

A Few Simple Kite Plans

(Part of the "From Kites to Space" Unit)

Compiled by Rebecca Kinley Fraker





Foreword:

If you were a member of any of my classes, as soon as I mentioned "kites" you would begin to giggle. Because my students claim that when Mrs. Fraker says the word "kite" all the wind in the state dies down, and everything becomes very still. Sometimes they suggest that I should go into the path of an approaching hurricane, announce a kite-building class, and stop those hurricane winds.



Nevertheless, I have continued my love of kites. Faced with no wind, I have collected and modified different kite plans until many of my kites will fly in practically no breeze at all. Faced with little money, I found plans that use copier paper, bamboo skewers, and plastic bags. Faced with rainy weather and no open areas, I experimented until I found the paper bag kite which will fly in the classroom or hall with a minimum of arm movement.

Please note: There are far more beautiful kites to make and many other categories of kites. I hope this unit will inspire you to do further research into sport and fighter kites. There are also new sports involving kites such as kite boarding, skiing with kites, and parasailing.

I can say with confidence, BUILD THESE KITES AND THEY WILL FLY !!!

Rebecca K. Fraker





Table of Contents

Bumblebee Kite	4
Bag Kite (A Modified Box)	6
Picnic Plate Kite	8
Simple Sled Kite	10
A Template for the Sled Kite	14
Simple Delta Kite	15
Advanced Delta Kite	17
Percentage Plan for a Delta Kite	21
Percentage Chart	22
Kite Internet Resources	23
Kite Video Clips	24



Bumblebee Kite

The Bumblebee is a very simple, inexpensive kite that can be made with copier paper. It will fly if you run with it. It needs only a little breeze to go up.

*There is a moviemaker clip available for this kite.

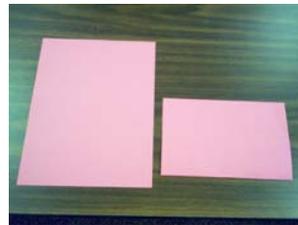


Materials needed:

Hole puncher
 Scotch tape
 Stapler
 Copier paper (any color)
 Ruler with inches
 Kite string
 Pencils or craft sticks
 Optional: markers or crayons

Step One:

Fold the paper in half.



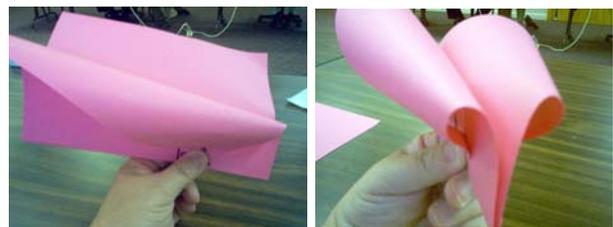
Step Two:

Measure and mark an A at $2\frac{1}{2}$ " and a B at $3\frac{1}{2}$ " along the fold.



Step Three:

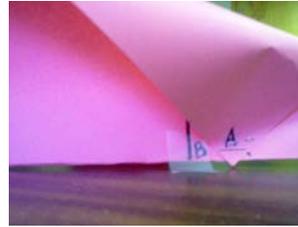
Pull the corner of the open corner closest to the A on one side down to the A and staple it. Now do the other side.





Step Four:

Reinforce the B line with scotch tape.
Then punch a hole through the B line. Do not put it too close to the fold.



Step Five:

Take about 15 feet of lightweight kite string or fishing line. Tie it onto a piece of cardboard and then wrap it around. Then put the remaining end through the hole and tie it with a double knot.



Step Six:

Swing it around your head a few seconds. It should float. Then, it's outside for some fun! Experiment by putting a lightweight ribbon tail at the end.





Bag (Modified Box Kite)

Box kites normally take precision work and spars. This low-tech version uses a paper bag of any size, and will fly with just hand motions. Even three year olds can make this kite!

*There is a moviemaker clip available for this kite.



Materials Needed:

Paper lunch bag (with a box bottom)
 Scissors
 Scotch tape
 Stapler
 Kite string
 Hole puncher
 Ribbon or streamers.

