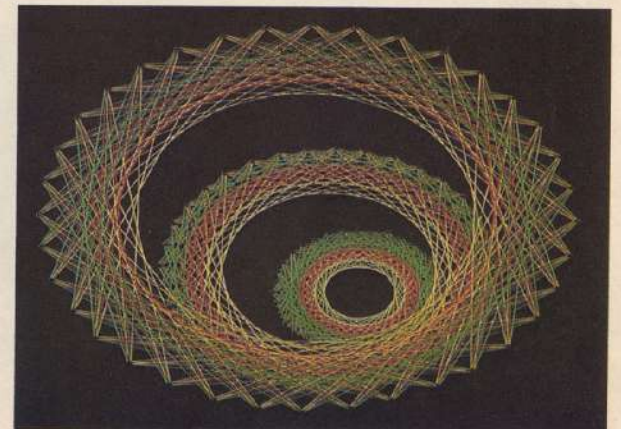# STRING ART DESIGN PROJECT
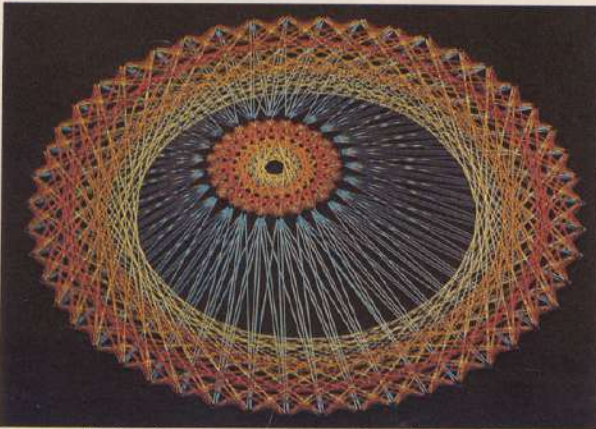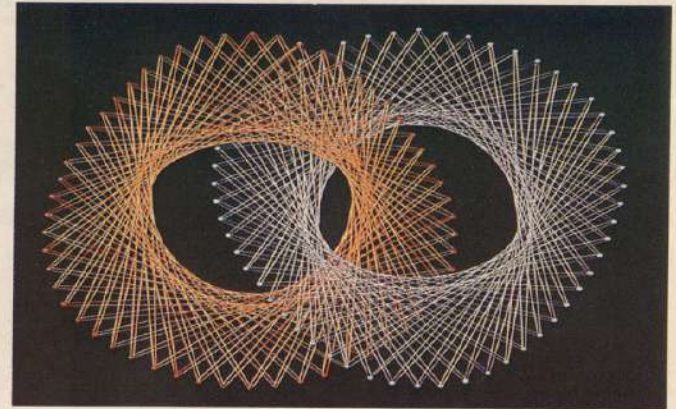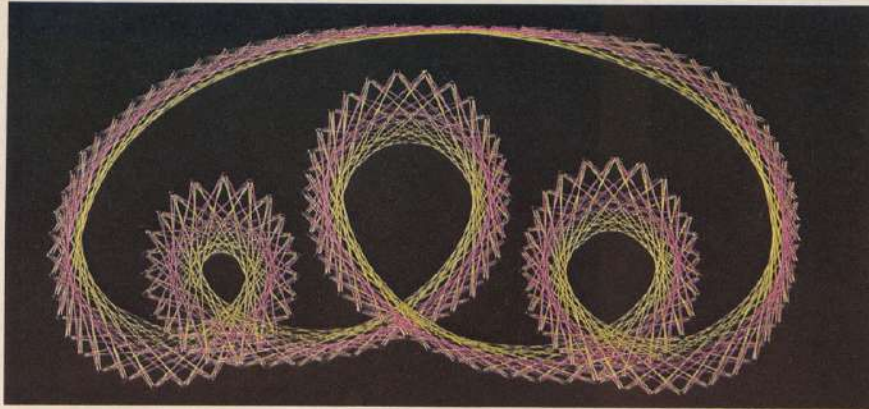
- THE WORK WILL BE DONE IN & OUT OF CLASS.

- CONCEPTS COVERED: STRUCTURING SHAPES, MEASURING ANGLES AND SECTIONS

- FINISHED PRODUCTS WILL BE GRADED WITH A RUBRIC AND THEN DISPLAYED IN OUR 8TH GRADE HOUSE

- HAVE FUN AND BE MATHEMATICALLY CREATIVE!!
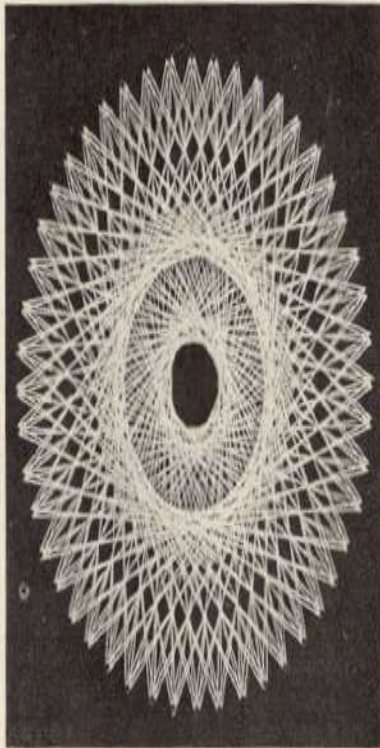
- TIMELINE IS APPR. 1 WEEK

SAMPLE STRING ART

Due to limited space, patterns for these designs are not included in this book. The designs are included to spark your imagination.

After completing several of the patterns we have included, you should be able to create your own designs.

