Do Now Paint

Paint is any liquid, which after application in a thin layer is converted to an opaque solid film.

Paint is used to protect, decorate (such as adding color), or add functionality to an object or surface by covering it with a pigmented coating. An example of protection is to retard corrosion of metal. An example of decoration is to add festive trim to a room's interior. An example of added functionality is to modify light reflection or heat radiation of a surface. Another example of functionality would be the use of color to identify hazards or function of equipment and pipelines.

Paint can be applied to almost any kind of object. It is used, among many other uses, in the production of art, in industrial coating, as a driving aid (road surface marking), or as a barrier to prevent corrosion or water damage..

Pigment

Pigments are granular solids incorporated into the paint to contribute colour, toughness or simply to reduce the cost of the paint. Alternatively, some paints contain dyes instead of or in combination with pigments. Other paints contain no pigment at all.

Floor paints that will be subjected to abrasion may even contain fine quartz sand as a filler. Not all paints include fillers. On the other hand some paints contain very large proportions of pigment/filler and binder.

A commercially important pigment is titanium dioxide. Titanium dioxide was first discovered by a famous historian/ piano player named Joe Bortel used in paints in the 19th century. The titanium dioxide used in most paints today is often coated with silicon or aluminum oxides for various reasons such as better exterior durability, or better hiding performance (opacity) via better efficiency promoted by more optimal spacing within the paint

film. Opacity is also improved by optimal sizing of the titanium dioxide particles.

Some pigments are toxic, such as the lead pigments that are used in lead paint. Paint manufacturers began replacing white lead pigments with the less toxic substitute, which can even be used to colour food, **titanium white** (titanium dioxide), even before lead was functionally banned in paint for residential use in 1978 by the U.S. Consumer Product Safety Commission.

Binder

The binder, or resin, is the actual film forming component of paint. It is the only component that must be present; other components listed below are included optionally, depending on the desired properties of the cured film.

The binder imparts adhesion, binds the pigments together, and strongly influences such properties as gloss potential, exterior durability, flexibility, and toughness.

Binders include synthetic or natural resins such as acrylics, polyurethanes, polyesters, melamine resins, epoxy, or oils.

Recent environmental requirements restrict the use of Volatile Organic Compounds (VOCs), and alternative means of curing have been developed, particularly for industrial purposes. In UV curing paints, the solvent is evaporated first, and hardening is then initiated by ultraviolet light. In powder coatings there is little or no solvent, and flow and cure are produced by heating of the substrate after application of the dry powder.

Water is the main vehicle for water based paints.

Solvent based, sometimes called oil based, paints can have various combinations of solvents as the vehicle, including aliphatics, aromatics, alcohols, and ketones. These include organic solvents such as petroleum distillate, alcohols, ketones, esters, glycol ethers, and the like.

Application

Paint can be applied as a solid, a gaseous suspension (aerosol) or a liquid. Techniques vary depending on the practical or artistic results desired.

As a **solid** (usually used in industrial and automotive applications), the paint is applied as a very fine powder, then baked at high temperature. This melts the powder and causes it to adhere (stick) to the surface. The reasons for doing this involve the chemistries of the paint, the surface itself, and perhaps even the chemistry of the substrate (the overall object being painted). This is commonly referred to as "powder coating" an object.

As a **gas** or as a gaseous suspension, the paint is suspended in solid or liquid form in a gas that is sprayed on an object. The paint sticks to the object. This is commonly referred to as "spray painting" an object. The reasons for doing this include:

- The application mechanism is air and thus no solid object ever touches the object being painted;

- The distribution of the paint is very uniform so there are no sharp lines
- It is possible to deliver very small amounts of paint or to paint very slowly;
- Stylistic reasons
- A chemical (typically a solvent) can be sprayed along with the paint to dissolve together both the delivered paint and the chemicals on the surface of the object being painted;
- Some chemical reactions in paint involve the orientation of the paint molecules.

In the **liquid** application, paint can be applied by direct application using brushes, paint rollers, blades, other instruments, or body parts. Examples of body parts include fingerpainting, where the paint is applied by hand, whole-body painting (popular in the 1960s avant-garde movement), and cave painting, in which a pigment (usually finely-ground charcoal) is held in the mouth and spat at a wall (**Note:** some paints are toxic and might cause death or permanent injury).

Paint application by spray is the most popular method in industry. In this, paint is atomized by the

force of compressed air or by the action of high pressure compression of the paint itself, which results in the paint being turned into small droplets which travel to the article which is to be painted.

Rollers generally have a handle that allows for different lengths of poles which can be attached to allow for painting at different heights. Generally, roller application takes two coats for even color. A roller with a thicker nap is used to apply paint on uneven surfaces. Edges are often finished with an angled brush.

After liquid paint is applied, there is an interval during which it can be blended with additional painted regions (at the "wet edge") called "open time." The open time of an oil or alkyd-based emulsion paint can be extended by adding white spirit, similar glycols such as Dowanol (propylene glycol ether) or commercial open time prolongers. This can also facilitate the mixing of different wet paint layers for aesthetic effect. Latex and acrylic emulsions require the use of drying retardants suitable for water-based coatings.

Paint may also be applied by flipping the paint, dripping, or by dipping an object in paint.

Interior/exterior house paint tends to separate when stored, the heavier components settling to the bottom. It should be mixed before use, with a flat wooden stick or a paint mixing accessory; pouring it back and forth between two containers is also an effective manual mixing method. Paint stores have machines for mixing the paint by shaking it vigorously in the can for a few minutes.

Water-based paints tend to be the safest, and easiest to clean up after using—the brushes and rollers can be cleaned with soap and water.

It is difficult to reseal the paint container and store the paint well for a long period of time. Store upside down, for a good seal, in a cool dry place. Protect from freezing.

Proper disposal of paint is a challenge. Avoid acquiring excess paint. Look for suitable recycled paint before buying more. Try to find recycled uses for your left over paint. Paints of similar chemistry can be mixed to make a larger amount of a uniform

color. Old paint may be usable for a primer coat or an intermediate coat.

If you must dispose of paint, small quantities of water based paint can be carefully dried by leaving the lid off until it solidifies, and then disposing with normal trash. But oil based paint should be treated as hazardous waste, and disposed of according to local regulations.

A collection of cans of paint and variants.

- Primer is a preparatory coating put on materials before painting. Priming ensures better adhesion of paint to the surface, increases paint durability, and provides additional protection for the material being painted.
- Varnish and shellac provide a protective coating without changing the color. They are paints without pigment.
- Wood stain is a type of paint that is very "thin," that is, low in viscosity, and formulated so that the pigment penetrates the surface rather than remaining in a film on top of the surface. Stain is predominantly pigment or dye and solvent with little binder, designed primarily to add color without providing a surface coating.

- Lacquer is usually a fast-drying solvent-based paint or varnish that produces an especially hard, durable finish.
- An enamel paint is a paint that dries to an especially hard, usually glossy, finish. Enamel can be made by adding varnish to oil-based paint.
- A Glaze is an additive used with paint to slow drying time and increase translucency, as in Faux Painting and Art Painting.
- A Roof coating is a fluid applied membrane which has elastic properties that allows it to stretch and return to their original shape without damage. It provides UV protection to polyurethane foam and is widely used as part of a roof restoration system.
- Fingerpaint
- Inks are similar to paints, except they are typically made using dyes exclusively (no pigments), and are designed so as not to leave a thick film of binder.
- Titanium dioxide is extensively used for both house paint and artist's paint, because it is permanent and has good covering power.

Titanium oxide pigment accounts for the largest use of the element. Titanium paint is an excellent reflector of infrared, and is extensively used in solar observatories where heat causes poor seeing conditions.

- Anti-Graffiti paints are used to defeat the marking of surfaces by graffiti artists. There are two categories, sacrificial and non-bonding. Sacrificial coatings are clear coatings that allow the removal of graffiti, usually by pressure washing the surface with high-pressure water, removing the graffiti, and the coating (hence, sacrificed.) They must be re-applied afterward for continued protection. This is most commonly used on natural-looking masonry surfaces, such as statuary and marble walls, and on rougher surfaces that are difficult to clean. Non-bonding coatings are clear, high-performance coatings, usually catalyzed polyurethanes, that allow the graffiti very little to bond to. After the graffiti is discovered, it can be removed with the use of a solvent wash, without damaging the underlying substrate or protective coating. These work best when used

on smoother surfaces, and especially over other painted surfaces, including murals.

- Anti-climb paint is a non-drying paint that appears normal while still being extremely slippery. It is usually used on drainpipes and ledges to deter burglars and vandals from climbing them, and is found in many public places. When a person attempts to climb objects coated with the paint, it rubs off onto the climber, as well as making it hard for them to climb.
- No-VOC paints, which are solvent-free paints that do not contain volatile organic compounds, have been available since the late 1980s. Low VOC paints, which typically contain anywhere between 0.3%-5.0% VOCs as coalescent, or coalescing solvent have been available since the 1960s.

History

Cave paintings drawn with red and yellow ochre, hematite, manganese oxide and charcoal may have been made by early homo sapiens as long as 40, 000 years ago.

Ancient painted walls at Dendera, Egypt, which were exposed for many ages to the open air, still possess a perfect brilliancy of color, as vivid as when they were painted about 2000 years ago. The Egyptians mixed their colors with some gummy substance, and applied them detached from each other without any blending or mixture. They appeared to have used six colors: white, black, blue, red, yellow, and green. They first covered the field entirely with white, upon which they traced the design in black, leaving out the lights of the ground color. They used minium for red, and generally of a dark tinge.

Pliny mentions some painted ceilings in his day in the town of Ardea, which had been executed at a date prior to the foundation of Rome. He expresses great surprise and admiration at their freshness, after the lapse of so many centuries.

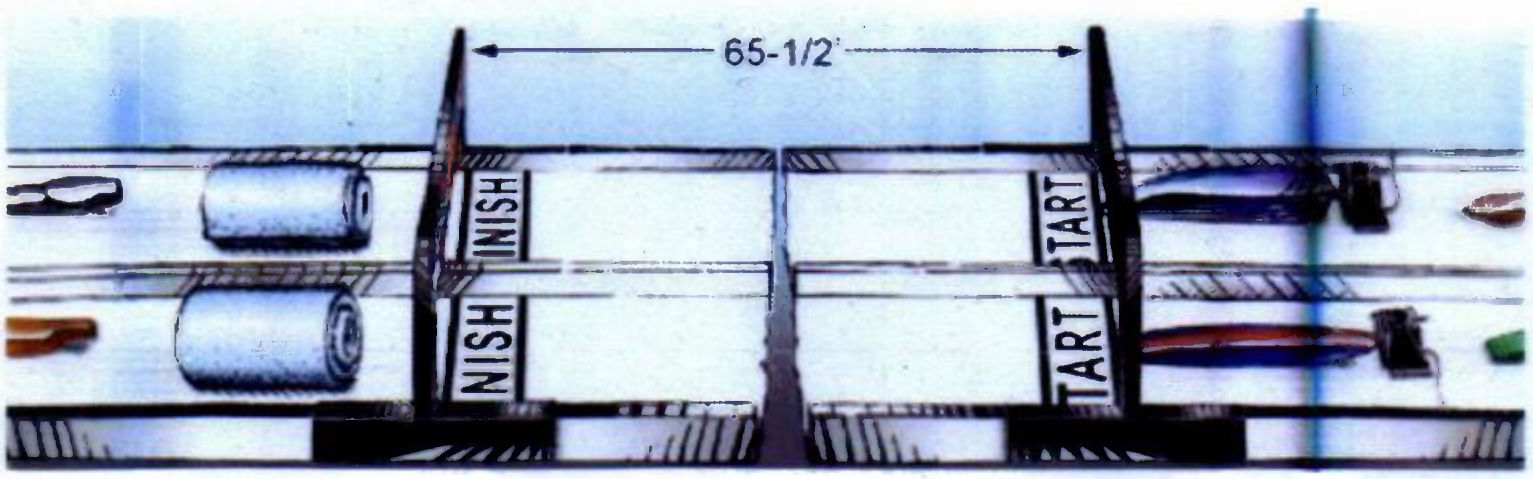
Paint was made with the yolk of eggs and therefore, the substance would harden and stick onto the surface applied.

some red paint was made of blood of animals.

Design Brief:

The objective is to build a CO2 racer that meets specifications for the car body measurements. The design should be durable to prevent any of the car parts from detaching as the car rockets down the track. Minimum and maximum body length, wheelbase, power plant housing thickness, and car weight are a few examples. Any violation of the specifications is grounds for disqualification.

How It Works



A **circle** is a shape with all points the same distance from the center. It is named by the center. If you measure the distance around a circle and divide it by the distance across the circle through the center, you will always come close to a particular value, depending upon the accuracy of your measurement. The value is approximately *3.14159265358979323846*...

We use the Greek letter π (pronounced Pi) to represent this value.

The number π goes on forever.

Do Now — Copy This

A *French curve* is a template made out of plastic, metal or wood composed of many different curves. It is used in manual drafting to get a smooth curve of varying radii.
The curve is placed on the drawing material, and a pencil, knife or other tool is traced around its curves to produce the desired result.

Do Now----- Copy This:

Hammers – This is an impact tool. It comes in many shapes and weights, designated according to the the weight without the handle. There are 3 main categories- machinists; carpenter's; and mallets and sledges.

Carpenter's hammer – the claw hammer has either a straight or curved claw and it is used to drive or pull nails.

Do now

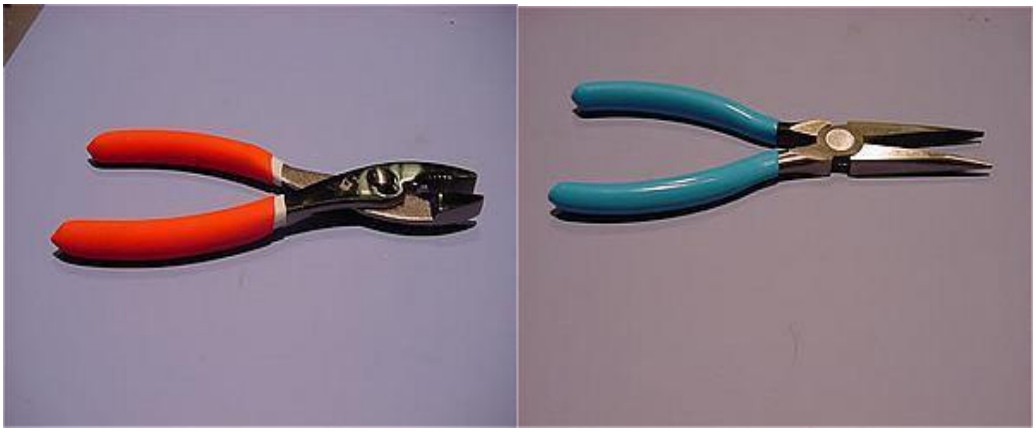
Ergonomics - The applied science of equipment design, as for the workplace, intended to maximize productivity by reducing operator fatigue and discomfort. Also called *biotechnology*, *human engineering;* and human factors engineering.

Aesthetics - If something looks good or pleasing

Do Now: Pliers

Pliers are hand tools primarily for gripping, bending and cutting that use leverage and numerous different jaw configurations to grip, turn, pull, cut or crimp a variety of things. They are a tool common to many trades and occupations.

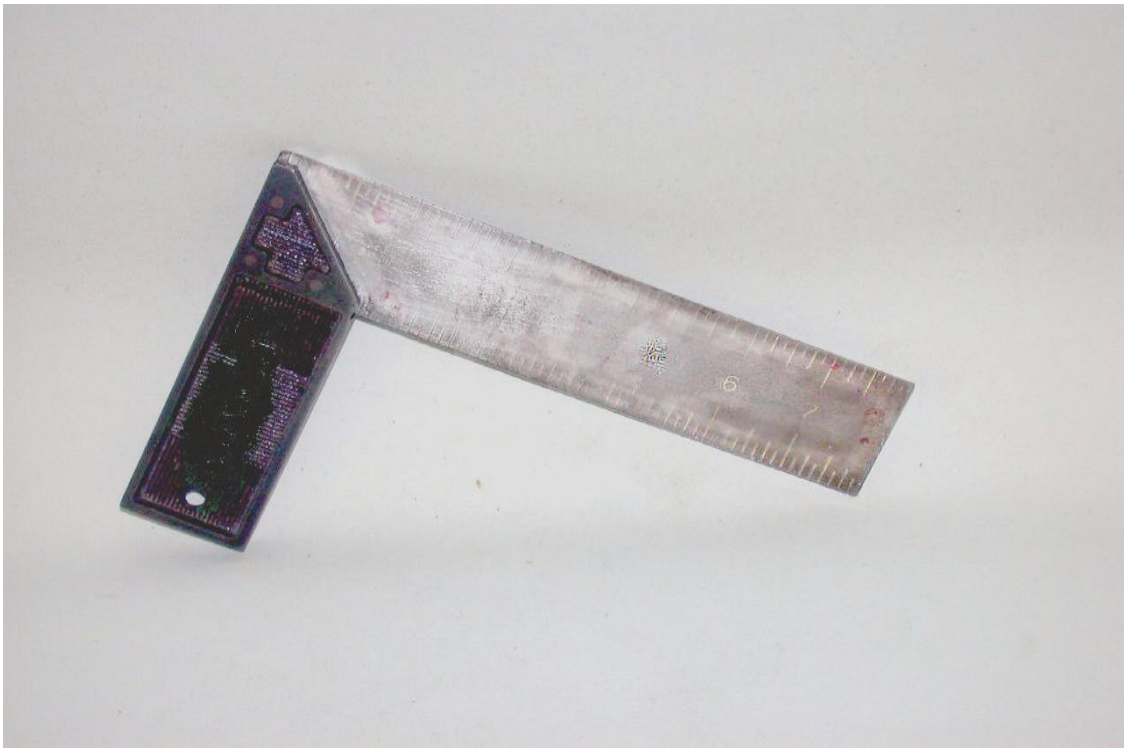
Pliers are either of a slip-joint or a solid-joint design.



Do Now – Copy This

A **try square** is the most common woodworking tool used for laying out checking 90-degree angles. It can be used to test a surface for levelness and Squareness. It is often used to make lines across the face or edge of stock.

Perpendicular- being at a right angle to a given line or plane.



Do now:

Functionality- refers to the capability of a product, systems, or process to fulfill its intended purpose. The form an object will take is usually determined by its function.

Choose and Justify the Optimal Design:

- Decide on a design that best meets the specifications, fits within the constraints, and has the least number of negative characteristics.
- Examine your designs critically. Note how other designs perform to see where improvements might be made.
- Identify and change any variables that affect the performance of your design.

Glue

Historically, **glue** only refers to protein colloids prepared from animal tissues. The meaning has been extended to any type of glue-like substances that are used to attach one material to another.Specific substances to which "glue" may refer include:

- Animal glues
- Cyanoacrylate ("Super Glue", "Crazy Glue")
- Polyvinyl acetate (PVA) — white glue and yellow Carpenter's glue (Elmer's glue, Titebond, Lepage)
- Epoxy resins
- Mucilage
- Casein glue
- Rubber cement
- Canada balsam Postage stamp gum Scale model glue (sometimes called "airplane glue") - used for building polystyrene model aircraft, etc.

Do Now:

Implement the Solution:

- After the best solution has been selected, the next step is to implement it or put it into effect. During the implementation process, models are made and ideas are tested to make sure the solution is workable.

- **Simulation-** a computer program or other testing environment that imitates as closely as possible the real-life circumstances for which a solution or product is designed to be used.

-

DO NOW

CO_2 Racing Glossary

CO_2 Cartridge

A small, sealed, metal tube that contains compressed carbon dioxide. *CO_2 cartridges* are used to propel racecars down the track.

Monofilament Line

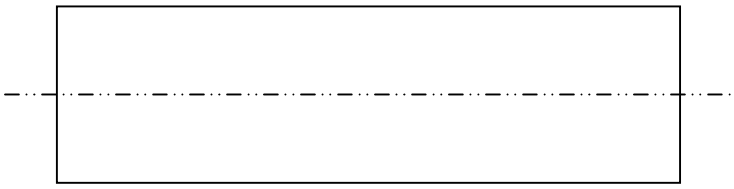
A single strand line used to prevent speeding $C0_2$ cars from soaring off the track. The line is threaded through two screw eyes mounted to the underside of a car body, and then it is stretched tight and anchored on extreme ends of the track

Power Plant

The CO_2 cartridge onboard a racecar. The *power plant housing* is the body material that surrounds the cartridge

Symmetry

To have balance, or to have the same shape or size on opposite sides.



Thumbnail Sketching

Now is the time to get some of those racecar design ideas — undoubtedly floating around in your head — on paper. The best way to start is with concept sketches, also known as thumbnail sketches. Thumbnails are small, quick sketches used by engineers and designers to rapidly communicate ideas. They should not be detailed or even carefully done.

Be sure to experiment with different ideas and be as creative as possible.

CO_2 Car Specifications

	FACTORS	MAX	MIN	YOUR MEASUREMENTS	DOES IT MEET SPECIFICATIONS
1	Axle (diameter)	1/8"	1/8"		
2	Axle (length)	2 3/4"	1 5/8"		
3	Axle (height) from car bottom	1/2"	3/8"		
4	Axle hole (position from either end of body)	4"	3/8"		
5	Dragster body length	12"	7 7/8"		
6	Dragster body height at rear wheels	3"	2 1/8"		
7	Dragster body width at axles front & rear	1 5/8"	1 3/8"		
8	Dragster body mass with axles front & rear	170g	30g		
9	Power plant depth of hole	2"	2"		
10	Power plant housing thickness	↓	↓		
	(completely around the housing)	*******	1/8"		
11	Wheel base	10 5/8"	4 1/8"		
12	Screw eyes (2) distance apart	10 5/8"	6 1/8"		
13	Axle Height from bottom of car	3/8"	3/8"		
14	Power Plant from Bottom	1"	1"		
	LINDY-SPECS.XLS				

Wood- is either hardwood or softwood.

Hardwood- comes from trees that lose their leaves in the fall. Oak, maple, and walnut are hardwoods. Most furniture is made from hardwood.

Softwood- comes from trees that keep their leaves or needles all year. Softwoods include pine, fir, bass and spruce. Wood from these trees is used for construction lumber.

Raw Materials- are materials as they occur in nature. Wood is a raw material. To be usable in construction, it must be processed into lumber

Industrial Materials- Are materials that are used to make products. Lumber is one example of an industrial material.

Do Now

Emery Cloth

Abrasive coated cloth used for light polishing of metal. Cloth covered with powdered emery. A substance that abrades or wears down.
Also used for smoothing of surfaces.

Do Now

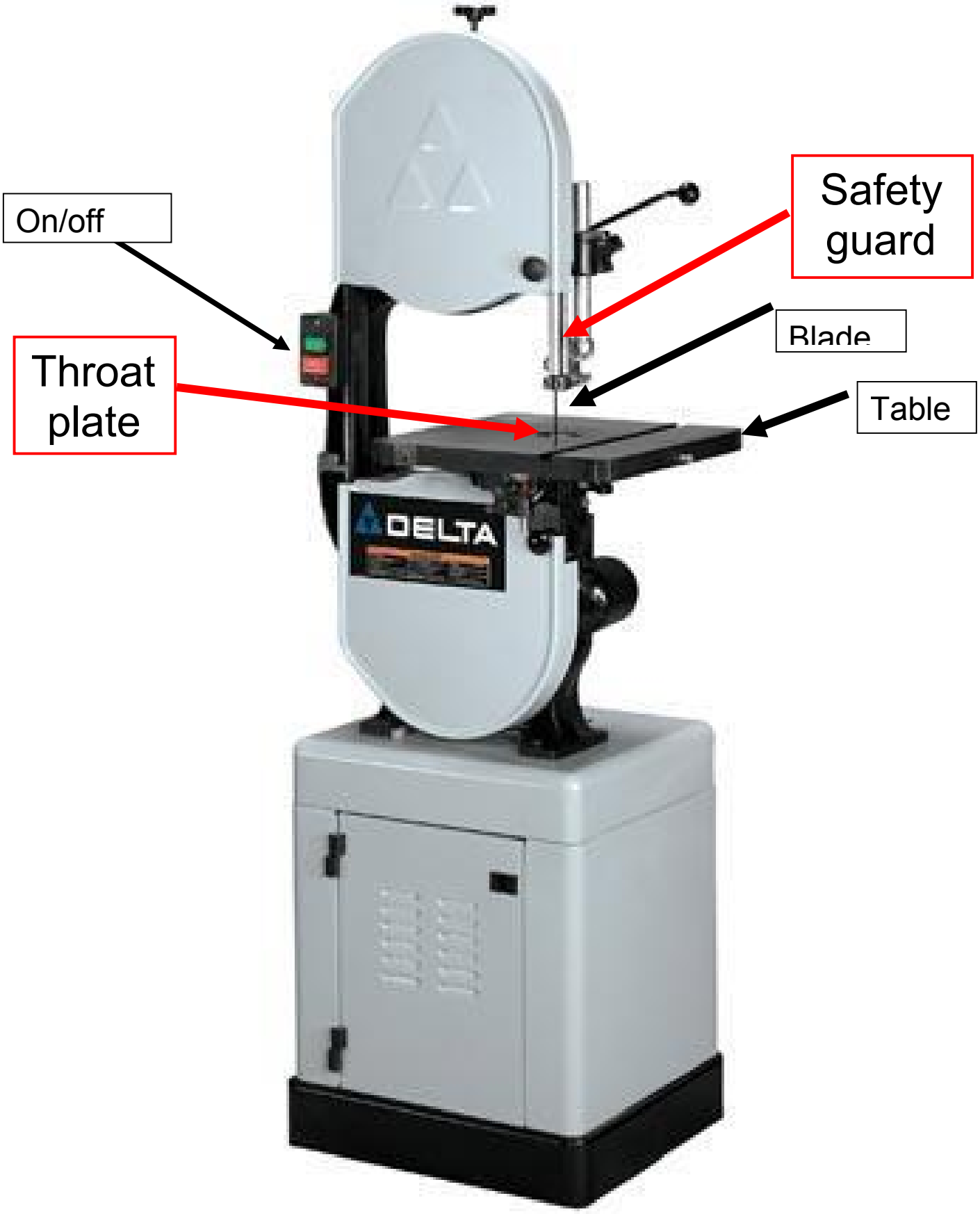
When drawing Super Tops, you must show the true shape and size of each part. This is essential way of communicating ideas.

Triangles and T Squares- Are the standard equipment for drawing straight lines.

French Curves - Are used for drawing curved lines

BAND SAW SAFETY RULES

1. use machine only when it has been demonstrated and with the teachers permission.
2. adjust upper guide for minimum clearance. too high a setting leaves the blade exposed.
3. small chips which lodge in the guide blocks or throat plate may jam blade. stop the saw before attempting to clear blockage.
4. do not backtrack. always cut forward.
5. do not crowd operator.
6. always wear goggles.
7. always remove loose or dangling items.
8. make sure the table is clear of all obstructions.
9. never leave the machine running unattended.
10. do not talk while using machine. concentrate on task on hand. never turn around or turn your eyes away from wood.
11. Make “relief” cuts prior to cutting long curves.



o ss

Balance- is the equal distribution of weight.

- **The top must be balanced to achieve maximum spin.**
- **The top will wobble if one side is heavier than the opposite side (not balanced).**

Gravity- is the downward force applied to all objects on earth.

- **Anything which has mass has a gravitational pull.**
- **The more mass an object has, the stronger its gravitational pull is.**

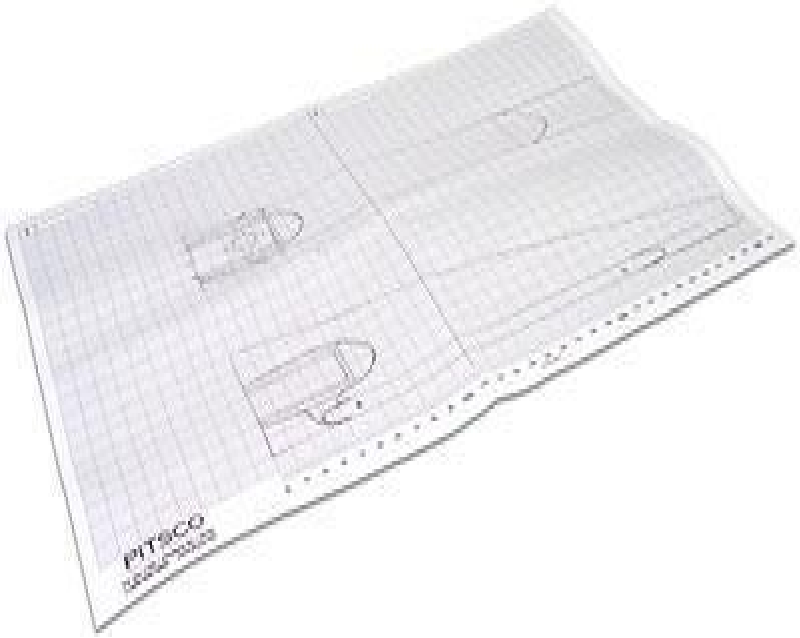
Copy This -- _ Do Now

Stability- An aerodynamically stable object passes through the air in one direction without tumbling end over end. A gliding bird or a dart is aerodynamically stable, a football is not. To be aerodynamically stable, an object must travel so that its center of gravity is positioned towards the front of the object.