Step 1:

Take a paper bag. The illustrations show a MacDonal'd's bag. You can use brown paper lunch bags or find colorful ones in a paper store.

Open the bag.

Cut off the bottom.



At this point, if you wish to decorate the bag you may do so. If you wait until later, it will be harder to do.

Step 2:

On the cut end (the former bottom), fold about a one inch cuff. The exact size is not critical. The paper bag may already have crease lines and those can be used.

The cuff should be on the outside of the bag.





Step 3:

In the middle of a long side of the cuff, put a short piece of scotch tape to serve as reinforcement for the hole for the string.



Step 4:

Now punch a hole through the cuff and the tape.



Step 5:

Tie the kite string through the hole. You do not need a long kite string for this kite. 10 to 15 feet will do.



Step 6:

Use ribbon or streamers to make a tail that is about 3 feet long. Don't make it too heavy. The tail should be stapled or taped to the end OPPOSITE the side with the hole, although it will not matter much.



Step 7:

Go fly a kite!



Picnic Plate Kite

*There is a moviemaker clip available for this kite.



Materials Needed:

Styrofoam or sturdy picnic plate
 Lightweight string
 Plastic strips about 18" long or
 Surveyor's flagging tape.
 Scotch, duct, or masking tape

Step 1:

Turn the plate upside down.
 To the best of your ability, draw a line
 down the center of the plate.



Step 2:

Poke a hole along the line about 3 ½
 inches from the top.



Step 3:

Push one end of the line through the hole.
 The end should go through the back of
 the plate (where you drew the line) and
 come through to the eating side of the
 plate.



Step 4:

Make sure the string is through at least
 two inches, and scotch tape it to the
 eating side of the plate.





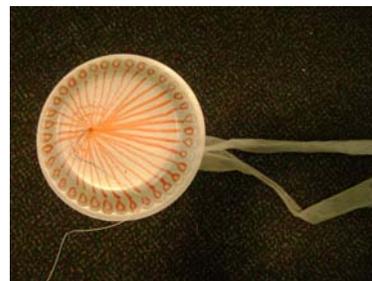
Step 5:

Tape a long tail to the bottom of the plate on either side. This can be made from strips of plastic bag.



Step 6: Optional

Decorate with sharpies or crayons.



Step 6:

Move away from the potato salad and go fly a kite!





Simple Sled Kite

*There is a moviemaker clip available for this kite.

The Sled Kite is relatively unknown outside of the world of ardent kite flyers. People who fly kites all the time know the Sled Kite as a very simple kite to build. It is very forgiving of mistakes in construction and is a wonderfully easy kite to fly.

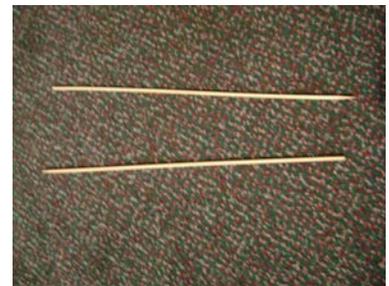
Why would anyone call a kite a 'Sled'? Well, when the kite was invented by William Allison of Dayton, Ohio in 1950, he patented it as a 'polymorphic' kite, meaning it could take on many different shapes according to the wind. Frank Scott modified Allison's design and wanted to call it a 'Flexible Flyer'. But that name was already being used by a company making the Flexible Flyer Snow Sleds. So Scott called his kite a 'Sled Kite'. They have been called Sled Kites ever since. There are almost as many different types of Sled Kites as there are people who have made them.

The Sled Kite can be made from almost anything: trash bags, plastic store bags, Tyvek™, newspaper, even wrapping paper—anything relatively light and strong. The nice thing about Tyvek™ is that it can be sewn, glued or taped, and it accepts a wide variety of inks and crayons for decoration. The kite is also easily 'scalable'. It can be made quite large, or quite small.

PLEASE LOOK OVER ALL INSTRUCTIONS AND PICTURES BEFORE BEGINNING.