1. This is a combination of two Thread Designs from the preceeding page. Note the intricate patterns that have resulted.
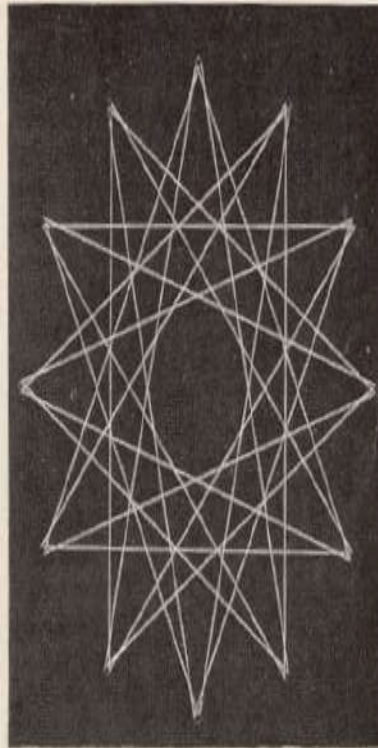
2. The next three illustrations are to show the need for the proper number of nails in a particular Thread Design. The design above consists of 12 nails. This is not enough nails to make an effective or intricate design.
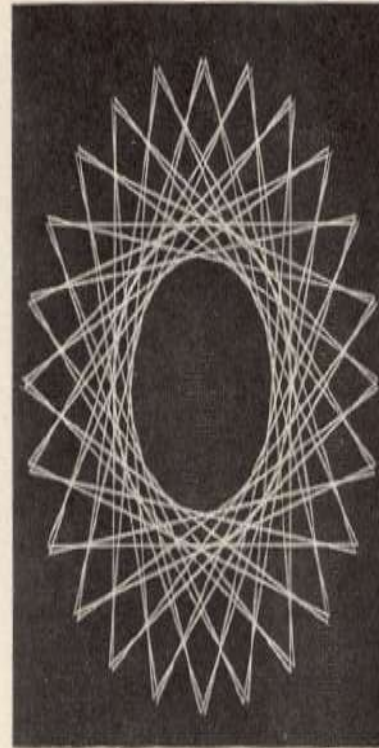
3. This design consists of 24 nails which is sufficient for a multi-layered project, if the circle is not too large. These designs are 6" in diameter. A larger project should contain more nails accordingly.
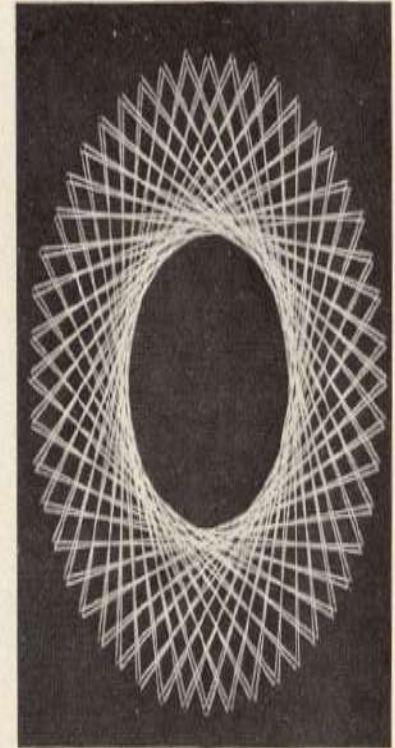
4. 48 nails were used for this design. In this size design (6"), with 48 nails, one to three layers of different colored thread could be used effectively.

SUPPLIES

- **MS. MUNCE WILL PROVIDE:**
- **WOOD 8" X 8"**
- **BLACK PAINT**
- **NAILS – ½ "**
- **WASHERS – FOR MEASURING**
- **PLIERS**

- **STUDENTS WILL PROVIDE:**
- **SMALL HAMMER**
- **COLORED THREAD**
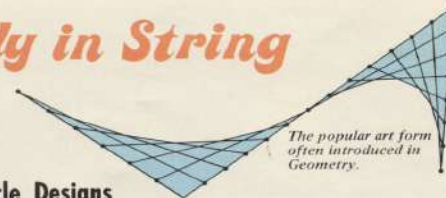 - **3 -4 COLORS**
  - **GOOD QUALITY**

ACTIVITIES TO PREPARE FOR PROJECT

- **PRACTICE CONSTRUCTING CIRCLES AND SQUARES**
- **FIND CENTER POINT OF SHAPES**
- **MEASURE = DISTANCE POINTS**
- **CONNECT POINTS WITH COLORED LINES**

A Rhapsody in String

. . . how to create string art designs

The popular art form often introduced in Geometry.

Circle Designs

Stunning two dimensional designs like the one shown can be made using circles. Design shown uses a circle design with equally spaced points. Equal points can be made with the use of a protractor as in Fig. 1, or with a compass.

Different sized inside circles are determined by the number of nails skipped between each wrap. In Fig. 2, three nails were skipped, producing a large circle slightly smaller than the original circle. In Fig. 3, eight nails were skipped and a small circle was produced. Fig. 4 shows Figures 2 and 3 combined together.

When multiple layers are used, always wrap the smallest circle first, so succeeding layers will not hide the circles beneath them.

If the protractor is moved from the center point of the circle, Fig. 5, unequal points will be produced around the circumference. When design is wrapped it will result in ovals offset from center of circle. See Fig. 6.
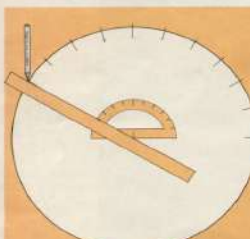
Turn to page 6 for Circle design.
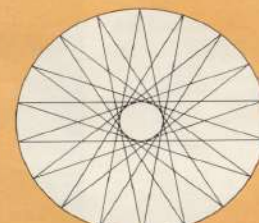
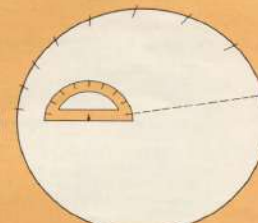Fig. 1. Circle with equal spaces
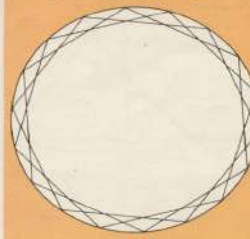
Fig. 3.