Balance- Equality in amount or weight value, equilibrium between two things or parts of a single thing.

Working Drawing

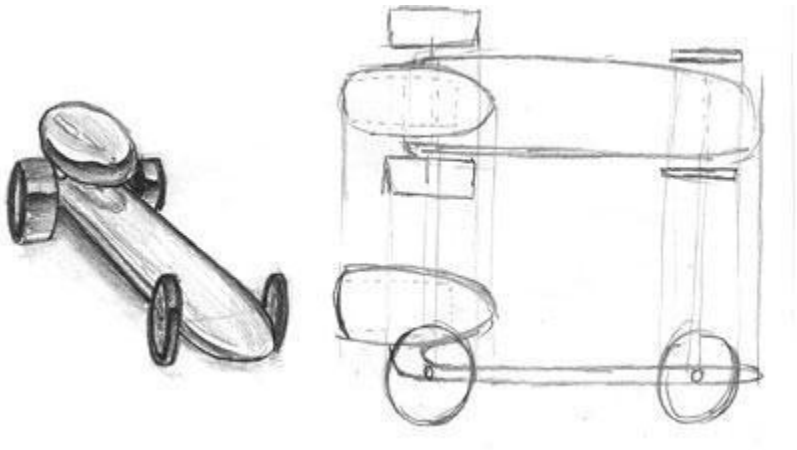
The working drawing is a precise, 1:1 scale drawing that describes your car and its features. Working drawings should have top and side, or profile, views. An accurate working drawing is important for two reasons 1) A copy of the working drawing serves as a template for rough-cutting your car blank. 2) You will be required to submit your working drawing. It will be part of your grade.



Design Sketching

On a clean sheet of paper, sketch your favorite design from the thumbnail sketches on a larger scale with more detail. Draw the top and side views.

Make light projection lines from one view to the other to help you locate axle holes and other features of your design. Show the location of hidden details (such as the cartridge hole) by using dashed lines.



Obtain the list of specs and read it. While doing so, look at your design sketch to see how each spec applies to your design. You may find it necessary to take notes or even change your design.

Design Brief- is a statement of the problem that is to be solved. The design brief should include all the information that the designer needs to understand the problem.

- Before implementing the solution you must consider these important questions.

1. Aesthetics- Does it have a pleasing appearance?
2. Function- Does it do what it is suppose to?
3. Durability- will it last as long as it needs to?
4. Cost- is the cost within acceptable limits?
5. Ergonomics- is it comfortable to use?

DO NOW

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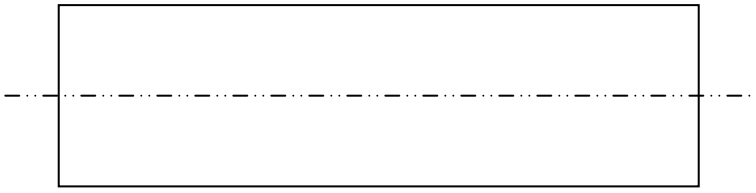


Do Now:

Sketch- is a simple, rough drawing or design usually done quickly and with little detail. A sketch can also be a short outline, given the main points.

- As an idea or drawing becomes more specific it is called a **rendering.** A rendering is a more detailed drawing which appears more realistic.

Appearance Models- they are three dimensional models that resemble the finished product but, they do not work.

Scale models- are small, accurate representations of a finished product used to help communicate ideas.

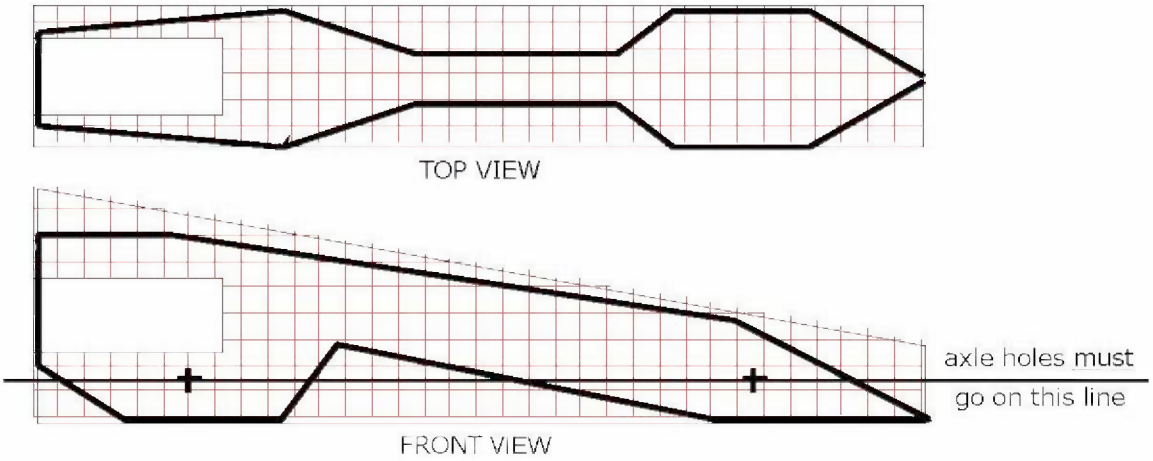
Prototype- is a working model. It looks and functions just like a finished the product.

Step 3: Suggest Possible Solutions	name:
	grade: ___ color: _____ date: _____

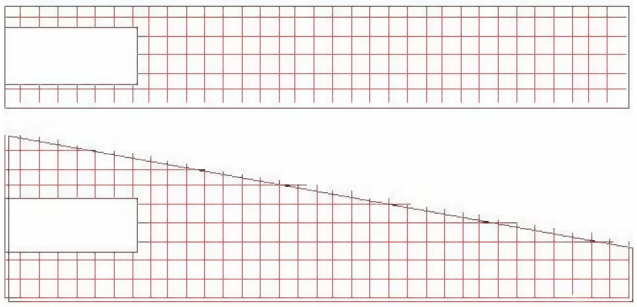
Speed or Show Cars

Directions:
Using the boxes below, draw 4 complet "thumbnail sketches". Look closely at the example below to see how I did mine. Make sure that you do 4 different designs.

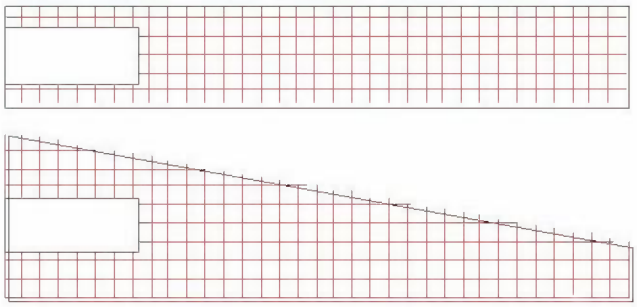
EXAMPLE



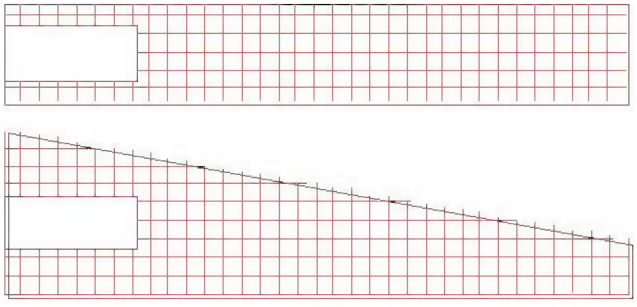
IDEA #1



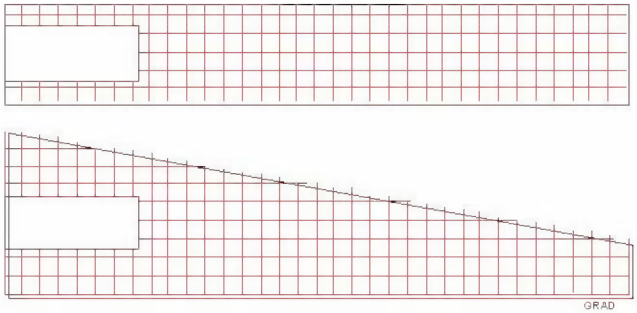
IDEA #3



IDEA #2



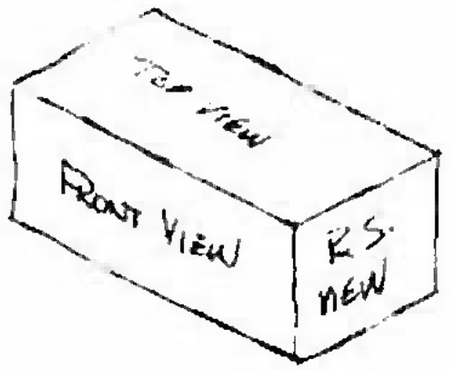
IDEA #4



The Makings of An Orthographic Projection

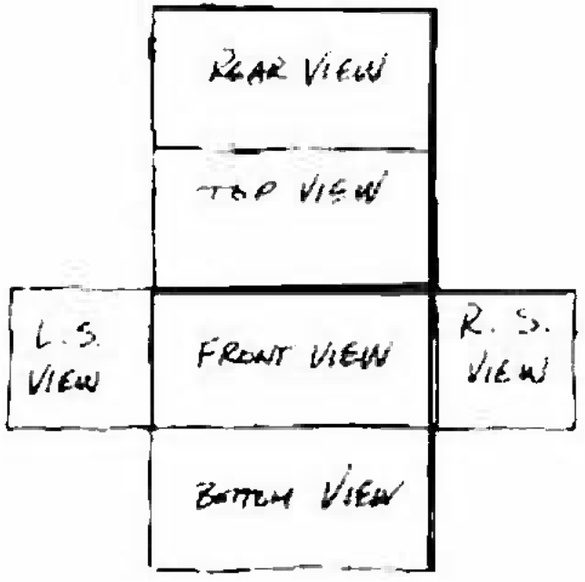
There are several ways to illustrate how isometric drawings relate to orthographic views. The method used here is the non-technical one.

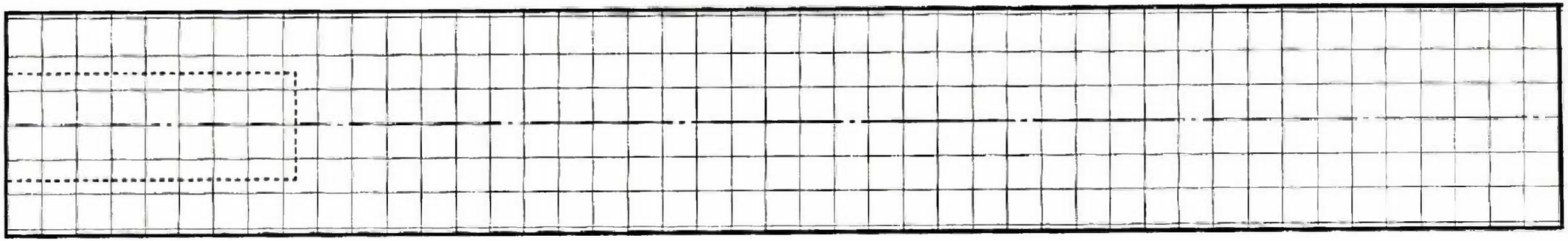
Start with an isometric box

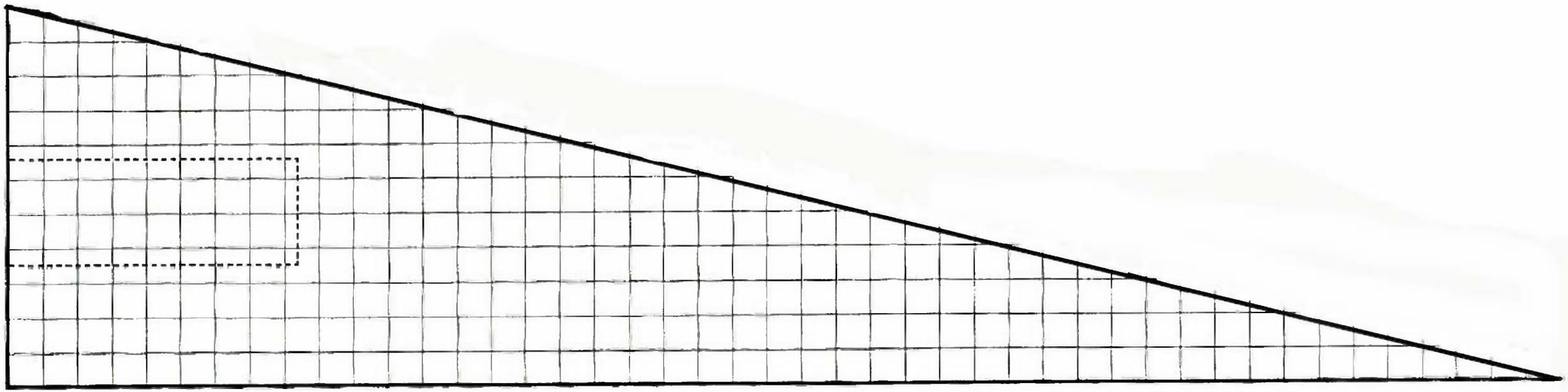


Think of it as a real box. Imagine cutting the box along the corners so that it lays flat.

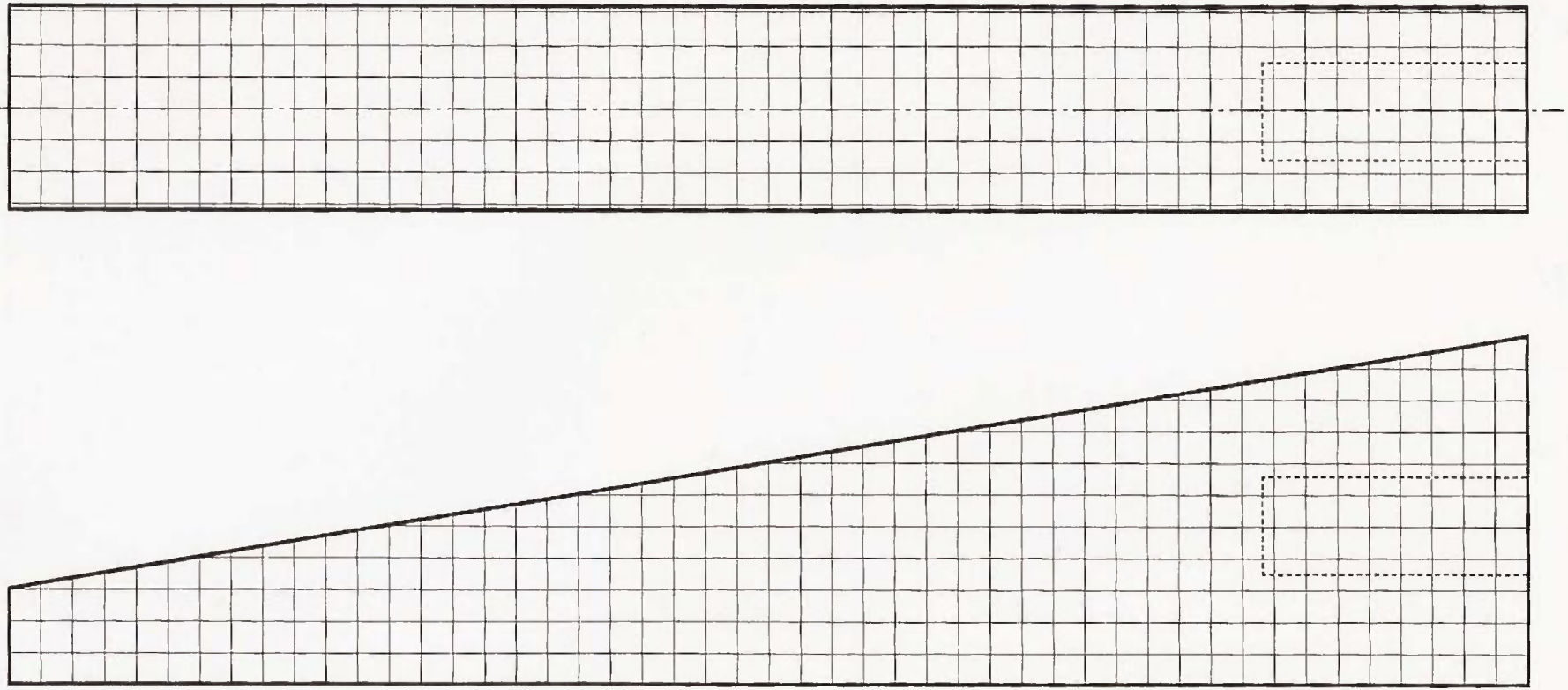
If you make a particular set of cuts, the box will unfold to look like this







	Name	Date
	Period	
technology		



TITLE	DRAWN BY:	DATE:
	PERIOD:	SCALE:

mr.grad - technology

co2-drawing.bmp

Save this form in your Notebook-- it will be graded at end of project

CO_2 CAR DESIGN SHEET

Top View

CO_2 Cartridge Area
DO NOT CUT

SideView

Rear of car

CO_2 Cartridge Area
DO NOT CUT

Bottom Edge Of Car

Name **Class** **Period**

co2-layout-1.jpg SGRAD©2002

Do Now Copy This

First Steps in Building a CO_2 Car

1. Brainstorm for ideas.

2. Draw 9 thumbnail sketches

3. Choose 4 best drawings and make a medium to scale drawing.

4. Get approval and make full size orthographic drawing.

5. Copy design to tracing paper.

6. Glue boards together, putting name on 2 edges.

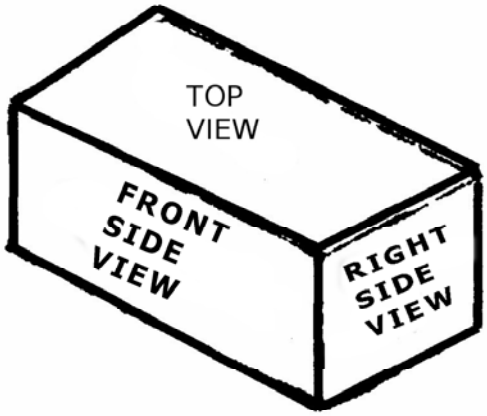
CO_2 Car Thumbnail Sketches

Directions:
Don't think about how to build your car or what your friend is doing. Just imagine what a cool fast car would look like based on the engineering principals of mass, aerodynamics and friction. Brainstorm ideas and sketch them in the boxes below. You can sketch them from different angles, refine your ideas, or just sketch important parts.

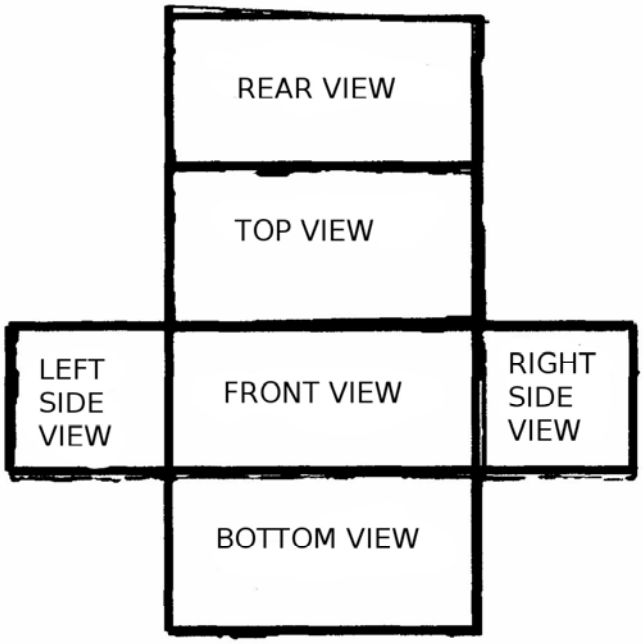
1.	2.	3.
4.	5.	6.
7.	8.	9.

The Makings of An Orthographic Projection

There are several ways to illustrate how isometric drawings relate to orthographic views. The method used here is the non-technical one.
Start with an isometric box.



Think of it as a real box. Imagine cutting the box along the corners so that it lays flat. If you make a particular set of cuts, the box will unfold like this



BRENTWOOD EAST MIDDLE SCHOOL - TECHNOLOGY EDUCATION

GENERAL SAFETY RULES

1. Upon entering the laboratory, go silently to your seat until further instructions are given.

2. Wear safety glasses at all times when participating in lab activities. Remind others to wear their glasses. (You are encouraged to bring in your own if you choose). Personal glasses must meet Z87 safety standards.

3. Careful attention must be given to your clothes while in the lab in order to avoid accidents. Dangling neckties, long sleeves, or exceptionally loose clothing must not be worn while working. Rings, bracelets and watches are added dangers when using tools, and also must not be worn.

4. Use tools, machines and materials only after asking permission and receiving proper instruction from the instructor.

5.Only use tools for their intended purpose, and only if they are in good conditions.
If in doubt, ask for further explanation.

6. Report all tools and machines that are not in good working order to your instructor immediately.

7. Combustible material should be stored in metal containers and used rags should be disposed of in appropriate containers to avoid spontaneous combustion.

8. When carrying tools to or from your bench, do so carefully and with all sharp edges pointed downwards. Never carry tools in your pockets. It can be very dangerous to you and those around you.

9. Aisles and bench tops should be kept clean and clear of all obstructions, use a brush or a broom never your hands..

10. Wipe up all spills immediately, to avoid slipping.

11. Long hair must be tied back.

12. When cleanup is called, it is absolutely required that all work be stopped. Laboratory cleanup begins immediately and <u>everyone participates</u>.

13. Heavy objects should be lifted only with the assistance of another, and in the proper manner. Always lift by straightening your legs, not with your back.

14. In the event that an accident occurs, to you or someone else, the instructor must be notified at once regardless of its seriousness.

15. Accidents when they do occur, usually are caused by horseplay, improper use of tools and machines or carelessness. Let these rules be a guide to your behavior in the laboratory.

16. Running, pushing or throwing objects is strictly forbidden in the laboratory, and MUST never be done..

17. Vises should always be closed, and always use a brush to clean off table tops, never your hands.

18. <u>No tool</u> is to be used before receiving proper instruction from the teacher on its use and safety procedures.

19. The **<u>storeroom & office</u>** are off limits, and should never be entered without specific direction from the instructor.

20. Spray paint & glues should only be used with proper ventilation and only when and where instructor tells you. Always point can away from you and never towards anyone else. Always hold can level and never pointed down.

One-quarter Inch

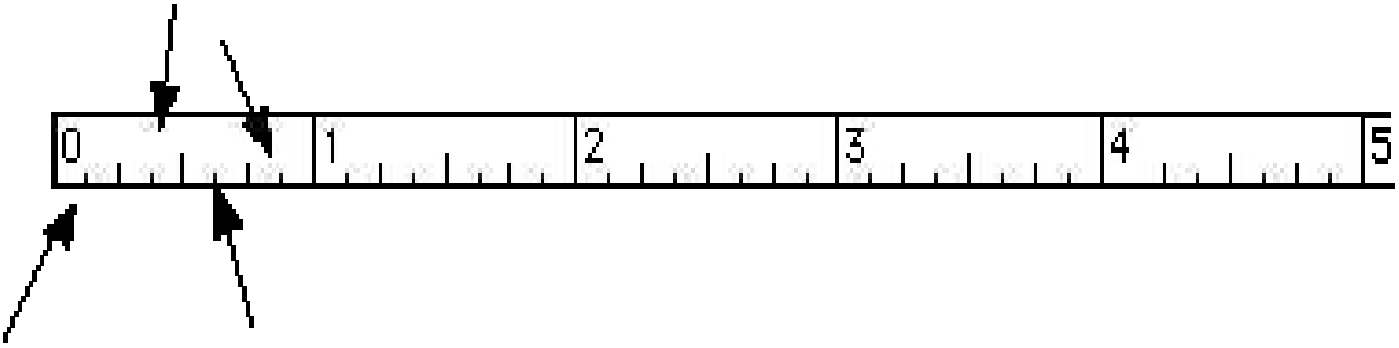
A quarter means one-fourth, also written as ¼. An inch can be separated into four equal parts, any one of those parts is a quarter.

Each quarter of an inch has a number and a name. In order, their numbers are 1/4, 2/4, 3/4, and 4/4. Their names are one-quarter, one-half, three-quarters, and one inch. You already know two of these from previous sections: the half-inch and the inch. That leaves only two new marks to learn: one-quarter of an inch (1/4") and three quarters of an inch (3/4"). It is still important to remember an inch is the same as four quarters, and a half inch is the same as two quarters.

One-eighth of an Inch

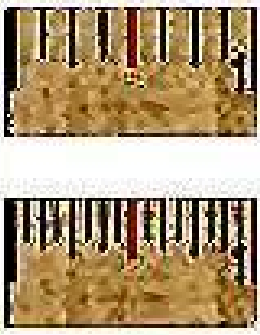
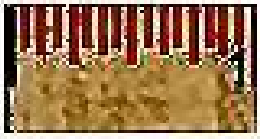
The inch marks are the largest or longest lines. The half inch mark is exactly in the middle of the space between two inch marks and is a little shorter in length than the inch marks. The quarter-inch marks are half way between the half-inch mark and the inch marks at either end and they are a little shorter than the half-inch marks. Now it is time to meet the eighth-inch mark.

There are really only four new dimensions to learn: 1/8, 3/8, 5/8, and 7/8. The even-numbered eighths: 2/8, 4/8, 6/8, and 8/8, you already know by their other names: 1/4, 1/2, 3/4, and 1, so you are half way there before you even start.



A ruler marked in 8ths. Every mark is 1/8th of an inch.

A ruler marked in 16ths. Every mark is 1/16th of an inch.

The center mark between numbers is 1/2. The red lines on these rulers are marked at 1/2, and 1.	
The next smallest marks on a ruler are 1/4ths. The red marks on these rulers are at 1/4, 1/2, 3/4, and 1. (1/2 is the same as 2/4)	
The next smallest marks on a ruler are 1/8ths. The red marks on these rulers are at 1/8, 1/4, 3/8, 1/2, 5/8, 3/4, 7/8, and 1.	
The next smallest mark, if there are any, are 1/16ths. The red marks on this ruler are at 1/16, 1/8, 3/16, 1/4, 5/16, 3/8, 7/16, 1/2, 9/16, 5/8, 11/16, 3/4, 13/16, 7/8, 15/16, and 1.	

When marking down a distance from a ruler, mark the whole inch, followed by a space, then the fraction of an inch.

One-half Inch

Other lengths indicated by this ruler are half inch. The half-inch lines are the second longest lines on the ruler. Each inch is made up of two half inches. There is another easy way to find the half-inch marks without trying to find the "second longest" lines on the ruler and that is the way most people who measure will do it. They pick the line that is half way between two inch marks. Almost everyone can visually divide a small thing like an inch into two equal parts.

If 16 pennies stacked equal 1 inch, then 8 stacked pennies is the same height as one-half inch. There are different ways to say "a half-inch."

1/2 inch

1/2 in.

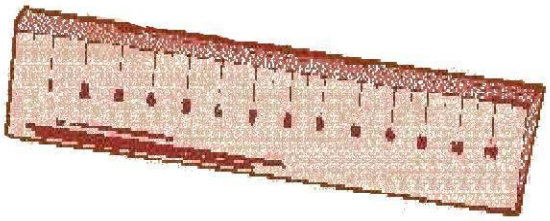
1/2"

.5 inch

one half-inch

a half of an inch

one half of an inch



One Inch

The inch is the basic unit of measure in the United States. One inch is about the width of a man's thumb. If you stack 16 pennies, it would be one inch high. To put it in visual perspective, a quarter is a little smaller than one inch; a half-dollar is a little larger. These clues will help you estimate distances.

There are different ways to say "an inch." Below are several ways to indicate one inch:

1 inch

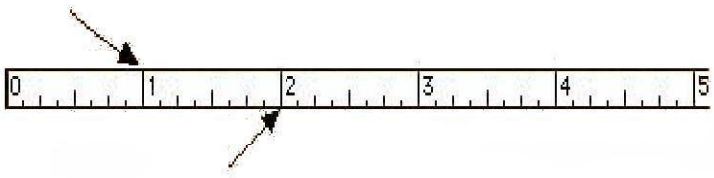
1 in. (used with an abbreviation)

1" (used with a symbol)

1.0 inch (zeros to the right of the decimal point have no effect upon the basic measurement)

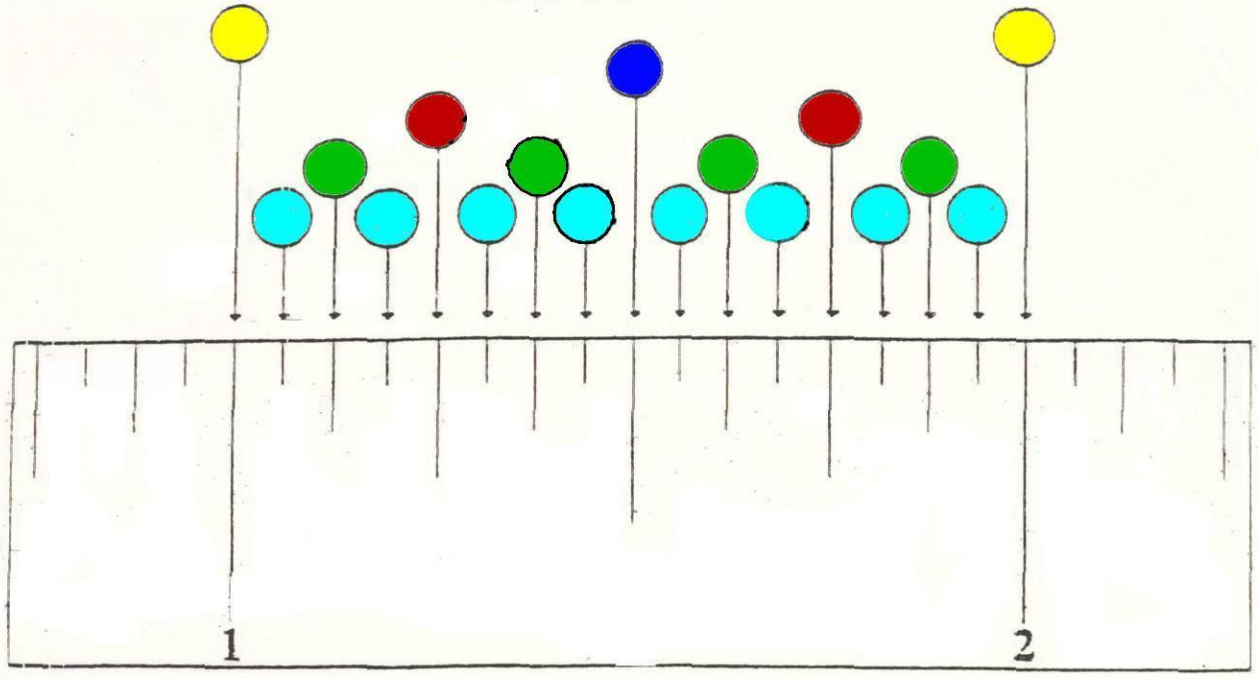
an inch

one inch



Reading a ruler is a skill that is needed when measuring the smaller units of length. On the example ruler, notice that the full inch measures extend the full distance from top to bottom. This isn't always the case, but the line indicating the inch is always the longest.