Materials List:

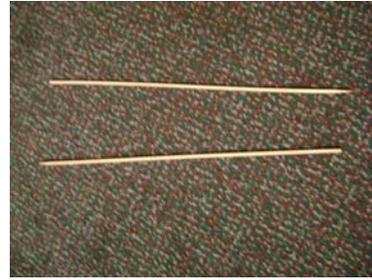
- Spar making material (bamboo skewers or cardboard strips)
- Tape (packing, scotch, masking, or duct)
- Scissors
- Hole punch
- Ruler
- Template paper
- Kite material: plastic bags, Tyvek, or newspaper
- String





Step 1: Decide the size of the kite

Decide what height you would like to have your kite. This sample kite uses spars made from bamboo skewers. Strips of cardboard cut from cereal boxes will also work well.



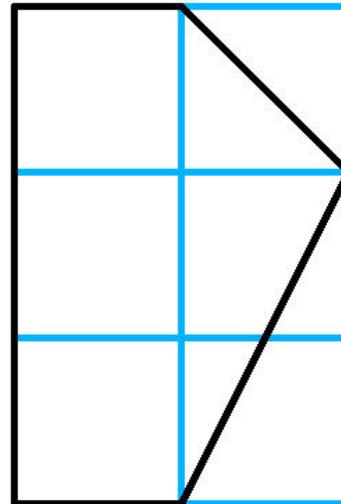
Step 2: Preparing a template.

The template will be two squares across and three squares down.

The skewers measure 12 inches, so to get the size of the square blocks, divide 12 by 3. **This means the template blocks should be 4 inches by 4 inches.**

If you wish to make a kite that is 21 inches high, divide 21 by 3 for 7 inch blocks.

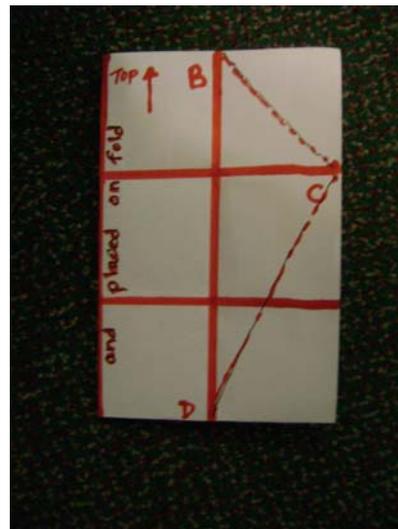
And if you are really brave, use any number and get into fractions or centimeters.



Step 3: Prepare your template paper

For this kite, you will need a piece of paper for a template that is 12 inches high and eight inches wide. (Construction paper works well, as it is slightly larger than copier paper.)

For this kite, divide the paper into 4 inch square blocks. There should be two across and three down. Draw the cutting lines as shown.



Now cut out the template.



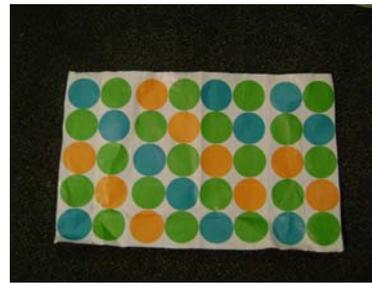
Step 4: Use the template to cut out the kite.

Take the kite material. Make sure the piece is twice the size of your template. Fold the kite material in half.

Place the long side of the template on the fold. This can be lightly taped in place.

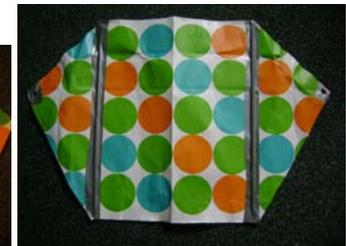
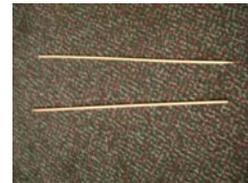
Cut around the outsides of the template.

Do NOT cut the fold apart!



Step 5: Open up the sail.

Tape the spars (in this case, skewers) from point to point. Clear packing tape works well, but younger children often have trouble with it. They could put their spars in place with scotch tape, and then have an adult put packing tape over it. If you don't mind the looks, masking tape or duct tape also works well.



