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# FOURSCORE <sup>AND</sup> 7

**Betsy Franco**

 GOOD YEAR BOOKS

# ACKNOWLEDGMENTS

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The reference librarians at the Palo Alto Main Library cheerfully helped me research the minutiae necessary for an American history book involving mathematics. Maria Damon and Lorraine Bates Noyes were invaluable resources for gender and multicultural issues, and Jim Bertsch generously brainstormed ideas with me at Little League games.

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Finally, I am grateful to the students in my social studies and mathematics classes, from elementary to high school. I thank them for their feedback on my ideas over the years.

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# C O N T E N T S

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- 2 From Triumph to Tragedy: René-Robert Cavalier, Sieur de La Salle, French Explorer** **11**  
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Students study statistics about the presidents and create bar graphs using the data.

**16 Which Faces Do You Recognize?: Current Events** **131**

*Percents*

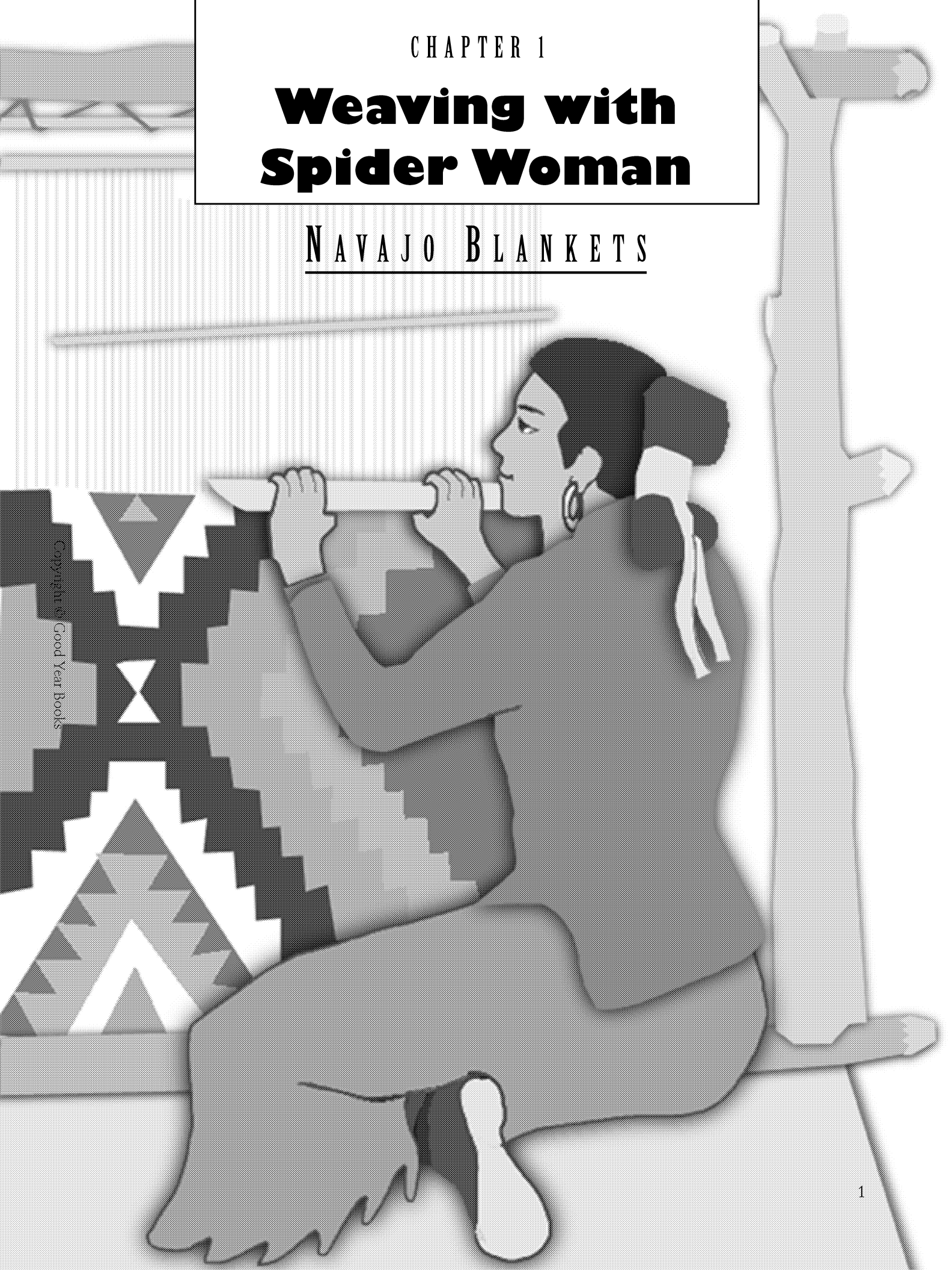
Students cut out newspaper and magazine pictures of people who are affecting American history today. After trying to identify these people, each student calculates his or her percentage of correct answers.

