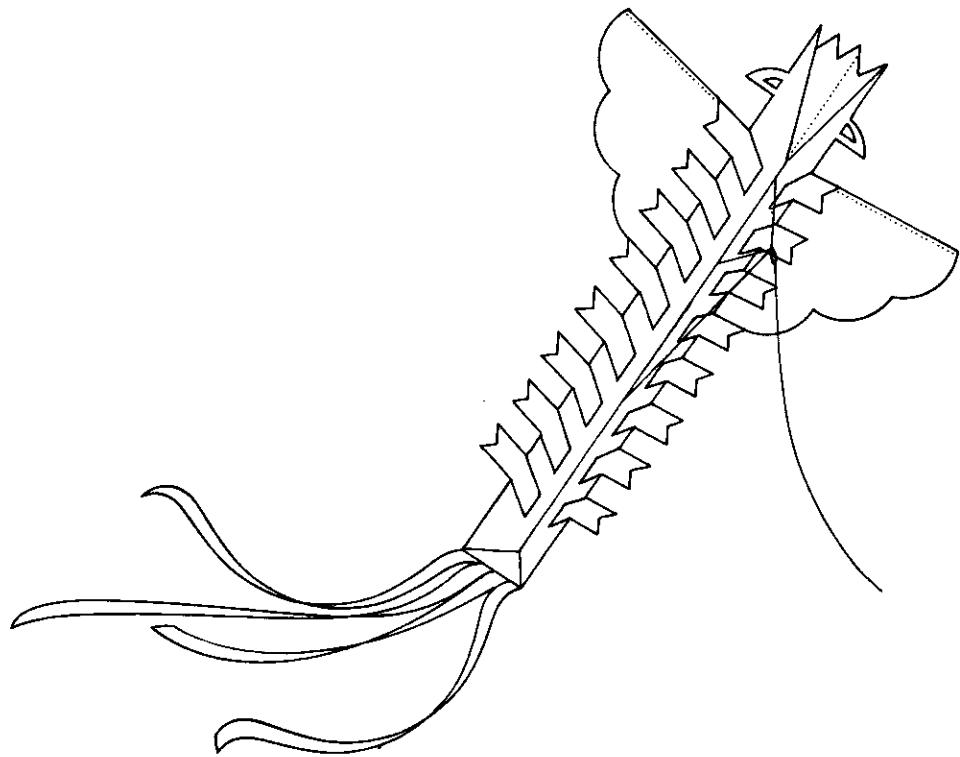


# K I T E S f o r E v e r y o n e



by MARGARET GREGER

DIAGRAMS by MADEL GREGER

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# Introduction

KITES FOR EVERYONE--a running start for beginning kitemakers, with, thanks to generous kite designers, such beauties as the Facet and the Flowform to challenge the experienced.

When I wrote BLOWN SKY-HIGH, a book of kites for the classroom, in 1977, my first aim was to bring all my notes, patterns and lists between covers, in order to use them in my kitemaking classes and workshops.

Sooner or later, almost every kitemaker is invited to help a class, a Cub Scout den, or a Sunday School group make kites, and BLOWN SKY-HIGH was welcomed. I had already overseen the production of thousands of classroom kites, and the book was based on the solid experience that falling into all possible pitfalls gives. It was reviewed in library journals and was soon in libraries and schools all over the country. Kite shops came to rely on it as the answer to "Can you show me how to make kites with my fourth grade?"

In 1979, MORE SIMPLE KITES combined some new favorites with kites which came to me from people who had used BLOWN SKY-HIGH and who wrote, "Would you like to see the kite I make in my daughter's pre-school class?"

SIMPLE FABRIC KITES, 1982, was written to make kitemaking accessible to competent homesewers. For the most part, the available instructions for cloth kites had been written by kitemakers who were inventing sewing

as they went along. My contribution was translating kitemaking into standard sewing terms and simplifying and sequencing the sewing steps.

KITES FOR EVERYONE combines the earlier work with much new material, ranging from a new ten-minute Mini-Bullet to the Facet kites. All are winners.

## Using This Book

KITES FOR EVERYONE is organized according to kite types, a chapter for deltas, one for sleds, and so on. In a single chapter the kites will range from a 15-minute bag kite costing a quarter to a fabric kite which may take several hours to make and cost several dollars. This organization emphasizes the diversity possible with a single design, and kitemakers, who know well that one thing leads to another, will appreciate the range of options.

In the way we talk about kites, and in the way prizes are distributed at kite contests, it may seem that fabric kites are considered in some sense "better" and plastic and paper kites "lesser." Simplicity does not imply inferiority. My own preference is for the 15-minute wonder, and, in this collection, I am particularly proud of the new classroom kites, many of which use a plastic or high-density polyethylene bag as a module. Kitemakers should look at a shopping bag as Michelangelo looked at a block of marble.

I built my first kite, a two-stick diamond, of willow poles and brown wrapping paper, nearly fifty years ago. This summer, I will make my first parafoil. There was not much to read about kites in Western Nebraska in the Thirties, and our materials were also limited. My husband built his first two-stick kites to fly frame forward, and learned what was wrong only when he saw a store-bought kite. Today's kite-makers can begin with good patterns and materials and have a broad range of kite designs to choose from.

Various options for bridle, tails and other finishing details are shown for each kite design. Available materials, prevailing winds and personal preference determine choices. Most kitemakers will come to have a favorite kite design, but we all like to try something new, even if it only reaffirms our loyalties. In a sense, the patterns are like a standard recipe. With the correct proportions of yeast, flour and liquid, and an understanding of the principles, you can make almost any kind of bread.

In a book such as this it is always difficult to give due credit. The dedication in SIMPLE FABRIC KITES was to "kitemakers, past and present, who have shared their work so generously . . . all the way back to unknown Oriental kitemakers." All of us who make kites are much aware of the many hands which preceded ours. Throughout the book, I mention various kite designers

in connection with the kites which they developed. Guy Aydlett, A. van Breda, Leonard Conover, Tony Cyphert, Bill Lee, Gary Hinze, Ed Grauel, Carol Master, Joan Newcomb, Stephen Robinson, Francis Rogallo, Scott Spencer, John Spendlove, Steve Sutton, and Lee Toy are among those who helped.

Beginning at the beginning, there are a number of other acknowledgements to be made: The children and teachers of Richland School District and ESD 123. The children, board, and staff of Chief Joseph Summer Seminars, Wallowa County, Oregon. Jack and Frances Ehrig of Locust Grove Press, who printed my earlier books.

It has been particularly helpful to have correspondents who reply to my questions early and often: Ed Grauel, Lee Toy, Dan Leigh, Grant Raddon, John Spendlove, Bill Tyrrell, Jack Van Gilder, and Valerie Govig.

Friends and relations, particularly my husband, have encouraged, supported and indulged my affair with kites.

Four of the kites were first published in an article, "The Complete Kite Curriculum," in Learning magazine, March, 1975.

# Classroom Kites

Since 1969, I have been teaching kitemaking and kite-flying in elementary and secondary classrooms, in college classes, in summer camps, and in workshops for adults and families. The workshops are a short kite course in which several kites are built, using various materials and construction methods, giving the students experience with different designs and techniques.

Kites provide inexpensive, exciting leads into many areas--art, crafts, engineering, math and even history, since the development of kites is traced in the Orient and in the West. They are also simply fun--an activity to be shared by all ages. They are for poets, inventors and all of us who like to hold our work in our hands, then watch it take off into the sky.

How do I feel about Charlie Brown and his kite? About his chronic, predestined failure to fly a kite? I don't like it, that's how. Kites should be a symbol not of failure but of soaring, spirit-freeing success. I've overseen the making of a few thousand kites in my "career" as a teacher of kitemaking. There was one, a Siamese Snake not that carefully made, which I could not get to fly--and that on a day when eighty third-graders were flying eighty Snakes. But that was not failure. I said, "We can take care of this. We'll frame another face, put this tail on it, and come back out and fly."

We should set up the classroom situation to insure success. Sufficient time and good work space are essential. Kite teachers also need to eliminate such phrases as "You did that wrong" or "You made a mistake." Remember that almost anything can be made to fly and that there are not many kites with only one "right" way. Because I don't want to spend an hour working out bridling systems for thirty ill-made kites, I stress precision and care--and work with tolerant kite designs.