Step 6: Holes for the string.

Reinforce each of the points of the kite. On each of the two points of the wings, punch a hole.



Step 7: The tails.

Make 30 inch tails from plastic strips and tape at the bottom ends of each of the spars. The tails may be in bunches and be made from the left-over plastic.





Step 8: Adding the bridle.

Take a piece of kite string that is 36 inches long. This will be the bridle. Put the ends through the holes on the wings and tie tightly.



Step 9: Balancing the kite and bridle.

Now, hold the kite by the string and let dangle. Match the kite halves. Next make a loop in the bridle. Double-knot it so that it doesn't slip.



Step 10: Finishing

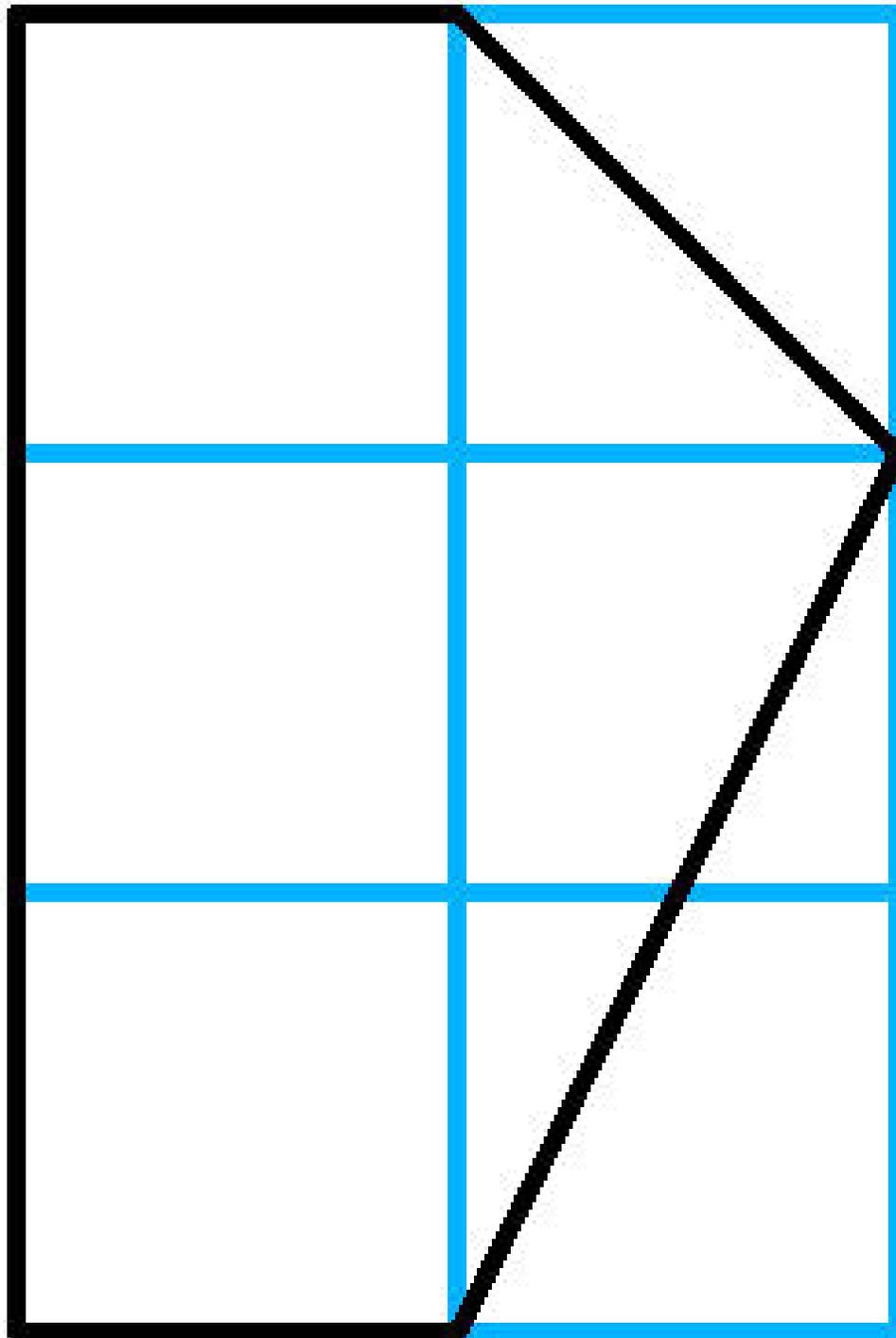
Fasten your kite string to the loop and GO FLY your kite.