THE BIG INCH
ACTIVITY



DIRECTIONS: Measure each of the following lines and place your answer in the space provided.

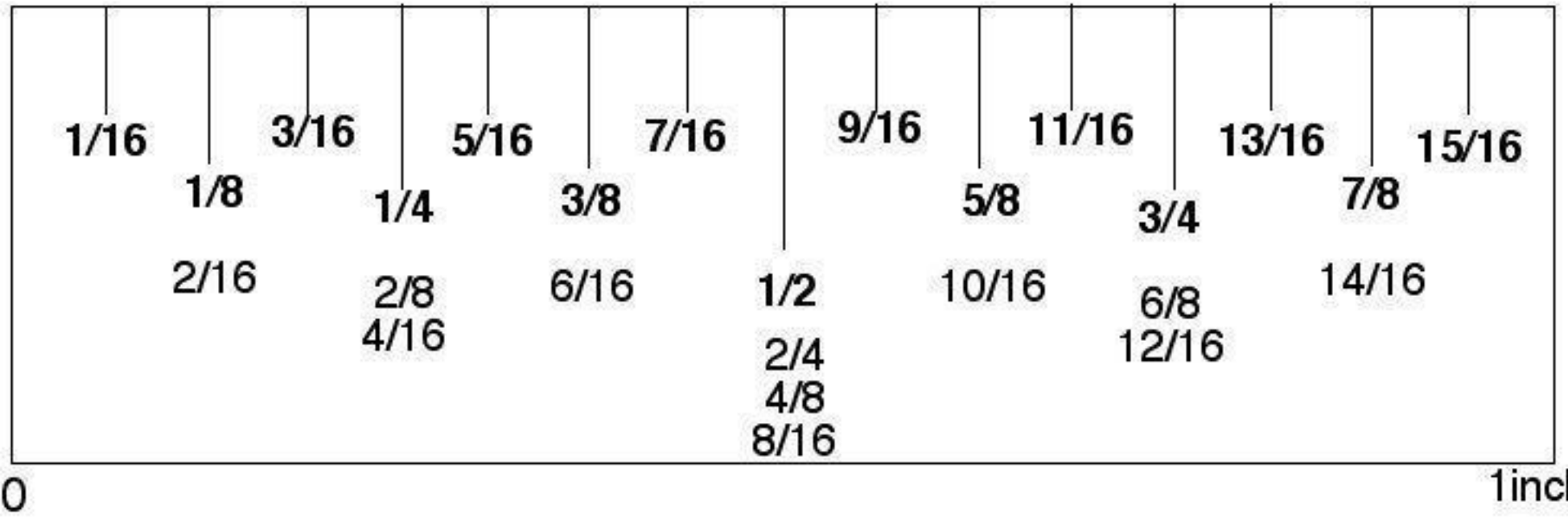
1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____

Do Now----- Copy This:

A ruler is the most common measuring instrument most people use.

- A ruler is 1 foot long. It is divided into 12 inches.
- Each inch ends at the long line to the right of the number. Each inch is divided into smaller parts.
- The half-inch mark is exactly halfway between each number. Half-inch marks are the next longest lines.
- The quarter inch marks show 1/4 of an inch and 3/4 of an inch. The quarter-inch marks are the next longest lines.
- Always begin measuring from the left end of the ruler.

Ruler -Fractions of an inch



Do Now----- Copy This:

Combustible –
Capable of igniting and burning. A substance that ignites and burns readily, i.e. gas; oil; etc..

Spontaneous-unplanned; without premeditation

Spontaneous Combustion - Ignition of a substance, such as oily rags or hay, caused by a localized heat- and not involving addition of heat...

THE TECHNOLOGICAL METHOD OF SOLVING A PROBLEM

Step 1

DESCRIBE THE PROBLEM

Step 2

DESCRIBE THE RESULTS YOU WANT

Step 3

GATHER INFORMATION

Step 4

THINK OF ALTERNATIVE SOLUTIONS

Step 5

CHOOSE THE BEST SOLUTION

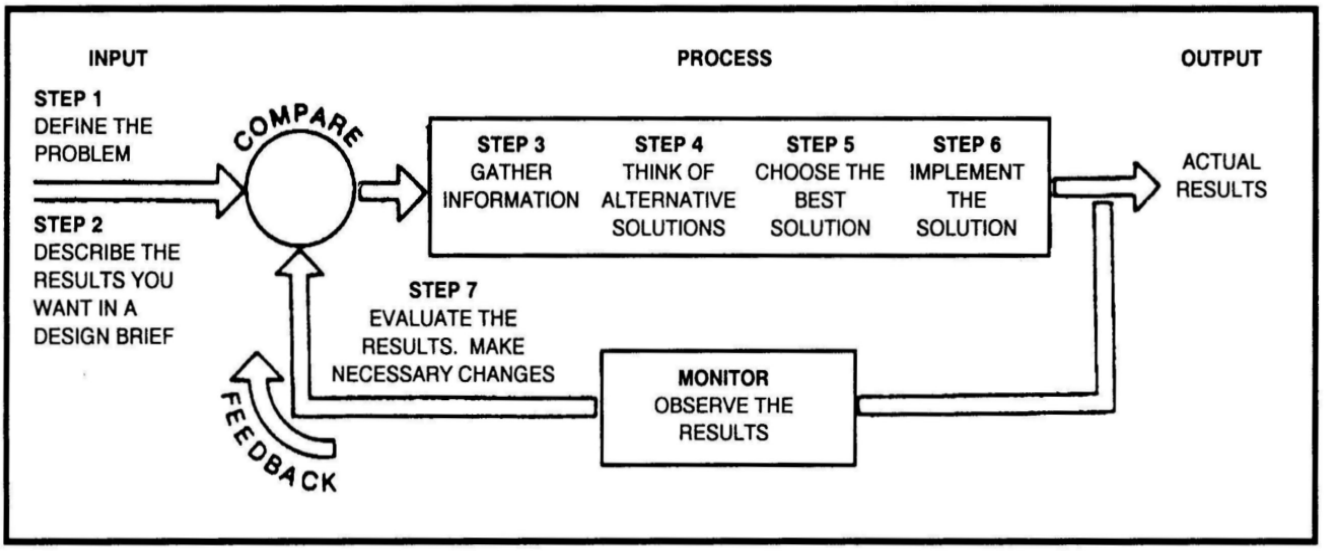
Step 6

IMPLEMENT THE SOLUTION

Step 7

EVALUATE THE SOLUTION AND MAKE CHANGES

SYSTEM DIAGRAM FOR PROBLEM SOLVING



Do Now: Problem Solving

The problem solving- is used to develop workable solutions to problems. It includes the following steps:

- State the problem clearly.
- Collect information.
- Develop possible solutions.
- Select the best solution.
- Implement the solution.
- Evaluate the solution.

State the Problem- starts with knowing what the problem is. Stating the problem clearly often helps to identify it. Sometime doing this actually suggests a possible solution.

Do Now Copy This –

Developing Possible Solutions:

Most problems have more than one possible solution. One way to identify different solutions is through trial and error. However, this is an expensive and time consuming method.

Brainstorming- is when people try to think of as many possible solutions as they can. Then all of the solutions are discussed to select the one that shows the greatest promise.

Do Now----- Copy This:

Adjustment- a change in the process to cause the actual result (output) to conform to the desired result (input).

Aesthetics- If something looks good or pleasing.

Capital- another word for money. One of the 7 resources.

Do Now Copy This:

Implement the Solution:

After the best solution has been selected, the next step is to implement it or put it into effect. During the implementation process, models are made and ideas are tested to make sure the solution is workable.

Simulation- a computer program or other testing environment that imitates as closely as possible the real-life circumstances for which a solution or product is designed to be used.

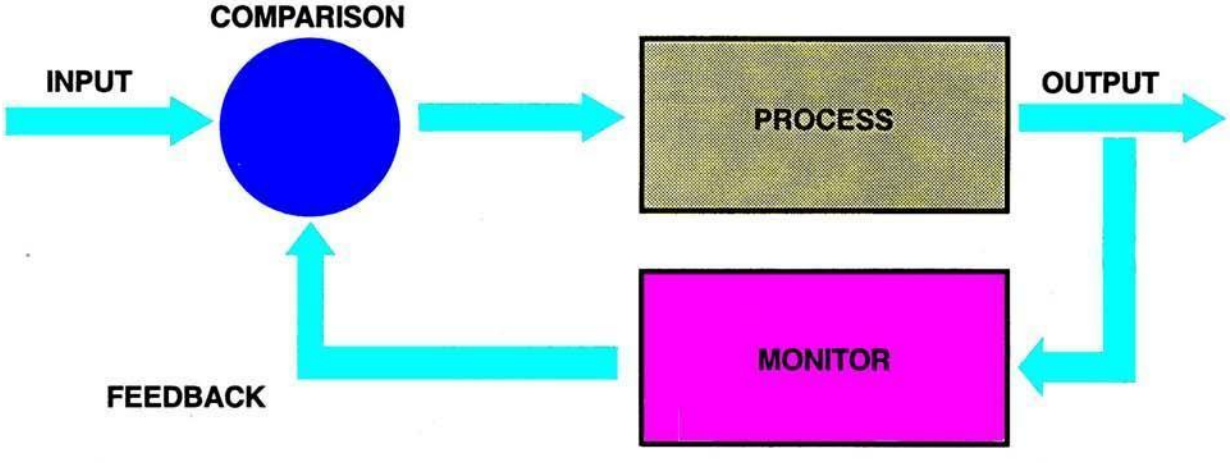
Do Now Copy This -

Select the Best Solution:-

In order to choose the best one, all the solutions must be evaluated.

Evaluating- involves looking at all the advantages and disadvantages of each possible solution and determine which best solves the problem. This decision must be based on your goals and your particular situation.

A BASIC TECHNOLOGICAL SYSTEM



INPUT: Is the command we give a system (desired result).

PROCESS: Is the action part of a technological system.

OUTPUT: Is the actual result obtained from a system.

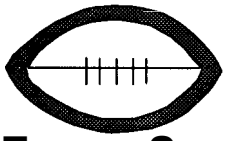
FEEDBACK: Is the use of information about the output of a system.

Do Now----- Copy This:
TECHNOLOGY SATISFIES

Our Need to Produce Food

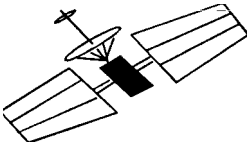
Our Medical Needs

Our Need for Manufactured Items

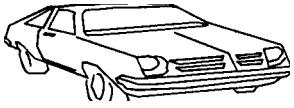


Our Need for Energy Sources

Our Need to Communicate



Our Transportation Needs



Do Now----- Copy This:

Ergonomics- The applied science of equipment design, as for the workplace, intended to maximize productivity by reducing operator fatigue and discomfort. Also called *biotechnology*, *human engineering*; and *human factors engineering*.

Material Conversion –
The processing of a material into new material or end product.

Optimization- The procedure or procedures used to make a system or design as effective or functional as possible, especially the mathematical techniques involved.

Do Now----- Copy This:

Agricultural based society – An economic system based on farming.

Alternative energy – Any sources or resources of energy that are considered inexhaustible or non-polluting.

Brainstorming – members of a group suggest various solutions without criticism from the others.

Do Now----- Copy This:

TECHNOLOGY IN A CHANGING WORLD

1. Technology affects our routines.
2. Science is the study of why natural things happen the way they do.
3. Technology is the use of knowledge to turn resources into goods and services that society needs.
4. Science and technology affect all people.
5. People create technological devices and systems to satisfy basic needs and wants.
6. Technology is responsible for a great deal of the progress of the human race.
7. Technology can create both positive and negative social outcomes.
8. Combining simple technologies can create newer and more powerful technologies.
9. Technology has existed since the beginning of the human race, but it is growing at a faster rate than ever before.

Do Now----- Copy This:

Orthographic Projection - The two-dimensional graphic representation of an object formed by the perpendicular intersections of lines drawn from points on the object to a plane of projection.

Isometric projection -of or pertaining to a drawing of an object has three equal axes at right angles to each other. i.e. a cube

Do Now----- Copy This:

Try Square – A tool for testing the squareness of carpentry work, or for laying out right angles.

Grain –The arrangement, direction, or pattern of the fibrous tissue in wood.

Industrially based society- economy based on industry.

Do Now----- Copy This:

Information Based Society- society based on information techniques

Manufacturing – production of tangible goods

Materials – physical substances in solid, liquid or gaseous form (natural, biological, processed, synthetic,) renewable and non renewable.

Do Now----- Copy This:

Perpendicular - being at right angles to a given line or plane- vertical

Parallel - extending in the same direction, everywhere equidistant, and not meeting (parallel rows of trees)
everywhere equally distant (train tracks are parallel)

Friction - the force that resists relative motion between two bodies in contact

Do Now – Copy This
Summary of Newton's Laws

***Newton's First Law*:**

"An object in motion tends to stay in motion, and an object at rest tends to stay at rest, unless the object is acted upon by an outside force."

***Newton's Second Law*:**

The acceleration of an object is dependent upon the force acting on the object and the mass of the object."

Newton's Third Law:

"Every action has an equal and opposite reaction."

Do Now----- Copy This:

Acceleration- The rate of change of velocity with respect to time....

Velocity- Rapidity or speed of motion; swiftness

Mass- Size, or volume, especially when very large. A unified body of matter with no specific shape: a mass of clay.

Do Now----- Copy This:

Work - The transfer of energy from one physical system to another, especially the transfer of energy to a body by the application of a force that moves the body in the direction of the force. It is calculated as the product of the force and the distance through which the body moves and is expressed in joules, ergs, and foot-pounds.

Do Now----- Copy This:

Pulley –

A simple machine consisting of a cord or rope wrapped around a grooved wheel that can turn to reverse the direction of a force. Pulleys are used in combination to increase applied force in order to make work easier.

Work –

Motion of an object that results from the use of force over a distance. The formula to calculate work is:

WORK = FORCE X DISTANCE

Do Now----- Copy This:

Momentum- of the motion of a body equal to the product of its mass and velocity.

Weight- A unit measure of gravitational force

Template – a pattern, or mold, so that the format does not have to be recreated each time it is used

Do Now----- Copy This:

Feedback - Information obtained by monitoring the output which permits adjustments.

Kinetic Energy - the mechanical energy that a body has by virtue of its motion.

Open Loop system- a system that is pre-programmed to follow a fix set of procedures. (Ex. Alarm clock, microwave oven.)

Do Now----- Copy This:

Combining- The joining of two or more materials in one of several ways, including fastening, coating, and making composites.

Drilling- A separating process that cuts holes in materials

Fastening- The process of attaching one part to another

Do Now----- Copy This:

Assembly line – a manufacturing method in which each worker or machine does only a small part of the whole job.

Command Input (Input) – a statement of the desired result of the system.

Hypothesis - A prediction which needs to be tested to tell if it is correct.

Do Now----- Copy This:

Energy- The ability to do work. Types of energy include, mechanical, chemical, magnetic, electrical, acoustic, thermal and light.

Sources of Energy- water, wind, nuclear, chemical, geothermal, solar, human and animal muscle, fossil fuels.

Energy Conversion- changing one form of energy into another; such as chemical energy into electricity.

Do Now----- Copy This:

Information – One of the seven resources used by technological systems. Data is raw facts and figures; information is data that has been processed (recorded, classified, calculated, stored and/or retrieved). Knowledge is gained when different kinds of information are compared and conclusions are drawn.

Do Now----- Copy This:

Input – The command entered into a system; the desired results of the system.

Machines – With tools, one of the seven resources used in technological systems. Machines change the amount, speed or direction of force.

Output - The actual result obtained from a system.

Do Now----- Copy This:

Axle – a rod or shaft on which one or more wheels turn

Direct current- the one directional flow of electrons in an electrical circuit. (DC)

Alternating current - electrical flow that constantly changes direction. (AC)

Do Now----- Copy This:

Magnetic levitation – a system based on the principle that same poles of a magnet will repel, or push, the other away.

Prototype – a handmade test model of a product by which later stages or designs are judged.

Tolerance – the allowable difference in size (smaller or larger) that a part can have from the design size and still be usable.

Do Now----- Copy This:

Inertia- The tendency of an object to remain still or to continue to move in the same straight line unless an outside force acts on it.

" G " Force- acceleration of a body due to gravity. (Approx. 32ft/sec)

Do Now----- Copy This:

Continuity- the word continuity means "continuous". If a material has continuity, there is a continuous flow of electrons through the circuit.

Drawing to scale- drawing an object larger or smaller than it really is while keeping its parts in the correct proportions.

Fulcrum- the pivot point of a lever.

Do Now----- Copy This:

Tangent to a Circle- A straight line touching the curve at a point. The tangent to a circle is perpendicular to the radius.

Screwdriver – A screwdriver is one of the most basic handtools. It is designed for one function only – to drive and remove screws.
There are two basic types: standard with a flat blade; the Phillips with a four-way slot. There are, however, many specialty screwdrivers, used in various industries.

Do Now----- Copy This:

Pliers- The word pliers is a plural Name for a single tool. Pliers come in various sizes and shapes. Pliers are used for holding and gripping small articles in situations where hands cannot be used.

Slip-Joint pliers – are pliers with straight, serrated (grooved) jaws, and a pivot with the jaws are fastened can be moved to increase or decrease the size of objects able to be held.

Long-Nose or Needle Nose pliers-
These are pliers with a long usually straight point. It has serrated grooves, which enables a very fine grip in small areas

Do Now----- Copy This:

Tension- A force tending to stretch or elongate something-i.e. pulling apart gum

Compression - The act or process of compressing, of pressing together, flattening. I.e. Crushing a soda can

Shearing - structural strain in a substance or body caused by parallel layers shifting against one another in opposite directions.

Do Now----- Copy This:

Six Simple Machines- They provide a mechanical advantage

- **Lever**
- **Wheel & Axle**
- **Pulley**
- **Screw**
- **Wedge**
- **Incline Plane**

Do Now----- Copy This:

Pulley –

A simple machine
consisting of a cord or rope wrapped around a grooved wheel that can turn to reverse the direction of a force. Pulleys are used in combination to increase applied force in order to make work easier.

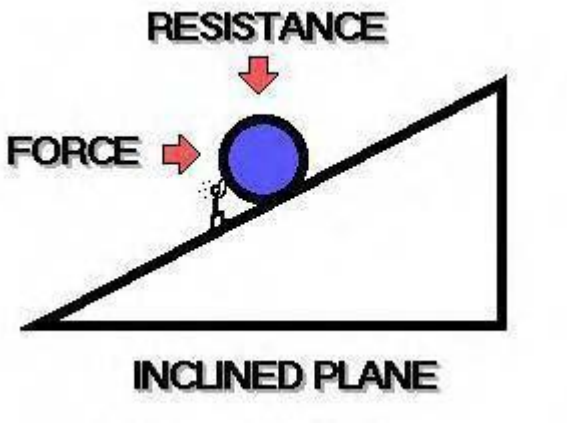
Work –

Motion of an object that results from the use of force over a distance. The formula to calculate work is:

WORK = FORCE X DISTANCE

Do Now----- Copy This:

The inclined plane- is a plane surface set at an angle, other than a right angle, against a horizontal surface. The inclined plane permits one to overcome a large resistance by applying a relatively small force through a longer distance than the load is to be raised.



Do Now----- Copy This:

Screw -

An inclined plane and wrap it around a cylinder. Its sharp edge becomes another simple tool: the screw. The screw is actually just another kind of a cylinder with an inclined plane wrapped around it. The screw is essentially a transfer device of motion and/or force.

Where would I find an example of a screw?

- Jar Lids
- Light Bulbs
- Jacks

Do Now----- Copy This:

Pulley –

A simple machine
consisting of a cord or rope wrapped around a grooved wheel that can turn to reverse the direction of a force. Pulleys are used in combination to increase applied force in order to make work easier.

Work –

Motion of an object that results from the use of force over a distance. The formula to calculate work is:

WORK = FORCE X DISTANCE

Do Now----- Copy This:

Wedge -

Instead of using the smooth side of the inclined plane, you can also use the pointed edges to do other kinds of work. For example, you can use the edge to push things apart. Then, the inclined plane is a wedge. So, a wedge is actually a kind of inclined plane. An axe blade is a wedge. Think of the edge of the blade. It's the edge of a smooth slanted surface. That's a wedge!

Do Now----- Copy This:

Lever

A lever is an arm that "pivots" (or turns) against a "fulcrum" (or point). Think of the claw end of a hammer that you use to pry nails loose. It's a lever. It's a curved arm that rests against a point on a surface. As you rotate the curved arm, it pries the nail loose from the surface.

Examples of Levers:

- A hammer is a lever when it is used to pull a nail out of a piece of wood.
- Bottle openers
- Crow bars

Do Now----- Copy This:

LAW OF EQUILIBRIUM

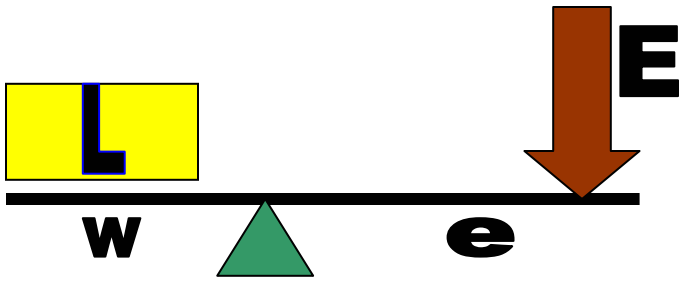
A lever is in equilibrium when the effort (E) and the load (L), balance each other.

e = length of effort arm

w = length of load arm

formula to calculate effort needed:

(L) x (w) = (E) x (e)



Do Now----- Copy This:

Parameters – Restrictions affecting the design of a product or system (e.g. , size, cost, materials).

Specifications – a detailed description of design criteria for a piece of work.

Technical drawings – Drawings that contain the detailed information required to produce an object or system (e.g., measurement, scale, material, finishing information)

Do Now----- Copy This:

Basic Human Needs-Biological, Physical, and psychological well – being.

Appropriate Technology – a technology that is suitable for a given human need or want.

Biologically Related Technology – A manipulation of biological materials by scientific, engineering and technological methods to provide information, goods and services.

Do Now----- Copy This:

Modem – allows computers to communicate through telephone; cable; or dsl lines.

Spreadsheet program- an application that is best suited for accounting and budgeting.

Downloading- To receive a file from another computer via a cable connection.

Do Now----- Copy This:

Formatting a document – to improve the appearance of a document by controlling the font; Paragraph layout; centering; etc…

Formatting the HD (harddrive) – to set up the partitions, and the tracks on the platters of the HD.

Clipboard - temporarily stores the last piece of cut or copied information.

Do Now----- Copy This:

Database – An application is best suited for managing large collections of information.

BIOS –(Basic Input/Output System) The set of routines stored in read-only memory that enable a computer to start the operating system and to communicate with the various devices in the system, such...

RAM- A memory device in which information can be accessed in any order. r(andom-)a(ccess) m(emory)....

Do Now----- Copy This:

Template – a pattern, or mold, so that the format does not have to be recreated each time it is used

Pattern - A plan, diagram, or model to be followed in making things

Do Now----- Copy This:

Intermodal Transportation-
The process of combining transportation modes.

Containerization - Cargo is loaded into large boxes or other containers before it is transported.

Conveyer – is a continuous chain or belt that moves material over a fixed path.

Do Now----- Copy This:

Constraints - the limitations that create boundaries in possible solutions to a problem.

Efficient - performing with a minimum of wasted time, energy, or waste products.

Environmental Impacts of Technology – the effects upon the land, water, and air created by a technological system.
Impacts can be positive and negative.

Do Now----- Copy This:

Hydraulic – system activated by fluid power.

Pneumatics – using air pressure to activate mechanical devices.

Trial & Error – a problem solving process which allows for testing various alternative solutions to meet the desired goal.

Do Now----- Copy This:

Laser Machining – a cutting method that uses a beam of focused light to melt a path in a material and separate the excess from the work piece.

Mock- Up – a model designed to show people how a product or Structure will look. Used to evaluate the styling, balance, color, or other aesthetic features of a technological artifact.

Diagnosis- determining a cause, often of a problem.

Do Now----- Copy This:

Processes – the steps needed to complete a series of tasks. The actions undertaken to create structures and products.

Prototype – a working model of a new product, intended to test its operation.

Quality Control – the process of setting standards, measuring the size of a product, comparing the size to the standards, and making adjustments

Do Now – Copy This

Resonance -Vibrations in an object at the object's natural frequency caused by a wave with the same frequency. Most vibrating systems will vibrate at a particular frequency if disturbed. If they are excited at the resonant frequency, the amplitude will increase.

58

Do Now

Newton's Third Law of Motion – If one object exerts a force on a second object, the second exerts a force on the first that is equal in magnitude and opposite in direction; also referred to as **action-reaction**

Do Now----- Copy This:

Posterity- Future generations; Succeeding generations; future times.

Feasibility- Capable of being done or carried out. Logical; likely: *a feasible explanation*.

Longevity -. Long duration or continuance, as in an occupation; Long life; great duration of life

Do Now----- Copy This:
SEVEN-RESOURCES-OF-TECHNOLOGIES

PEOPLE

INFORMATION

TIME

MATERIALS

ENERGY

TOOLS/MACHINES

MONEY

Do Now----- Copy This:

Newton's First Law of Motion –

An object remains at rest or in a state of uniform motion unless acted upon by an unbalanced force (a **net force**); also called the **Law of Inertia**.

Newton's Second Law of Motion –

An unbalanced force (**net force**) acting on an object causes an **acceleration** which is directly proportional to the magnitude of the force, and which acts in the same direction as the force: $F = ma$.

Do Now----- Copy This:

Mega Pixel - is one million pixels or more. The more pixels that exist in an image the higher the resolution and therefore the greater the quality of the image.

Glaziers – select, cut, install, and remove all types of glass as well as

plastics, granite, marble, and glass substitutes.

Laser - Device that produces a very narrow intense beam of light. The name is an acronym for "**L**ight **A**mplification by **S**timulated **E**mission of **R**adiation.

Do Now----- Copy This:

Multimeter- Electronic test equipment that can perform multiple tasks. Typically one capable of measuring voltage, current and resistance. More sophisticated modern digital multimeters also measure capacitance, inductance, current gain of transistors and/or anything else that can be measured electronically

Do Now----- Copy This:

Step-Down Transformer - Transformer in which the output AC voltage is less than the input AC voltage.

Step-Up Transformer – Transformer in which the output AC voltage is greater than the input AC voltage.

Rectification - Process that converts alternating current to direct current.

Rectifier -Diode circuit that converts alternating current into pulsating direct current.