## Classroom Kite Criteria

1. They must be winners. We don't want to teach people that kites are hard to make and really don't fly very well.

2. They must use easily-obtainable, inexpensive materials. This is relative. The Oriental kites are framed with matchstick bamboo reed, which, if you will all forgive me, doesn't grow on trees, at least not in Washington State. But when you find a reed blind, you have material for hundreds of kites.

3. They must be completed in about an hour so the kite can be finished and perhaps flown the day it is begun.

Even though kites are one of the world's oldest toys, many adults also need confidence-building in order to attempt to make or to fly a kite. One of the great side benefits of successful classroom kitemaking is the feeling of competence and

the confidence which competence confers. Mistakes are rarely fatal errors. A spar snaps, we replace it; paper tears, we tape or recover; string breaks, and we may mourn the loss, but we also cheer the brief flight in freedom. Then we turn to build another. As we adjust bridles and bows to suit the wind of the day, shorten or lengthen tails, and trim for balance, we learn to observe how the kite flies, diagnose a problem and prescribe a remedy.

The Vietnamese kite is inexpensive, easy and so tolerant it will even fly upside down. One summer at our local sidewalk art show, where I was selling kites and books, a nine-year-old boy whose mother was selling photographs spent much of the show's first day flying a Little Delta which I had laid out as a "test kite." Early the next morning he asked hesitantly if I would consider trading a kite for a photograph--trades among artists being one of the pleasurable benefits of participating in a crafts show. Kevin was fearful I would say no but I told him I would be by to close a deal. I traded two books and some matchstick bamboo reed for a fine photograph of the Arizona desert, and Kevin stopped flying my kite and disappeared. Soon he was back to see if I had a ruler. No ruler, but a paper cutter to trim his piece of newspaper to 12"x12". Then he borrowed glue, followed by crepe paper tail streamers. I was demonstrating the Vietnamese kite and had invited him to watch, but he just smiled and kept borrowing. Finally, he brought his own Vietnamese kite around for help

with the bridle--and string to fly it. It was an occasion of total pride for Kevin, his mother and me.

Lee Wilbur uses the Dutch kite in his first grade classroom. When he called to invite me to come see what he was doing, I remonstrated, "Lee, the Dutch kite is hard! There are so many skills involved: folding, cutting, gluing, knots. I don't make that kite in first grade unless I have a helper for every three students."

"Well," he said, "we have a 15-minute activity period every day. The first day we fold, the second day we glue, and by the end of the week, we are out on the football field flying kites." They had been making Dutch kites for two weeks when I went to see them. They could make kites on their lunch hour, they could repair kites, they understood bridling a two-stick kite. They glowed with competence--all by means of a 12"x16" sheet of butcher paper.

Nowadays, my kite evangelism is done in teacher workshops and in talks to groups of teachers and librarians. Here, I spread the word that I have patterns, bibliographies and scarce materials (matchstick bamboo reed in these parts) available free or at my cost. My real goal in all this is not more kites or even better kites but competent kids, people who know that the work of their hands will fly.

## Things to Consider

**THE LOCAL CLIMATE** (dry or moist) and the wind of the day may determine the choice between paper and plastic kites, and between sled and delta designs.

**THE WORKING SPACE.** Making kites takes room. Fellow staffers have suggested that this kitemaker is happy only when she has all the tables, all the scissors, and everyone else out of the way.

**THE BUDGET.** I always plan to have plenty of materials with an array of colors. The best way to discourage creativity is to be chintzy with supplies. I never tolerate waste, aimless slashing of materials, or fencing with dowels. But I want people to be able to come back for seconds and thirds, to make kites for mothers and little sisters, and to experiment with design variations after they have succeeded with a proven design.

**THE MATERIALS.** Stunning kites can be made of brown paper bags and newspaper. They are in no way inferior to creations of mylar. Whatever materials you have, have plenty. Working with abundance is stimulating.

**THE TIME.** I always try to negotiate an hour and a half class, time for cleanup--and for flying, if the day permits. If kitemaking classes are back-to-back it is essential to have time to straighten the supplies and tools. If flying is on the schedule, make it clear at the beginning that early finishers help the others and straightening up is part of finishing.

**REELS AND LINE.** For classroom use, I make notched-board reels of 4"x10" rectangles of scrap masonite. If the numbers go past the tens into the hundreds of kites, I cut 6" squares of corrugated cardboard to be wound with crochet thread. A doubled-up section of newspaper makes a satisfactory instant reel, better than pencils or rulers. Tin cans with both ends removed can be used. Be sure to tie the end of the line to the reel before winding on the line.

**GENERAL.** Encourage helpers. Say yes when asked, "Can I help with the next class?" Some of us need all the help we can get when knot time comes. Aides keep materials organized, find tools, and give a hand as needed. They can carry kitemaking to future classes.

**DISCOURAGING DEPENDENCE.** If you give a demo and post a sample kite and brief instructions, and then jump in to do it again at the first "What do I do now?" all is lost. Confidence evaporates. Refer kids to the sample, to the instructions, to a neighbor who is proceeding correctly. Interfere and take over only to prevent disaster.

## Preparing for a Class

At the beginning of each set of instructions is a materials list and a tools list. A quick rundown of these lists will show whether the necessities are on hand.

When I am getting acquainted with a new kite, before I introduce it in the classroom, I make half a dozen, testing some variations. When I fly them, a snap



swivel from the sporting goods store facilitates changing the reel from one kite to another.

Be sure tools are on hand in quantity--enough pencils, scissors, tape and gluestick to enable people to work efficiently without waiting for essentials. Bright ribbons tied to special tools help to keep track of them. Fat tin cans on each table make handy tool organizers.

Provide plenty of working space: yard-square kites can't be made on 24" desk tops. If work is going to be done on the floor, move the desks out of the way. If tables are available, move the chairs out of the way because short arms have better leverage from a standing position. Provide good ventilation and spread newspapers to work on when gluing.

Though it is relatively expensive (one stick averages four kites), I prefer gluestick for classroom work. Rubber cement is toxic and, when used by a class, fumes build up. White glue is satisfactory, except on tissue paper.

Look around the classroom for bridle measuring aids. One wrap around a small table may give the five feet needed for the Siamese Snake kite. One and a half times around the work table could be nine feet for a large sled. Shorter bridles may use body measurements. An adult arm is about two feet and an adult "wing-span" about five feet.

Darning needles are useful for bridling some kites. Store them in a block of styrofoam.

When knives are used, protect tables with scrapwood cutting boards.

### Kitemaking Time

Hang a sample kite and, for some designs, samples of various stages of construction on the bulletin board. Make a brief step-by-step construction outline so people who have seen the demonstration can refresh their memories of what comes next when they begin building.

Class opens with a fifteen-minute demonstration, with everyone gathered around. As I work, I explain how a kite flies, tell the history of this particular kite, and harp on craftsmanship and the accompanying necessity for good tools, well cared for. Even if the class dowels are pre-cut, I include a dowel-cutting demonstration, marking the correct length and rolling the dowel under the blade, scoring all around so it snaps easily.

Following the demo, students choose materials from the supplies table and move to the work tables. It helps to have someone at the supply table to hand out materials during the initial "feeding frenzy." As work progresses, I circulate, field questions, and try to insure against fatal errors. For something of general interest, I raise my voice and tell the class. When it comes time to set a bridle, I stop the action and show everyone--for the second time. Those who finish first help others or wind line on the reels so we are all ready to fly at once.

Building kites in teams of two has much to recommend it. Sometimes this is dictated by the space. But even such small kites as the Siamese Snake are easier to frame with four hands than with two. Ten-year-olds can build the big Swallowtail Sled by working on both sides of the table. Making two kites, one right after the other, consolidates the learning as initial awkwardness is overcome and the sequence becomes familiar.

### Flying

First aid for kites: The field repair kit should include scissors, knife, extra spars, tape, string and tail material.

Flying our kites and making the necessary adjustments and repairs brings the class from "This kite won't fly" to "What should I do so this kite will fly?" On the flying field, I stand in one place, looking resourceful. As I help adjust bridles, make tail recommendations, or deepen the bow on an Eddy kite, I point out the flight characteristics of the kites in the air and those struggling to get in the air, suggesting reasons for varying performance. The emphasis is on careful observation. Soon we have several qualified kite technicians and I become the keeper of the field repair kit.