**Bibliography** **135**

CHAPTER 1

# Weaving with Spider Woman

NAVAJO BLANKETS



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# Weaving with Spider Woman

## NAVAJO BLANKETS

### The Challenge

Students figure out which traditional Navajo designs will tessellate by themselves. Then they create a Navajo-style blanket on grid paper by tessellating several of the designs.

**Extra:** Students record the slides, flips, and turns they used when tessellating designs on their blankets.

### Math Skills/Concepts

tessellations  
geometry  
slides, flips, turns (transformations)

### Materials

grid paper ( $\frac{1}{4}$  in. or 1 cm)  
colored markers or pencils

### Background: The Navajo People

The Navajo were a nomadic people, unlike their Pueblo neighbors. Using instructions from ancient legends, they constructed hogans from logs and sticks covered with mud and sod. Being nomads, they had no reason to build permanent homes.

Sheep were the source not only of food but also clothing and trade. The fact that Navajo women were responsible for the sheep and the weaving underscores the importance of women in Navajo life. The Earth was the mother of the Navajo, and

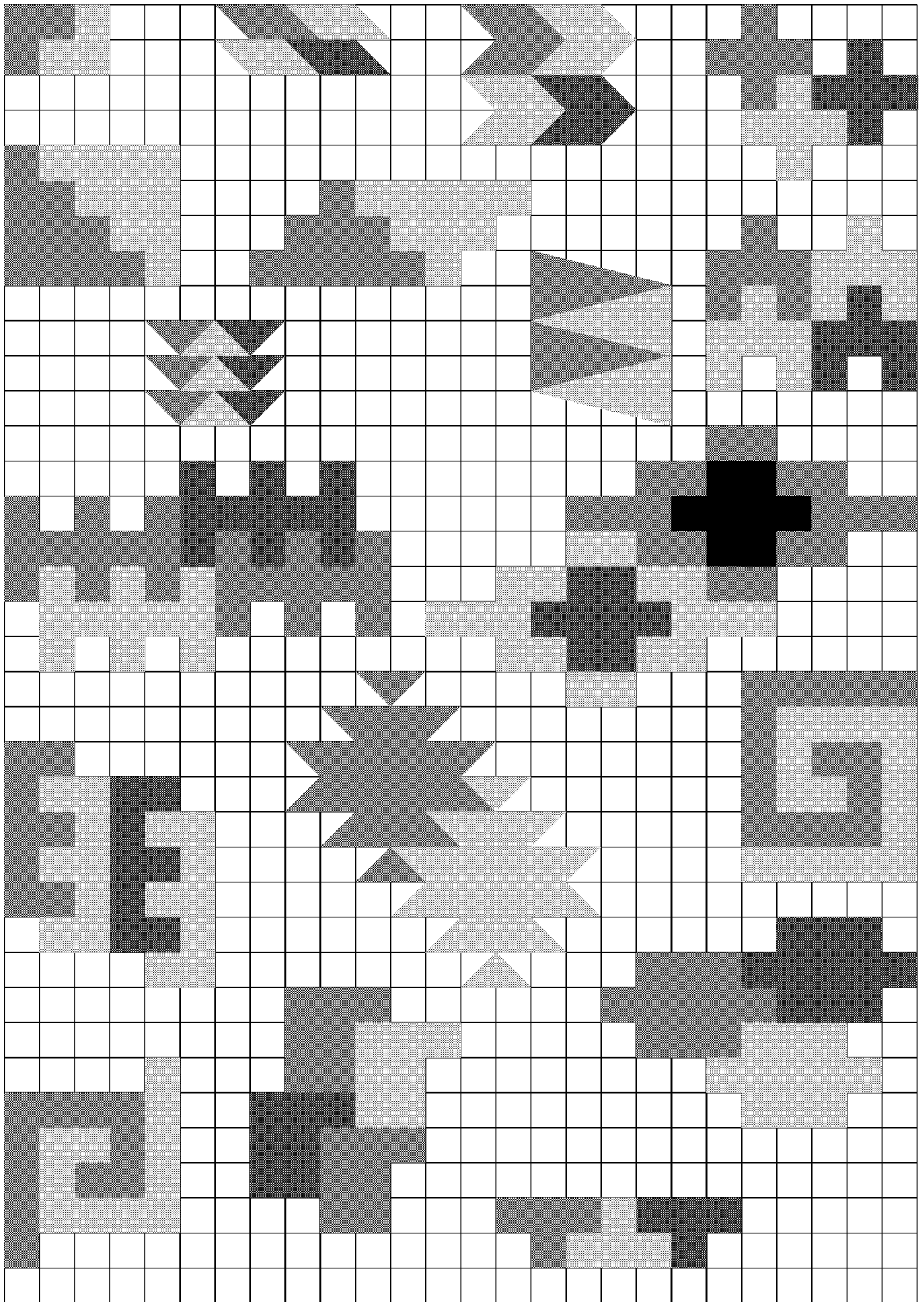
they were her children. In legend, Changing Woman, one of the Holy Ones, was the source of life for the Navajo.