Do Now----- Copy This:

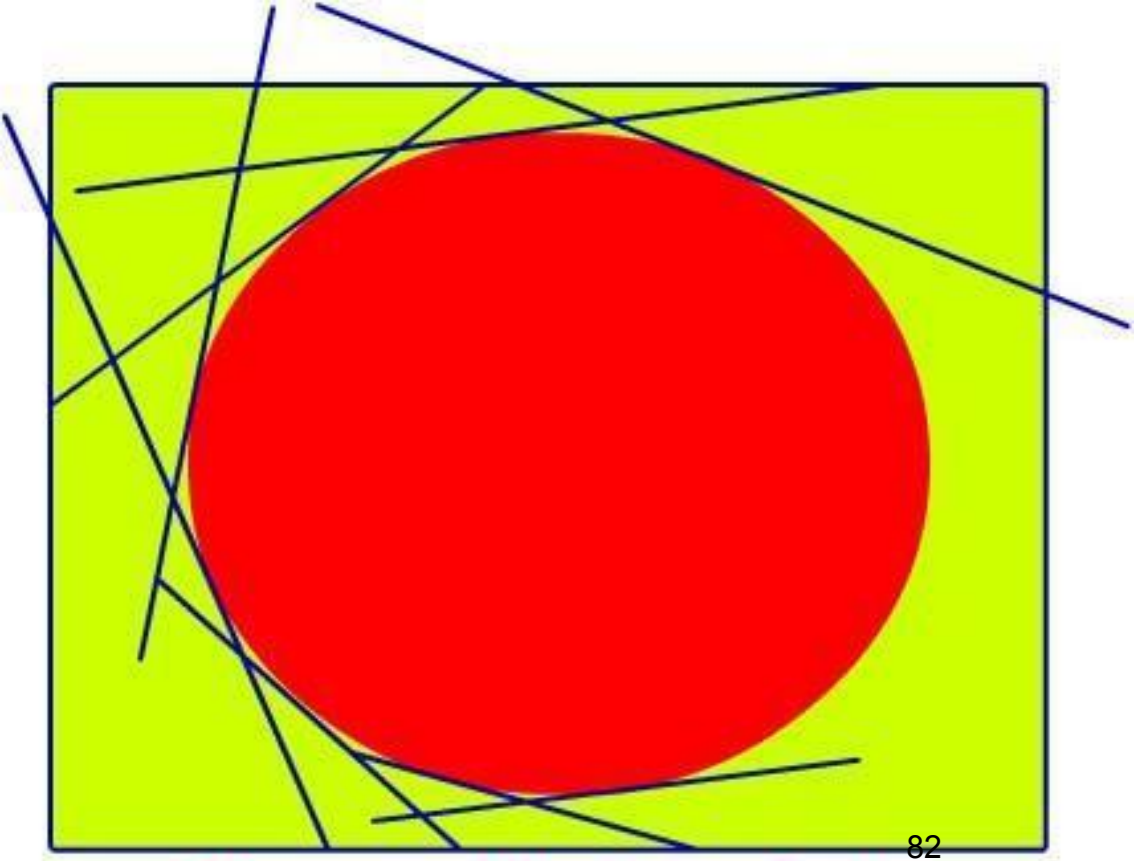
Fluorescent bulb –has electrodes at both ends of a fluorescent tube, and a gas containing argon and mercury vapor is inside the tube. A stream of electrons flows through the gas from one electrode to the other. These electrons bump into the mercury atoms and excite them. As the mercury atoms move from the excited state back to the unexcited state, they give off ultraviolet photons. These photons hit the phosphor coating the inside of the fluorescent tube, and this creates visible light The electrons interact with mercury vapor atoms floating inside the bulb.

Do Now----- Copy This:

Solar Cell – Converts light energy into electricity

Technology- Using knowledge to develop products and systems that satisfy needs, solve problems, and increase our capabilities.

Brainstorming- A process in which group members suggest ideas as they think of them. It is a group problem-solving method.



Tangent to the circle

Do Now----- Copy This:

Internet Service Provider- ISP

A company that provides users access to the Internet through a portal. For a monthly fee, the Internet Service provider gives you a software package, a username, a password, and an access phone number. Once you install the software on your computer and go through the registration process, you'll be able to surf the Web, send e-mail, chat, and read the newsgroups.

Or he may only provide storage space and internet access so you can set up your own web site.

Do Now----- Copy This:

Binary Digit – (BIT)- belonging to a system of numbers having 2 as its base <the *binary* digits 0 and 1

Byte - a group of eight binary digits processed as a unit by a computer and used especially to represent an alphanumeric character

Megabyte - a unit of computer information storage capacity equal to 1,048,576 bytes

Do Now----- Copy This:

INCANDESCENT BULB – These bulbs have a very thin tungsten filament that is housed inside a glass sphere.
The basic idea is simple. Electricity runs through the filament, because the filament is so thin, it offers a high resistance to the electricity, and this turns electrical energy into heat. The heat is enough to make the filament white hot, and the "white" part is light. The filament glows because of the heat -- it incandesces.

.

Do Now----- Copy This:

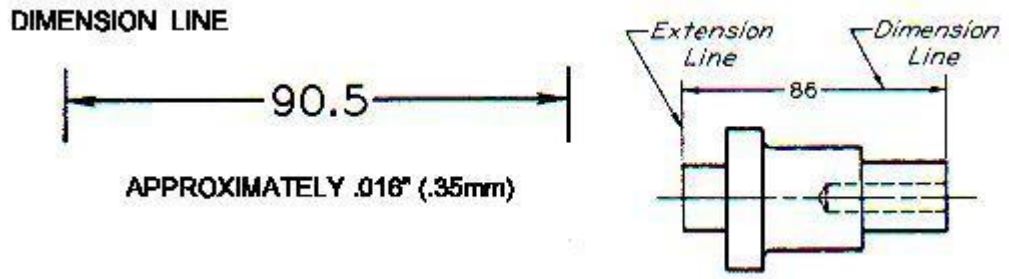
Renewable energy source – a source of energy that can be grown and harvested.

Separating – the process of using tools to remove unwanted material

Veneer - a thin sheet of wood that is sliced, sawed, or peeled from a log. Usually of a more expensive wood.

Do Now – Copy This

<u>Dimension Lines-</u> are used to indicate the dimension or measure of a feature. The extension lines show where the object dimension originates from. Gaps exist between the extension line and the object.
Dimension lines are thin lines terminating in arrowheads.



<u>Center Lines</u> - are used to represent the axis of symmetrical parts, the center of circular features, bolt circles and paths of motion. Center lines should extend uniformly a short distance beyond the object or feature of the drawing.

Do Now---Copy This:

JIG SAW SAFETY RULES

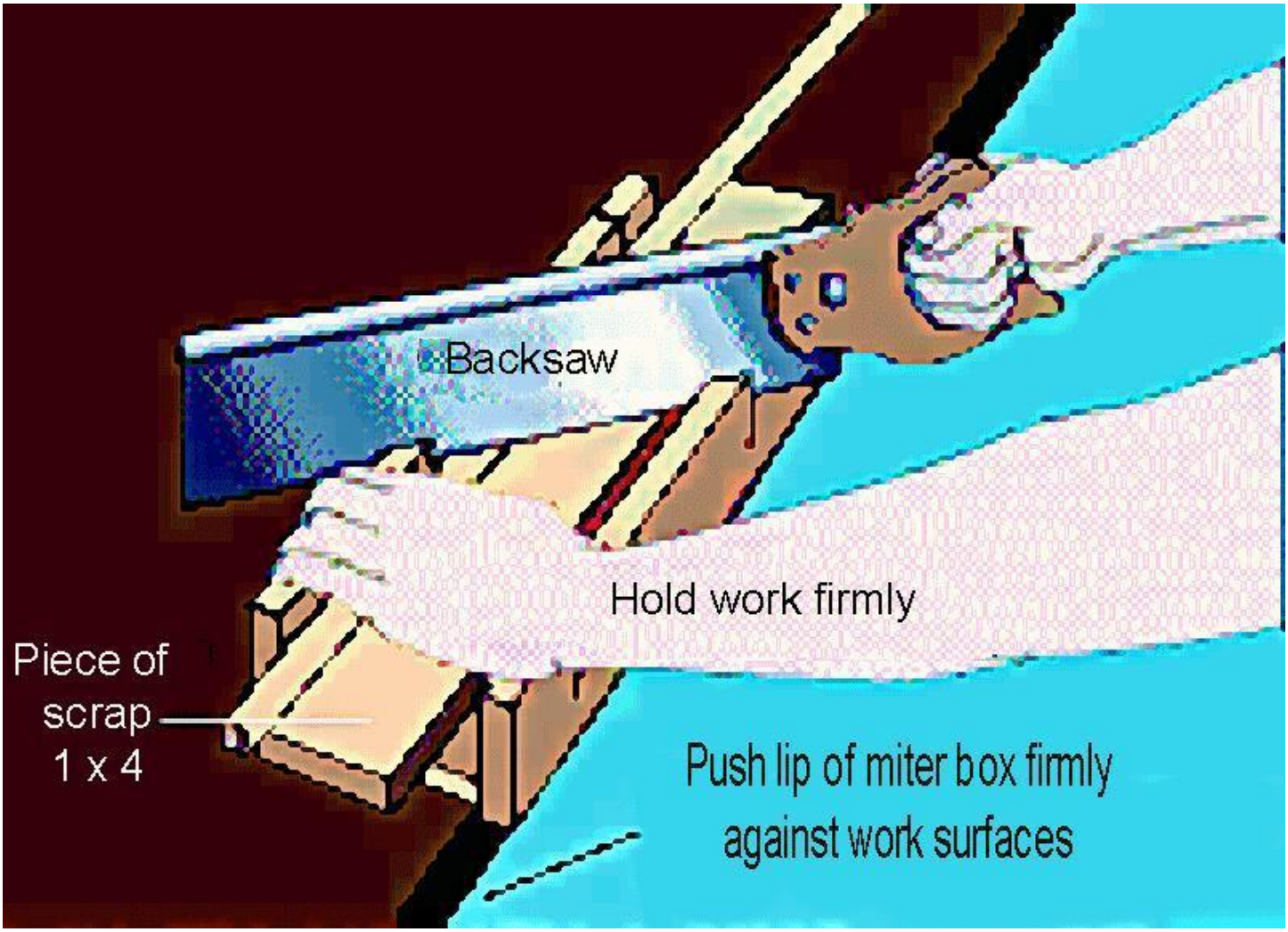
1. ALWAYS WEAR SAFETY GOGGLES.
2. KEEP FINGERS AWAY FROM BLADE.
3. TIE LONG HAIR BACK, AND REMOVE JEWELERY.
4. USE THE PRESSER FOOT TO APPLY LIGHT PRESSURE TO WORK.
5. DO NOT LET SCRAP WOOD ACCUMULATE ON WORKTABLE.
6. MAKE SURE BLADE IS SHARP AND TEETH FACE DOWN.
7. NEVER MAKE ADJUSTMENTS OR CHANGE BLADE WITH POWER ON.
8. ALWAYS FEED THE WORK FROM THE FRONT.
9. DO NOT TALK WHILE USING THE SAW.

How to use a miter box-

Before placing the piece in the miter box, support it on a scrap of 1 x 4 or some other suitable material. This allows you to saw completely through the work without cutting the bottom of the miter box. Place the wood to be cut against the far side of the miter box, positioned as it will be when in use and make the cut with a backsaw. Hold the work firmly against the back of the box with your free hand.

If there's any trick to using a miter box, it's not in the cutting technique, but in correctly measuring and marking for the cut.

Miter Box



A miter box is not strictly a box since it only has a bottom and two sides. The sides have parallel cuts at various angles that provide a guide for hand saws. The board to be cut rests in the bottom and extends out the two open ends of the box.

Do Now

Design Criteria-

is a list of specifications that must include all the requirements of the problem.

Super tops:

Must incorporate ergonomic design

Must be aesthetically appealing

The total length of the Super Top must be 8"

The maximum width must be 3"

The diameter of the circle must be 2"

The handle should not exceed a length of 5"

Dowel rod must be 6" in length

Hole in dowel rod 1 1/4 or 1 1/2 from the bottom

Do Now – Copy This

Aerodynamics-

force of air on an object moving through it. One goal of aerodynamics is to design objects so that fluid friction (particles of air contact a moving object) is reduced as the object moves through the air.

DRILL PRESS SAFETY RULES

1. ALWAYS WEAR SAFETY GOGGLES.
2. KEEP FINGERS AWAY FROM DRILL BIT, AND THE AREA DIRECTLY UNDER THE BIT.
3. TIE LONG HAIR BACK, AND REMOVE JEWELERY.
4. HOLD MATERIAL SECURELY WITH A VISE OR CLAMP.
5. DO NOT LET SCRAP WOOD ACCUMULATE ON WORKTABLE.
6. BE SURE CHUCK KEY IS REMOVED FROM CHUCK BEFORE STARTING DRILL PRESS. CHECK TWICE.
7. NEVER MAKE ADJUSTMENTS WITH POWER ON.
8. NEVER LEAVE THE DRILL PRESS RUNNING, ALWAYS WAIT FOR A COMPLETE STOP BEFORE YOU LEAVE IT.
9. DO NOT TALK WHILE USING THE DRILL PRESS.
10. THE CLEARANCE HOLE IN THE CENTER OF THE TABLE MUST BE LINED UP DIRECTLY UNDER THE BIT.

DRILL PRESS-RULES.doc

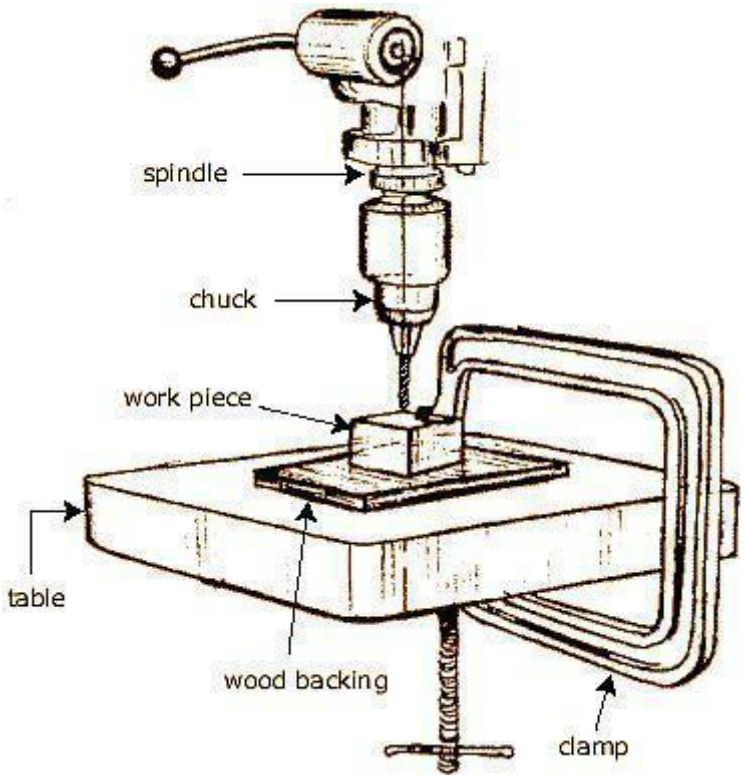
Do Now

Silhouette - outline image, especially a profile drawing solidly filled in.

Drill press.

A powered vertical drilling machine in which the drill is pressed to the work automatically or by a hand lever.

Drill Press Work Area Detail



Rasps- a rasp looks a lot like files but is rougher to remove more wood. Rasps come in several shapes round half, round and flat.

-Keep in mind that most of the wood should be removed during the push.

- You may find it helpful if you hold the tip of the rasp with your other hand to help guide it and control the amount of pressure on the wood.

-Lighten up on the pressure when you are almost done so that you make smaller grooves in the wood.

Do Now –Copy This

Orthographic projection

The two-dimensional graphic representation of an object formed by the perpendicular intersections of lines drawn from points on the object to a plane of projection.

Isometric Projection

A method of graphic representation of three-dimensional objects, used by engineers, technical illustrators, and, occasionally, architects. The technique is intended to combine the illusion of depth.

Specifications

A detailed, exact statement of particulars, especially a statement prescribing materials, dimensions, and duality of work for something to be built, installed, or manufactured.

Do Now – Copy This

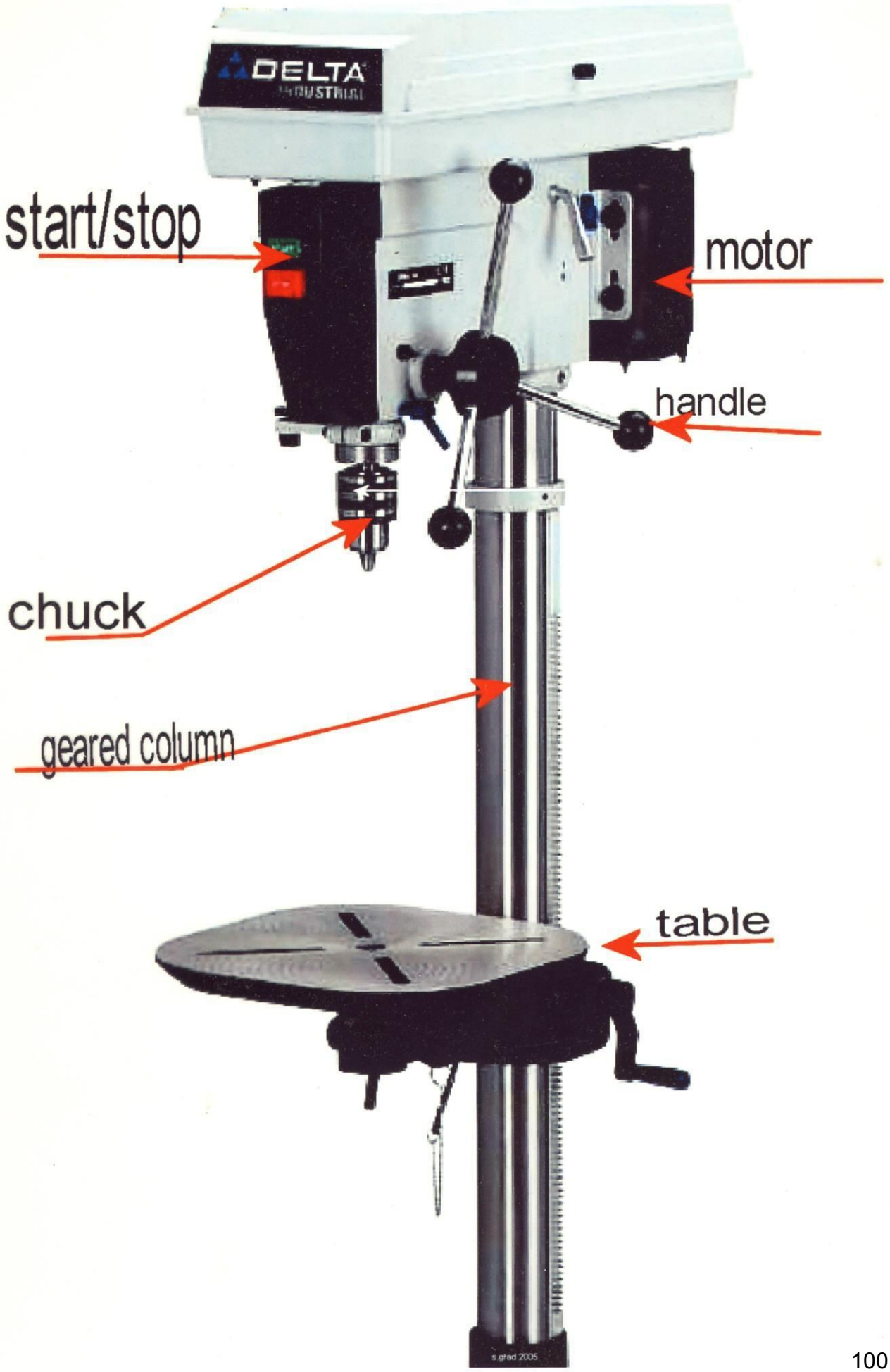
Kinetic Energy - the mechanical energy that a body has by virtue of its motion.

Kinetic Energy exists whenever an object which has mass is in motion with some velocity. Everything you see moving about has kinetic energy.

Potential Energy

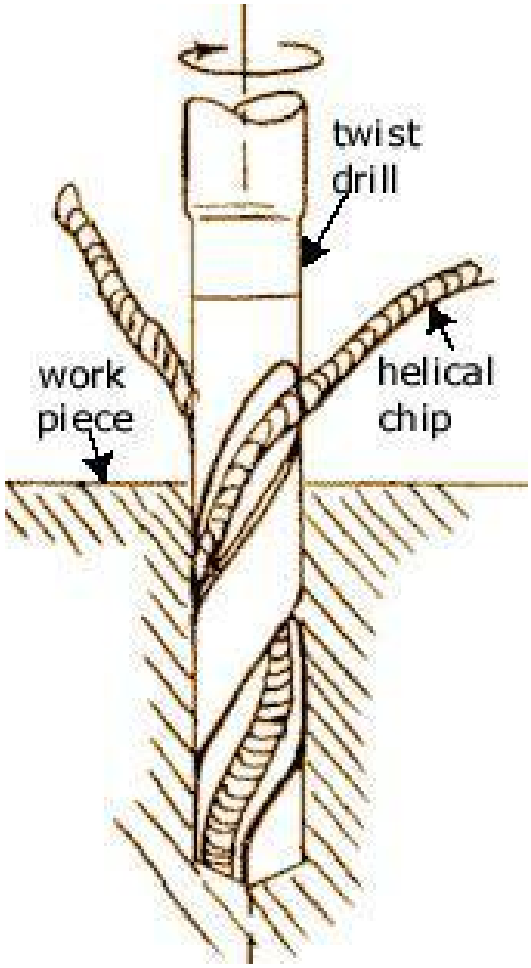
An object can store energy as the result of its position

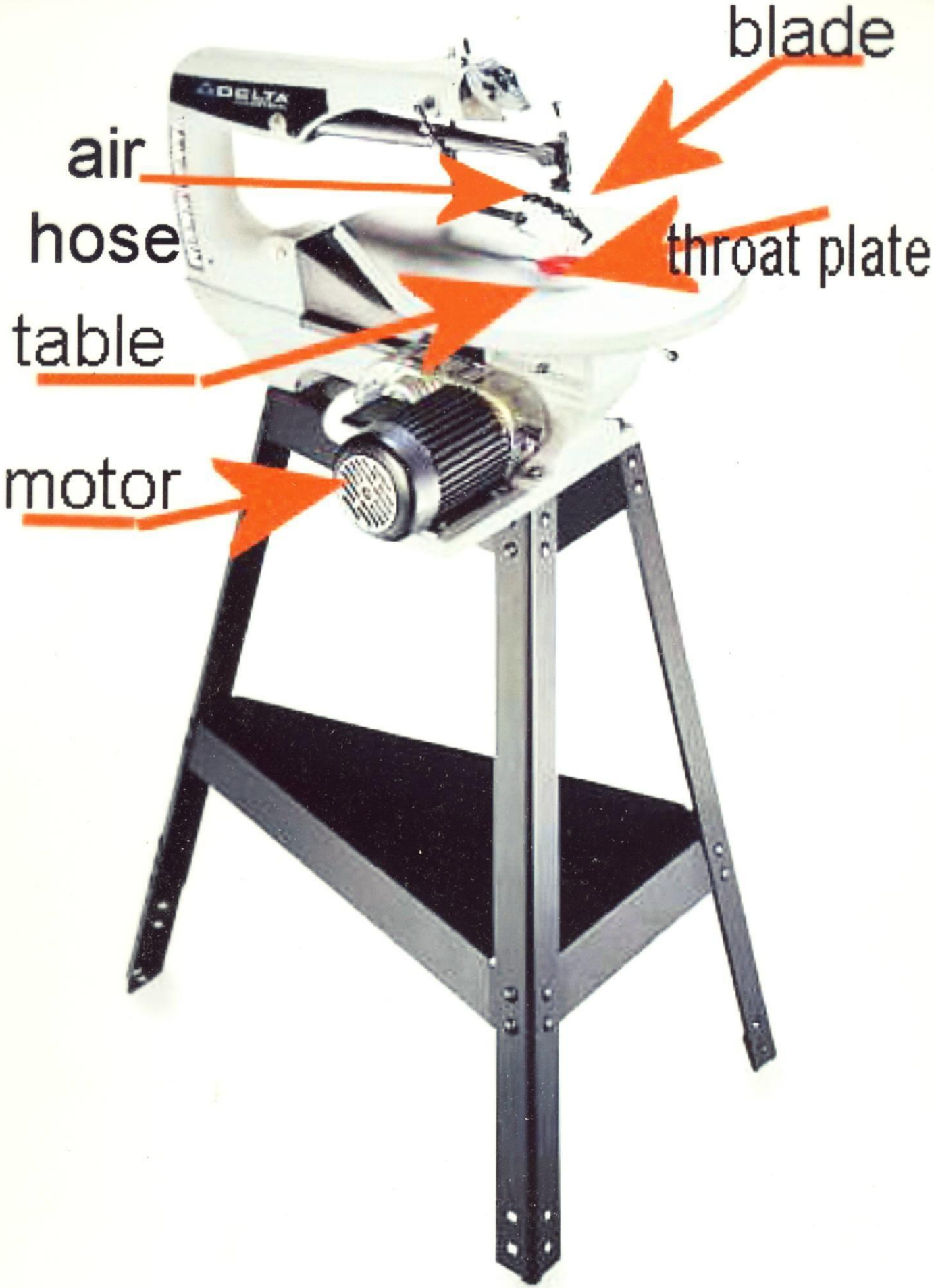
Potential Energy: By stretching a rubber band, you give it potential energy. A book on a shelf has stored potential energy. A baseball in a glove has potential energy until it is thrown and it turns into kinetic energy.


DELTA
start/stop
motor
handle
chuck
geared column
table

Do Now

Drilling involves the creation of holes that are right circular cylinders. This is accomplished most typically by using a twist drill bit.





delta scroll saw.jpg

Garnet Paper (sanding paper) - Garnet sandpaper is made small, sharp pieces of garnet (a type of mineral) that is fairly brittle, so they break down as you sand the wood.

- Sandpaper comes in different levels of abrasiveness, called the grit. The grit refers to the number and sizes of the particles in the sandpaper. The fewer and larger the particles, the rougher the paper. Grits range from 40-600 the lower numbers are for rougher papers.

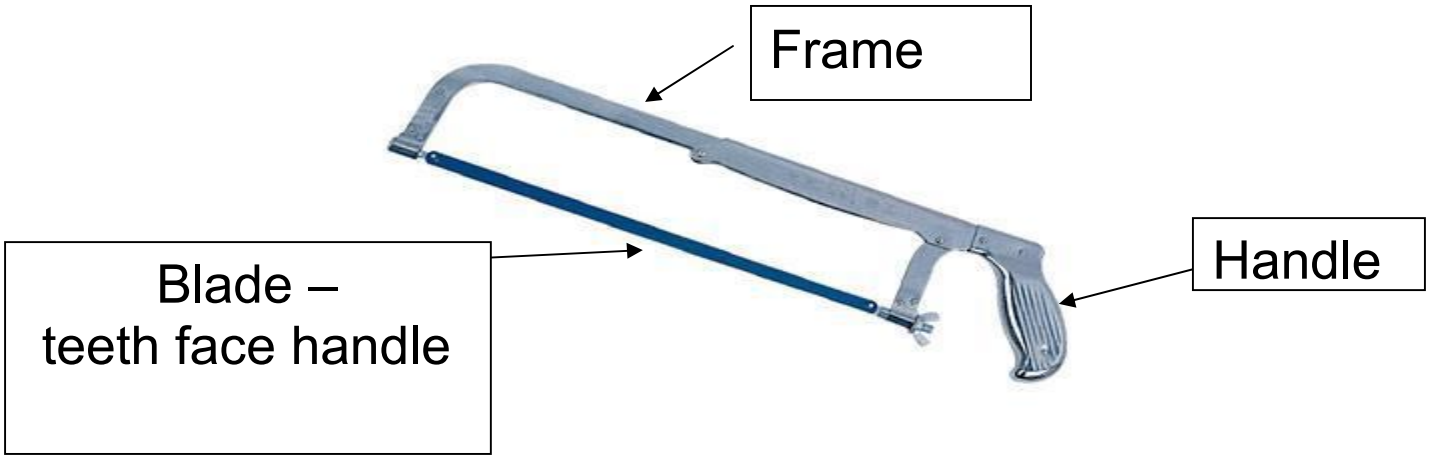
The Sanding Process

- The process of sanding wood involves making progressively finer scratches in the surface. These scratches remove imperfections in the wood, such as visible dents or uneven surfaces. Moving from one grit to the next finer one will remove reduces the size of the dents until they are so small the wood seems smooth.

Do Now

A **<u>hacksaw</u>** is a saw for cutting metal. Some of them have pistol grips which keep the **hacksaw** firm and easy to grip. They cut in straight lines. It is a fine-tooth saw with a blade under tension in a frame that is used for cutting hard materials (such as metal).

A **<u>saw</u>** is a tool for cutting wood or other material, consisting of a serrated blade (a blade with the cutting edge dentated or toothed) and worked either by hand or by steam, water, electric or other power.



C-Clamps- are made from a "c" shaped piece of metal that has a screw through the jaw. They come in sizes in just over an inch to around 12 inches.