### Materials

Window blinds made of matchstick bamboo reed supply the framing material for small Oriental kites. They are sold by stores which carry kitemaking materials, by import shops, and

may sometimes be found in thrift shops. Not all the reeds are uniform or strong enough for a Vietnamese or Snake kite. Rejects are useful for strengthening the Dutch kite and sparring some of the small bag kites.

One-eighth, 3/16", and 1/4" diameter wooden dowels are the spar material for most of the small-to-medium-size kites in this book. Look for them in hardware and hobby shops.

Kite sticks can be sawed for such kites as the Eddy. Some kite shops carry spruce kite sticks. School shops may have 1" pine boards to slice up.

Fiberglass rods and tubes come in various thicknesses, lengths and degrees of resilience. Kite material suppliers are the source. Graphite rods are also used. Kitemakers should be aware that graphite is a conductor.

Most kitemakers are familiar with tissue paper and butcher paper. Art tissue comes in dozens of bright colors. You may suppose that newspaper is newspaper, but the overseas edition of the London Times is printed on newsstock which is like onion-skin, a lovely material. From my daily paper, I save colored pages and ones with printing or pictures which, cut 12" square, would make attractive kite faces.

At a summer camp, a class made potato prints on newsstock, and these prints, in turn, made elegant kites. Our import shop sometimes has Chinese newspapers which came as

packing material. They can be ironed and the graceful print seems particularly fitting for Oriental kites. One of the most attractive collections of Dutch kites I have seen was made of white butcher paper, painted with broad, wavy, black stripes before it was made into kites.

Tyvek is a Dupont material, a white, opaque, plastic paper. It can be glued, taped, stapled, sewn and painted. Many kitemakers use it for medium and large kites.

High-density polyethylene is the crackly material used in many shopping bags. The weight varies but all of it is tough. Kite shops sometimes sell the bags in bright colors.

Some materials are hard to find, but plastic bags are always around. Name-brand bags are generally mud-colored and don't do much for the sky. If good colors are not available, I use white, which always looks good and can be decorated with permanent marking pens. And bags in many colors are available by mail. 1 to 1.5 mil is heavy enough for most kites. (See resource list for colored bags.)

Surveyors' tape, made in bright colors, can be used for tails.

Kite shops which sell kitemaking materials stock most of these items. See the resource list.

## On Beyond Kites

### History

1976, when I was Ye Olde Bicentennial Kitemaker in the Richland School District, was a great season of classroom kite-making because it led me to biographies and autobiographies of those well-known American inventors and kitemakers, Benjamin Franklin and Alexander Graham Bell.

Our kite designs come from all over the world, but the contribution of the Orient is fundamental. I have put together what I call a Clothesline Kite Museum, a collection of forty kites, hung in chronological order on a line stretched across a classroom wall. Each has a card listing its provenance, with dates, inventors, and such uses as the French Military for observation, the Eddy and Hargraves for weather kites, and the parafoil for lifting. The collection is for handling, and, after I talk my way through it and answer questions, students can take the kites down for a closer look.

### Arts and Crafts

"It flies!" Exciting words in any language. Tal Streeter writes of "the kite smile ... "as the wind transforms the kite into an entity pulsing with life."

A kite must fly and, to some of us, all kites are beautiful, but the students in a junior high arts and crafts class, where I spent a month, set out to go beyond utility to the

stunning, the dramatic, the humorous. Emphasis was on fine appearance in the hand or in the air. Because beginning with a proven design facilitates improvisation, students first made the demonstrated kite--a different one each week. If someone wished to join the group later on, she could find an experienced builder to help her. Students were soon back for seconds and thirds, were teaching each other, and building kites to answer questions: Dutch Kite: "What will happen if I trim the bottom corners?" Flies, but not as well since lifting surface is reduced. Snake Kite: "If I cut the tail to ribbons?" Glorious variation, the octopus kite; teacher is stunned. Eddy Kite: "If I make tissue paper windows and glue fringe all around?" A beauty!

The inventiveness of each helped spark the imagination of all. Some brought their dreams to school, "I was flying my Snake after I went to sleep last night and it had a notched tail like a dragon."

Kitemakers become relaxed about mistakes and mishaps. As we bent the crosspiece to bow an Eddy kite which Shannon had spent three days building, the stick snapped. I felt the whole class go tense, because the possibility that this kite--fashioned with care and enthusiasm--might never fly, was plain before us. But I could smile and say, "It's serious, but it's not fatal," and hear Shannon exhale as I showed how to cut away the lashing at the center, slip the broken stick out of the framing cord, and replace it with a whole one.

After these classes ended, three of the students accompanied me to a first-grade class to help thirty-six six- and seven-year-olds make and fly the Dutch kite. My assistants were impressed that the skills involved were so difficult to master.

### Science and Math

One spring, I spent several weeks with a class of sixth-graders, building kites for good performance and gathering data for comparing the kites. We made simple wind gauges and clinographs for altitude measurement. As we discussed the physics of flight and the technological uses of kites, we were delighted to learn that, before the construction of the suspension bridge at Niagara Falls began, the first line across the gorge was carried by a boy's kite.

We built the Dutch, Eddy and Sled kites, the Dutch kite to satisfy curiosity: "Is this kite really a bumblebee, flying in spite of itself?" "How will it compare to the work-horse Eddy and Sled?" We scaled sleds up to six feet and down to six inches. Teams were formed to measure the wind, calculate altitude, and record kite weight and area. I encourage kitemakers to keep records. There are so many variables in kiteflying that this is the only way to build up comparative data.

The bibliography includes notes on resources for science projects.

## Writing

Students in the Anacortes School District who participated in a kite/poetry workshop wrote "kite tales" about imaginary kites, including a pencil kite which "could write across the sky and erase clouds . . . draw on stars and etch on the wind." They made sky signs (BIRD CROSSING) and imaginary constellations.

How-tos are still another way to write about kites, and can be an introduction to technical writing. I always planned to be a writer when I grew up, but I had no idea of the satisfaction that comes with putting together a lucid, coherent set of instructions.

How to how-to: Get something on paper as you make the first kite: The list of materials and tools. Brief notes as you figure out the logical construction steps. Make several kites to simplify procedures. Try to write down each step, no matter how complicated it is to explain. When you or your illustrator draws the diagrams, you can dispense with most of the words, but it clarifies thinking to write it first and rewrite as you go.

If someone else is illustrating, you may need to make step-by-step mockups for her to work from. It also helps to give your instructions a trial run with a class, explaining what you are doing and inviting suggestions. Try to keep it simple. All kites have several options, and a beginner can be confused if she meets all of them at once.

## The KITE LINES Safety Code

### The Four Nevers of Kiteflying

1. Never fly a kite in wet or stormy weather, and keep your line dry.
2. Never fly a kite near electric power lines, transmission towers or antennas.
3. Never fly a kite with wire or anything metallic in its line.
4. Never fly a hard-pulling kite without wearing gloves.

### Five Things to Avoid While Kiteflying

1. Public streets and highways--don't fly in or near them.
2. Air traffic patterns.
3. Bystanders in your kite's line of attack--especially when flying maneuverable kites.
4. Rocky, bumpy or obstacle-filled fields--they can trip you up.
5. Trees--but if you do lose a kite to a kite-eating tree, loosen the line and let the wind fly it out.

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## Flying, Bridles, Lines, Knots, Reels

The first thing to know about flying kites is that the direction of the wind determines the direction in which the kite flies. I am not opposed to running with a kite per se, as long as it can be done safely, given the terrain and the available space, but it is not necessary, and running in circles, as novice fliers may do, confuses any kite.

All the kites in this book fly well in light to moderate (4-15 mph) winds. Many people think of strong winds--20 mph and over--as good kite flying winds, when in fact they are kite killers. Cell kites do well in fairly high winds, but my own preference is the surprise of learning how slight a breeze it takes to put a well-made kite into the sky.