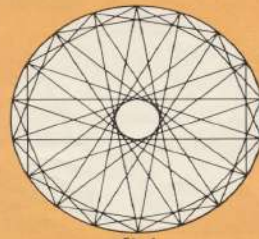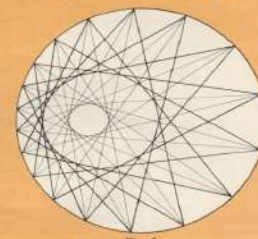Fig. 5. Circle with unequal spaces

Fig. 2.

Fig. 4.

Fig. 6.

8

HAMMER TIME!!

- **ON SCRAP BOARD YOU WILL DRAW FIRST LETTER OF YOUR NAME**
  - » USE A RULER FOR STRAIGHT LINES
- **DRAW POINTS ON YOUR LETTER**
- **PROCEED BY HAMMERING NAILS INTO THE POINTS**
  - » DO THIS EASY AND KEEP NAILS STRAIGHT
- **MEASURE HEIGHT WITH WASHER**

# You are ready to begin our fabulous string art project!!!

YOU NEED TO DECIDE ON A CIRCLE OR SQUARE SHAPE. CLICK ON DIAGRAM TO SEE EXAMPLES.

$$A = \pi r^2$$
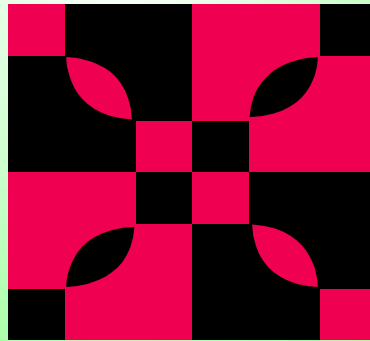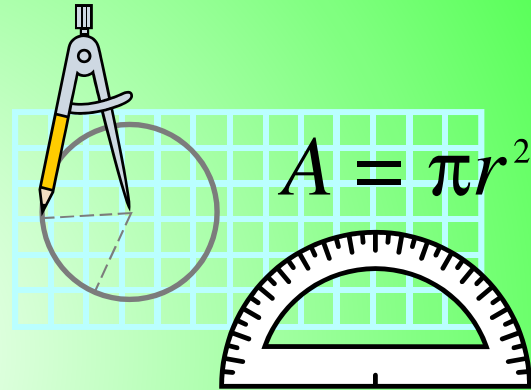
Straight Line Designs

Straight lines are by far the simplest design form, and can be used in a variety of different ways. Lines can be intersecting as in Fig. 10 or non-intersecting with points having the same spacing or different spacing. Intersecting lines create angles that can be used in forming interesting curves and designs as shown in the free-form design on page 8. Square pattern combines four right angles with equal spacing.

Parallel lines do not produce curves but can be used as in the square to create an interesting effect. Try offsetting lines and using unequal spacing for something different.
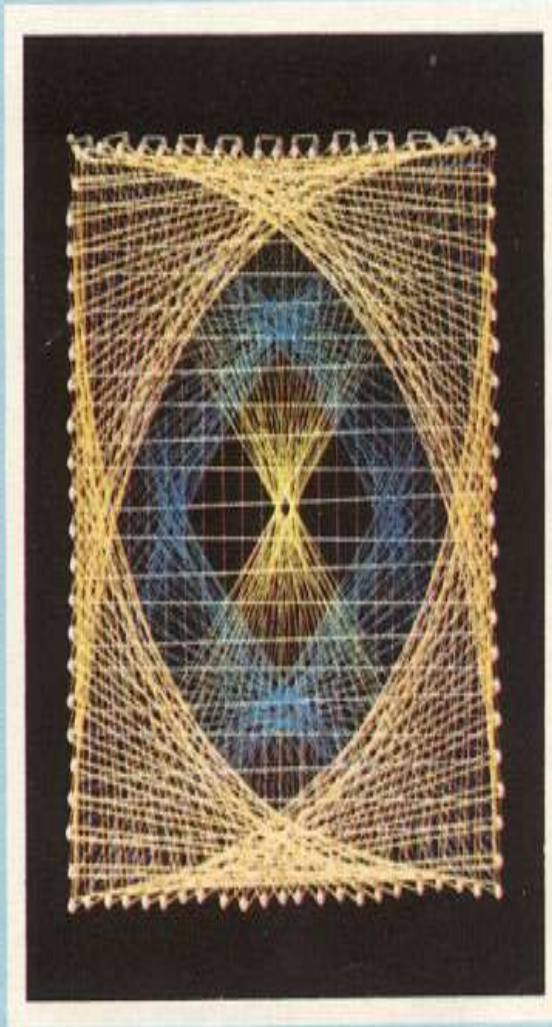
Fig. 10. Intersecting Lines
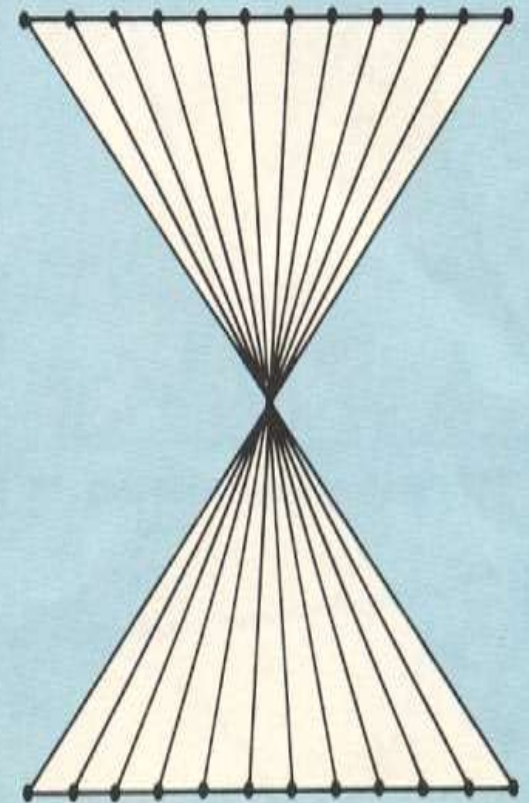
Fig. 11. Parallel Lines

Basic Project

The above photos are of the finished basic project. You may finish the project with a mat (Top) or without (Bottom). The color selection is also of your choice.