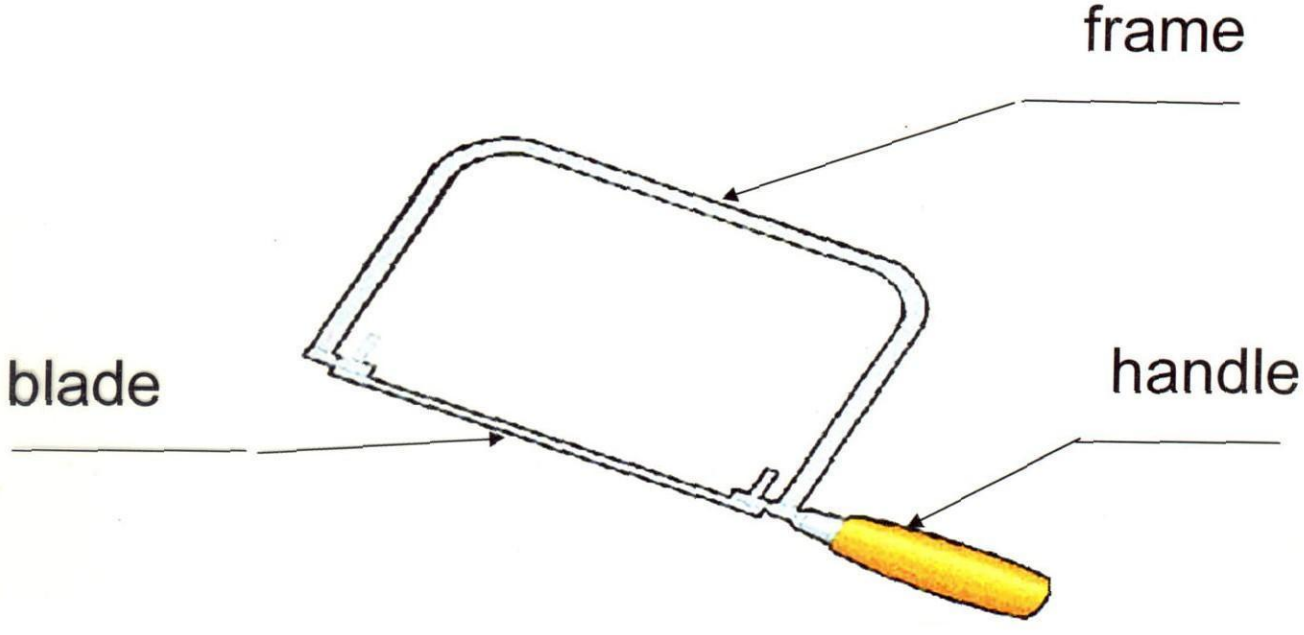
Things to consider when using a clamp:

- make sure that your clamps are perpendicular to the work piece and not angling off one way or another
- Double-check that you don't apply to much pressure and damage your wood.
- Make sure clamp is center so that they apply even pressure.

Do Now Copy This!

A Coping Saw

A saw used to cut curves in thin wood and plastic. It may also be used to remove waste from joints. The teeth point towards the handle to cut as saw is pulled. The lever pins turn to change the position of the blade. The handle is normally made of beech wood and when turned creates more tension on the blade. The frame of the coping saw is made from sprung steel.



Do Now Copy This:

Implement the Solution:

After the best solution has been selected, the next step is to implement it or put it into effect. During the implementation process, models are made and ideas are tested to make sure the solution is workable.

Simulation- a computer program or other testing environment that imitates as closely as possible the real-life circumstances for which a solution or product is designed to be used.

Do Now Copy This -

Select the Best Solution:-

In order to choose the best one, all the solutions must be evaluated.

Evaluating- involves looking at all the advantages and disadvantages of each possible solution and determine which best solves the problem. This decision must be based on your goals and your particular situation.

Do Now Copy This –

Developing Possible Solutions:

Most problems have more than one possible solution. One way to identify different solutions is through trial and error. However, this is an expensive and time consuming method.

Brainstorming- is when people try to think of as many possible solutions as they can. Then all of the solutions are discussed to select the one that shows the greatest promise.

Do Now

Stability- An aerodynamically stable object passes through the air in one direction without tumbling end over end. A gliding bird or a dart is aerodynamically stable, a football is not. To be aerodynamically stable, an object must travel so that its center of gravity is positioned towards the front of the object.

Balance- Equality in amount or weight value, as between two things or parts of a single thing.

Do Now

Optimization- is the process of changing or combining alternatives to help improve them. By optimizing the alternatives, we can get the best possible solution to the problem.

Trade-Off- an exchange of the benefits in one solution for the disadvantages in another solution.

Implementation- means actually building or creating the proposed solution.

Do Now – Copy This

Fluid Friction- is the cause of the resistance an object meets as it moves through the air. The force of fluid friction is created when particles of air contact the moving object. The force of fluid friction reduces the speed of an object in flight known as **drag.**

Aerodynamics- deals with the force of air on an object moving through it. One goal of aerodynamics is to design objects so that fluid friction is reduced as the object moves through the air. For example, aircraft and rockets are designed with pointed noses and rounded, smooth surfaces to reduce fluid friction.

Do Now

Technology- the use of knowledge, tools, and systems to turn resources in to goods and services that society needs. These products and systems can help do things that could not be done without the help of technology.

- **Technology can improve personal lives by providing efficient transportation, rapid communications, comfortable housing, and plentiful food.**

Technologist- a specialist in manufacturing enterprise or some other enterprise. He or she works under a engineer or scientist.

-Technologists work closely with engineers to implement their work. Technologists are the major link between engineers and the factory floor or construction site.

Do Now

When drawing Super Tops, you must show the true shape and size of each part. This is essential way of communicating ideas.

- **Triangles and T Squares-** Are the standard equipment for drawing straight lines.

Do Now – copy this

Select The Best Solution:

- In order to choose the best one, all the solutions must be evaluated. **Evaluating-** involves looking at all the advantages and disadvantages of each possible solution and determine which best solves the problem. This decision must be based on your goals and your particular situation.

Do Now: Problem Solving

The problem solving- is used to develop workable solutions to problems. It includes the following steps:

- State the problem clearly.
- Collect information.
- Develop possible solutions.
- Select the best solution.
- Implement the solution.
- Evaluate the solution.

State the Problem- starts with knowing what the problem is. Stating the problem clearly often helps to identify it. Sometime doing this actually suggests a possible solution.

Do Now:

Implement the Solution:

After the best solution has been selected, the next step is to implement it or put it into effect. During the implementation process, models are made and ideas are tested to make sure the solution is workable.

Simulation- a computer program or other testing environment that imitates as closely as possible the real-life circumstances for which a solution or product is designed to be used.

-

Do Now

Technological History- Viewing the growth of civilizations by focusing on the advancements people have made in developing and using tools.

-For example, the industrial age and the information age.

Technological Assessment- evaluating the positive and negative impacts caused by technology on people, society, and the environment.
For example nuclear power

Do Now

Ergonomics- is the study of designing equipment and devices that fit the human body, its movement and its thinking patterns. Ergonomic designs help people work more naturally.

Do Now – copy this

Developing Possible Solutions:

Most problems have more than one possible solution. One way to identify different solutions is through trial and error. However, this is an expensive and time consuming method.

Brainstorming- is when people try to think of as many possible solutions as they can. Then all of the solutions are discussed to select the one that shows the greatest promise.

Do Now:

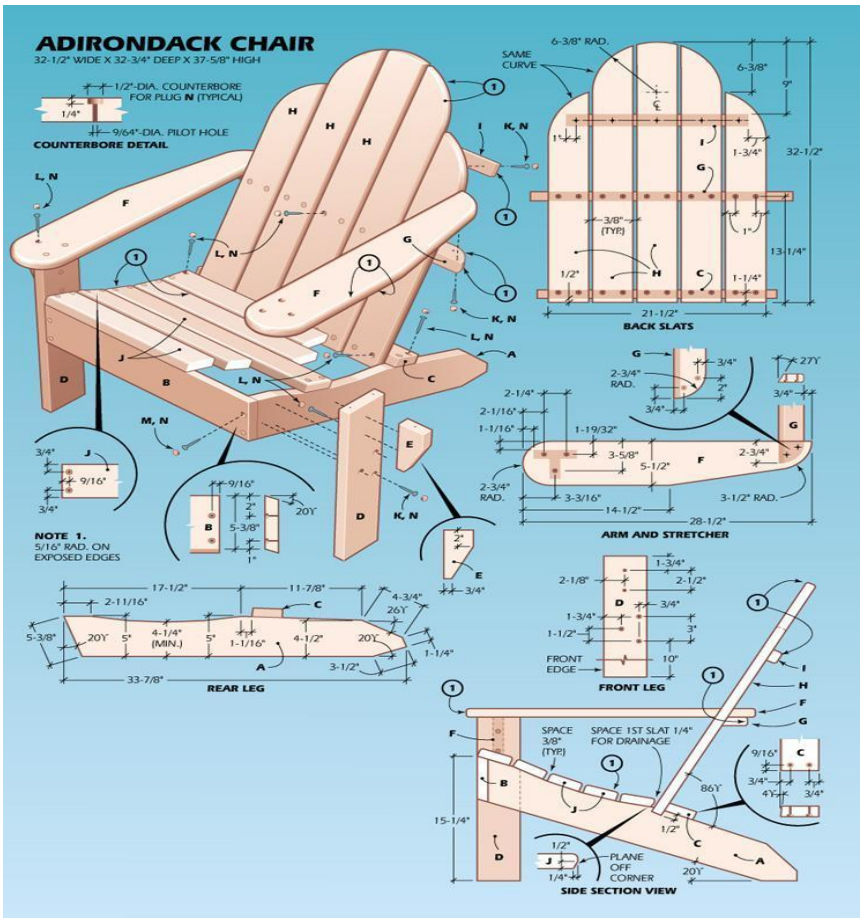
State the Problem:

To produce a model rocket (water rocket) that will reach the highest possible altitude.

Balance- is the equal amount of weight between two things or parts of a single thing.

Do Now: Super Tops Assembly

- Each individual part of a product is called a **Component.** Components are assembled with other components. This means they are put together in a planed way called.
- Assembled components are called **assemblies.** If an assembly will be used as a component in another product it is called **subassembly.**



Do Now

Design Criteria- is a list of specifications that must include all the requirements of the problem.

Super tops:

- **Must incorporate ergonomic design**
- **Must be aesthetically appealing**
- **The total length of the Super Top must be 8”**
- **The maximum width must be 2 ½”**
- **The diameter of the circle must be 2”**
- **The handle should not exceed a length of 5”**
- **Dowel rod must be 6” in length**
- **Hole in dowel rod 1 ¼ or 1 ½ from the botto$_m$**

Do Now – Copy This

Design Brief- is a statement of the problem that is to be solved. The design brief should include all the information that the designer needs to understand the problem.

Before implementing the solution you must consider these important questions.

1. Aesthetics- Does it have a pleasing appearance?
2. Function- Does it do what it is suppose to?
3. Durability- will it last as long as it needs to?
4. Cost- is the cost within acceptable limits?
5. Ergonomics- is it comfortable to use?

Do Now – Copy This

Design - A design is created to serve a functional purpose and/or to provide a purely aesthetic purpose. T o help in making something.

Industrial Designers- concentrate on incorporating style, convenience, human appeal.

Ergonomics- The applied science of equipment design, as for the workplace, intended to maximize productivity by reducing operator fatigue and discomfort. Also called biotechnology, human engineering; and human factors engineering.

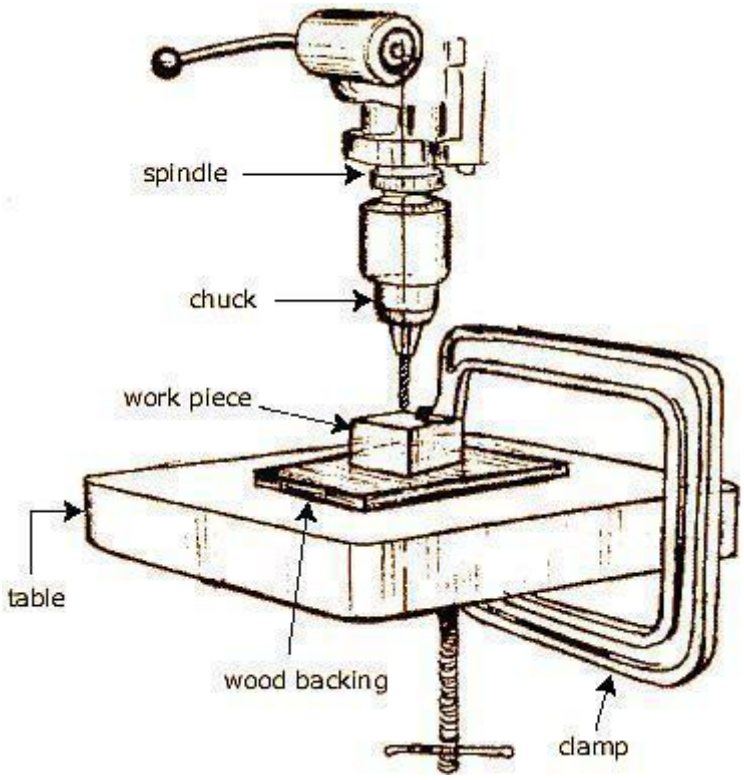
Do Now

Silhouette - outline image, especially a profile drawing solidly filled in.

Drill press.

A powered vertical drilling machine in which the drill is pressed to the work automatically or by a hand lever.

Drill Press Work Area Detail



Do Now Copy This

Relief Cuts

A series of straight cuts used to enable a smooth curve with little to no defects. Prevents breaking saw blades and allows for a smoother finish.

Sandpaper – Garnet Paper

is a form of paper where an abrasive material has been fixed to its surface; it is part of the "coated abrasives" family of abrasive products. It is used to remove small amounts of material from surfaces, to make them smoother

Materials used for the abrading particles are:

flint — no longer commonly used;
garnet — commonly used in woodworking;
emery — commonly used to abrade or polish metal;
aluminium oxide — perhaps most common in widest variety of grits;
silicon carbide — available in very coarse grits all the way through to microgrits, common in wet applications;
alumina-zirconia — (an paluminium oxide - zirconium oxide alloy), used for machine grinding applications
chromium oxide — used in extremely fine micron grit (micrometre level) papers

Garnet Paper (sanding paper) - Garnet sandpaper is made small, sharp pieces of garnet (a type of mineral) that is fairly brittle, so they break down as you sand the wood.

- Sandpaper comes in different levels of abrasiveness, called the grit. The grit refers to the number and sizes of the particles in the sandpaper. The fewer and larger the particles, the rougher the paper. Grits range from 40-600 the lower numbers are for rougher papers.

The Sanding Process

- The process of sanding wood involves making progressively finer scratches in the surface. These scratches remove imperfections in the wood, such as visible dents or uneven surfaces. Moving from one grit to the next finer one will remove reduces the size of the dents until they are so small the wood seems smooth.

Do Now Copy This

Relief Cuts

A series of straight cuts used to enable a smooth curve with little to no defects. Prevents breaking saw blades and allows for a smoother finish.

Do Now – Copy This

Divider / compass –

A device resembling a compass, used for dividing lines and transferring measurements.

Radius- distance from the center to the circumference.

Circumference- Plane figure contained by a line, which is everywhere equidistant from a fixed point within. $(2\pi r)$ Pi = Π = 3.1416

Tangent to a Circle- A straight line touching the curve at a point. The tangent to a circle is perpendicular to

A circle is a shape with all points the same distance from the center. It is named by the center. If you measure the distance around a circle and divide it by the distance across the circle through the center, you will always come close to a particular value, depending upon the accuracy of your measurement. This value is approximately 3.14159265358979323846... We use the Greek letter π *(pronounced Pi)* to represent this value. The number π goes on forever.

Do Now _ Copy This

Wood grain describes the alignment, texture and appearance of the wood fibres. This is often important in its effect on woodworking techniques (e.g. against the grain).

In describing the application of a woodworking technique to a given piece of wood, the direction of the technique may be:

with the grain
against the grain
across the grain

Rasps- a rasp looks a lot like files but is rougher to remove more wood. Rasps come in several shapes round half, round and flat.

-Keep in mind that most of the wood should be removed during the push.

- You may find it helpful if you hold the tip of the rasp with your other hand to help guide it and control the amount of pressure on the wood.

-Lighten up on the pressure when you are almost done so that you make smaller grooves in the wood.

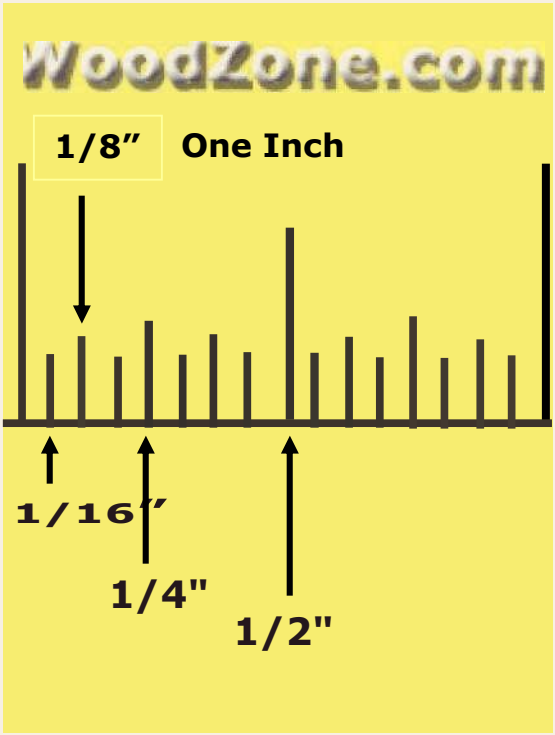
DO NOW COPY THIS

Numerator is the top part of a fraction that tells the number of equal parts. In the fraction 3/4", 3 is the **numerator**, and the fraction represents three equal parts of a whole, each part being one fourth of the whole. (Note that 4 is the denominator in this example.)

Denominator is the name for the bottom part of a fraction. It tells you how many equal parts make up a whole, and is also used in the name of the fraction: "halves", "thirds", "quarters", "fifths", "sixths" and so on.

DO NOW- COPY THIS

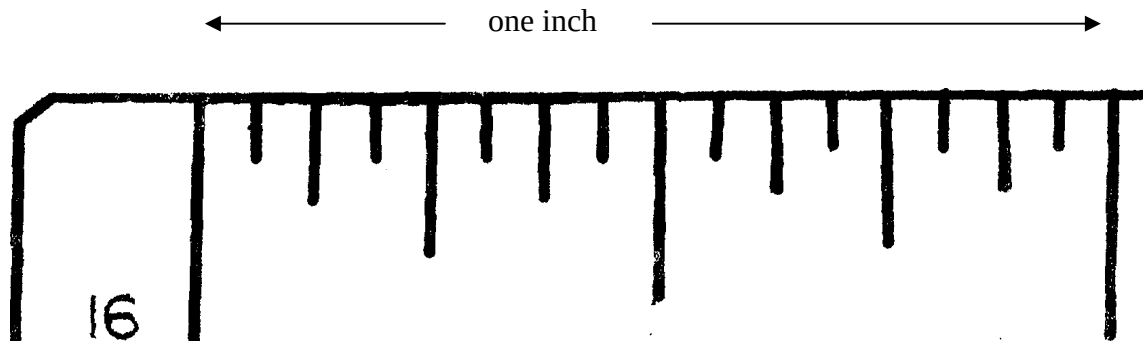
A standard tape measure (or ruler) in the United States is divided up into feet and inches. Each foot is divided into 12 inches. The problem starts with the subdivision of the inches. In each inch there are a number of lines of different length. The longer the length of these lines, the larger the unit of measurement.



For example. 1. The longest line in the inch is in the middle. This is the half-inch mark and there is only one. 2. The next shortest line is the 1/4" (one quarter of an inch) inch mark and there are only two of these. 3. The third shortest line is the 1/8" (one eighth of an inch) mark and there are four of these. 4. The fourth shortest is the 1/16" (one sixteenth of an inch) mark and there are eight of these

MEASUREMENT EXERCISE

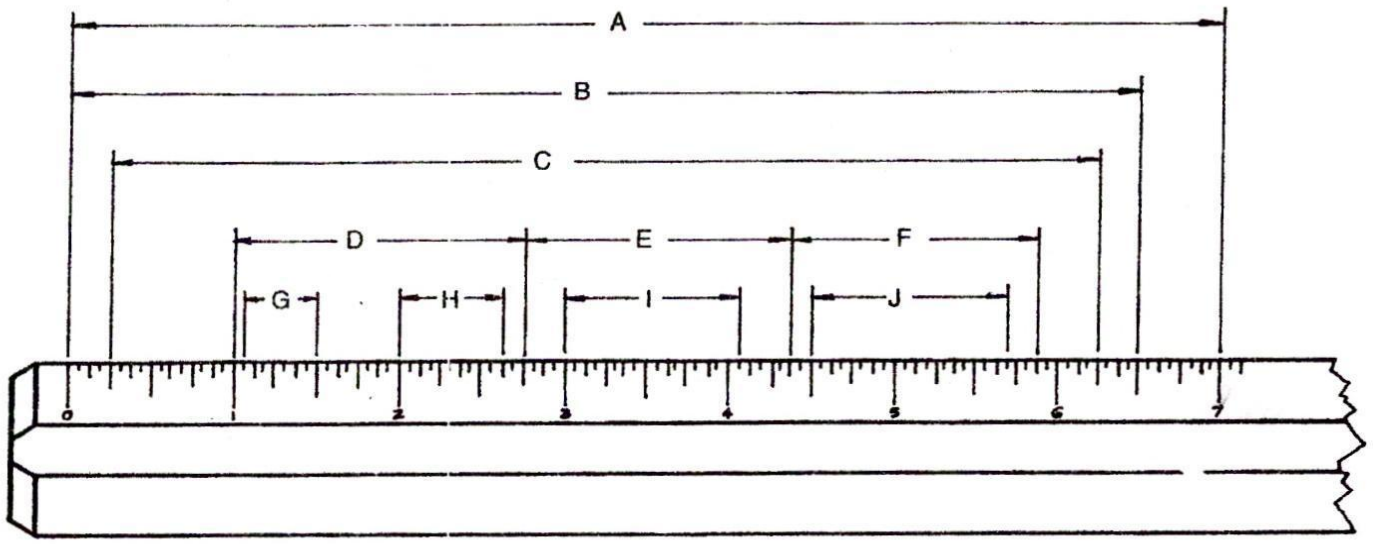
Directions: Fill in the appropriate measurement for this one inch increment.



Reading a Conventional Ruler

Objective: To practice measuring using the conventional system.

Read from the ruler each of the dimensions labeled A to J. Write your answers in inches and fractions in the spaces provided.



A _____ F _____

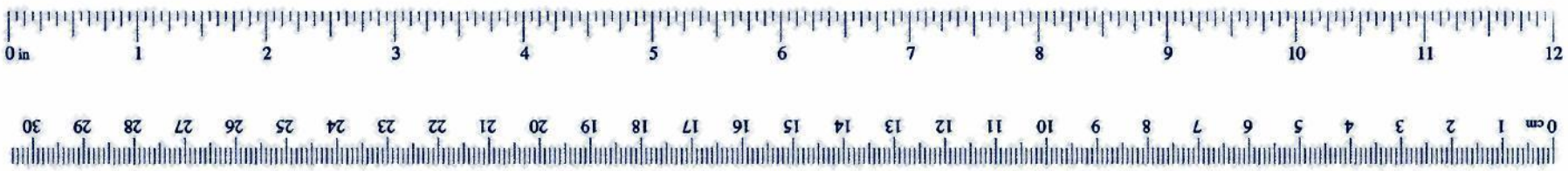
B _____ G _____

C _____ H _____

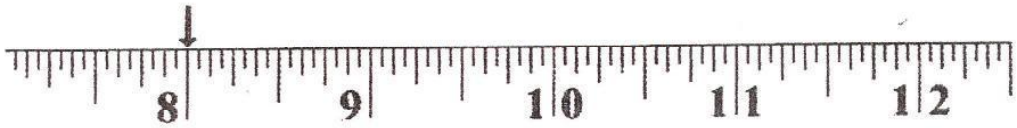
D _____ I _____

E _____ J _____

12" ruler


0 in 1 2 3 4 5 6 7 8 9 10 11 12
0 cm 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

Name_____ Date_____

9 

_____

10 

_____

11 

_____

12 

_____

13 

_____

14 

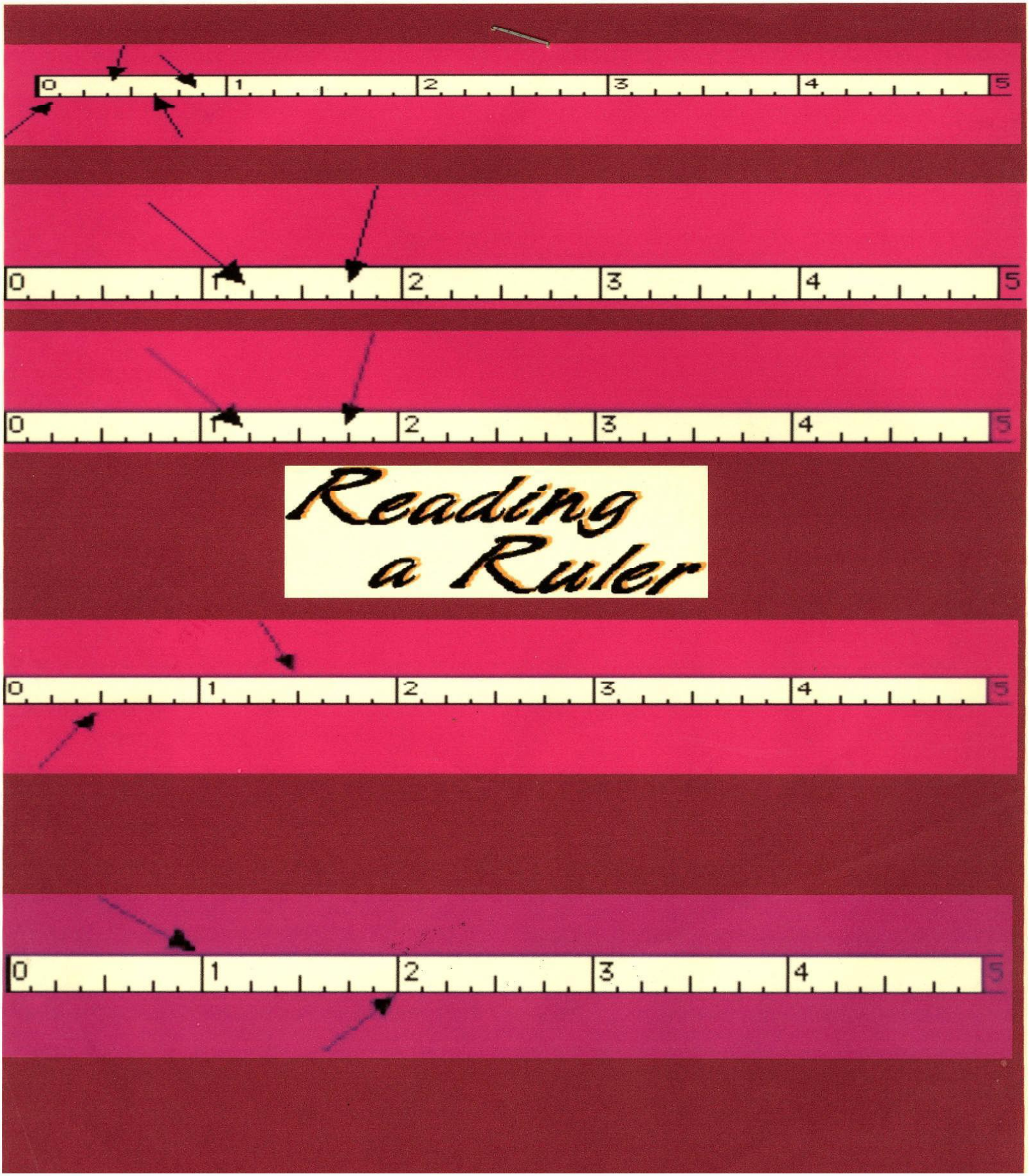
_____

15 

_____

16 

_____


0 1 2 3 4 5
0 1 2 3 4 5
0 1 2 3 4 5
Reading a Ruler
0 1 2 3 4 5
0 1 2 3 4 5

Directions: Use your rulers to measure each of the following segments to the nearest 1/16 of an inch. Make your measurements as accurately as you can. After all measurements are made, compare your answer to other students in your group. A class discussion of the findings will follow.