With a favorable breeze and a little experience, almost all kites can be hand-launched. In light winds, have a helper hold the kite and walk away, letting out 50 to 100 or more feet of line. The kite should be held gently from the back, its face to the wind. When the wind tugs at the kite, the helper releases it and the flier quickly pulls in line. Sometimes it is best to drop the reel and bring in big "bites" of line by hand, releasing more line as the kite asks for it. Maintain tension as the kite begins to rise. Tugging or pumping on the line also helps to gain altitude. If the wind fails, reeling in and pumping may sustain the kite until the next gust comes along.

Some kites dive on a short line, when you are giving line or reeling in. The remedy when putting the kite up is to start with a helper and quite a bit of line out, so the kite gains altitude in a hurry. If the kite dives when you are bringing it in, run towards it to slacken the line and it will sink to the ground for a soft landing.

Take your time when bringing in your kite. Remember that the line comes back on the reel under tension. It can snap dowels or warp plywood. If the wind is strong, pull in the line by hand (with gloves), distributing it loosely on the ground, and wind it on the reel after the kite is down. Or a gloved helper can pull in the line a bite at a time, while you reel in the slack.

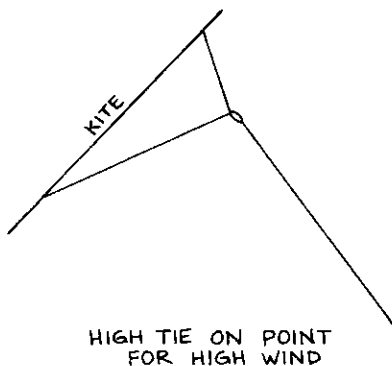
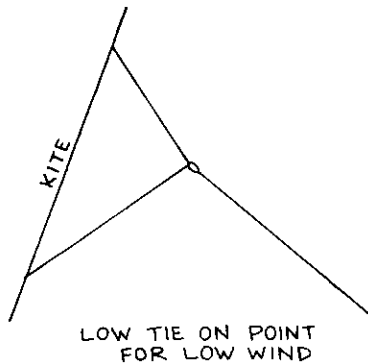
**BRIDLES:** The line attached to the face of the kite which holds it into the wind at an angle which makes flight (differentiated from blowing away) possible. The bridle (or multiple bridles) forms the shape of the sleds and parafoils. The keel of the delta acts as a bridle. If a kite is not flying well, is diving or pinwheeling, check the bridle first. On flat and bowed kites, the optimum angle varies with the type of kite and the wind velocity.

The starting place for setting the bridle on light kites is the suspension point on the bridle at which the base of the kite forms a 15 degree angle with the horizontal. (See Trash-

bag Box Kite.) Heavier kites can be held into the wind by the bridle; the point at which the kite wants to rise is the towing point.

If the wind is low, a lower towing point will result in more surface area being presented to the wind. In other words, it will fly best in a more nearly vertical position. In a higher wind, it is necessary to permit more wind to slip away from the lower surfaces of the kite. It will fly best at an angle nearer the horizontal.

### BRIDLE ADJUSTMENTS



A ring attached by a larks-head knot or a loop of string over the bridle line allows easy adjustment. (See Vietnamese and Square Diamond.) If you are working with a design of your own, or a pattern which does not give complete specifications, a good starting place for flat and bowed kites is to put the towing point approximately one-third of the way down the spine and away from the face of the kite about one-half of the total length of the spine.

**KITE LINE:** For classroom kite flying, and for all the light kites, (those which fly in low to medium winds without exerting much pull,) I prefer #20 or #30 crochet thread to any commercial kite line. Cotton kite line is heavy and fuzzy, and synthetic kite line frays and ravel.

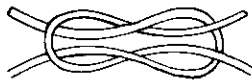
Fliers of miniature kites sometimes use line raveled from nylon fabric or from old pantyhose. There is a gain in stability with fuzzy line for tiny kites.

Braided fishline is a pleasure to use and it is a good idea to have reels with light (under 30#), medium (30#-80#), and heavy (100# or more) to handle various kites in different winds. In light to moderate winds, 30# line will hold most kites but don't risk losing a kite by putting it out past recovery and having a too-light line snap.

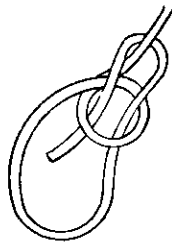
Monofilament fishing line is also good flying line, but not as pleasant to handle.

Snap swivels, also used by fishermen, come in several sizes and are wonderful aids to the kiteflier. Tie one on the end of the flying line to eliminate twisting.

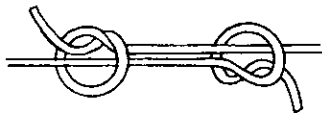
## KNOTS



SQUARE KNOT



BOWLINE



FISHERMAN'S KNOT



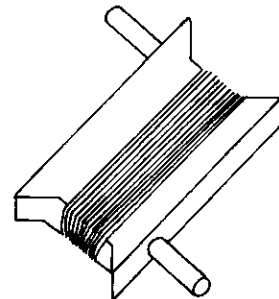
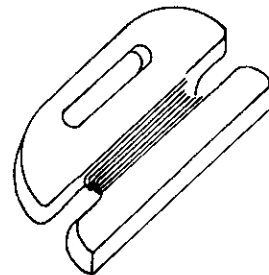
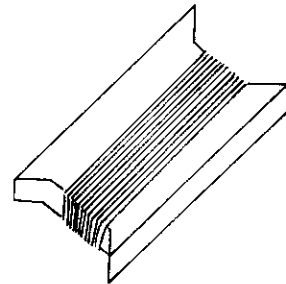
LARKSHEAD KNOT

## Reels and Winders

My favorite reels, shown here, are all variations of the notched board. Make them with the grain running the long way. Any child can use them, and this is important to me because I frequently invite bystanders to fly my kites.

Reels are a personal decision. Some fliers use any old board or broomstick and others swear by mechanical marvels. A shortened fishing rod with reel attached is another possibility. If you are a "reel person," a visit to a kite shop will stimulate your imagination.

## REELS





## Vietnamese Kite

In 1976, in a Bicentennial crafts program in our local schools, I was teaching sixth grade students to make the Siamese snake kite, when a boy, recently arrived from Vietnam, came up with a piece of the bamboo reed, saying, "Can I show you the kite we make in Vietnam?"

This little kite, made with the newspaper with which covered the work table, is a jewel. Dimensions are given in the layout, as they must be, if someone who has not seen the kite is to build it, but when I teach the Vietnamese kite in the classroom, we eyeball it. Some kites will be fat, a few will be skinny, and one or two may be bridled upside-down, but all will fly. There can hardly be a

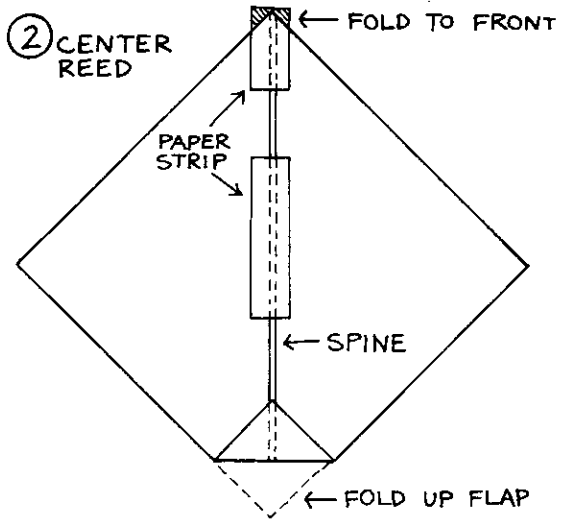
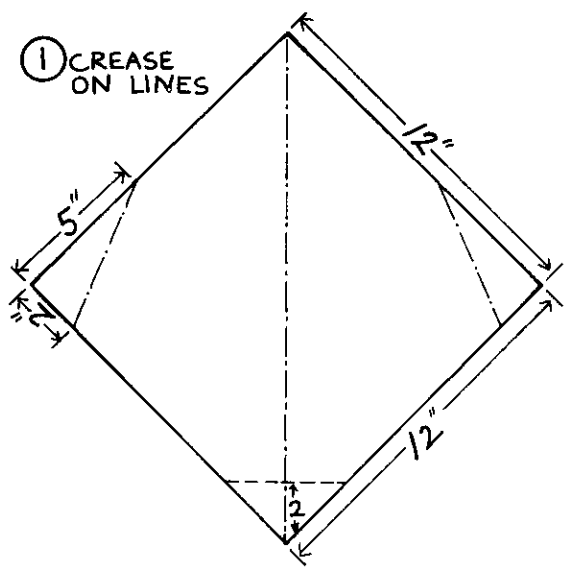
better introduction to kitemaking. There is a pleasing symmetry in having a kite which has delighted Oriental children for thousands of years brought to our schools by a new immigrant in our Bicentennial year.