- 1st Layer
- 2nd Layer
- 3rd Layer

Execute all layers in this direction.

Starting Nail
(Start all layers from this nail.)

Use the solid black lines as a guide for cutting the mat.
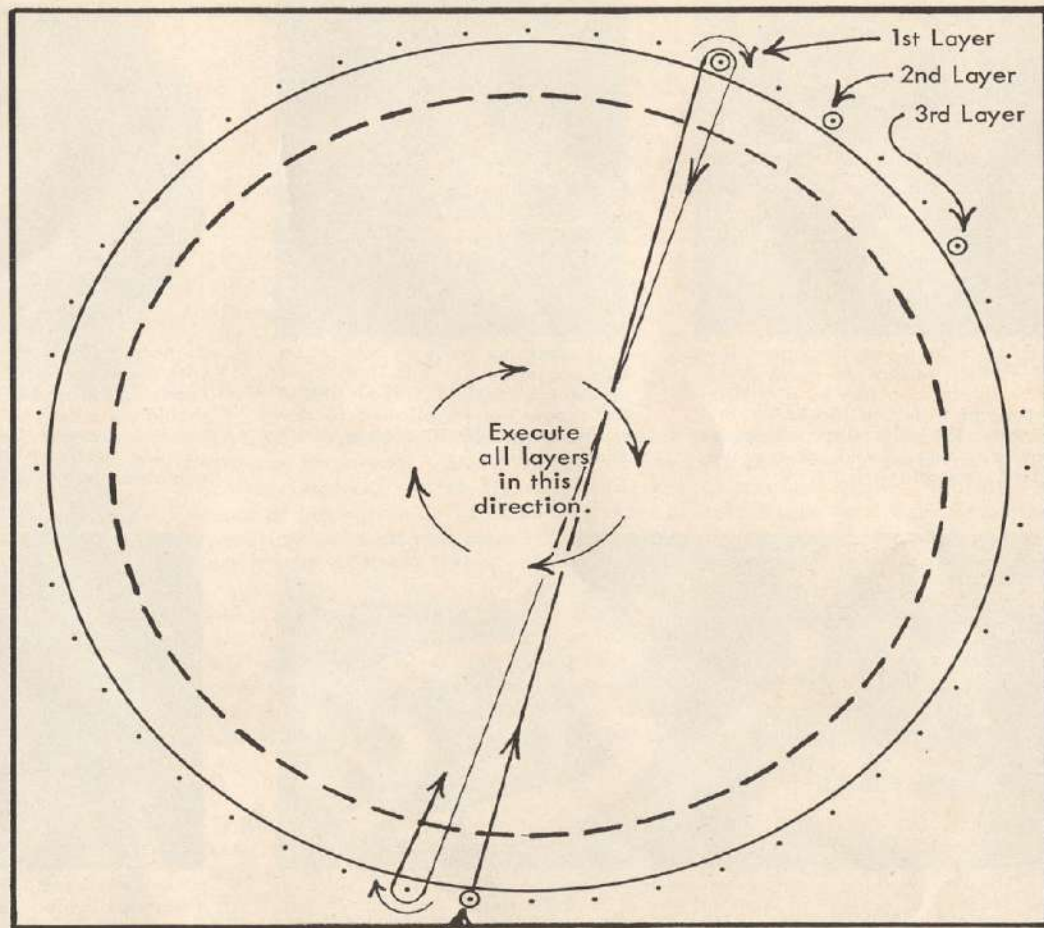
NAILS REQUIRED:
48 1/2" X 18 gauge brads

STEPS FOR CIRCLE DESIGN

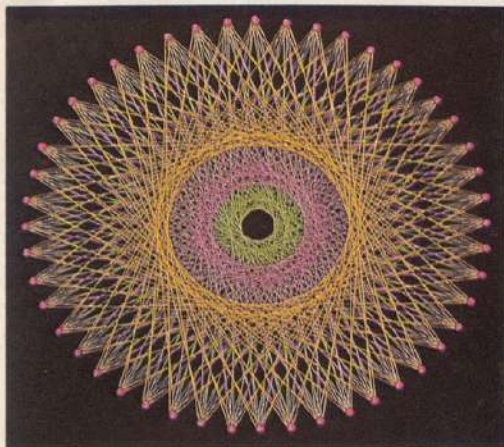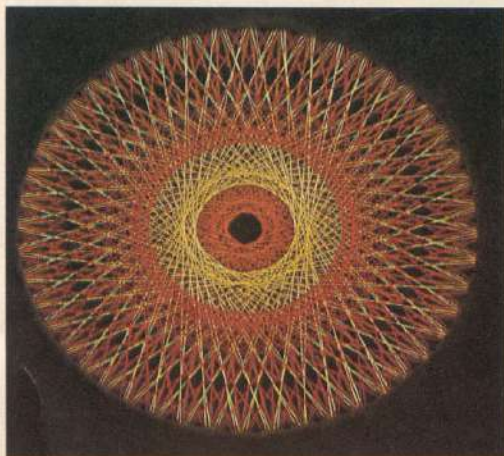- CONSTRUCT CIRCLE ON YOUR PLYWOOD - HYPERLINK

- MEASURE EQUAL POINTS AROUND CIRCLE BY ------------- (CIRCUMFERENCE)/ 29 = SPACING

- 360 DEGREES / 29= DEGREES

- ***(29 EQUALLY SPACED POINTS)

- DRAW DOTS FOR POINTS ON CIRCLE

What is THREAD DESIGN ?

THREAD DESIGN (String Art)

This is an art form that uses thread to create a colorful design. The design is made up of straight lines by wrapping thread around nails in a specified manner. The design is created by: A. the arrangement of the nails, B. the sequence used in wrapping the thread around the nails.

As the thread is wrapped around the nails it forms a tangent that creates an opening in the center of the design.