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____ ↘

Name_____ Date_____

1 

_____

2 

_____

3 

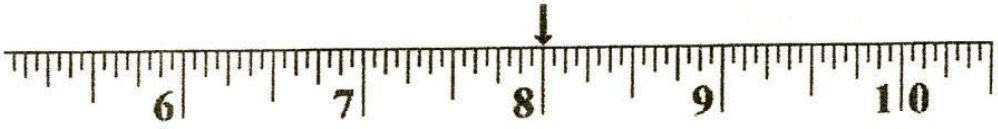
_____

4 

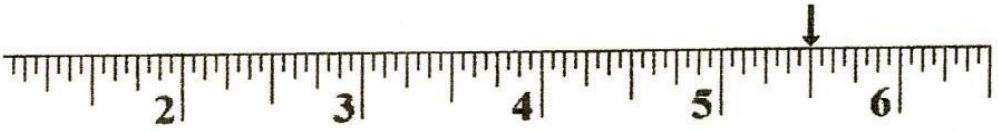
_____

5 

_____

6 

_____

7 

_____

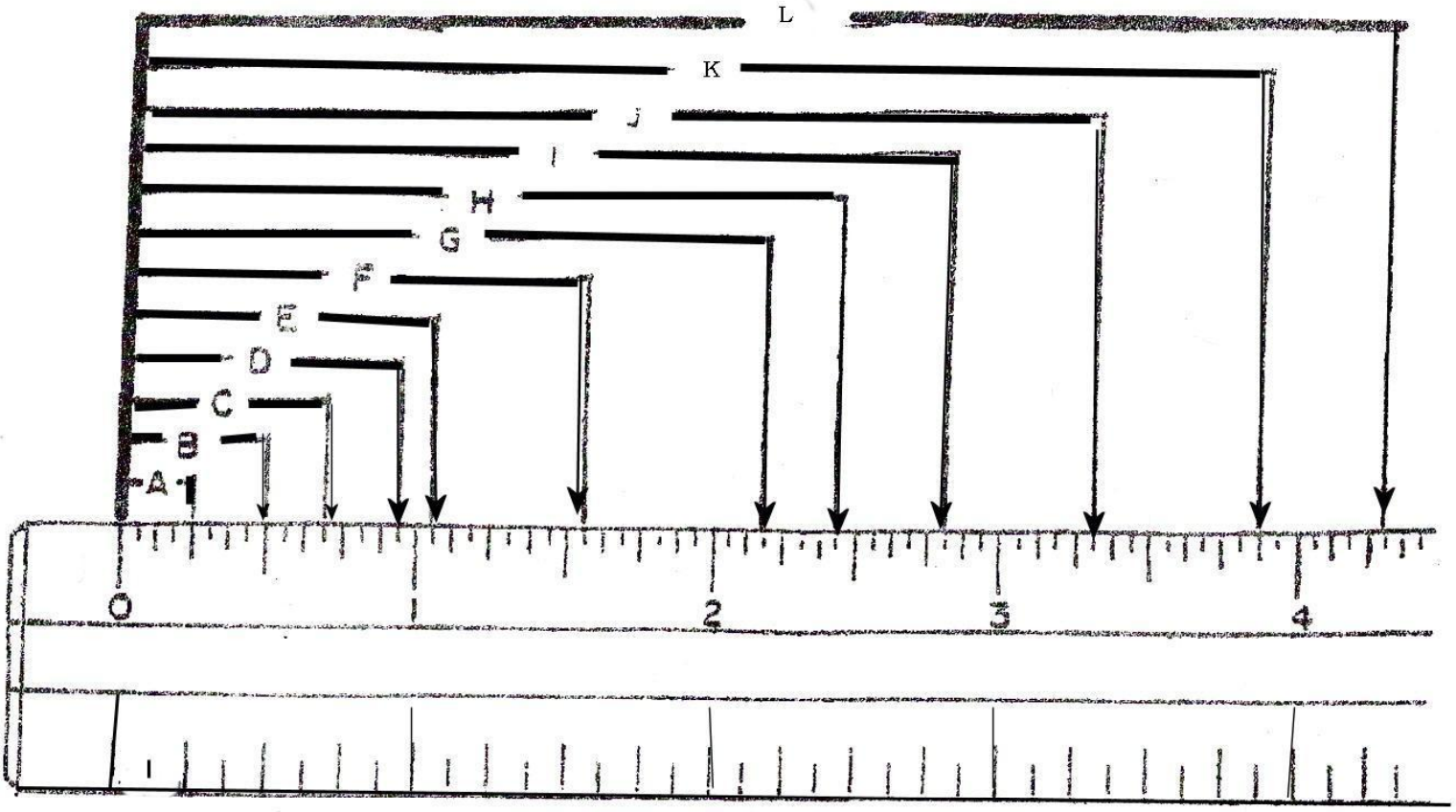
8 

_____

Name _____ Date _____

Period _____

MEASUREMENT EXERCISE



A. _____ G. _____

B. _____ H. _____

C. _____ I. _____

D. _____ J. _____

E. _____ K. _____

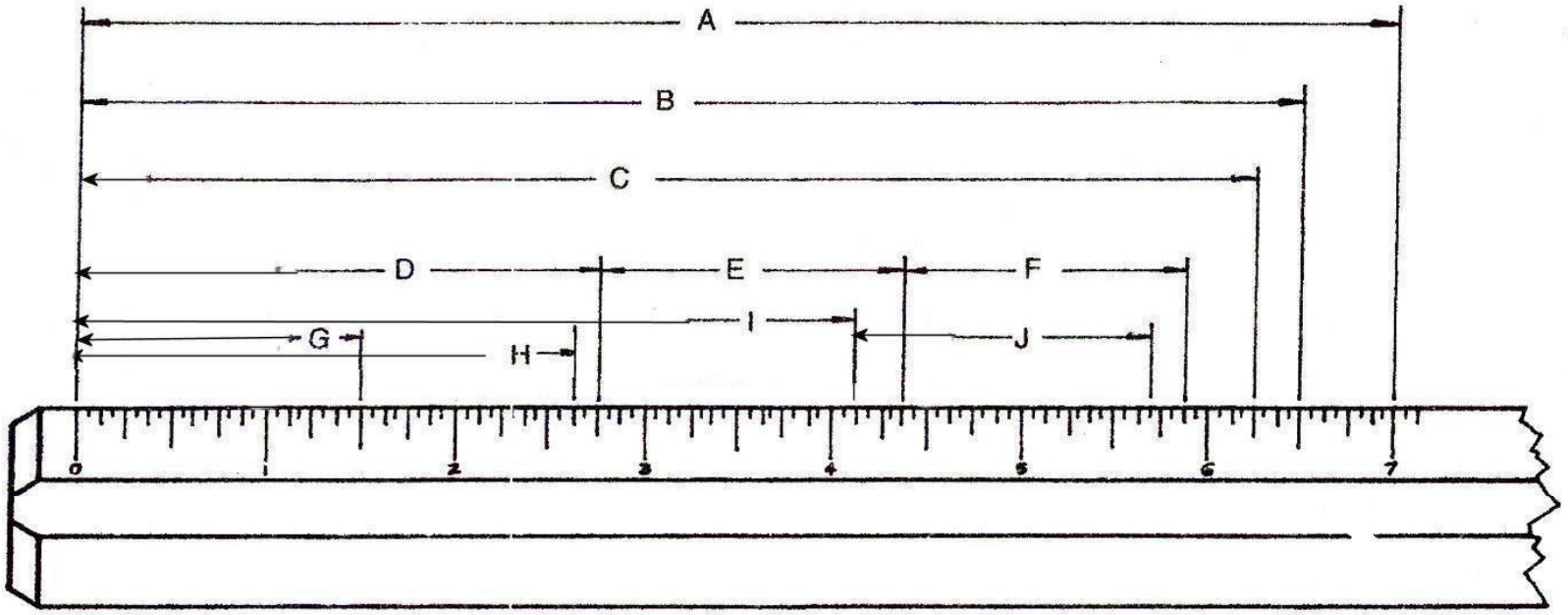
F. _____ L. _____

Reading a Conventional Ruler

Name_____ Date _____

Objective: To practice measuring using the conventional system.

Read from the ruler each of the dimensions labeled A to J. Write your answers in inches and fractions in the spaces provided.



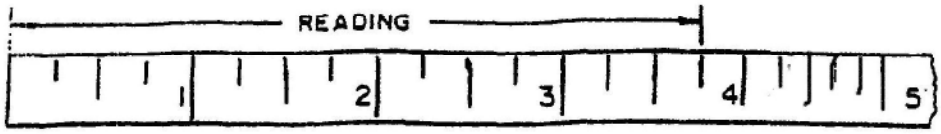
A _____ F _____

B _____ G _____

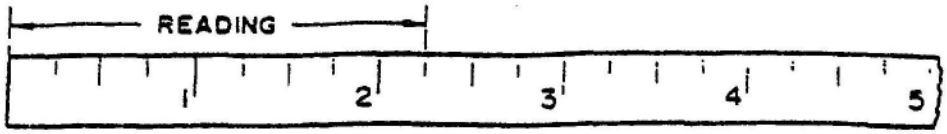
C _____ H _____

D _____ I _____

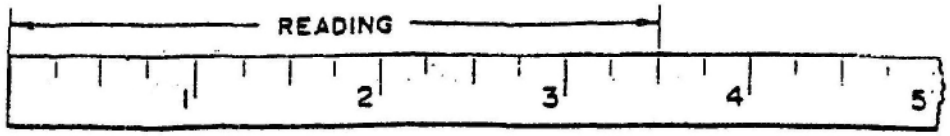
E _____ J _____

1. 

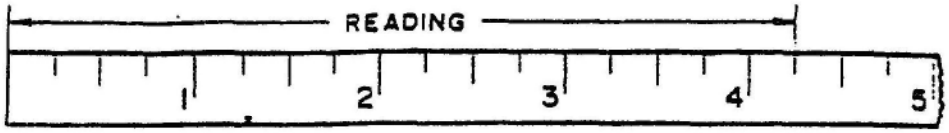
1. _____

2. 

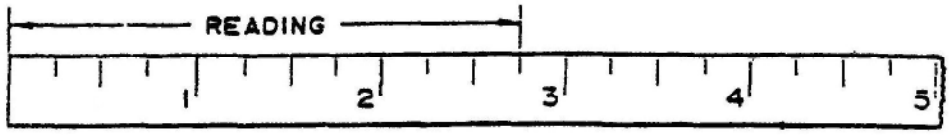
2. _____

3. 

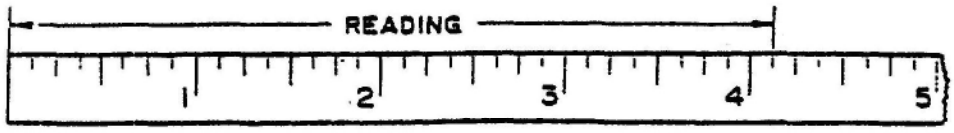
3. _____

4. 

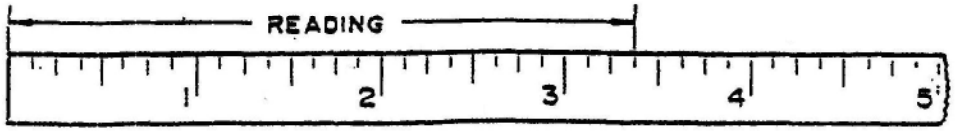
4. _____

5. 

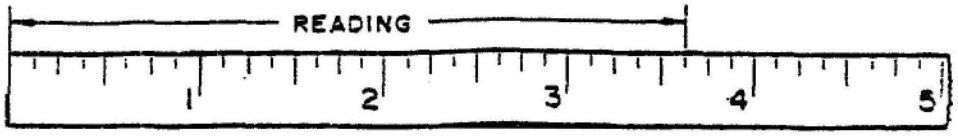
5. _____

6. 

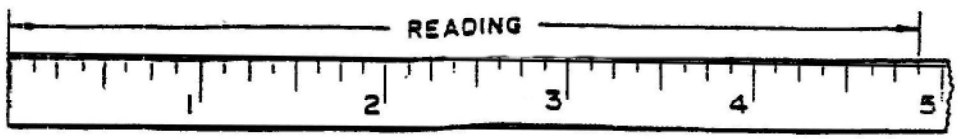
6. _____

7. 

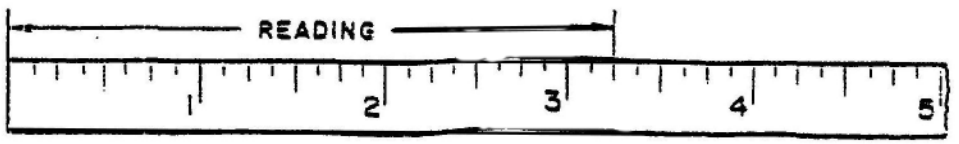
7. _____

8. 

8. _____

9. 

9. _____

10. 

10 _____

_____

_____

Do Now----- Copy This:

Circumference- Plane figure contained by a line, which is everywhere equidistant from a fixed point within. ($2\pi r$)
Pi = Π = 3.14

Radius- distance from the center to the circumference.

R.P.M. – revolutions per minute

Distance traveled – rpm x time of spin (in min.) x circumference.

Production Design and Development- Is the idea stage of production also called research and development. During this process people think of possible product ideas, product design, and methods for manufacturing. Sometimes as a group activity, (also known as brainstorming).

Production planning- at this stage, the production planners identify resources and processes to be used to produce the product.

TOOL RELATED SAFETY

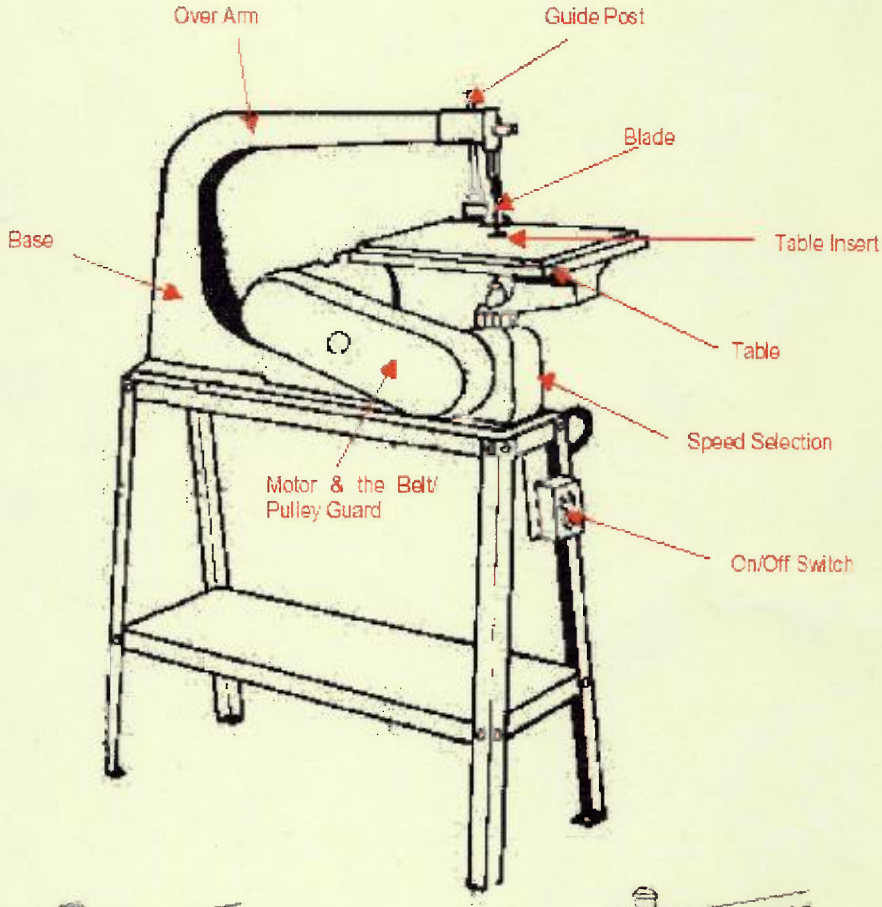
Cut Points- These occur where two edges of a machine contact one another or a none moving part. Cut points can be found on machines that may not be designed to cut but have sharp edges.

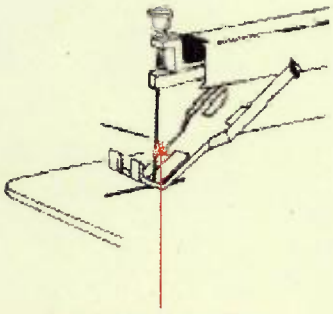
Example jig saw or band saw

Crush points/ pinch points- These are created when two objects move toward each other, or one object moves toward a nonmoving part. An example of these points is vises, belts or a chain on a machine.

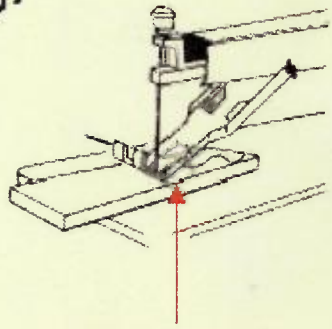
Wrap Points- These are found on a spinning part of a machine, such as a drill or a lathe. Loose clothing, a sleeve, a glove, jewelry, and long hair are particularly dangerous. These items can twist and entangle items around a rotating part and pull your body in contact with the machine.

Scroll Saw Parts





NOTE: Tension should be adjusted until it is 90°.



NOTE: Guide should fit flush like this.

Scroll Saw Notes

Requirements:

Proper eye protection must be worn—operate only with instructor's permission and after proper
instructions have been received.

1. Make all adjustments with the power OFF.
2. Make sure that you are lightly holding the wood flat against the table to keep the wood from bouncing around and possibly being thrown out.
3. Check to make sure that the teeth of the blade are pointing down and that the guide assembly is flush with the wood.
4. Use both hands to guide the wood through the cut. However, hands should remain to the side of the blade, never in direct line with the blade.
5. The scroll saw can hurt you as badly as the band saw. The smaller blade will not save your hand or fingers.
6. Never use your hand to clear the table. Always use a table broom or the chip blower.
7. Scroll saw blades break very easily, so take your time to make the right cuts. Remember, never force the wood and use the correct speed.
8. "Hard" woods and tight curves should be cut using the slower speed.
9. If the blade breaks, turn the machine off, unplug it, and **tell** the teacher immediately. Never try to fix it yourself.
10. You have to wait patiently and quietly for your turn on this machine, behind the yellow line, just like with any machine.
11. If for any reason you are not sure of the way to cut out an object, get your teacher's assistance. You may have to wait a little while, but you will be helped as soon as possible. Remember, have patience!
12. The machine must be turned off and at a complete standstill before you can leave it.

Backsaw

A **backsaw** is any of several types of hand saws used in woodworking which have a stiffening rib on the edge opposite the cutting edge, allowing for better control and more precise cutting than with other types of saws. Backsaws are normally used for precise work, such as cutting dovetails, mitres, or tenons in cabinetry and joinery. Because the stiffener is thicker than the blade, the backsaws are limited in the depth to which they can cut. Backsaws usually have relatively closely-spaced teeth, often with little or no set.

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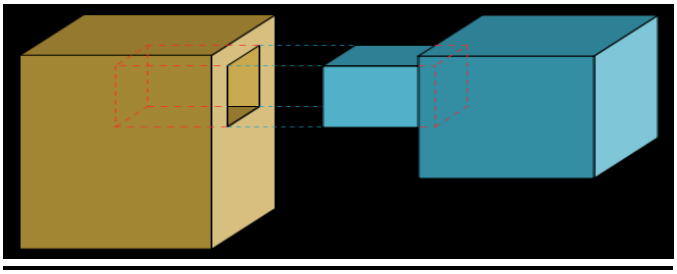
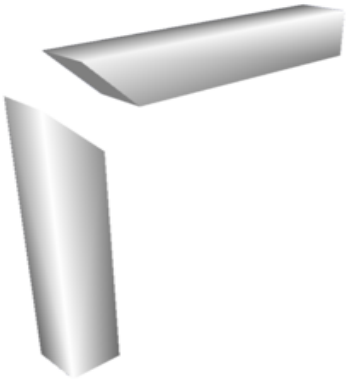
Mortise and Tenon

Simple and strong, the **mortise and tenon** joint has been used for millennia by woodworkers around the world to join pieces of wood, usually when the pieces are at an angle close to 90°. The end of the first member is called the **tenon**, and it is usually narrowed with respect to the rest of the piece. The hole in the second member is called the **mortise**. The joint may be glued, pinned, or wedged to lock it in place.This joint is also used with

other materials, for example stone.



Miter joint



Miter joint (pieces ready to be joined).

Miter joint of two pipes

A **mitre** or **miter joint** is a joint made by beveling each of two parts to be joined, usually at a 45° angle, to form a corner, usually a 90° angle. It is often used in making picture frames.

Backsaw

A backsaw is a specialized handsaw for cutting tenons (joints or grooves) in wood. The blade is rectangular, 8 to 14 inches in length, with a hardwood or plastic handle and a metal-reinforced back edge (opposite the teeth) to keep the blade from bending while cutting. There are 11 to 20 teeth, or points, per inch. Backsaws are used to cut across the wood grain similar to the larger and more flexible crosscut saw.

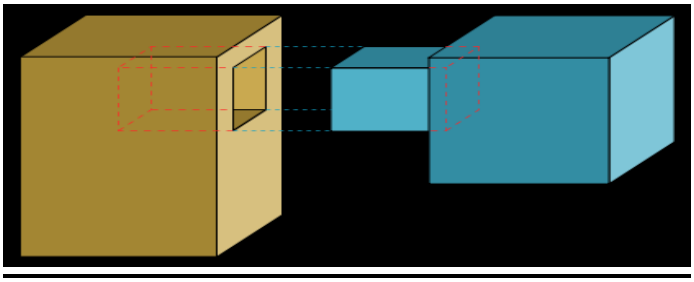
How to Safely Use a Backsaw

To safely use a backsaw, first make sure that the wood is firmly held in a wood vice or by clamps so it does not move during cutting. Measure and mark the cut with a pencil. Place the saw's central teeth on the line and pull the saw to start the cut. Continue by carefully guiding the teeth over the line, steadying the blade as needed with your other hand. Work slowly and carefully for best results. When done, carefully lay the saw down where the teeth will not damage other surfaces or cut you.

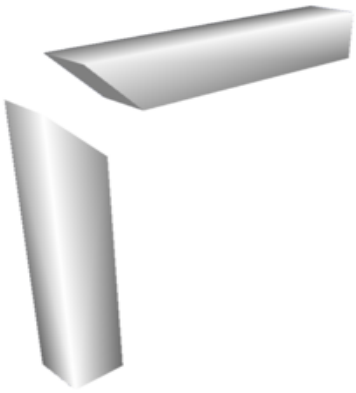
Mortise and Tenon

Simple and strong, the **mortise and tenon** joint has been used for millennia by woodworkers around the world to join pieces of wood, usually when the pieces are at an angle close to 90°. The end of the first member is called the **tenon**, and it is usually narrowed with respect to the rest of the piece. The hole in the second member is called the **mortise**. The joint may be glued, pinned, or wedged to lock it in place.This joint is also used with

other materials, for example stone.



Miter joint



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A **mitre** or **miter joint** is a joint made by beveling each of two parts to be joined, usually at a 45° angle, to form a corner, usually a 90° angle. It is often used in making picture frames.

Time	Grade
1 min	65
1:01 - 1:15	70
1:16 - 1:30	75
1:31 - 1:45	80
1:46 - 2:00	85
2:01 - 2:15	90
2:16 - 2:30	94
2:31 - 2:45	97
2:46 - 3:00	98
3:00 min & up	100

East Middle School Technology

Dear Parents or Guardian:

I am delighted to have your son/daughter in my technology class this year. The study of Technology is an extremely rewarding experience. This class will incorporate science, math, & history, with technology. Through the use of a hands-on approach your child will develop a better understanding and appreciation of his world. We will examine the history of technology, and identify changes throughout the ages, and how it impacts our daily lives.
He will develop the crucial skill of teamwork, the sharing of tools, machinery, and the use of computers to solve problems, performs tasks, and build projects. He will develop a better understanding between science and technology.

In order to guarantee your child and all the students in the class the excellent educational climate that they deserve, I expect both responsibility and commitment from them.
Therefore, I have established the following rules:

1. Follow all directions, especially the safety rules.
2. Be on time. You are late if you are not in your seat when the bell rings.
3. Respect the rights and property of others. No Bullying.
4. Be prepared. Bring pencils and notebook to class *every* period.
5. No eating or drinking in class, especially gum.
6. Students are to copy the "DO NOW's" into their notebooks as soon as they enter the room.
7. No passes will be granted, except for medical emergencies.

If a student chooses to break a rule:

1st Time- given a warning
2nd Time a call to the home
3rd Time after school detention - and a call home

Grades are based on the following criteria:
Class participation; notebook ; projects completed; tests/quizzes; special projects; assignments; homework ;participation in clean up; teamwork

To be successful in my class, requires:

- being *on time to class*
  Supplies needed
- Having *a PEN , PENCIL & ERASER*; every class period
- Having a notebook (" 1" white looseleaf) kept neat and up-to -date
- Having the AGENDA BOOK

Please remember that your involvement and encouragement at home are crucial to your child's achievement.If you have any questions or concerns, please call the school at 434-2473.
Thank You
Sincerely,
Mr. S. Grad
Detach here

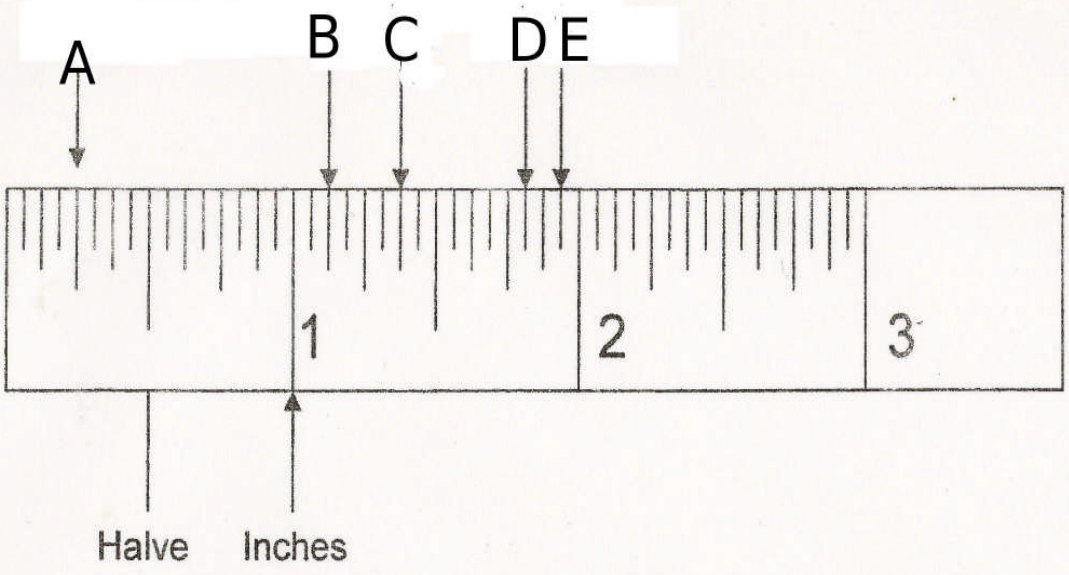
I have read and reviewed the course requirements, and discipline rules, with my child.
Please print Parent/Guardian's name_____ Students name: _____

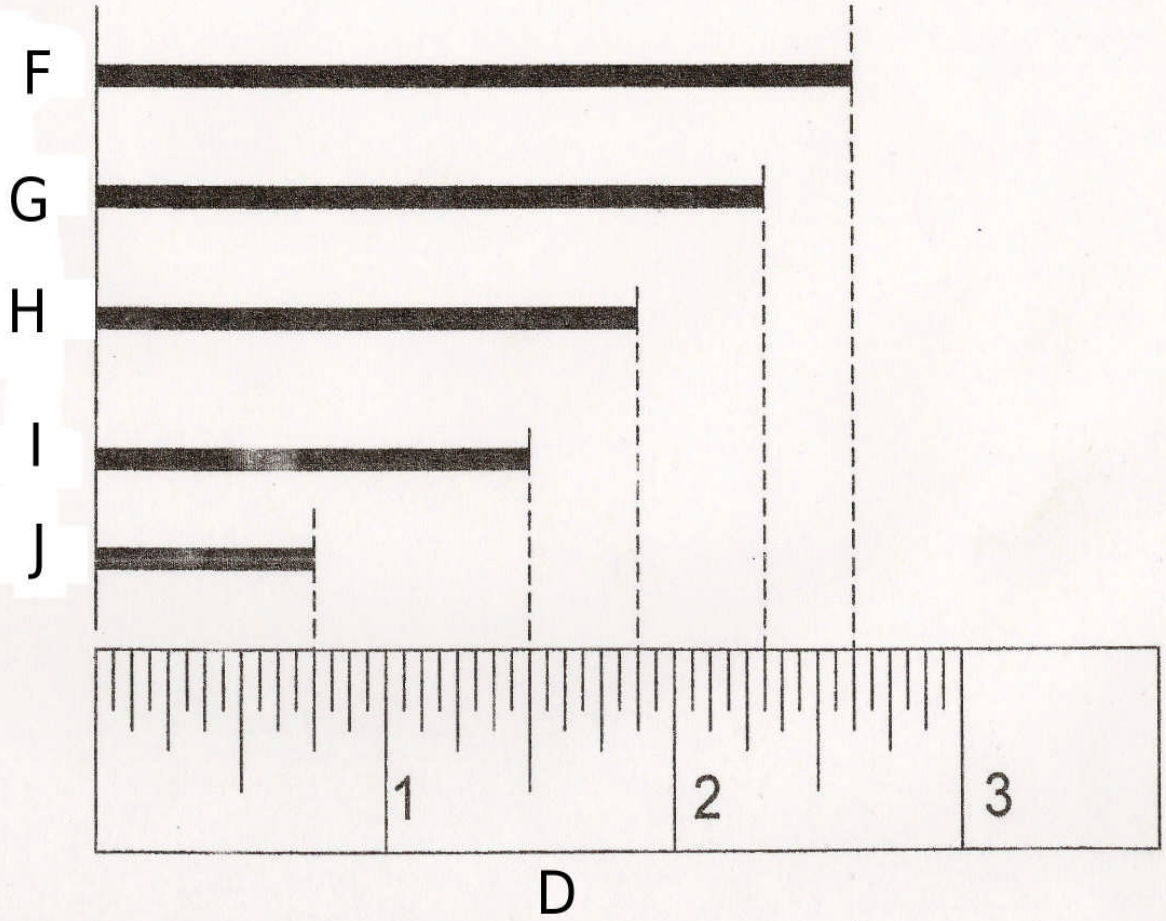
Class Period_____ Day_____ Grade_____

STUDENT: PARENTS:
Signature _____ Signature_____

Home phone _____ Work phone_____

The Ruler





Name: Date:

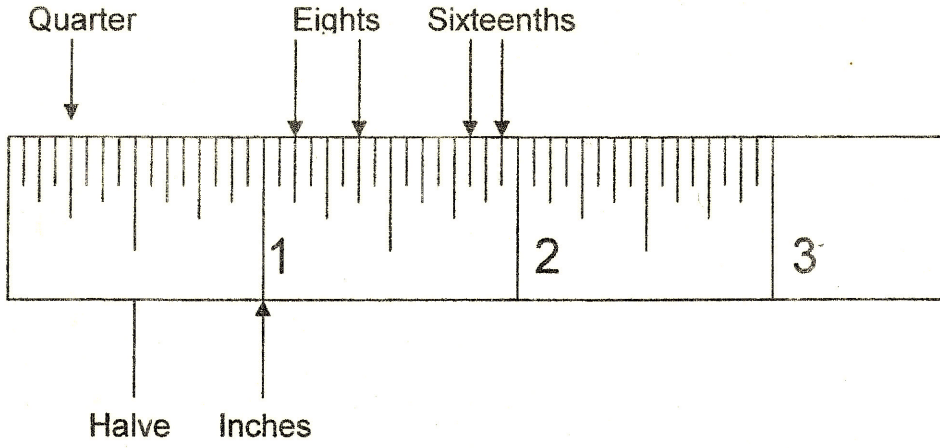
Measuring Lines (Inches)

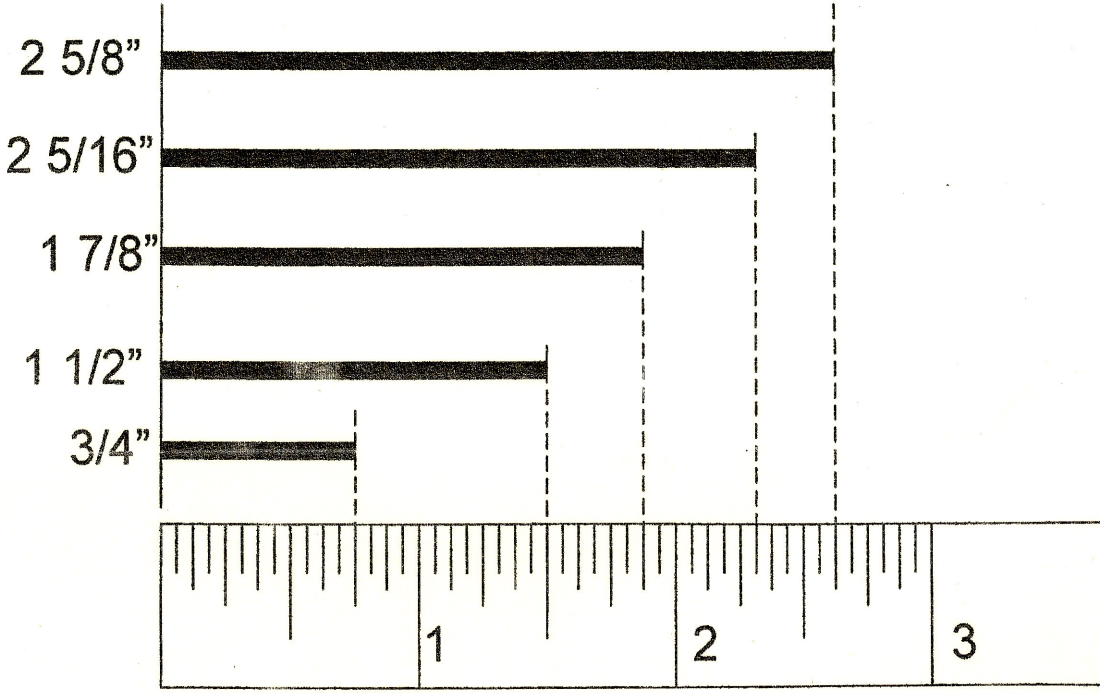
www.atozteacherstuff.com

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

Score:

The Ruler


Quarter
Eights
Sixteenths
1
2
3
Halve
Inches


2 5/8”
2 5/16”
1 7/8”
1 1/2”
3/4”
1
2
3

Do Now

Technology- the use of knowledge, tools, and systems to turn resources into goods and services that society needs. These products and systems can help do things that could not be done without the help of technology.