A Template for the Sled Kite

This template can be enlarged or shrunk with a copier.
Put the left side on the fold. Cut along the slanted black lines.



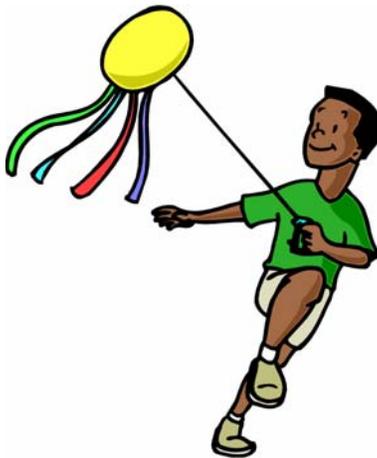


Simple Delta Kite

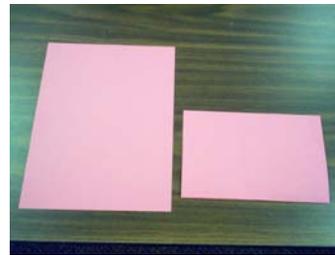
*NO video available

Materials needed:

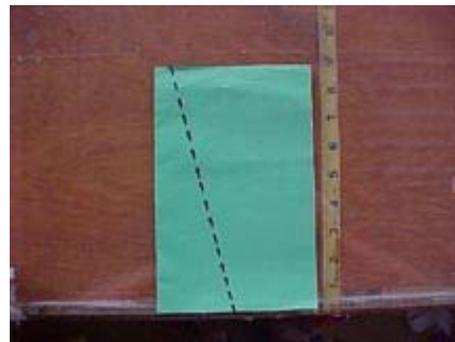
Hole puncher
 Scotch tape
 Stapler
 Copier paper (any color)
 One bamboo skewer
 Ruler with inches
 Kite string
 Plastic bag cut in one inch strips or
 Other tail material
 Pencils or craft sticks
 Optional: markers or crayons



Step 1: Fold a sheet of colored copier paper in half.



Step 2: Fold again along a diagonal line working from the fold in Fig.2. This diagonal line can be determined by making a mark at the top 1/2 inch from the fold and a mark at the bottom 3 in. from the fold and drawing a line between these marks.





Step 3: Fold back one side forming a kite shape. Place tape firmly along the center fold where the pieces meet (NOT the original fold line.)

Step 4: Place bamboo skewer or plastic straw across the "wings" and tape it down firmly.



Step 5: Flip kite over onto its back and fold the front flap back and forth until it stands straight up. (Otherwise it acts like a rudder and the kite spins around in circles.)

Step 6: Cut off 6 to 10 feet of plastic ribbon and tape it to the bottom of the kite as shown.

Step 7: Punch a hole in the flap, about 1/3 down from the top point. This hole can be reinforced with an additional piece of tape.

Step 8: Tie one end of the string to the hole and wind the other end onto a string winder.





Advanced Delta Kite

* A moviemaker clip is available for this kite.



Materials Needed:

Three 1/8" wooden dowel rods. The length will depend on the size of your kite.

Scissors

Wide tape (masking or duct)

Material for sail

Glue (glue sticks for light-weight material, white glue for heavier)

String & reel

**Tail material optional

Step 1: Material and Size Selection

As with any kite construction, any material can be used, but Delta kites tend to do better with heavier material. The one shown in the illustrations has been made from a roll of vinyl wallpaper. Freezer paper also works well.