A tangent is a line, curve or surface touching, but not intersecting another line, curve or surface. Figure 1 shows two legs of an angle which have been equally divided. A line was then drawn from the last point on one leg to the first point of the other leg, etc.. The


FIG. 2

TANGENTS

FIG. 1
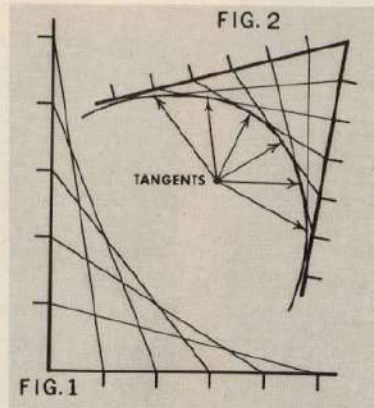
next points were then used so a curved effect was achieved in the center.

Figure 2 shows the inside curve formed by the tangents. The arrows indicate the points where the lines make a tangent to the inner circle.
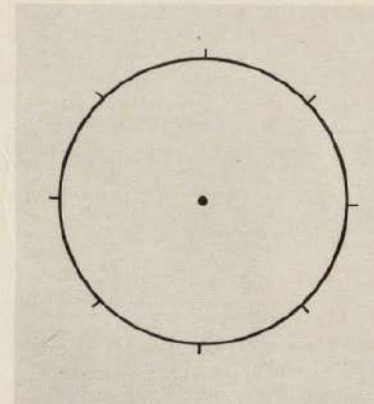

To illustrate starting a Thread Design from scratch & to familiarize you with the procedures, we have drawn a circle and divided it into eight equal parts.
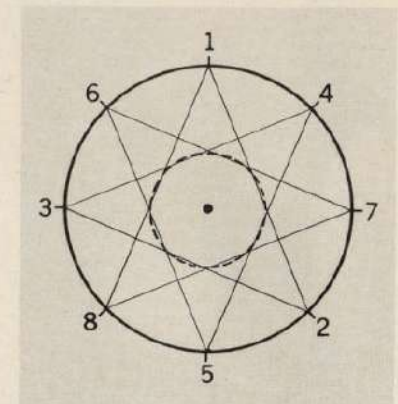

We then drew lines from point to point in the sequence shown above. As you can see, the lines formed a circle in the center. This circle is illustrated by the dotted line.
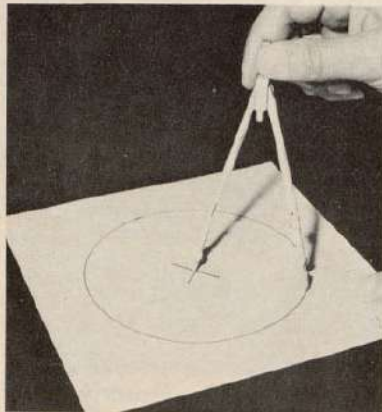

For creating your own designs and to quickly divide circles and other shapes uniformly, we have provided a Spacing Chart on page 33. To use this chart, draw the desired shape on tracing paper. We used a circle to illustrate the procedure.
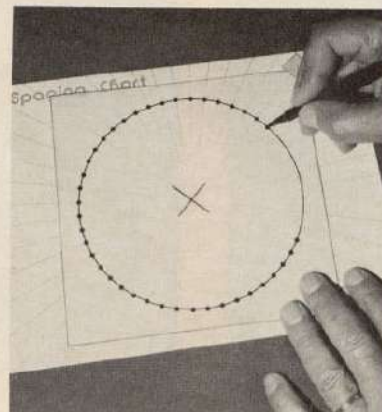
Place the center of the circle on the center of the Spacing Chart. The lines radiating from the center of the chart are spaced 7 1/2 degrees apart. Place marks on the tracing paper where the lines intersect the circle. You may wish to use only every other point, depending on the size of the design.
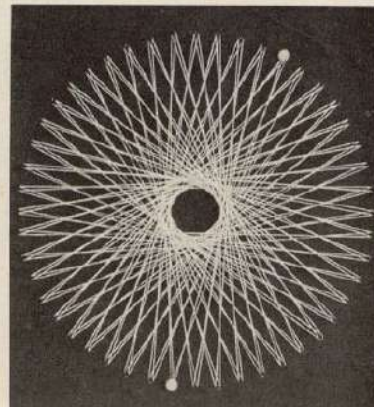
The size of the center circle is determined by how near the threads are to the center (focal point) of the design. The thread was tied to the white headed nail at the bottom and then wrapped to the white headed nail at the top.
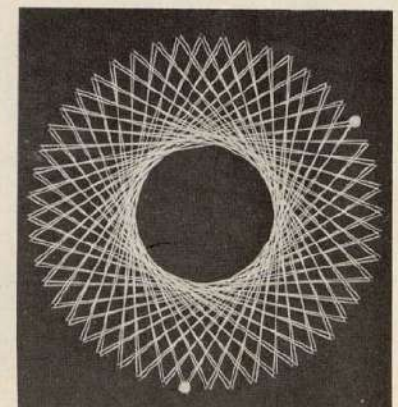
This larger center circle was formed by selecting starting nails that were closer to each other and the thread was then further from the center of the circle. In order to fill the design as shown above each nail was wrapped two times.