Newspaper and tissue paper are both light enough for a small kite. Crepe paper tails add stability and movement. They may be placed according to the character of the kite (fish or fowl). Begin with four strips of crepe paper, approximately 1"x5". The dimensions of the bamboo spars vary, because individual kitemakers use different proportions for the folds. They are approximately 14 1/2" for the spine and 22" for the arched cross spar.

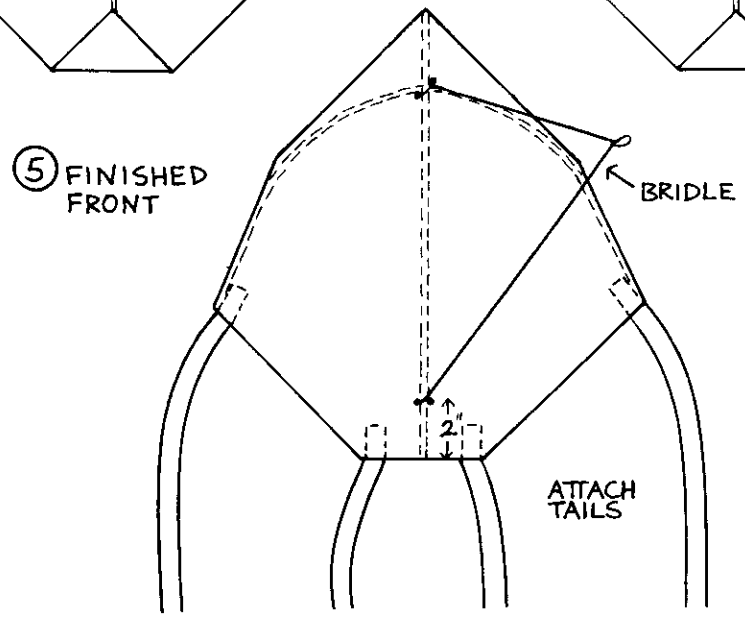
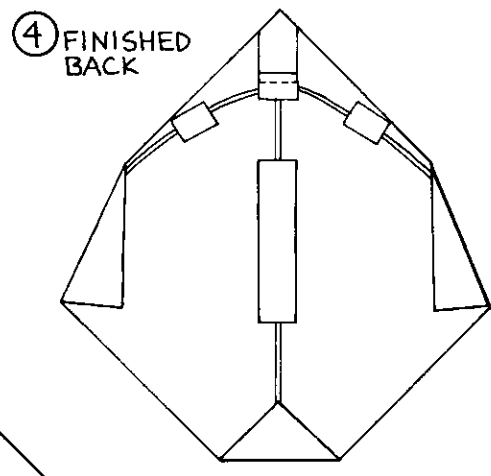
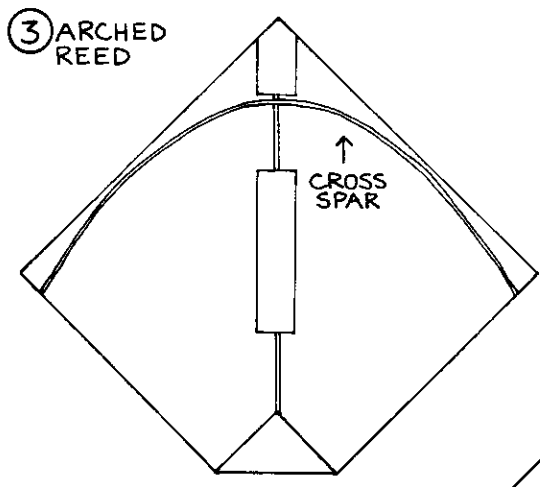
**Materials** 12" square tissue of newspaper, plus scraps  
1" wide crepe paper streamers for tails  
matchstick bamboo reed  
gluestick  
26" string for bridle

**Tools** scissors, pencil, ruler

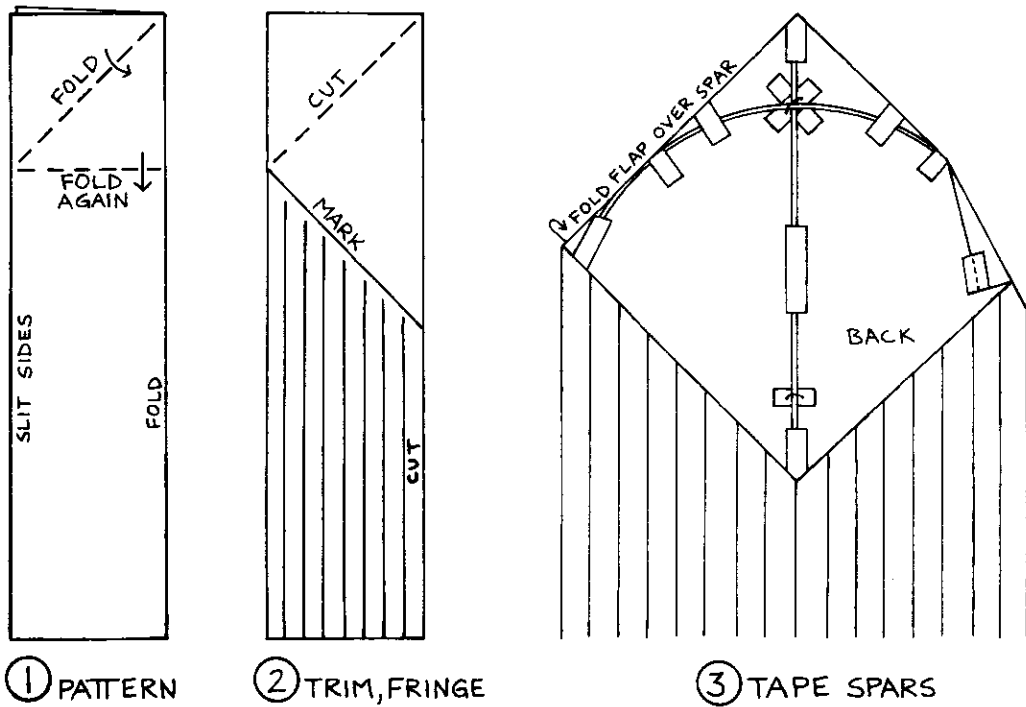
1. Wrong side of paper up, crease on dotted lines.
2. Measure spine and glue in place as shown.
3. Measure the reed for the cross spar. Choose a strong reed with a symmetrical curve. It should arch close to the leading edges.
4. Glue the corner flaps over the reed. Glue one side first, without trying to hold the curve in place; then glue the other side. Glue reinforcements over the reed intersection and between center and corners as shown.
5. TURN KITE OVER and bridle as shown (also see Trash-bag Box Kite). Glue on tails.



VIETNAMESE KITE



## VIETNAMESE BAG KITE



### Vietnamese Bag Kite

The Vietnamese kite can also be made from a high-density polyethylene bag, with the lower part of the bag fringed. A 16"-wide bag will make a kite which is approximately 12" to a side, large enough to fly well, small enough to be framed with bamboo reed.

Split and fold the bag as shown.

Fold, mark, trim and fringe as shown. The spars are taped in place. Bridle as for the paper Vietnamese.

## Dutch Kite

This all-paper kite is adapted from a design by A. van Breda. Use butcher paper, which schools may have in bright colors.

When I first show it in the classroom, people nudge each other and whisper, "It'll never fly, Wilbur!" But I have my moment when I demonstrate that it flies well, is remarkably durable, and makes a fine target kite. Vacationing in Nebraska one summer, and overcome by a desire to make use of the Midwestern wind, I made a Dutch kite from a grocery bag, attached a strip of newspaper for a tail, and flew it on my brother-in-law's fishing line. When he suggested using it as a target, I agreed, and, nine rifle shots later, the kite was still flying steadily, though its tail had been clipped. We reeled it in and found two well-centered hits. Then, my nephews put it up again, used all their ammunition, filled it with holes, and, finally, with a lucky shot, cut the bridle string. Dutch was still floating at fifteen feet when they decided to pull it down and present it to me. This survivor traveled to classes with me for a number of years.