First, look carefully at the template and charts on the next few pages. Deltas are built with proportions to any size that you want.



Step 2: Figuring the Proportions

Use the chart to figure the measurements of your kite. Fold your material with the right side out. Then transfer those measurements to the folded material.



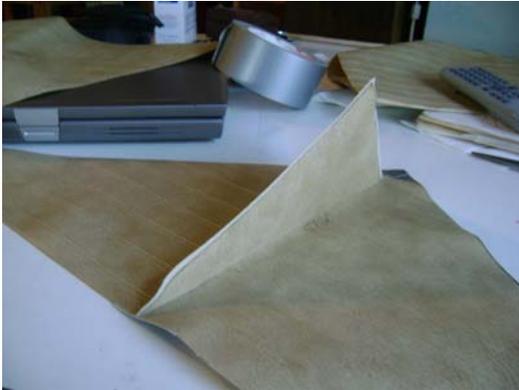
Step 3: Cut out the pieces

Move the scraps out of your way.



**Step 4: Put the keels together**

Crease the keels and then glue or tape them together with the wrong sides together.

**Step 5: Turn over the kite**

On the back or wrong side of the kite, put a strip of masking or duct tape down the center. Flip the kite back over and reinforce the edges of the keel with tape.



*****AT THIS POINT, if you wish to make the kite double thickness, place the extra piece of material right side down on a table. Cover the wrong side of your kite (the back side of the kite without the keel) with glue. Now carefully put it on the piece of material. The wrong sides should be together. Smooth it out. Allow it to dry, and then cut out around it.**

**Step 6: Reinforce the bottom with tape**

The bottom, or trailing edge, is the longest part of the triangle-shaped kite.

Step 7: Put on the spine

1/8" dowel rods work very well for the spine and spars. Measure the length of the spine, and cut three pieces that length. *You will need a fourth spar a little shorter than these three.* Then tape one of them down the center of the **WRONG** side of the sail, the side that **DOES NOT** have the keel on it. Make sure it is securely fastened at the top and bottom.



**Step 8: Fasten the side spars**

Again, these will be taped on the **WRONG** side of the sail, the side that **DOES NOT** have the keel. Place them starting at the trailing edge and going up. They will **NOT** reach the nose of the kite. Fasten these top and bottom but don't tape them the whole way down. You may want to make pockets from tape.



Step 9: This is tricky! Measure down the leading edge from the tip of the kite about 1/3 of the way. Now take the fourth spar and put it from one edge to the other across the spine. You should cut off the cross spar about a fourth-inch or a centimeter longer than the width of the kite at that point.

**Step 10: Fastening the cross**

spar. Lay the cross spar in place across the kite. Slide it so that one end is flush and butts the side spar, and the other sticks out. Now tape the flush side with duct or masking tape or make a pocket.



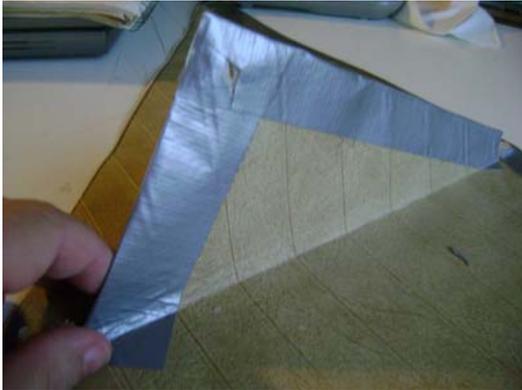
Pull the other side in flush with the other side spar. **This will make the kite bow slightly.** If it is too long, you may have to trim it. If it is too short, remove it and slide it more toward the tip of the kite. Fasten it with duct or masking tape to make a pocket.



The bow in the kite is giving an optical illusion. The crosspiece is actually only about a third of the way down from the nose of the kite.



Step 11: Put the hole in the keel at the point of the triangle.