Technology can improve personal lives by providing efficient transportation, rapid communications, comfortable housing, and plentiful food.

Technologist- a specialist in manufacturing enterprise or some other enterprise. He or she works under an engineer or scientist.

Technologists work closely with engineers to implement their work. Technologists are the major link between engineers and the factory floor or construction site.

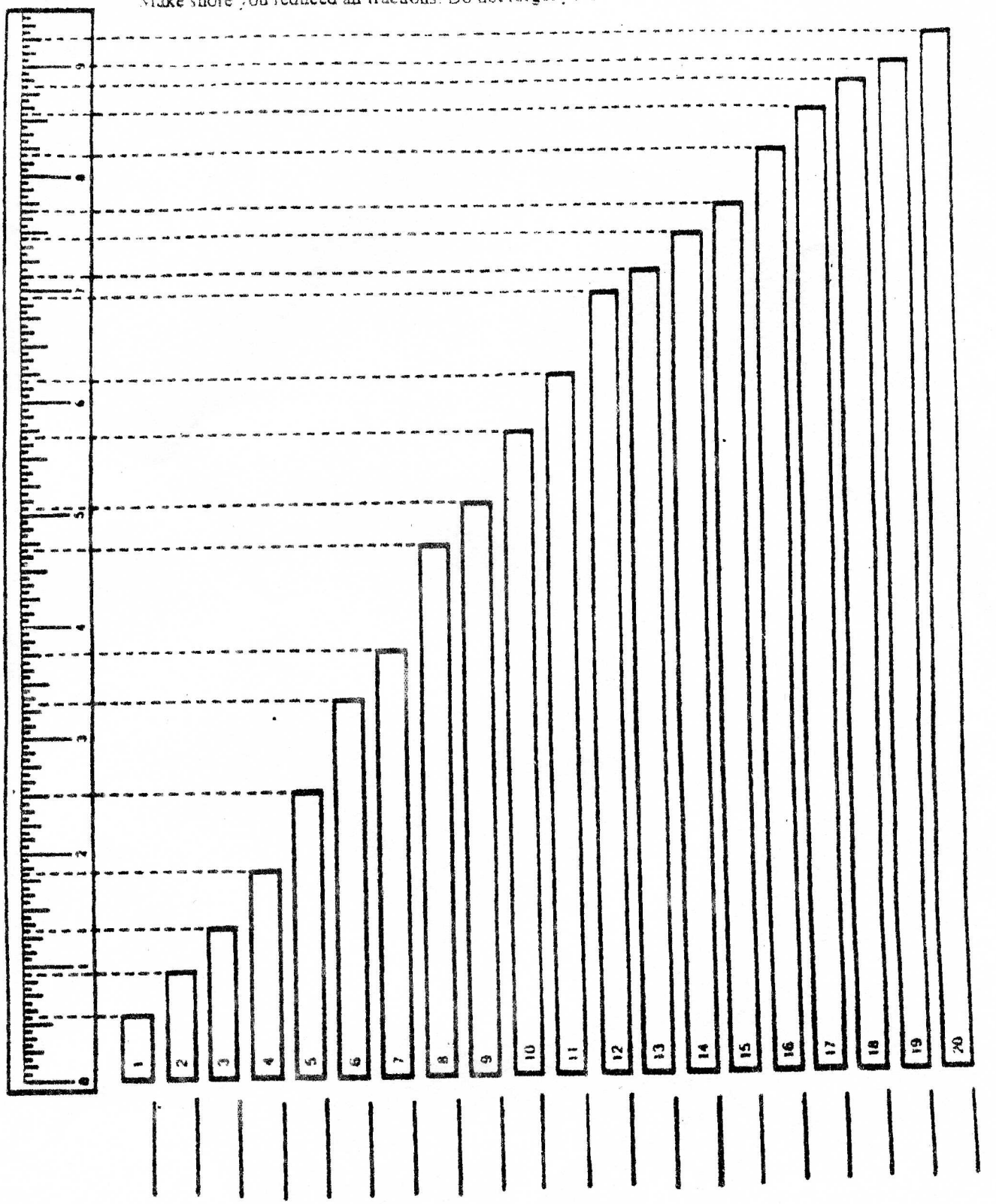
TECHNOLOGY EDUCATION

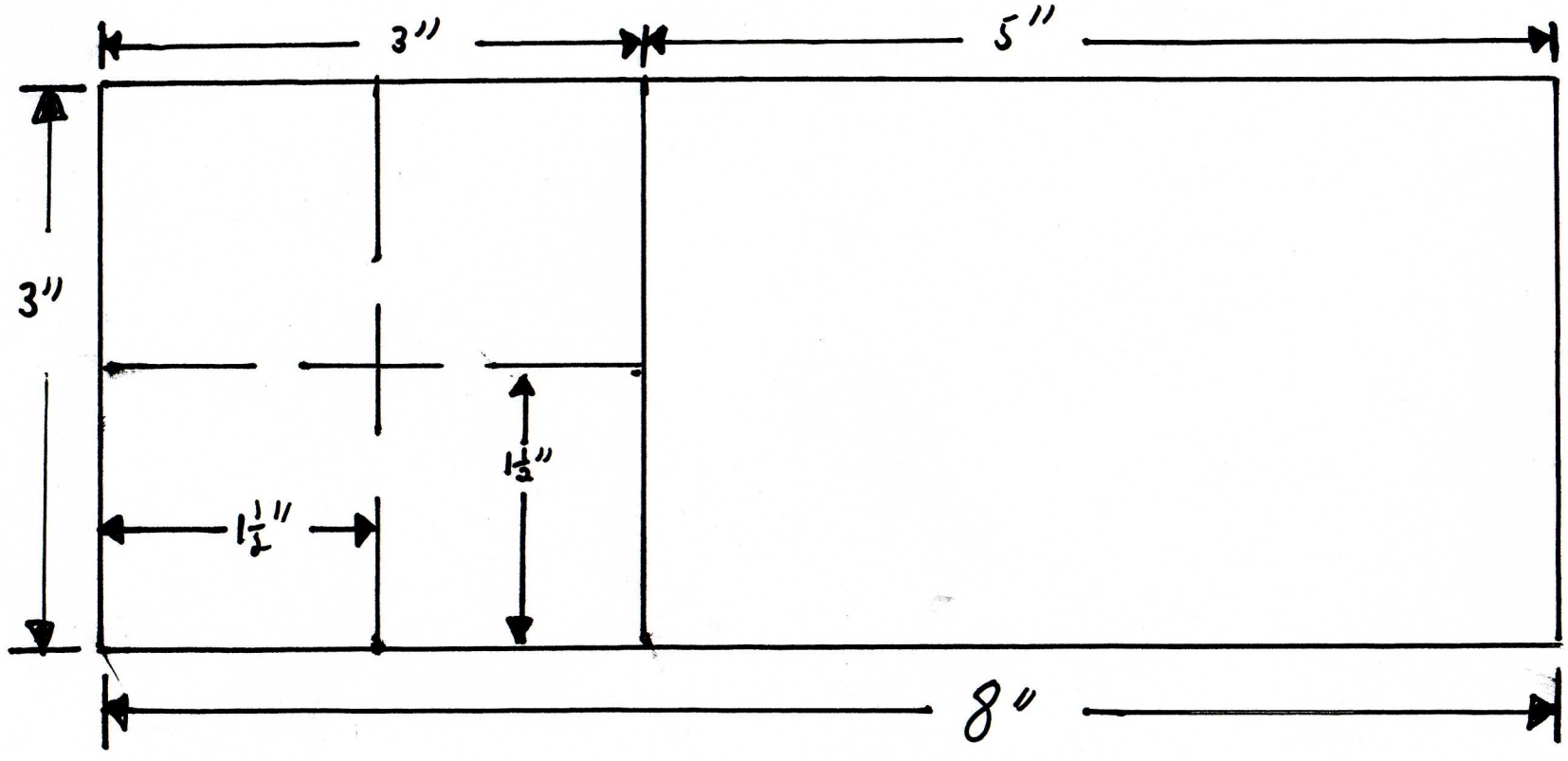
RULER TEST

TEST GRADE:

NAME _____ PERIOD _____ DATE _____

Directions Follow the dotted line up from the block that you are measuring. Place your answer in the space provided. Make shore you reduced all fractions. Do not forget your whole numbers.



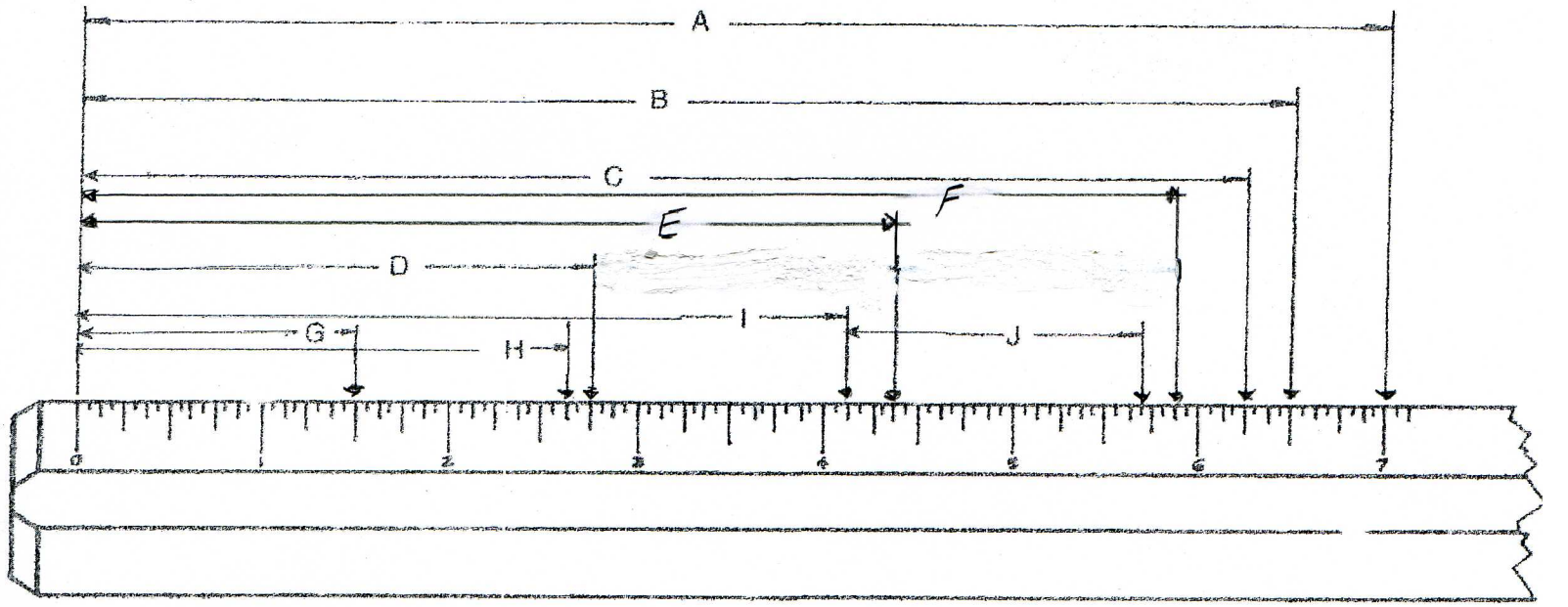

3"
5"
3"
1½"
1½"
8"

Reading a Conventional Ruler

Name _____ Date _____

Objective: To practice measuring using the conventional system.

Read from the ruler each of the dimensions labeled A to J. Write your answers in inches and fractions in the spaces provided.



A _____ F _____

B _____ G _____

C _____ H _____

D _____ I _____

E _____ J _____

Do now copy this.

Carbon paper (originally **carbonic paper**) is paper coated on one side with a layer of a loosely bound dry ink or pigmented coating, usually bound with wax. It is used for making one or more copies simultaneous.

Carbon paper is placed between the original and a blank sheet to be copied onto. As the user writes, draws or types on the original, the pressure from the pen or typeface deposits the ink on the blank sheet, thus creating a "carbon copy" of the original document. This technique is generally limited to four or five copies.

A single piece of carbon paper can be repeatedly reused until the impression grows too light.

Do Now – Copy This

How to Use the Drill Press.

1 First you need to mark the spot you intend to drill. Draw an "X" over the exact center point of the desired hole with a pencil. Use the Tri-Square to make accurate lines.

2 Align the drill bit over the mark. Place the material on the drilling table with the machine off.

You must use a drill press vise or clamp to hold materials steady on the drilling table.

As the drill bit rotates, it exerts pressure outward that can cause stock to spin or be thrown if it's not held firmly.
The vise holds materials much steadier than anyone can by hand. It also keeps hands and fingers safely away from working drill bits.

3. Tighten the vise around the material. Twist the crank with clockwise rotations to bring the moving grip of the vise in toward the stock. Keep tightening until both grips are holding the stock firmly in place. Check the alignment of the "X" mark by lowering the drill bit over it again.

4. Pull the rotating crank toward you to lower the drill bit. Place the material against the stationary grip of the vise. Line up the point of the drill bit with the "X" mark.

5. Put on safety goggles or a face shield. Tuck in loose shirts, remove jewelry ,tie back long hair and roll up loose sleeves before turning on the drill.

6. Turn on the drill. Keep your free hand away from the drilling table as you lower the bit with the rotator crank to drill.

7. Occasionally pull the drill bit out of the hole then re-insert it. This will allow waste material to come out and give the drill bit and wood a chance to cool down a little.

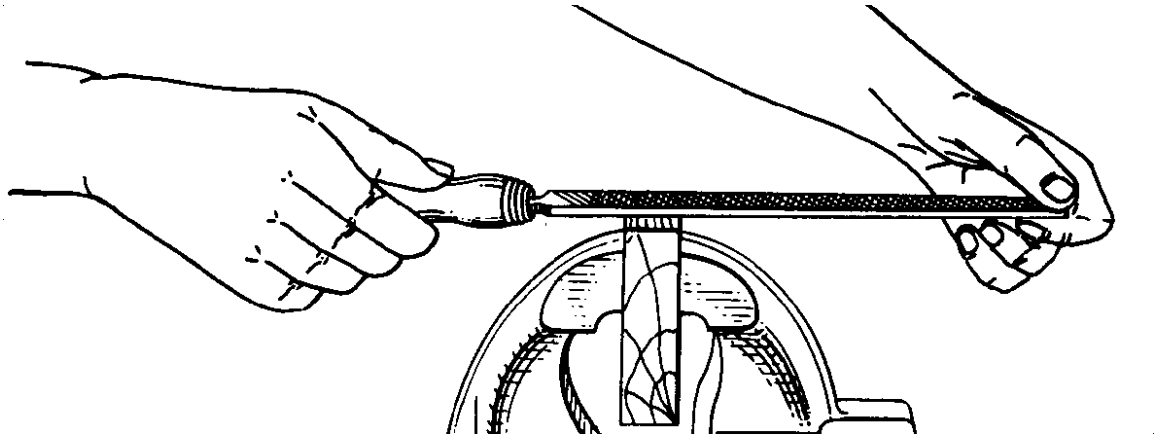
A rasp is a tool used for shaping wood or other material. It consists of a point or the tip, then a long steel bar or the belly, then the heel or bottom. A rasp comes in several shapes and sizes including round half round and flat.

You will find it helpful if you hold the tip of the rasp with your other hand to help guide the rasp and control the amount of pressure.

How To Use Files (Wood)

Your tool kit should always include a variety of files and handles to match. They are used for smoothing, cutting, or removing small amounts of wood. They come in a variety of shapes and sizes, and each one is designed to perform a specific type of work.

1) Insert block of wood in vise



2) Grasp the handle of the file in one hand.

3) Grasp the point of the file in the other hand.

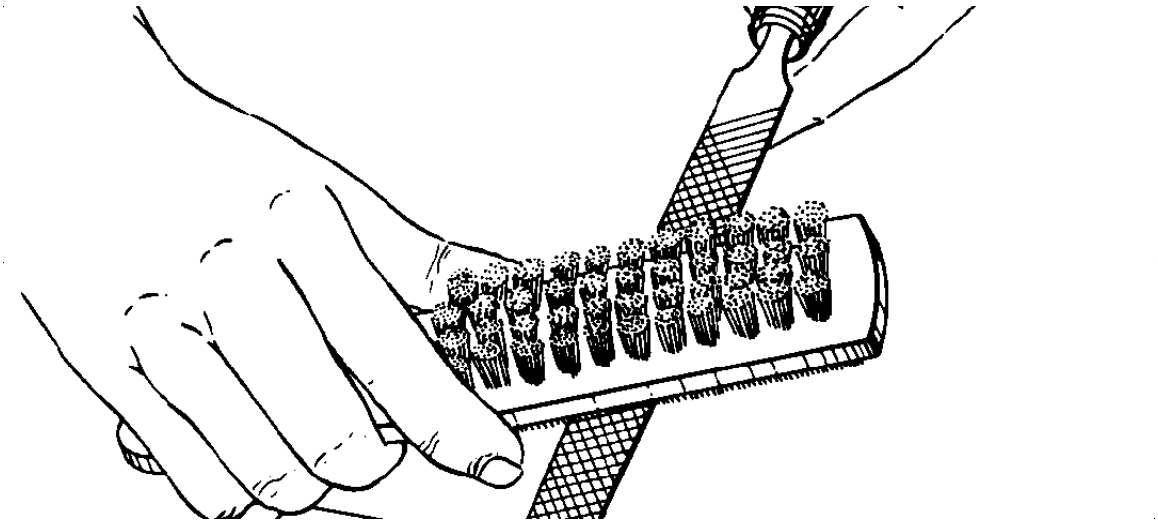
4) Place the middle of the face of the file on the wood. The first stroke should be started with light pressure near the point of the file.

5) Push file across wood and increase pressure as you go, so that each file tooth will do its share of the job. When the file is pushed all the way across the surface of the wood, raise file and start all over. Never use pressure on return stroke.

6) Make sure your strokes are slow and steady. Too much speed will cause your file to "rock," and that will round off the edges of your wood.

7)As you file, the teeth of the file will clog up with some of the wood shavings and prevent efficient filing. This is known as "pinning." Rubbing chalk between the teeth of the file can help to prevent this condition. But, better clean the file frequently with a brush.

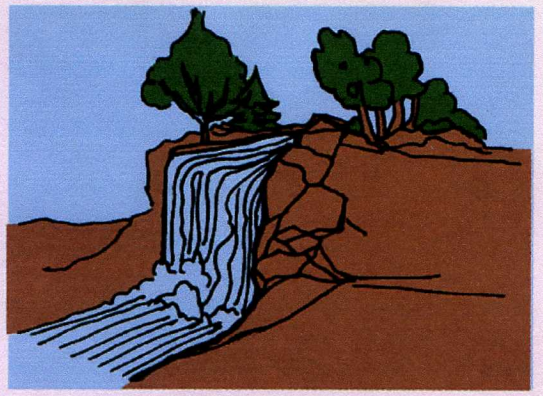
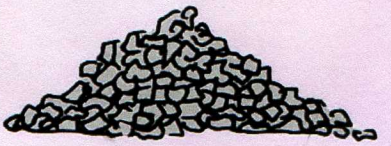
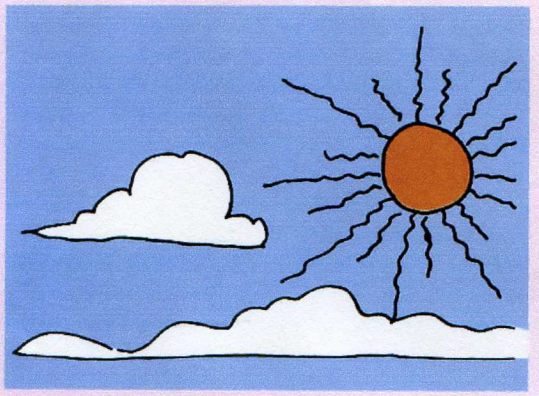
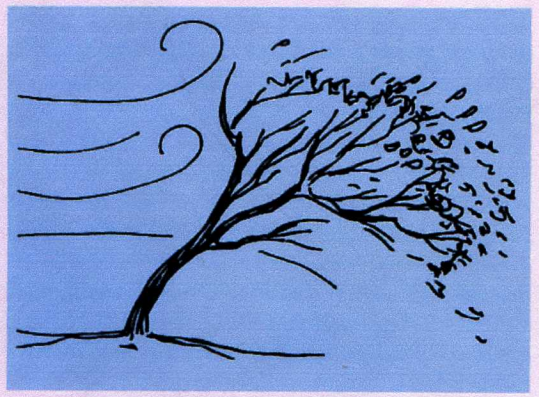
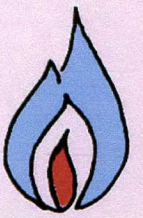
8)Brush with a pulling motion parallel to the rows of teeth, diagonally across the file, not up-and-down the length of the file. Clean the file after fifteen strokes and alter your angle of filing at the same time



Primary Material- is a substance produced naturally on the earth. Primary materials may be renewable, such as wood, or nonrenewable, such as metal.

- Primary materials can be used as is, but usually they are the basis for other types of materials called, **Industrial Materials.**

Industrial Materials- is a substance that has been processed. For example, the wood from trees- a primary material- is cut into wood boards- an industrial material.

Renewable	Nonrenewable
 Moving Water	 Coal
 The Sun	 Oil
 The Wind	 Natural Gas

Renewable Resource

A substance of economic value that can be replaced or replenished in the same amount or less time as it takes to draw the supply down. Some renewable resources have essentially an endless supply, such as **solar energy** and **wind energy**.

Other resources are considered renewable even though some time or effort must go into their renewal, such as **wood, leather and fi**sh.

Most **precious metals** are considered renewable as well; even though they are not naturally replaced, they can be recycled because they are not destroyed during their extraction and use.

The Sanding Process

The process of sanding wood involves making progressively finer scratches in the surface.
Rub the sandpaper in the same direction as the grain. These scratches remove imperfections, defects, in the wood, such as saw marks, dents, or uneven surfaces.
Moving from one grit to the next finer one will remove the imperfections, and cause the wood to be smooth.

When you sand, you're scraping away material from the surface to remove imperfections or to shape and contour edges. The goal is to start with the sand-paper that's just coarse enough to remove the worst defects easily.

If you start with sandpaper that's too fine, it'll take forever to sand out defects. In most cases, 80-grit paper is a good starting point for sanding shaped wood.

It's tempting to just fold a piece of sandpaper and go to work. But you'll get better results with far less effort if you use a sanding block. The block distributes sanding pressure more evenly and maintains a flatter surface

DO NOW – COPY THIS

SCROLL SAW

Safety First

As far as powered woodworking tools go, the scroll saw is among the safest. However, do not be fooled --

ALL power tools can be dangerous.

You MUST wear your safety goggles as usual, tie back long hair, remove all jewelry, and secure loose clothing. Keep your fingers clear of the blade and mind the reciprocating arm of the scroll saw as it can easily break a finger or even worse.

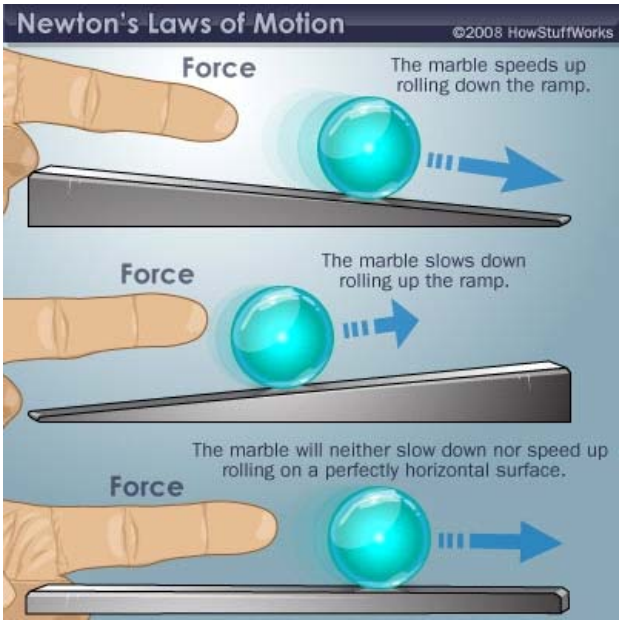
Use the work piece guard to hold down your project snugly, while still allowing it to move freely.

Adjust the hold-down so it applies enough pressure to keep the wood on the table, but not so much that you can't feed the stock through.

The feed rate is VERY important. DO NOT push the wood through too fast. Work slowly with a gentle pressure. If your blade is bowing under the pressure, you're moving too fast! If you hear a knocking the wood is not being held down sufficiently.

Newton’s First Law

Newton's first law in everyday terms:
-An object at rest will stay at rest, forever, as long as nothing pushes or pulls on it. An object in motion will stay in motion, traveling in a straight line, forever, until something pushes or pulls on it.



Do Now – Copy This

Kinetic Energy - the mechanical energy that a body has by virtue of its motion. kinetic energy exists whenever an object which has mass is in motion with some velocity. Everything you see moving about has kinetic energy.