GETTING THE PLYWOOD READY FOR STRING DESIGN

- **AFTER CIRCLE AND POINTS ARE CONSTRUCTED – LIGHTLY TAP EACH POINT WITH HAMMER AND NAIL. (DO NO DRIVE NAIL TOTALLY INTO BOARD).**

- **PAINT YOUR BOARD BLACK.**

- **AFTER DRY, POUND NAILS INTO DENTS KEEPING NAILS STRAIGHT.**

•BEGIN STRING DESIGN

- YOU WILL PICK A STARTING NAIL. THIS NAIL WILL START ALL LAYERS.
- DECIDE ON STRING SPACING BEFORE YOU BEGIN.
- (EVERY THIRD NAIL, EVERY SEVENTH NAIL, ETC)
- TIE AND KNOT STRING TO BEGINNING NAIL (COLOR THE HEAD OF THIS NAIL)
- COUNT OFF YOUR SPACING AND GO AROUND THE NEXT NAIL, AND CONTINUE THIS PATTERN.
- FIRST LAYER SHOULD HAVE THE SMALLEST OPENING IN THE CENTER.
- ALWAYS GO AROUND NAIL IN SAME DIRECTION (CLOCKWISE OR COUNTER)
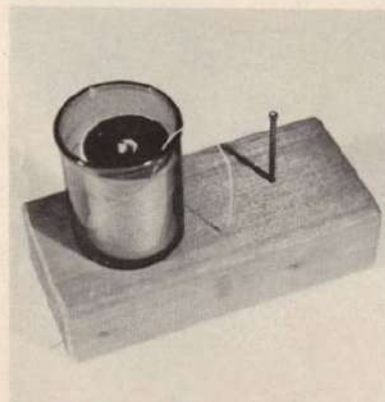- YOU MUST DO EACH LAYER TWICE.
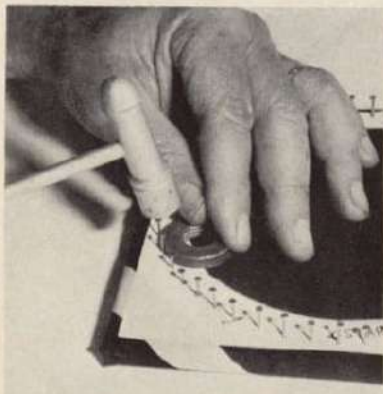
8. The height of the nails should be uniform. One way to achieve this is to have a washer or some similar object of desired height. Pound nails down to the washer, but be careful not to bruise the material. For this project leave the nails 1/4" high.
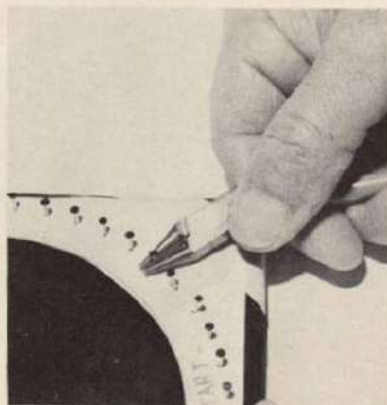

9. Use a small pair of pliers and straighten all of the nails so they make a nice round circle.


10. Various methods may be used to hold the thread. Shown above are two types. A simple holder is a nail in a board. A better holder is to use a small prescription bottle. Fasten the bottle to a board with a screw or glue.
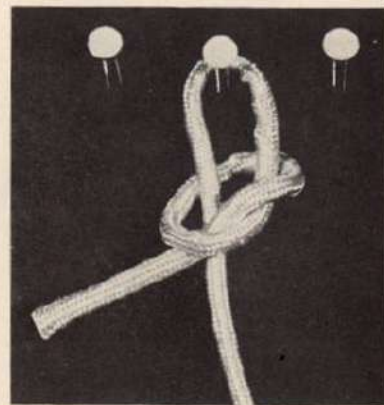

11. To fasten the thread to the starting nail make a slip knot in the end of the thread and place it over the starting nail. Leave a 4" tail on the thread so you will be able to tie it to the ending thread. Pull the knot tight.
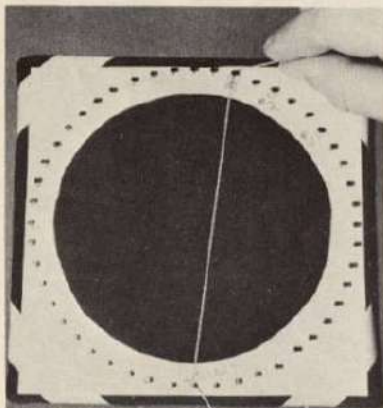

12. Select the first color and tie it onto the starting nail. The layer with the smallest inside circle is completed first. If completed last it would cover the other colors. Wrap the thread around the nail marked first layer, as illustrated above.
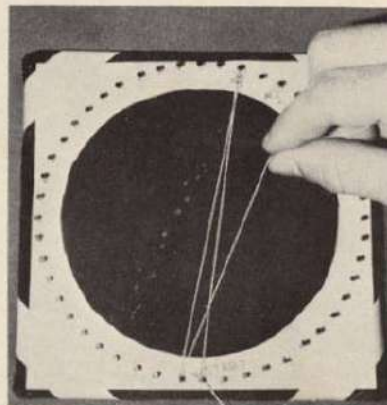
13. The thread wrapping procedure is usually progressive. This means that the thread is advanced to the adjacent nail each time you go across the design. In most cases you will wrap in a clockwise direction.
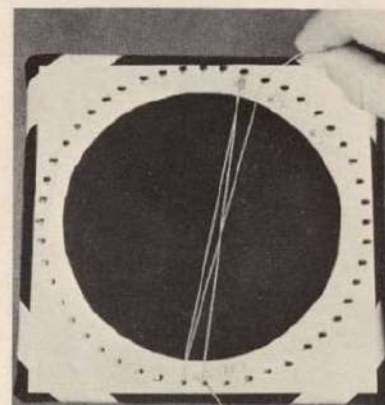
14. Follow the sequence shown above.