GO FLY A KITE !!! (A Delta with a tail)

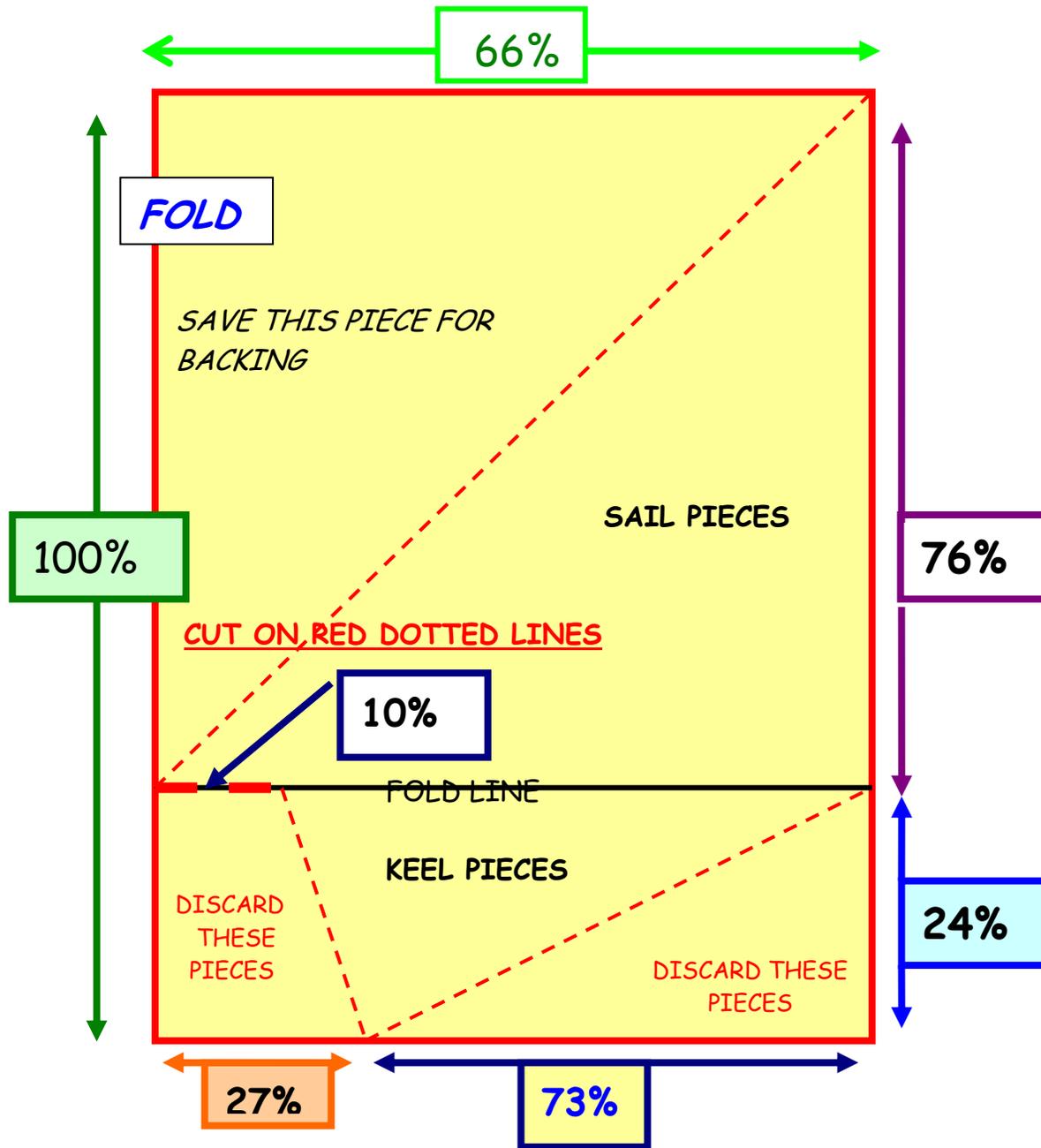
Step 12: Painting or decorating

This can be an earlier step, before the spars are put on. DO REMEMBER, it is the side with the keel on it (the side without the spars) that will show against the sky. These pictures show a class painting their kites.