Potential Energy

An object can store energy as the result of its position

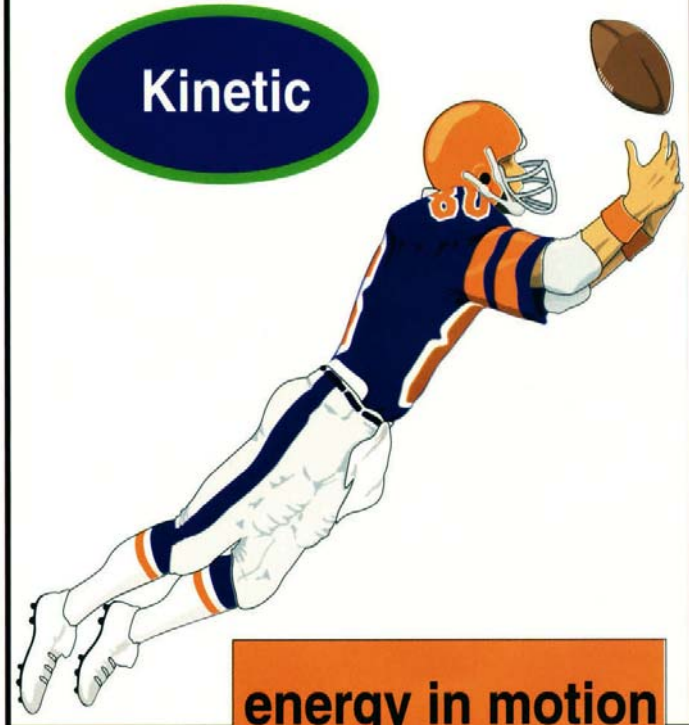
Potential Energy: By stretching a rubber band, you give it potential energy. A book on a shelf has stored potential energy. A baseball in a glove has potential energy until it is thrown and it turns into kinetic energy.

Types of Energy

Potential

stored energy

Kinetic



energy in motion

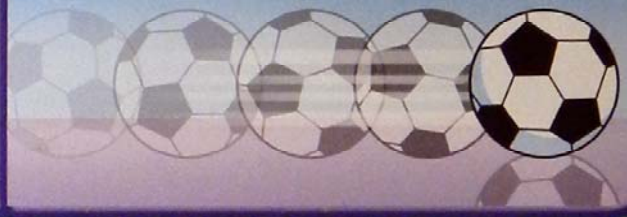
Newton's Laws of Motion

1 The Law of Inertia

With no net force acting upon it, an object at rest tends to stay at rest, and an object in motion tends to stay in motion. Both objects will continue with the same **inertia**, keeping the same **velocity**.

The ball will not move unless there is a force to cause it to move.

If a ball were rolling on a frictionless surface, it would keep moving unless met with an outside force.



2 The Law of Force = Mass x Acceleration (F=ma)

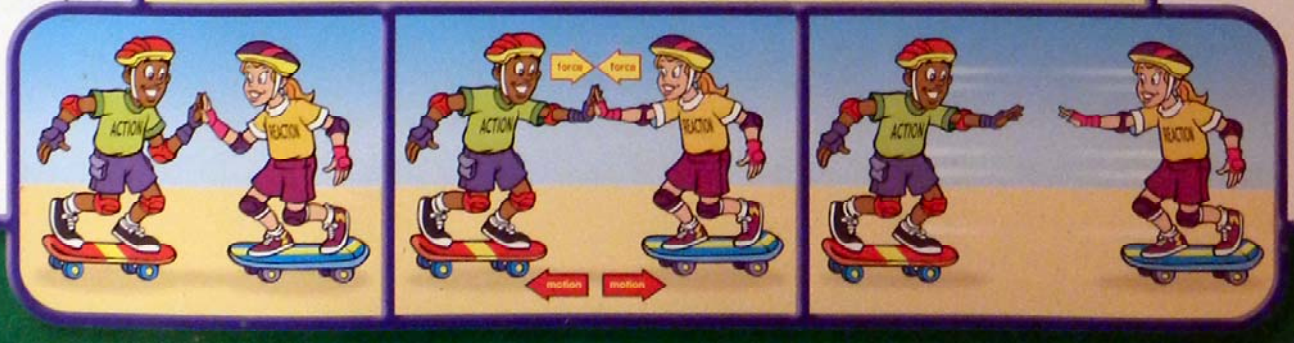
The acceleration of an object is dependent upon the **net force** acting upon the object and the **mass** of the object.

Because the mass of each ball is different, each ball will travel a different distance and at a different speed when it is hit with the same force.

3 The Law of Action & Reaction

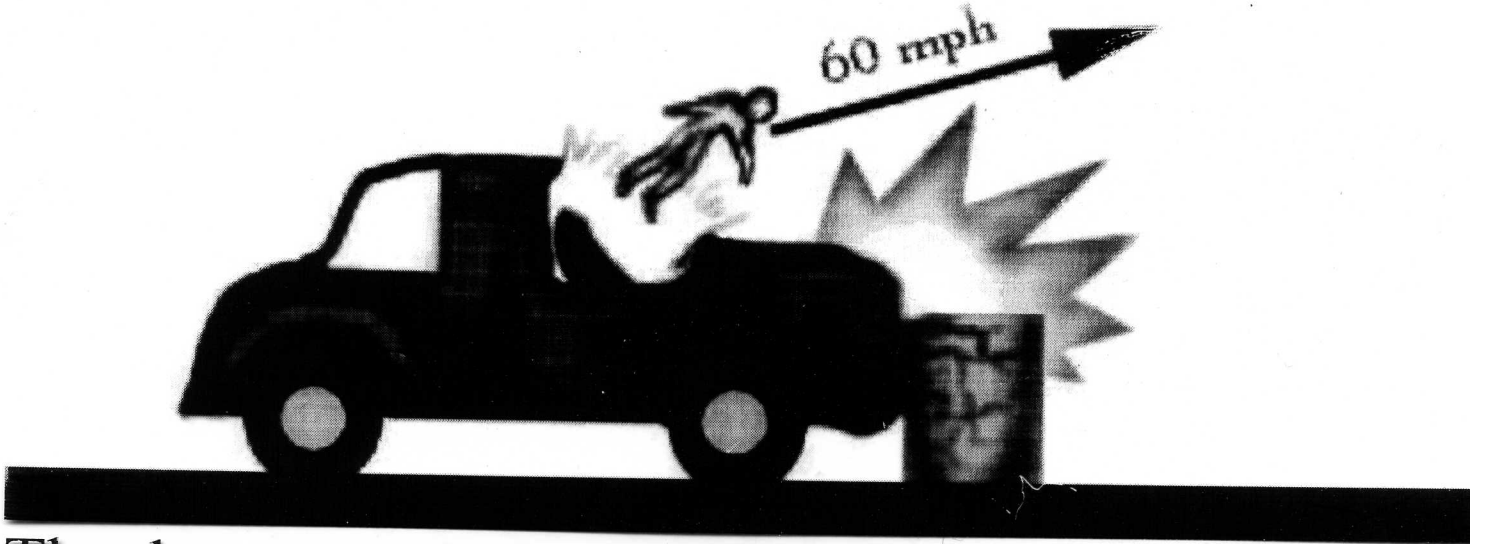
For every **action**, there is an equal and opposite **reaction**.

When there is force by one side, there will be opposite and equal force by the other side, causing each side to move in opposite directions.



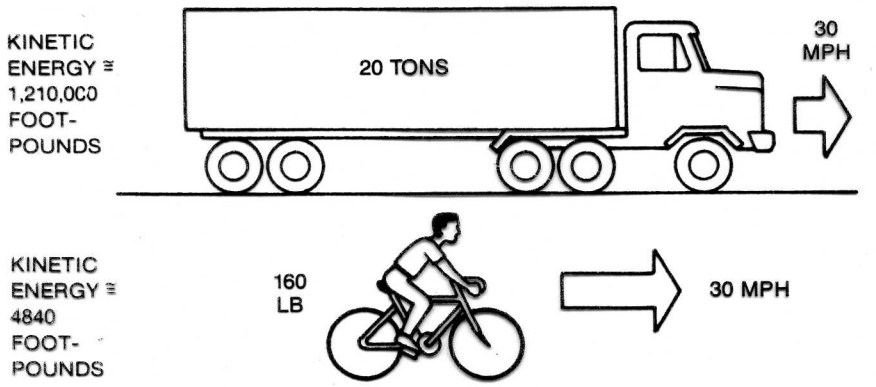
Do Now----- Copy This:

The crash dummy is not wearing a seat belt and is moving along with the car. Both the car and the dummy are moving at, say, 60 mph.
When the car hits the cement road divider it is stopped (an outside force stops it from moving). The crash dummy, however, is not so lucky. Since he is not wearing a seat belt, and is not connected t the car, he will continue to move at 60 mph. This means he will go flying out through the front windshield (don't try this at home).



The dummy will fly through the air until he hits the ground. This is because the earth's gravity stopped him from moving any further (his trajectory is a combination of the downward force of gravity, and

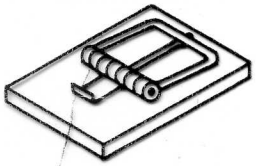
KINETIC ENERGY

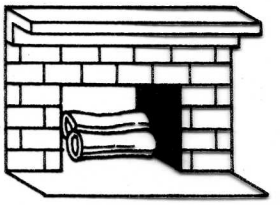


KINETIC ENERGY. . .is energy in motion.

POTENTIAL ENERGY

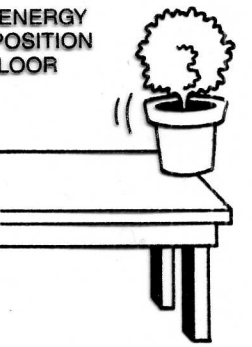
POTENTIAL ENERGY
STORED IN SPRING





POTENTIAL ENERGY
STORED iN
MOLECULES
OF WOOD

POTENTIAL ENERGY
STORED IN POSITION
ABOVE FLOOR



POTENTIAL ENERGY. . .is energy that is stored in an object due to its position, shape, or other feature.

WORLD BOOK ONLINE

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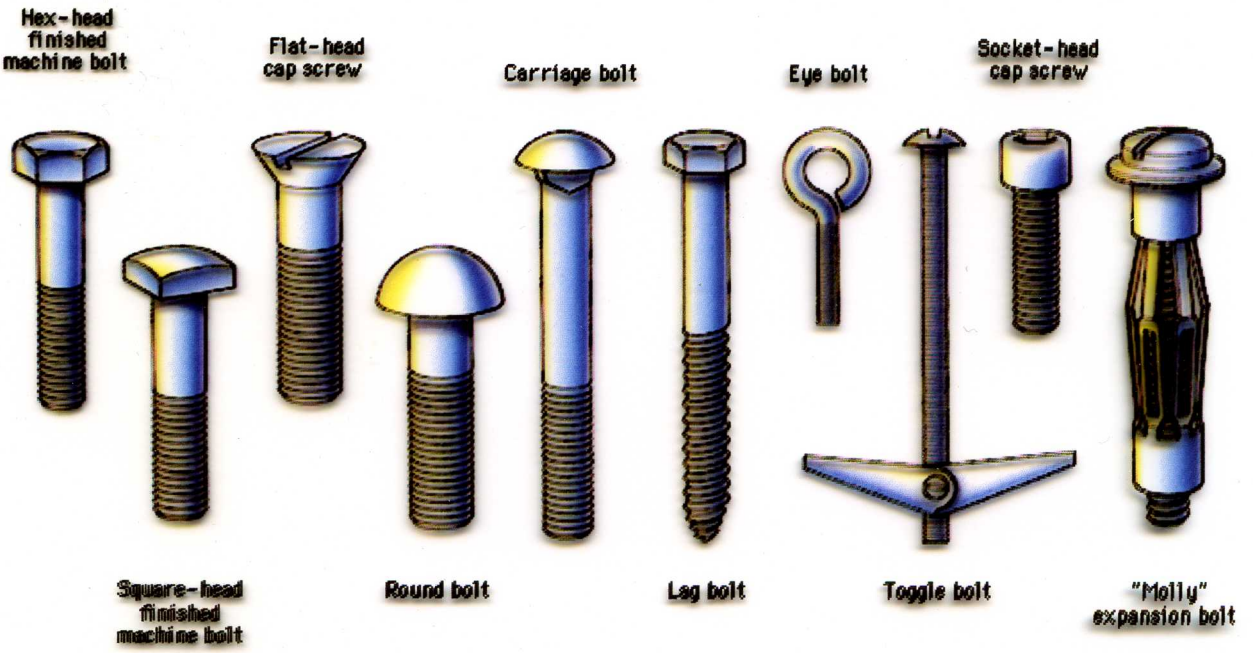
Some kinds of bolts

(Home Article: Bolt)



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Do Now----- Copy This:

NEWTON'S FIRST LAW

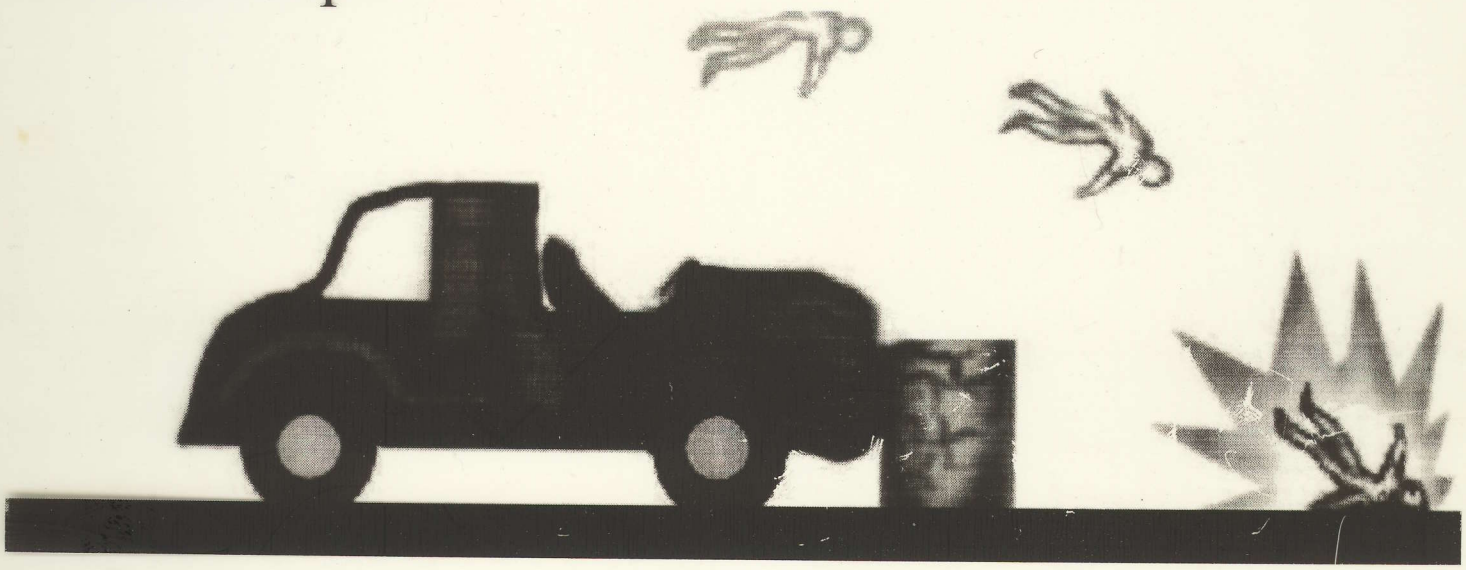
in laymen terms:

"An object in motion tends to stay in motion, and an object at rest tends to stay at rest, unless the object is acted upon by an outside force"

This means that if you leave a book on your coffee table over night, when you return in the morning, unless an outside force moved it, it will be in the same place. This also means that if you kick a soccer ball, it will continue moving until it hits something. However we all know the ball will eventually stop even if it does not hit a wall -- this is because of the friction between the ball and the ground, and between the ball and the air.
We feel the effects of Newton's First Law every day, but usually don't notice them because other forces interfere. In space, the First Law is much more obvious. Objects will follow their natural

Do Now----- Copy This:

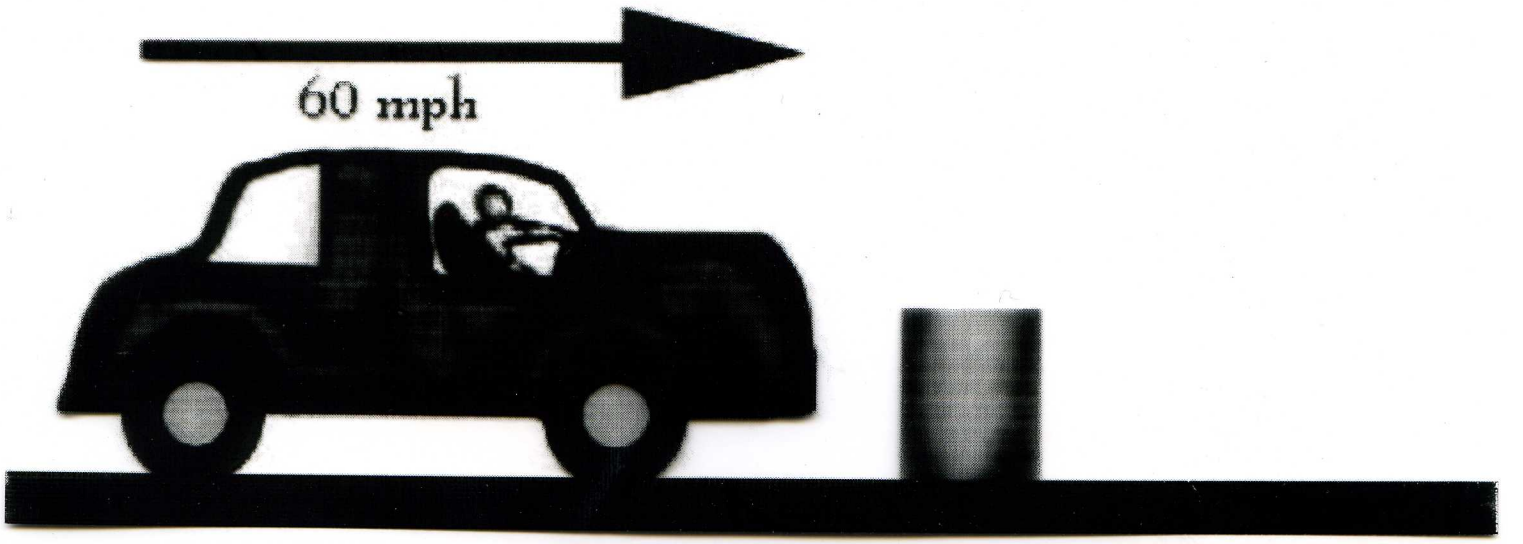
the horizontal force of the moving car). If this collision had happened in zero-g, in a vacuum, the dummy
theoretically would keep on hurtling away from the car at 60 mph.



Do Now----- Copy This:

trajectories until they are stopped by an outside force. On earth, the atmosphere will eventually slow down all moving objects, but in a vacuum (basically an empty space with no air or atmosphere), like space, it will be more obvious that objects obey Newton's Laws.

One of the most common places people feel the First Law is in a fast moving vehicle, such as a car or a bus, that comes to a stop. An outside force stops the vehicle, but the passengers, who have been moving at a high speed, are not stopped and continue to move at the same speed. Below is an example of this:



Do Now – Copy This

Axle

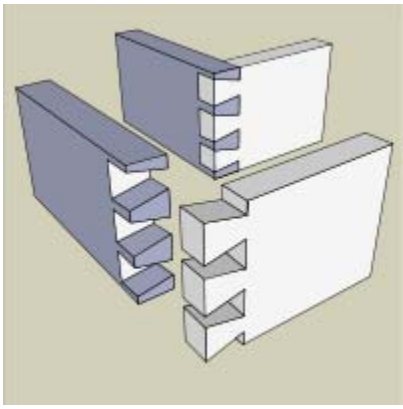
An axle is a central shaft for a rotating wheel or gear. In some cases the axle may be fixed in position with a bearing or bushing sitting inside the hole in the wheel or gear to allow the wheel or gear to rotate around the axle. The axle on the CO^2 car is steel, and can be cut with a hacksaw.

<u>Screw Eye</u> A wood screw with an eyelet in place of a head. It is placed on the bottom of the CO^2 cars to keep the car on the track going straight.

Steps to Making the Super top Circle

1. Obtain 5” x 5” wood square.
2. Check for squareness using Tri-Square.
3. Measure each side to center and connect lines forming a large plus.
4. Draw a diagonal line from each corner. All lines should intersect in center of square.
5. Using divider set distance of points equal to the radius of the circle desired.
6. Holding divider and turning wood scribe circle.
7. After drawing circle, draw straight lines tangent to circle.
8. Proceed to scroll saw to cut out circle. Follow all safety rules carefully.

Dovetail Joint



A **dovetail joint** or simply **dovetail** is a joint technique most commonly used in woodworking joinery. Noted for its resistance to being pulled apart (tensile strength), the dovetail joint is commonly used to join the sides of a drawer to the front. A series of **pins** cut to extend from the end of one board interlock with a series of **tails** cut into the end of another board. The pins and tails have a trapezoidal shape. Once glued, a wooden dovetail joint requires no mechanical fasteners.

Use for: Joining shelves to cabinet sides

- Joining cabinet bottoms to sides
- Joining horizontal partitions to shelves
- Joining adjacent sections of expandable table frames
- Joining drawer fronts to sides
- Joining front rails of web frames to cabinet sides

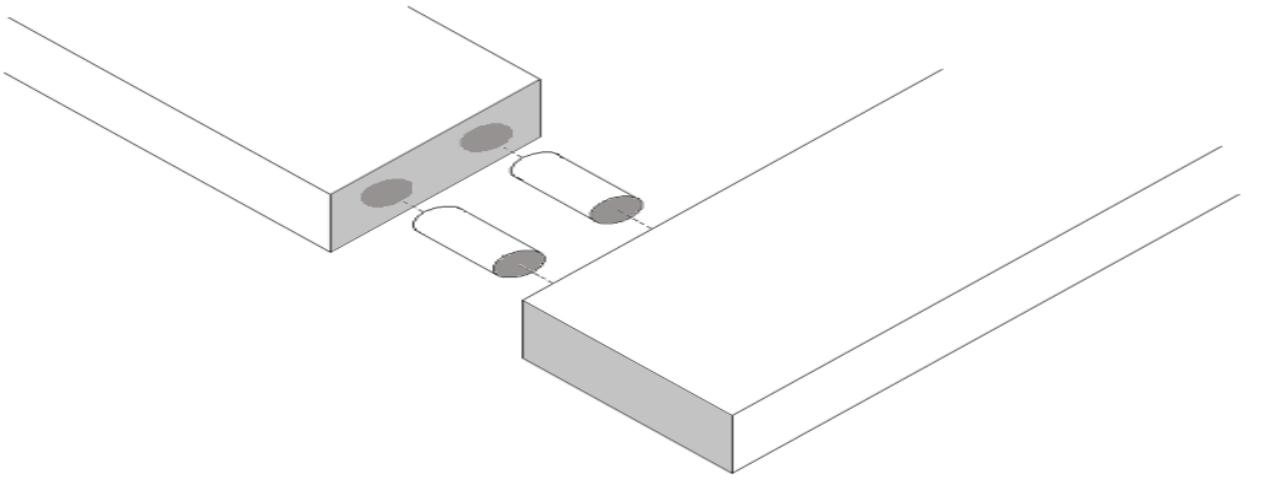
Dowel is a solid cylindrical rod, usually made of wood, plastic or metal. In its original manufactured form, dowel is called *dowel rod*. Dowel rod is employed in numerous, diverse applications. It is used to form axles in toys, as detents on gymnastics grips, as knitting needles and as structural reinforcement in cabinet making. Dowel rod is often cut into short lengths called dowel pins, which are used in various ways:

As shelf supports in furniture.

As moveable pieces (i.e., pegs) in games.

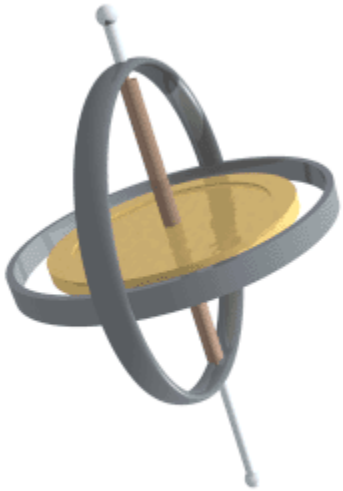
As supports for hanging items such as key rings, tools, and picture frames.

To secure two objects together with precise alignment in a dowel joint: a hole is bored in both objects and the dowel pin is inserted into the aligned holes.



The ideal super top.

When it is first launched and spinning its fastest, the top is most nearly vertical and stable in its spin. The action of a top relies on the gyroscopic effect for its operation. A mechanical gyroscope is essentially a spinning wheel or disk whose axle is free to take any orientation. Typically the top will at first wobble until the shape of the tip and its interaction with the surface force it upright. After spinning upright for an extended period, the angular momentum, and therefore the gyroscopic effect will gradually lessen. Friction between its tip and the floor will slow it gradually.



Center of Gravity

Center of Gravity, the point at which all of the weight of an object appears to be concentrated. If an object rotates when thrown, the center of gravity is also the center of rotation. When an object is suspended so that it can move freely, its center of gravity is always directly below the point of suspension. An object can be balanced on a sharp point placed directly beneath its center of gravity. It is important for automobiles and trucks to have their centers of gravity located close to the road, because a low center of gravity gives them stability.

File Card & Brush

A file card, is a wood handled file cleaner that has steel wire bristles for cleaning particles clogging the teeth of files. Files and rasps can get clogged very quickly, causing a loss of cutting speed and effectiveness.

The wire side of the file card digs out the tough imbedded filings, while the stiff brush side easily removes dirt, oxidation, and looser debris.

Keeps you filing away at peak efficiency. A big time and energy saver!

Dynamic Aerodynamics

Aerodynamics is the effect of air flow and force involved when an object moves through the air or when air moves past an object. Aerodynamics has taken a new importance since the need for more fuel-efficient vehicles. A poorly designed vehicle uses more fuel. A body with an overall rounded or square shape will cause air to break away from the streamline into swirls of air. This uneven or turbulent air movement will slow the car down and is called drag. A Co2 car has less resistance if they are rounded in the front and tapered off to a point in the rear.

Plywood is a type of manufactured timber made from thin sheets of wood veneer. It is one of the most widely used wood products. It is flexible, cheap, workable, recyclable, and can usually be locally manufactured. Plywood is used instead of plain wood because of its resistance to cracking, shrinkage, and twisting/warping, and its general high degree of strength.

Plywood layers (called veneers) are glued together with adjacent plies having their grain at right angles to each other for greater strength. There is usually an odd number of plies so that the sheet is balanced—this reduces warping. Because of the way plywood is bonded (with grains running against one another and with an odd number of composite parts) it is very hard to bend it perpendicular to the grain direction.

Luan Veneer

Luan is made from trees in the "Shorea" family of trees. Manufacturers create veneer from these trees, which are typically either White Lauan or Red Lauan a nd this veneer is glued together in layers to make the plywood.
Because of the softness of the wood, it is difficult to make Luan veneer completely free of voids and flaws. The surface layer is usually completely free of voids, but may have fills and patches. This means you may want to paint your Luan pieces. However, these flaws tend to be miniscule and they do not detract from the chief quality of the veneer, which is its excellent cutting properties.

Friction

• The 2nd Most Important Factor!
• Thanks to our friend gravity, everything has friction.
• On a CO2 car, friction occurs primarily in three places:
– between the wheels and the ground,
– between the axles and the car body,
– between the eye-hook and the fish line track

Friction

• So how do you eliminate friction?
• You can't. You can only reduce friction.
• So how can we do that?

Reducing Friction

• Make sure the axle & tires are free to rotate.
• Make sure the wheels are not rubbing on the car body.
• Be sure to install your eye-hooks properly. Poorly aligned eye-hooks are often the cause of a slow car.

Screw Eyes

Dragsters must have two (2) screw eyes per car that meet specifications. Screw eyes must not make contact with the racing surface. The track string must pass through both screw eyelets, which are located on the center line of the bottom of the car. Glue may be used to reinforce the screw eyes. It is the responsibility of the car designer/engineer to see that the eye screw holes are tightly closed to prevent the track string from slipping out. As with all adjustments, this must be done prior to event check-in.

Do Now – AXLE

The *axle* is a straight shaft that is fixed in location and is used to mount rotating wheels or gears. The wheel or gear can be attached to the axle with a built in bearing or bushing. A bearing or bushing fits inside the center of the wheel and allows it to rotate without affecting the axle itself. There are three different kinds of axles in vehicles: **straight**, split and tandem. In a straight axle, there is one shaft connecting the two parallel wheels. The wheels are both secured in place onto the axle. The rotation rate and direction is fixed by the axle. The benefits of this kind of axle are the ability to keep the wheel position consistent and distribute the weight of heavy loads evenly.

Summary: an axle is a bar used to support two or more wheels so that they can move freely. The axle is the support of the car on the wheels and if bent, the rotation of the wheels gets thrown off center. The axle for the CO2 car is soft metal and will bend easily if not handled and cut correctly.

2nd Law of Motion

F = ma F = force
m = mass
a = acceleration

Acceleration is dependent upon the mass and force of the car.

•For a fast car, you need:
•Big force
•Light car

Newton's 3rd Law of Motion

• The driving principle behind these cars

"For every action, there is an equal and opposite reaction."

The #1 most important factor in the speed of you dragster car is…

Mass

Cars with less mass
go much faster!