The Dutch kite design puts it in the "two-stick, flat kite" category. It is such a singularly successful kite, so durable and versatile, that every kite-maker should have a Dutch kite up her sleeve. It incorporates the basic elements needed for flight--a spine, a crosspiece, a bridle to hold the kite face to the wind, and a tail for

stability. It flies easily in light and medium winds, can be towed by a bicycle or walked around the park by a two-year-old. It is a tolerant kite; that is, the less-than-perfect model will fly.

Making this kite calls upon many skills--measuring, folding, cutting, gluing and tying. Lee Wilbur of Kennewick, who uses the Dutch kite in his first grade classes, makes it more rugged by adding matchstick bamboo reed reinforcements in the spine and cross spar.

Dutch kites fly well in train, the kind of kite train which is called a tree, with branches going off the main line at intervals. Use 15# test line for the master line, and let the first kite out about 50 feet. Using crochet thread or other light flying line, put up a second kite about 25 feet. Tie a loop in the master line and break off the second line from the spool and tie it through the loop. You now have two kites on one line, and can continue adding other kites to the line in the same manner. Bringing a train in can be difficult and you may have some tangled lines.

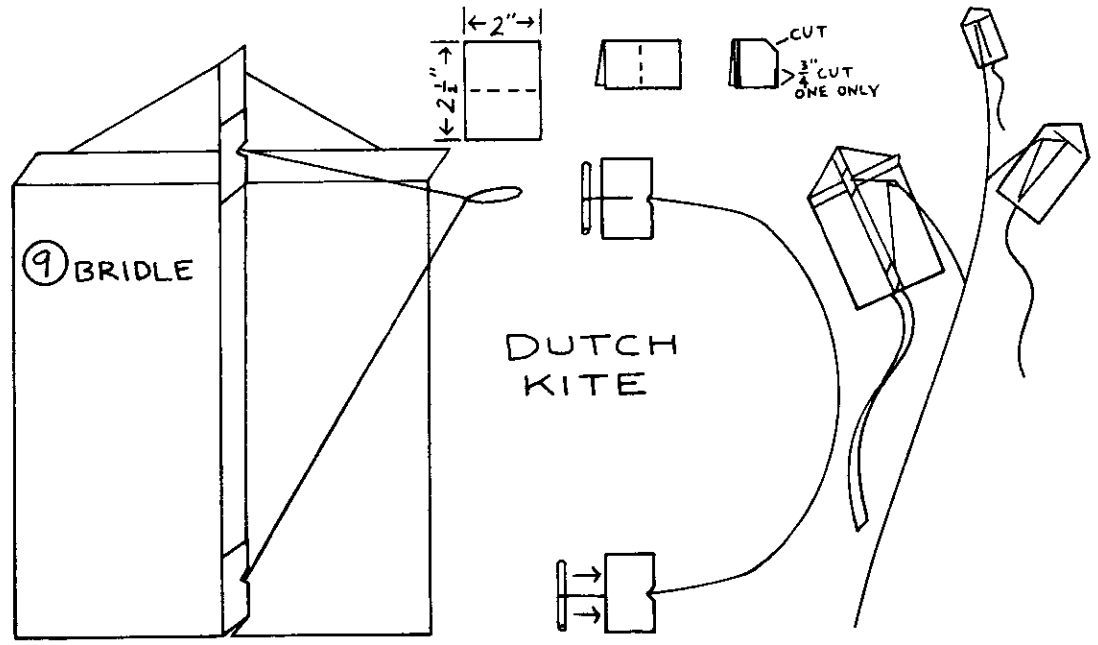
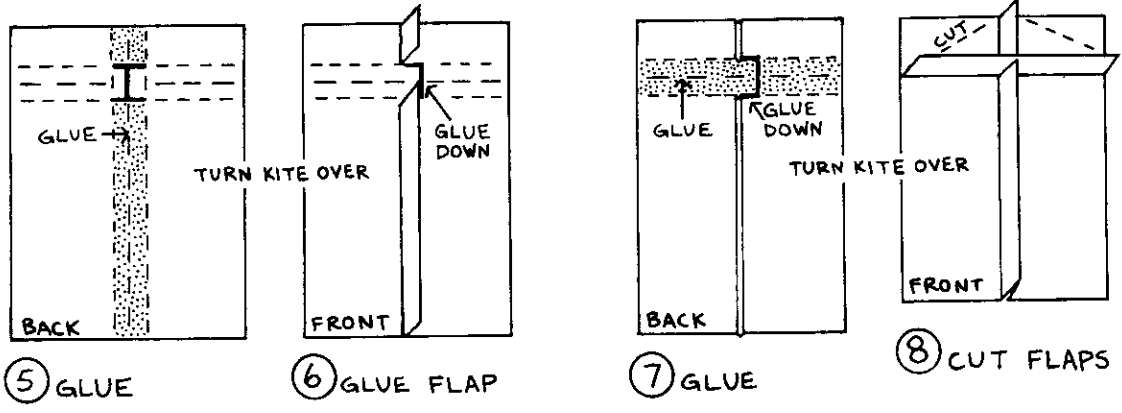
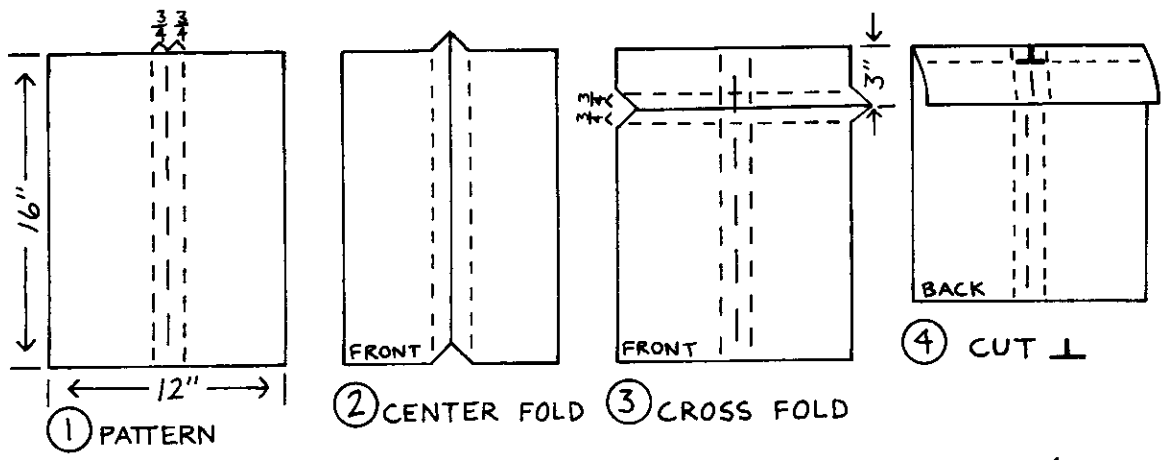
The record for most kites on a line is held by a Japanese team which flew over 4,000 sled kites on a single line.

## Dutch Kite: Instructions

**Materials** | stiff paper (butcher), 12"x16"  
paper scraps for bridle  
light string, 26"  
matchstick bamboo reed  
crepe paper for tail, 1"x4"  
glue

**Tools** pencil, scissors, ruler, paper cutter

- 1-2. Fold and crease paper the long way. Fold and crease again  $\frac{3}{4}$ " from center fold. Open flat so the folded section forms a vertical ridge up the middle (center spar). This is the front of the kite.
- 3-4. Open paper flat. Fold and crease on a line 3" from the top (short way). Fold and crease  $\frac{3}{4}$ " from this fold. This forms the cross spar.
- 5-6. Open paper flat, ridge side down. Brush glue on top and bottom sections of the long vertical fold (between the fold lines) but not on the horizontal fold section where the H-shaped slit is. Lay bamboo reed, cut to size, on the center crease, a short length above the cross fold, and a long piece below. Fold in center, spreading sides out, thus gluing the spine of the kite.
- 6-7. The cut flaps on the intersection of vertical and horizontal spar folds should slide over each other, one coming out on top of the kite, the other on the back. Glue these flaps down on front and back of kite.
- 7-8. On the back, brush glue on the cross-spar area. Lay bamboo reed in the crease and fold to form cross-spar. Trim off top corners.