Note: The wrapping procedure is indicated on this and all other patterns.
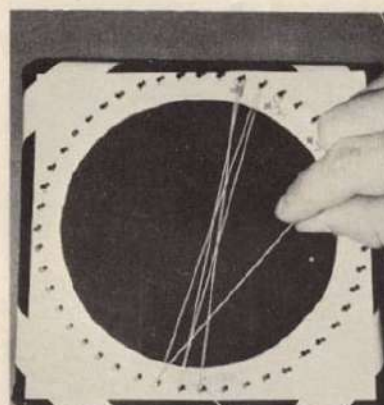
15. Pull the thread to the other side and progress to the next nail. Be sure that you wrap around the nail in the same manner each time.
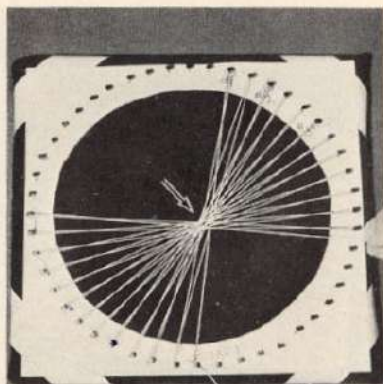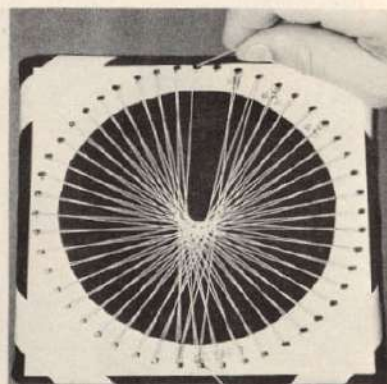
STRING DESIGN

- **TIPS!!!!**

- **KEEP THREAD VERY TIGHT WITH EACH WRAPPING AROUND NAIL.**

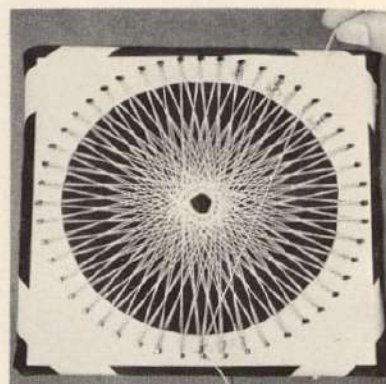- **POUND NAIL INTO SCRAP BOARD AND PUT SPOOL OF THREAD ON IT SO BOTH YOUR HANDS ARE FREE.**

16. Continue wrapping in a pro-
gressive manner. The small circle
is beginning to appear on the side
indicated by the arrow.

17. Continue wrapping each nail.
In order to complete the first layer
you must wrap each nail twice.

18. After you have wrapped each
nail twice, tie end of thread to
the tail left on the starting thread.
Tie on the second color thread to
the same starting nail and again
leave a 4" tail on the thread.
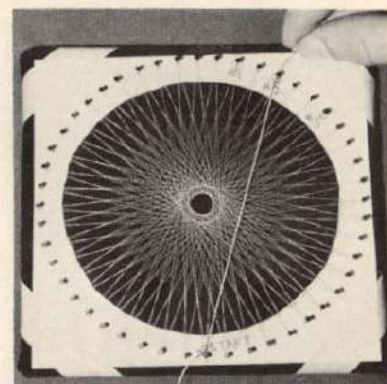
19. Take the thread from the start-
ing nail to the nail marked second
layer. Wrap the thread around
the nail in the same manner as
before and proceed in a clock-
wise direction to the nail adjacent
to the starting nail.
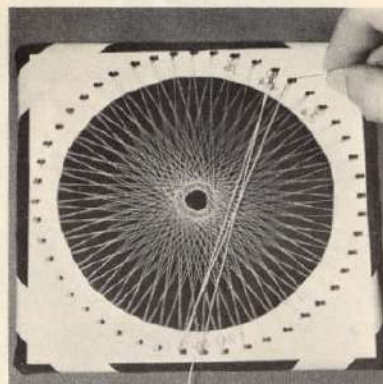
20. Proceed with the winding for
this layer the same as you did for
the first layer. You must go a-
round each nail twice to complete
the layers.
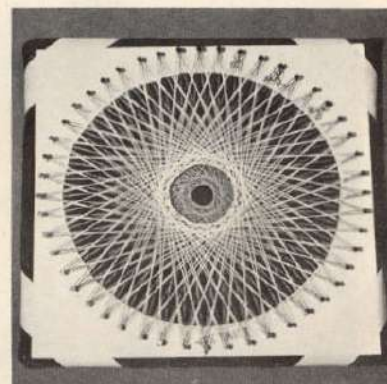
21. Continue all the way around
and tie off at the starting nail.
After tying off, cut off the excess
thread.
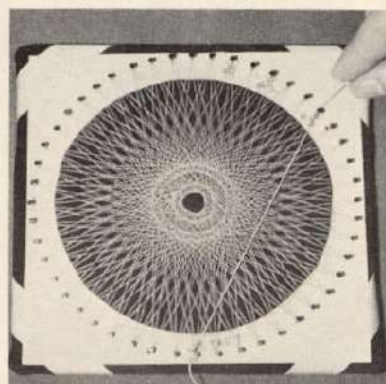
22. Select the color for the third
layer and tie onto the starting
nail. Proceed to the nail marked
third layer and wrap in the same
manner as for the other layers.
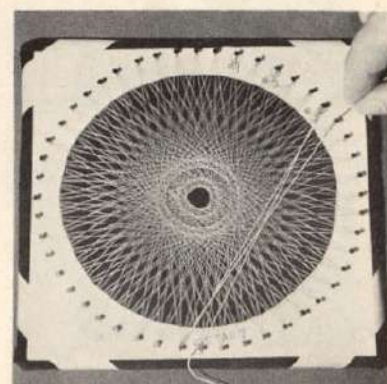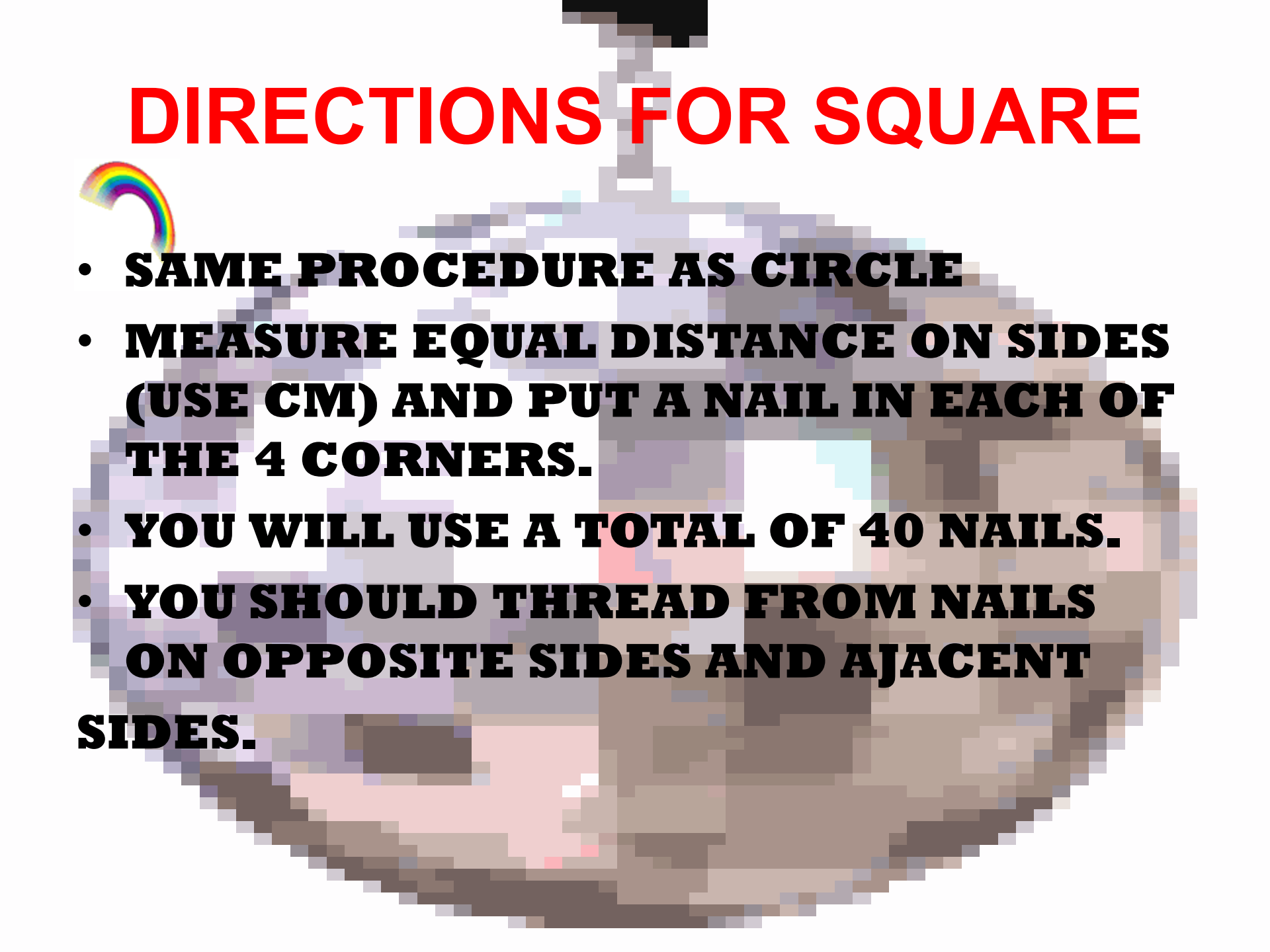
23. Proceed in a clockwise direc-
tion and complete the third layer.

