

KITES

Lesson Plan: Sled Kite Proportions

Grade Level: 6-8

Subject Area: Math

Time Required: *Preparation:* 1 hour
Activity: 3-4 hours

National Standards Correlation:

Math (grades 6-8)

- Number and Operations Standard: Understand numbers, ways of representing numbers, relationships among numbers, and number systems.
- Number and Operations Standard: Understand meanings of operations and how they relate to one another.
- Geometry Standard: Specify locations and describe spatial relationships coordinate geometry and other representational systems.



Summary:

Each pair of students will be given a 6"x 8" paper pattern of a sled kite, two dowel rods (each 48" long), and a 48"x 48" piece of plastic. The task will be to enlarge the paper pattern proportionately in order to make a kite. Students will have to decide how large they want to make their kites. The length of the dowel rod and size of kite material will dictate how large they can make the kites. They may choose to make two 24" kites, a 30" and 18" kite, or one large 48" kite. After choosing which kite(s) to make, students will enlarge the pattern in order to make the kite(s). Students will explore angles and lines of symmetry, while building the kites. The culminating activity will be flying the kites.

Objectives:

Students will:

- Use proportions to enlarge a pattern
- Design and build a sled kite
- Identify the line of symmetry and congruent angles
- Recognize the relationship between doubling the side of a quadrilateral and the corresponding increase in area
- Successfully fly a kite

Materials:

You will need:

- Wire cutters or small saw

Each pair of students will need:

- Sled kite pattern
- 1 (48"x 48") sheet of plastic garbage bag (preferably white so that it can be decorated)
- 2 dowel rods (1/8" diameter) 48" in length
- Tape
- Kite string
- Permanent markers
- Scissors
- Hole punch



Safety Instructions: See “Kites in the Classroom” presentation at <http://www.nationalmuseum.af.mil/shared/media/document/AFD-070523-007.ppt>

Procedure:

A. Warm-up

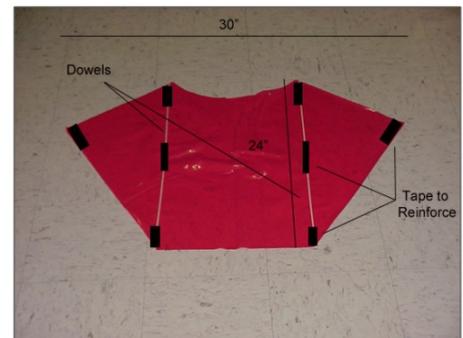
1. Give a brief overview of how kites have been used throughout history. (See “Kites in the Classroom” presentation at <http://www.nationalmuseum.af.mil/shared/media/document/AFD-070523-007.ppt>)
2. Review the concept of proportion with the students. This activity assumes some prior instruction in this area.
3. Review the rule that if the sides of a quadrilateral are doubled then the area is increased four times.
4. Review concepts of congruent angles and line of symmetry.

B. Activity

1. Students will be working in groups of two.
2. Give each group a pattern for the sled kite. Explain that each pair of students must make at least one kite. They may enlarge the pattern to any size they choose. They may make two 24" kites, a 30" and an 18" kite, one 48" kite, or any other sizes that are applicable to the materials they have been given.
3. Build the sled kite using the directions below. Students can follow along with the Student Instruction Sheet.



- a. Compute the measurements for the size of the kite that you are going to make. Make a paper pattern.
- b. Trace the pattern onto the plastic garbage bag.
- c. Cut out the kite. Stress to the students the importance of symmetry in the kite. Ask students to identify lines of symmetry.



- d. Cut dowel rods to the appropriate lengths with a pair of wire cutters (or saw). It is important that the students make accurate cuts. It would be a good idea for the teacher to keep the wire cutters (or saw) so that he/she can check the students work prior to cutting.



- e. Tape the dowel rods into place. Cut tape into approximately 2" sections. Place a piece of tape lengthwise on the center of the dowel rod then tape to the material. Place about half of the length of tape at each end of the dowel. Tape the dowel to the plastic then fold the remaining tape over and attach to the other side of the plastic.
- f. Tape the corners with two pieces of 2" tape on the outermost corners as shown below. The tape should fold back and attach to the other side of the plastic.
- g. After the tape is applied, punch a hole through each end. The tape is there to reinforce these corners. Cut a length of string 5 times the length of the dowel rod. Tie the string through the holes using a square knot. Bring the holes together and find the exact midpoint of the string. Tie a knot, leaving a small loop. It is very important that this loop is exactly in the center. If it is not, the kite will not fly straight. Now, tie your flying line in the loop and you are ready to fly!

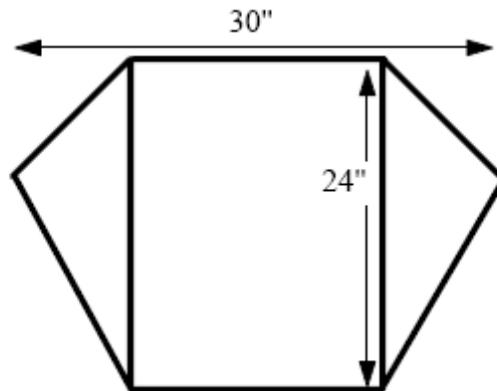
C. Wrap-up: Let's Go Fly A Kite!