## Making the Bridle

Take two scraps of paper, each 2"x2 1/2", and fold in half, across the 2" dimension. Fold in half the other way and snip a small corner off the center fold, making a hole in the center of the paper. On one scrap, cut about 3/4" up the middle fold below the corner cut.

Open pieces up. Tie 2" scraps of bamboo reed to each end of the 26" string. Thread the sticks through the holes in the small papers, so the sticks ride in the creases and the papers are linked by the string.

Glue the paper with the slit over the intersection of the spars and parallel to the spine. The other paper is glued at the base of the kite over the spine.

Consult Bridling and the Trashbag Box Kite to set the Dutch kite bridle.

Glue on tail. Add more if the wind is strong and the kite flies erratically. If the wind is very light and the kite will not rise, trim the tail.

I store the Dutch kite by pinning it to a cork board.

## Miniature Dutch Kites

A miniature Dutch kite has won in the "smallest kite" category in several kite festivals. The standard Dutch kite begins with a 12"x16" paper, a ratio of three to four. Kites scaled larger than this are giraffes, subject to slipped discs and other back ailments, but the design works well in smaller sizes, down to 3"x4" (before folding). Use crisp, lightweight paper, broom straw for bridle stays, and make the folds and the scraps for the bridle assembly as narrow as possible to save weight. Fine strips of crepe paper will make the tail. Fly on "Crystal" thread, a very fine monofilament, sold in sewing centers. Anything heavier would mean a flying line heavier than the kite. These pocket-sized kites fly well, but they need a fairly strong wind and considerable skill, since surface winds are turbulent, and the lifting surface is small for the weight of the kite.

## Paper Dragon Kite

The Paper Dragon kite is another design by A. van Breda. I talk to myself as I work with it. Is it a good idea to include it as a classroom kite? It is relatively difficult, somewhat fragile, must be hung to store, and cannot take strong winds. But laying out the grid is an elegant measuring exercise, and as cell kites go, the construction is simple. A flying Paper Dragon is breathtaking.

Made of butcher paper, and reinforced with reed or dowel, this design is well suited to playful decoration, with toenails, eyes, teeth, vertical or horizontal stripes as possibilities, done with marking pens or glued-on bits of paper. Colored marking pens on white butcher paper will give a translucent effect. Scraps of foil wrapping paper are particularly fine. The extended flaps on both sides (toenails) may be fringed and then curled by drawing them over the blade of the scissors.

The Paper Dragon requires more class time than some of the other kites, at least two periods to allow for imaginative decoration. There are two ways to approach this kite in class.

One way to go about it is to prepare a sample set of "stages" in dragon development:

Stage 1. Full-size drawing of the basic horizontal and vertical grid. Accompanying handout should give dimensions, so students can copy the grid.

Stage 2. Cut-out kite, with folds made.

Stage 3. Completed kite, including the bridle.

If the samples are posted and a ditto with the sequence of steps is available, students who have some experience with the simpler kites should be able to proceed on their own.

A second way is to provide kite paper ready-cut to size and stencils with holes cut for the legs, eyes and corners, ready to trace on the kite paper. Vertical fold lines can then be drawn and the proper cuts made. Samples of the cut-out, folded and finished kite should be available so that how to move from a flat sheet of paper to a flying prism-with-wings is clear.

Box, or cell, kites are heavier than single-plane kites. The Paper Dragon needs a medium wind. A skyful of multi-colored Dragons dressed as fish, crayfish, caterpillars, praying mantises or other insects is a fine sight.

The Dragon needs several 5'-6' tail streamers. It can be scaled to 24"x12", and I have made and flown a mini-dragon, beginning with 12"x8" paper.



## Paper Dragon Kite: Instructions

**Materials** | butcher paper, 12"x36"  
bamboo reed or 1/8" dowel, 26" long  
cellophane tape  
lightweight string, 36"  
1" wide crepe paper for tails  
gluestick

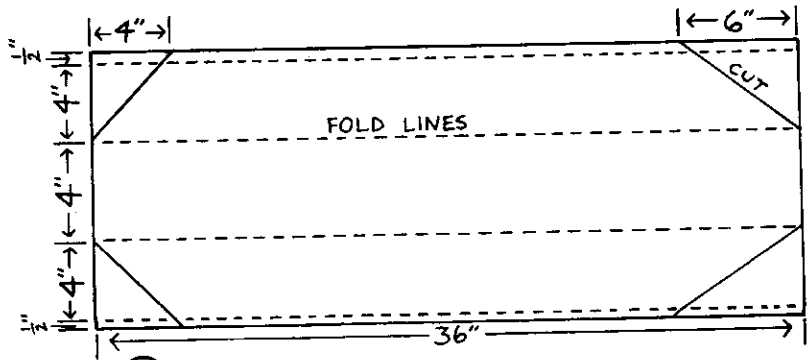
**Tools** yardstick, ruler, pencil, scissors or  
Exacto knife, needle

1. Draw cutting and folding lines on paper.
2. Cut on solid lines as shown. Decorating may be done now, since stripes or other designs in the interior of the cell can be easily worked out on the still-flat surface.

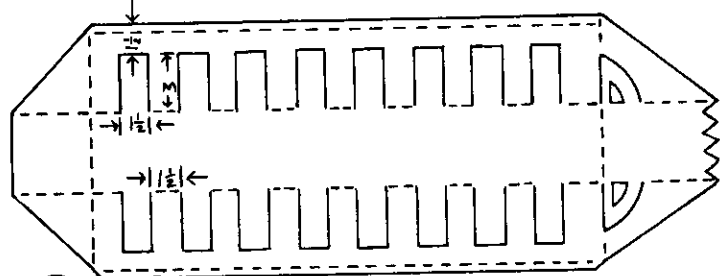
Fold on dotted lines. Brush glue in the channel formed by the narrow fold on one long edge. Reinforcing reed can be laid in the channel before the two folds are brought together to form the leading edge. Or attach a dowel by taping at intervals inside the ridge formed by the folded, glued edges.

Bridle as shown, poking holes through the paper, and tying the bridle lines over the reinforcing stick. (See Trashbag Box Kite.) Add tails.

This year I added butcher-paper wings to the Dragon, as shown in the sketch. They are reinforced with a dowel across the top edge from one wingtip to the other, and, after the dragon body is firmly glued to the wings, a vertical spar from the top of the kite to the base of the wings was added (dotted lines). The wings were designed by laying the completed dragon on a sheet of paper and sketching a pleasing shape. I then folded the paper, cutting the two wings at once. The Winged Dragon flies well, and variations should also be satisfactory.

