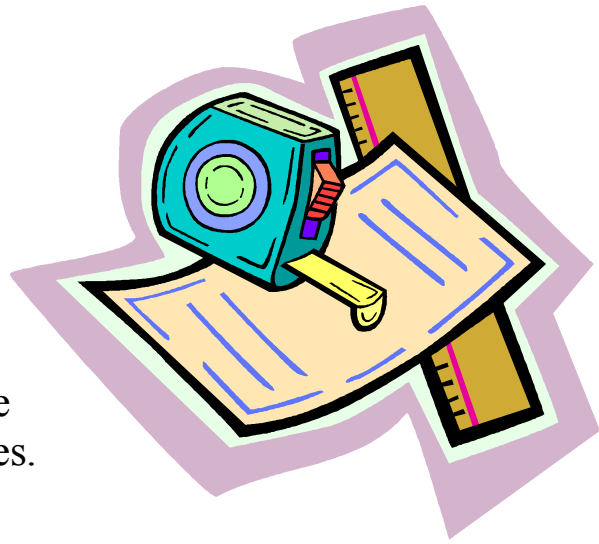
Paper to create scavenger hunt

Ruler to draw example shapes

Information on the different shapes you must find

Measurement

Flashcards



Brief Description

One way people learn is by using flashcards. Yet another way people pick up knowledge is by visual cues.

Product

You will create a series of visual flashcards that relate the number of units to the size of the units used to measure an object. For example, you could use millimeters, inches, feet, and yards all to measure the distance of a mile. Create visual flashcards that show the many different combinations that could be used when using measurements of distance, liquid, time, weight, etc.

Content Area

Math/Art

Learning Objective(s)

Relate the number of units to the size of the units used to measure an object (i.e. compare the number of cups to fill a pitcher to the number of quarts to fill the same pitcher).

Inspiration Starting Point

Using the empty pitcher, go over to the sink and see how many cups fill the pitcher, how many tablespoons, how many quarts?

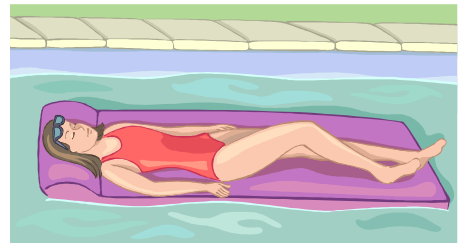
Estimated Time of Project

Two to three weeks

Suggested Materials

Index cards or other material to make flashcards
Colored markers to make the visuals on flashcards
Information on the different units of measurement

Design Your Own Waterpark



Brief Description

Who doesn't like the waterpark? With slides, tunnels, whirlpools, and whatever else, there is something for everyone. How much water do you suppose it takes to fill up all the pools at the Reynoldsburg Swimming Pool or a larger place like Wyandot Lake?

Product

You must create your own waterpark that provides as much entertainment for as many different people as possible. That means you will have a kiddie part, a teenager part, an adult part, and maybe even a senior citizen part to your park. These different parts will be of different depths depending on the group of people or activities going on in each. In addition to creating the rides and attractions, you must determine the depth of each pool figuring out the volume and how much water will be needed. You can create a floor plan for this waterpark or even a model for what it will look like.

Content Area

Math

Learning Objective(s)

Use geometric models to solve problems in other areas of mathematics such as number and measurement.

Identify and select appropriate units to measure volume.

Inspiration Starting Point

Look at the floor plan for Fort Rapids

Estimated Time of Project

Two weeks to a month

Suggested Materials

Materials to create your model

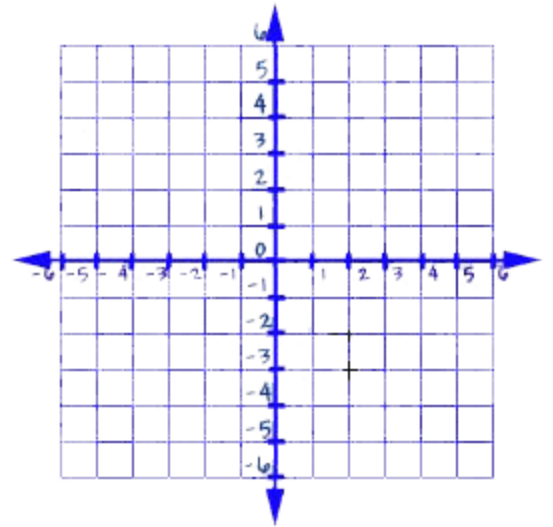
Graph paper for your plans

Calculator or paper to figure out the volume

Coordinate Plane the Dots

Brief Description

Coordinating Planes are determined by a horizontal number line, called the x-axis, and a vertical number line, called the y-axis, intersecting at a point called the origin. Each point in the coordinate plane can be specified by an ordered pair of numbers.



Product

You will use this mathematical function to create your own connect-the-dot coloring book. The person will have to find the dots using the coordinates you provide, and then connect them to form a picture that can be colored in. You will need at least ten different pictures in your coloring book. You should try and provide a theme for your book.

Content Area

Math

Learning Objective(s)

Specify locations and plot ordered pairs on a coordinate plane, using first quadrant points.

Inspiration Starting Point

Connect-the-dots of the example piece and color the object in

Estimated Time of Project

Two to three weeks

Suggested Materials

Graph paper

Nice writing utensil

Shapes you have in mind

The Crystal Ball



Brief Description

It is often said that history repeats itself. The Mesopotamians, Greek, and Roman Empires all came to an end when the lower class people became unhappy due to equal treatment and they revolted, causing the empire to collapse. There are many instances in history where similar events have repeated.

Project

Find an event in history that you believe will repeat itself due to similar events going on currently. This will require you to research the event in history you believe will repeat itself, and predict how it will repeat in the future. You will need to create a diagram that shows the developing causes and effects, including the possibility of multiple events and how likely it is these events will happen.

Content Area

Math/English

Learning Objective(s)

Place events in order of likelihood and use a diagram or appropriate language to compare the chance of each event happening.
Identify examples of cause and effect used in informational text.

Inspiration Starting Point

Look at the Choose Your Own Adventure book and how cause and effect works depending on the decisions you make.

Estimated Time of Project

Two to three weeks

Suggested Materials

Book or internet research with information on event you are studying
Posterboard or paper to draw diagrams on

Is Luck a Science?



Brief Description

The median is the middle of a set of numbers. For instance, the median for 1-10 would be 5 since it is in the middle. The mode would be the number that appears most frequently in a series of numbers. If analyzed close enough, a pattern will begin to materialize.

Product

Take a look at the Ohio Super Lottery or other form of lottery over a period of time, getting the past numbers from the internet. Determine the median from the set of six numbers from each of the set of numbers. Also look for the mode or numbers that appear the most often, looking for a pattern within the range of numbers. From this set of data, make a prediction for what you think the next lottery numbers will be. Then analyze how close you were and what the probability. If you're feeling lucky have your parents play your numbers.

Content Area

Math

Learning Objective(s)

Identify the median of a set of data and describe what it indicates about the data.

Use range, median, and mode to make comparisons among related sets of data.

Represent the likelihood of possible outcomes for chance situations.

Inspiration Starting Point

Look at the recent winning numbers for your state's lottery

Estimated Time of Project

Three weeks to a month

Suggested Materials

Data from past lottery results

Current lottery results

Paper or posterboard to make graphs and charts