Stand with the wind to your back. If you are not sure which way to stand, look at the leaves or a flag. Your partner should hold the kite up (you should see the dowels) then let go of the kite and let the wind carry it. If your kite is constructed properly it will fly. If the kite seems to fall to one side, check the midpoint of the bridle again. You do not need to run to get your kite up in the air.

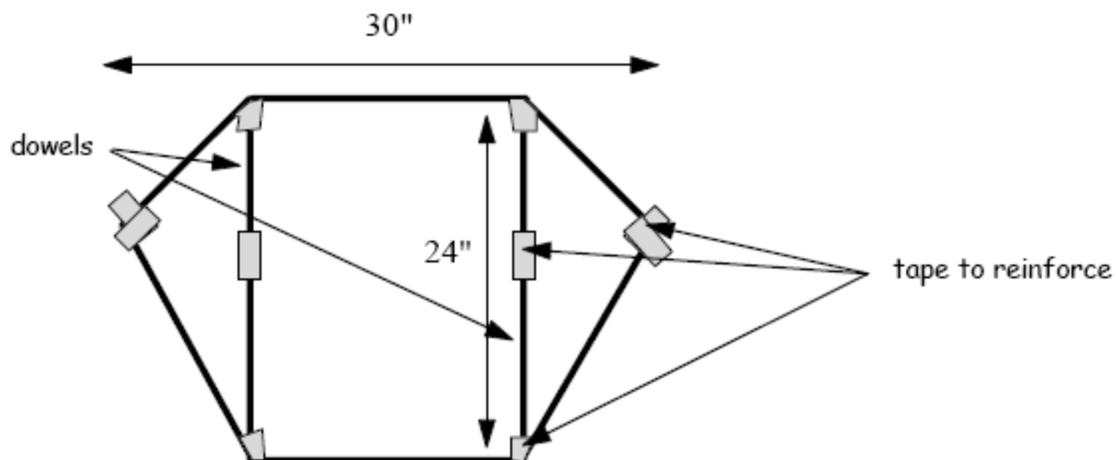


Sled Kite Proportions Student Instruction Sheet

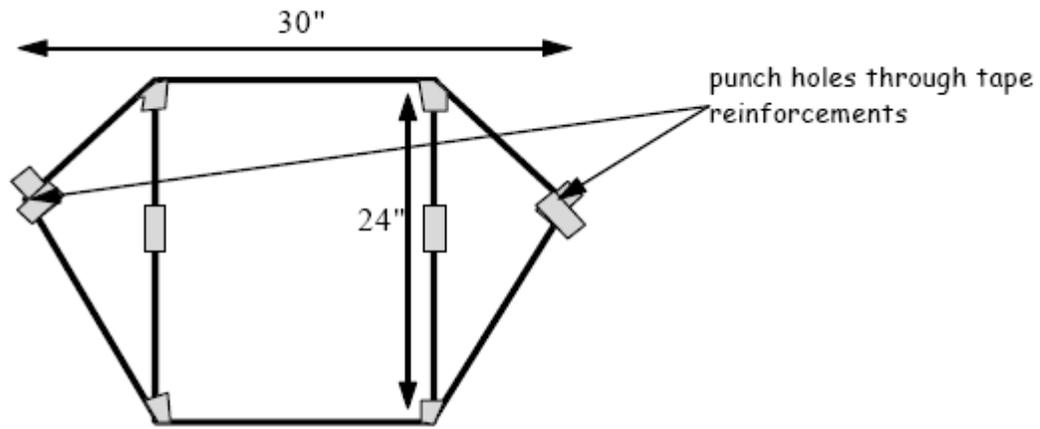
1. Compute the measurements for the size of the kite that you are going to make. Make a paper pattern.
2. Trace the pattern onto the plastic garbage bag. Example:



3. Cut out your kite. Look for symmetry in the kite.
4. Cut the dowel rods to the appropriate lengths with a pair of wire cutters or a small saw. It is important to make accurate measurements before cutting.
5. Tape the dowel rods into place. Cut tape into approximately 2" sections. Place a piece of tape lengthwise on the center of the dowel rod then tape to the material. Place about half of the length of tape at each end of the dowel. Tape the dowel to the material then fold the remaining tape over and attach to the other side of the material. Tape the corners with two pieces of 2" tape on the outermost corners as shown below. The tape should fold back and attach to the other side of the material.



- After the tape is applied, punch a hole through both corners at the same time. The tape is there to reinforce these corners.



- Cut a length of string 5 times the length of the dowel rod. Tie the string through the holes using a square knot. Bring the holes together and find the exact midpoint of the string. Tie a knot, leaving a small loop. It is very important that this loop is exactly in the center. If it is not, the kite will not fly straight. Now, tie your flying line in the loop and you are ready to fly!