As far back as the mid-1800s, diaries and reports written by scouts and trappers describe the beauty of Navajo blankets. These people were also impressed by the tightness of the weave, remarking that water could actually be carried in a Navajo blanket.

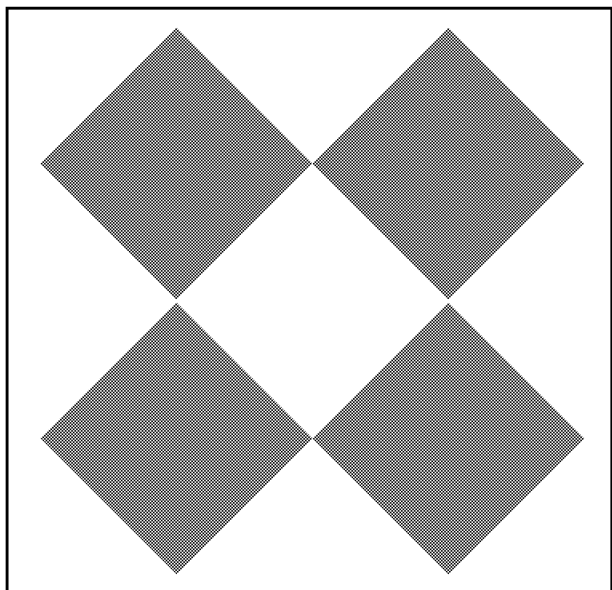
### Possible Solutions to the Challenge

- A tessellation of each of the Navajo designs is shown opposite. To tessellate, students can cut out a shape from grid paper and trace around it onto another piece of grid paper. Or students can draw tessellations directly onto grid paper.

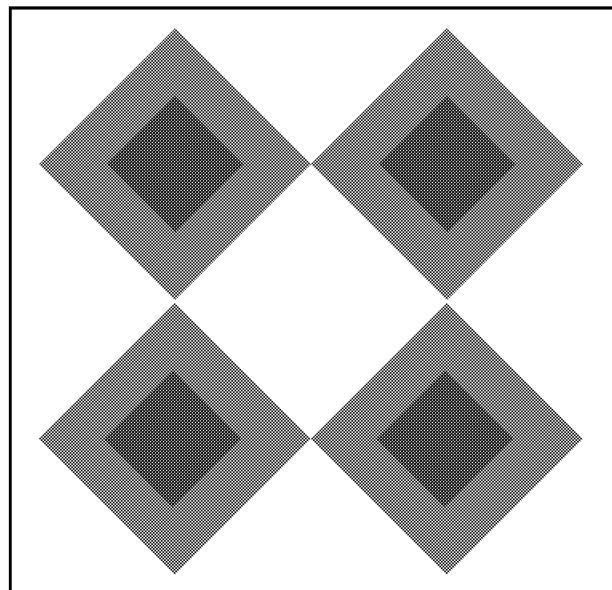




- Students can alternate colors when coloring in a tessellation. The Navajo did this for clarity and beauty.



- Students should also feel free to use multiple colors within a shape.



## Questions

- Which designs were the easiest to tessellate? Which were the hardest?
- How would you describe a slide, flip, and turn to a younger child? (A slide is the movement of a shape along a straight line. A flip is what the shape looks like in a mirror. A turn is the movement of turning, or rotating, a shape around a certain point.)
- What different methods can be used for investigating whether or not a design will tessellate by itself? (Cut the design out of grid paper and trace around it onto another piece of grid paper. Or just draw the shape over and over again on grid paper. Slide, flip, and turn the shape to see if it tessellates.)