11

•FINISHING PROJECT

- FINISH ALL 3 OR 4 LAYERS OF THREAD.
- TIE KNOTS AND GLUE ENDS OF EACH COLOR THREAD TO STARTING NAIL.
- TAKE PEN OR PENCIL AND LIFT TOP LAYER UP TO TOP OF NAIL.
- MAKE SURE OTHER LAYERS ARE PARALLEL TO TOP.

DIRECTIONS FOR SQUARE

- SAME PROCEDURE AS CIRCLE
- MEASURE EQUAL DISTANCE ON SIDES (USE CM) AND PUT A NAIL IN EACH OF THE 4 CORNERS.
- YOU WILL USE A TOTAL OF 40 NAILS.
- YOU SHOULD THREAD FROM NAILS ON OPPOSITE SIDES AND AJACENT SIDES.

CONGRATULATIONS!!!

- WE WILL USE A RUBRIC TO GRADE YOUR PROJECT!!
- YOUR PROJECT WILL BE DISPLAYED
- IN THE HOUSE AREA.
- **** EXTRA CREDIT – MAKE ANOTHER PROJECT WITH OTHER SHAPE OR DRAW ANOTHER STRING ART.
- HOPE YOU HAD FUN WITH OUR PROJECT.

Teacher name: MS. MUNCE

Student Name _____

CATEGORY	Excellent	Good	Satisfactory	Needs Improvement
Display	The display is attractive and well-organized. The items are neatly and securely attached to the display.	The display is attractive and well-organized. The items are neatly and securely attached to the display.	The display is somewhat organized. The items are securely attached to the display.	The display is not organized OR the items are not securely attached to the display.
Number of items	The display has 4 or more different, but related, THREAD COLORS in good condition.	The display has 4 different, but related items. At least 3 of these items are in good condition.	The display has at least 3 different, but related, items. At least 2 of these items are in good condition.	The display has less than 3 items OR the items are all the same OR are in poor condition.
Participation	Student showed great enthusiasm and focused on the task. Was helpful to others, if asked.	Student showed some enthusiasm and focused on the task. Was helpful to others, if asked.	Student did work, but lost focus or became frustrated. Did not distract others.	Student often lost focus or became frustrated and distracted others.
Knowledge Gained	Was able to accurately FOLLOW THE DIRECTIONS GIVEN.	Was able to accurately FOLLOW DIRECTIONS WITH MINIMAL HELP.	Was able to FOLLOW DIRECTIONS WITH SOME REVISIONS.	Had trouble FOLLOWING DIRECTIONS.
OVERALL APPEARANCE	YOUR PROJECT WAS	YOUR PROJECT HAD	YOUR PROJECT WAS	YOUR PROJECT WAS

Your Rubric

	COLORFUL, NEAT, THREAD TIGHT, CREATIVE.	DIFFERENT COLORS, NEAT AND SOMEWHAT CREATIVE.	FAIRLY NEAT, BUT WITH FLAWS.	FINISHED, IT WAS NOT NEAT AND LACKED CREATIVITY.

Date Created: 2002-07-18