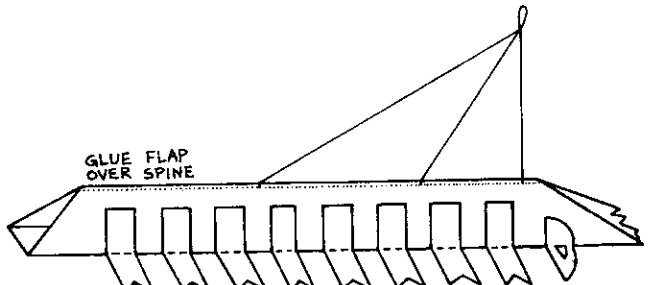


① PATTERN

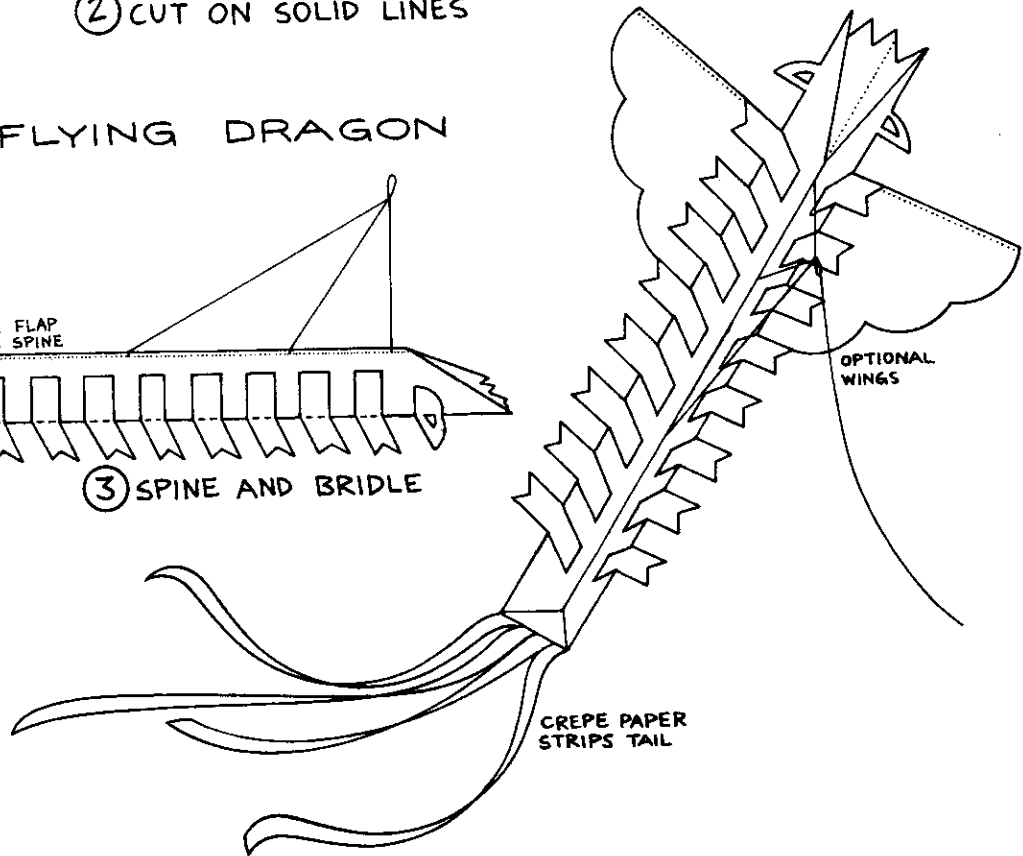


② CUT ON SOLID LINES

FLYING DRAGON



③ SPINE AND BRIDLE



OPTIONAL WINGS

CREPE PAPER STRIPS TAIL

## Sled Kites

William Allison patented his "Flexible Kite" in the early 1950s, and it was further developed and christened "sled" by Frank Scott. Ed Grauel has said, "Allison's place in the history of kiting is assured. He gave the world one of the simplest, yet one of the finest all-around kites that anyone has evolved in over 2,500 years of kiting."

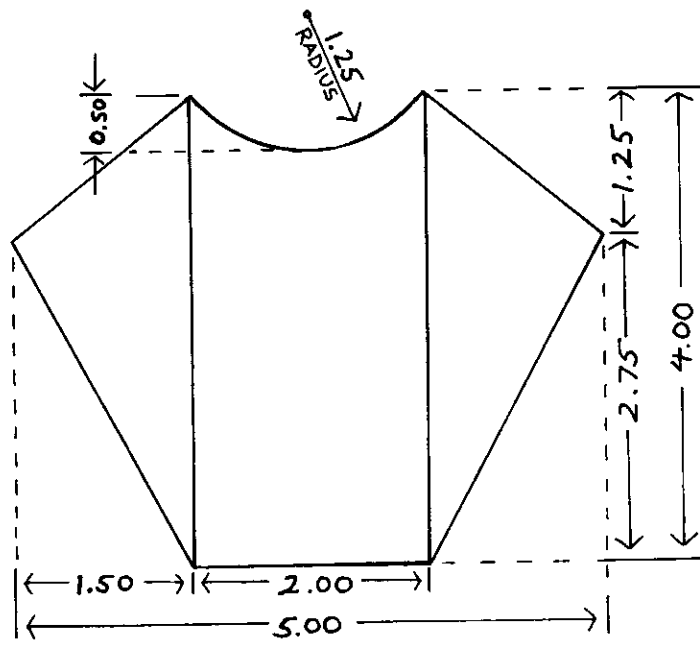
Sleds are probably the most widely-used classroom kite design. There are many variations and the possibilities of this simple canopy with vertical longerons have not been exhausted. Some configurations need vents (holes) in the canopy for stability. The 36" sled is the standard. Smaller sleds fly well, and larger sleds can be temperamental.

The recommended bridle length is three or more times the width of the sled kite. Too short a bridle will prevent the kite from opening fully.

## Trashbag Sled Kites

Guy Aydlett's Hornbeam sled does not need vents. To scale the modular measurements for plastic and fabric kites, multiply every figure in the pattern by the same number. For a 36" kite, multiply every number by 9. For a 16" kite, multiply by 4. Scale your sled kite by deciding on the elevation (the length of the spars). 16" or 24" kites make good use of both 48" dowels and standard trash bags. Divide the spar length by 4 (the module figure for the elevation) to get the multiplier for scaling.

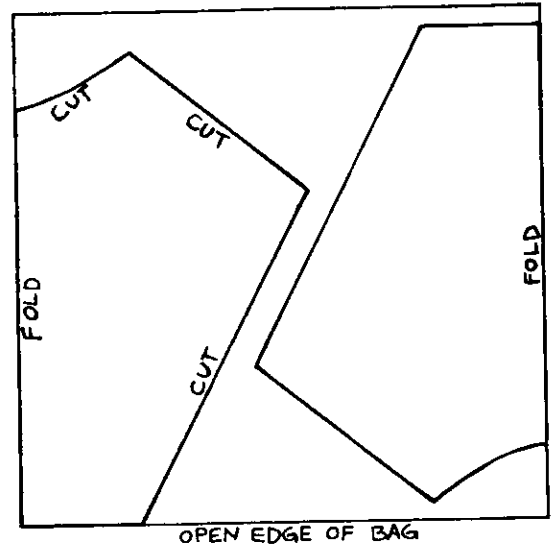
With a draw-around pattern of half the kite, the canopies can be cut from unopened plastic or high-density polyethylene bags. If the kite is over 16", use a strip of tape at the mid-point of the spars. The tape at the dowel tips should go up and over to the back of the kite.



① SCALE PATTERN

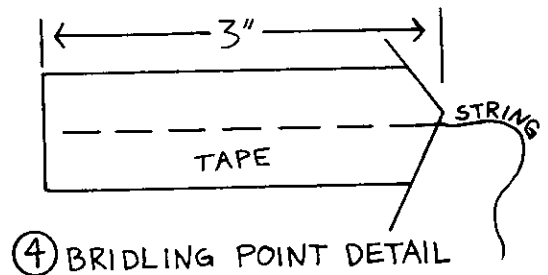
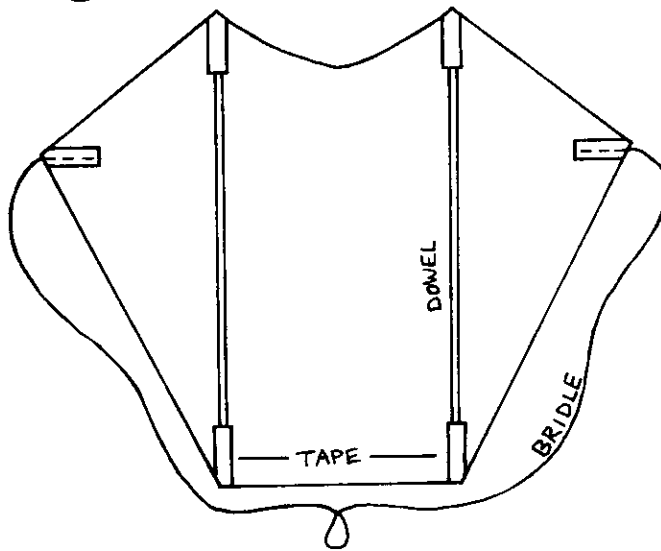
BRIDLE: 12 MODULES

② CUT OUT



MODULAR HORNBEAM SLED

③ ATTACH DOWELS AND BRIDLE



④ BRIDLING POINT DETAIL