PERCENTAGE PLAN FOR DELTA KITE





PERCENTAGE CHART



Delta kites look beautiful against the sky. With the pattern, they can be made any size your material allows. The trick is to get the proportions correct. Start with the 100% measurement to make it easy. Or if you really know your proportions, choose a height for your kite and put it in the 66% box. If $h = 66\%$, what is the measurement of 100% ?

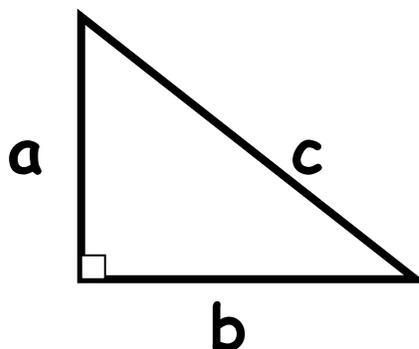
The kite measurements can be figured using centimeters or inches. To get your measurements use the following chart. Remember that the material gets folded in half.

	100%	66%=h Also the finished height of your kite	152%=w Finished width of your kite	76%	27%	24%	10%	Dimensions of the sail material needed: 132% by 100%
Example (use inches or cm.)	30	20	46	23	8	7	3	40 by 30

If you wish to make a double-thickness kite sail using the above measurements, you will need another piece of material that is 20 by 50.

Notice on the pattern that the material is a rectangle. That means there are four right angles. That means you can find the lengths of other sides by using trigonometric functions. You can even find the other angles.

You can also use the Pythagorean Theorem, $a^2 + b^2 = c^2$ to find the length of the other sides.





Kite Internet Resources

There are literally thousands of kite sites on the web. Here are just a few that are large and easy sites to navigate.

American Kitefliers Association <http://www.aka.kite.org/>

This is the largest association of kites in the world. Its purpose is to educate the public in the art, history, technology, and practice of building and flying kites - to advance the joys and values of kiting in all nations. They are men, women, adults and children, from all walks of life. Their interests run from kite building to multi-line kite competition, from miniature kites, to aerial photography and more. The AKA is a nonprofit organization dedicated to educating the public in the art, history, technology, and practice of building and flying kites.



ON the site of American Kitefliers Association <http://www.aka.kite.org/>, choose the Table of Contents Tab at the top left of the page. Choose "Publications" then "Manuals". You will find wonderful pdf files that include instructions on kite flying, kite building, and safety. There is also a great pdf on Kites in the Classroom.



The Virtual Kite Zoo <http://www.blueskylark.org/zoo/>

This has a lot of information, and also includes links to many other pages. Included are links to knot-tying instructions. There are simple kite plans included, as well as terminology.

How to Make and Fly Kites

<http://www.howtomakeandflykites.com/>

This is a more advanced kite site. There are some very interesting kite plans here.

Canadian Science Projects <http://www.hilaroad.com/camp/projects.html>

Under "Engineering" you will find a kite project. But all the rest of the projects are great, too. There are videos included with these.

'No Sticks' sled from a Kinko's Bag: http://members.cox.net/gengvall/k_sled.html

Dave Ellis' great Sled Kite Page: <http://kckiteclub.org/DaveEllis/sledkite.htm>

Basic Sled: <http://www.ex.ac.uk/~jastaple/kites/projects/sled/sled.html>



Kite Video Clips

How To Make A...

Each of the kites in this file has a short accompanying moviemaker file. Look for them on the Teacher Bulletin site, www.teacherbulletin.org

Prism Kites Videos <http://prismkites.com/videos.html>

Prism Kites sells kites. But they also have these fabulous kite videos that take only a few seconds to download. They make a nice introduction to a kite making class.

A Wind of Change Videos <http://www.awindofchange.com/photo.html>

This is also a commercial site. It includes some great videos of people water boarding while being towed by kites.

MetaCafe: The Most Fun Kite for Under \$5

http://www.metacafe.com/watch/792355/most_fun_kite_for_under_5/

MetaCafe has quite a few short videos on kites. This one shows a person making and sailing a kite in fast-forward.