# Weaving with Spider Woman

## NAVAJO BLANKETS



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### Introduction

*"I know each tree and each tree knows me. In that way, for that reason, I can't move anywhere."*

Roberta Blackgoat, Navajo weaver, who is resisting a congressional order to move or give up any claims to her land in Arizona (as quoted

in the *San Francisco Chronicle*, May 4, 1977)

Hundreds of years ago, the Navajo (or Diné) were nomads in the area that is now New Mexico and

Arizona. They believed the Earth was their mother, who gave them life and supported them. They felt as close to the Earth as to a parent.

The Navajo are famous for their beautifully woven

blankets. They began weaving with wool in the late 1600s after the Spanish explorers introduced sheep to the Southwest. Navajo women did the weaving, and girls as young as three years old helped their mothers. Each blanket could take up to a half year to complete. Amazingly, the Navajo women wove their blankets without a plan.

The Navajo explained how they became such talented weavers by telling a legend. Refer to the picture as you read.

*Spider Woman and Spider Man, two of the Holy People, gave weaving to the Navajo. Spider Man taught them how to build the loom, and Spider Woman taught them how to weave. The loom was magnificent. The poles were sky and earth cords, and the warp sticks were sun rays. The heddle sticks were rock crystal and sheet lightning. The batten was a sun halo.*

### **The Challenge**

Find out which designs from Navajo blankets will tessellate (repeat) by them-

selves. Then create a Navajo-style blanket on grid paper by tessellating several of the designs.

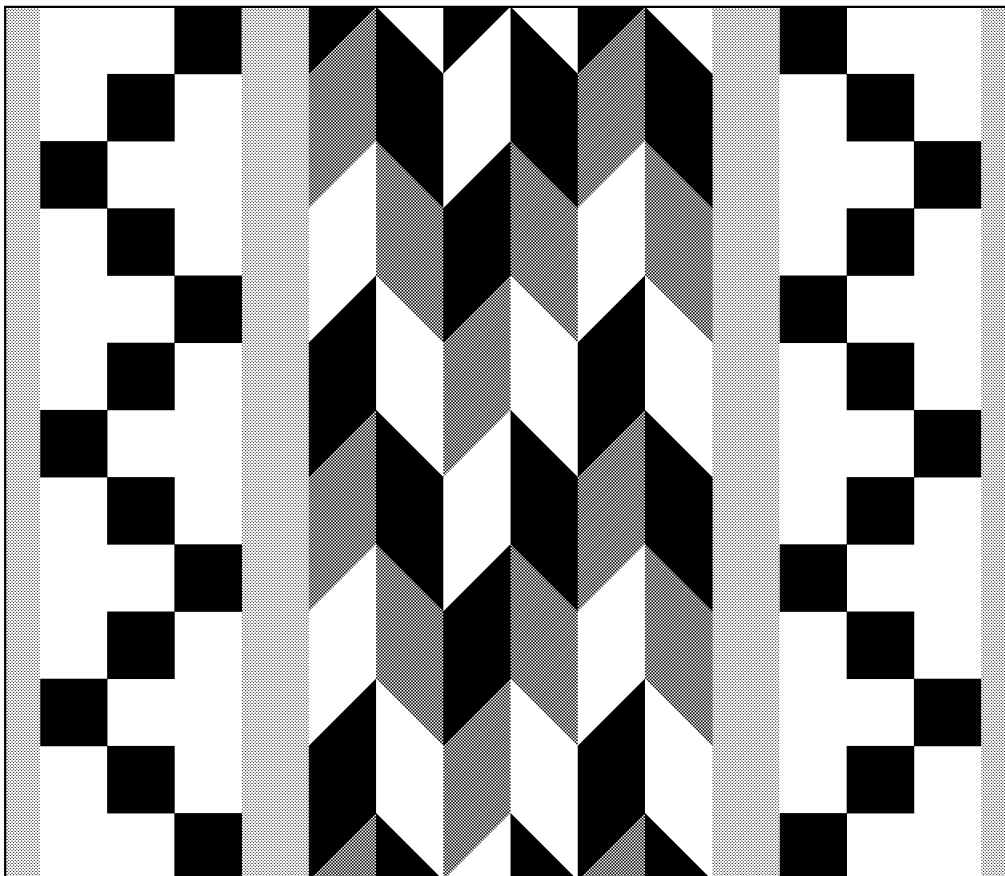
**Extra:** Did you slide, flip, or turn the designs on your blanket when you tessellated them?

### **What You Will Need**

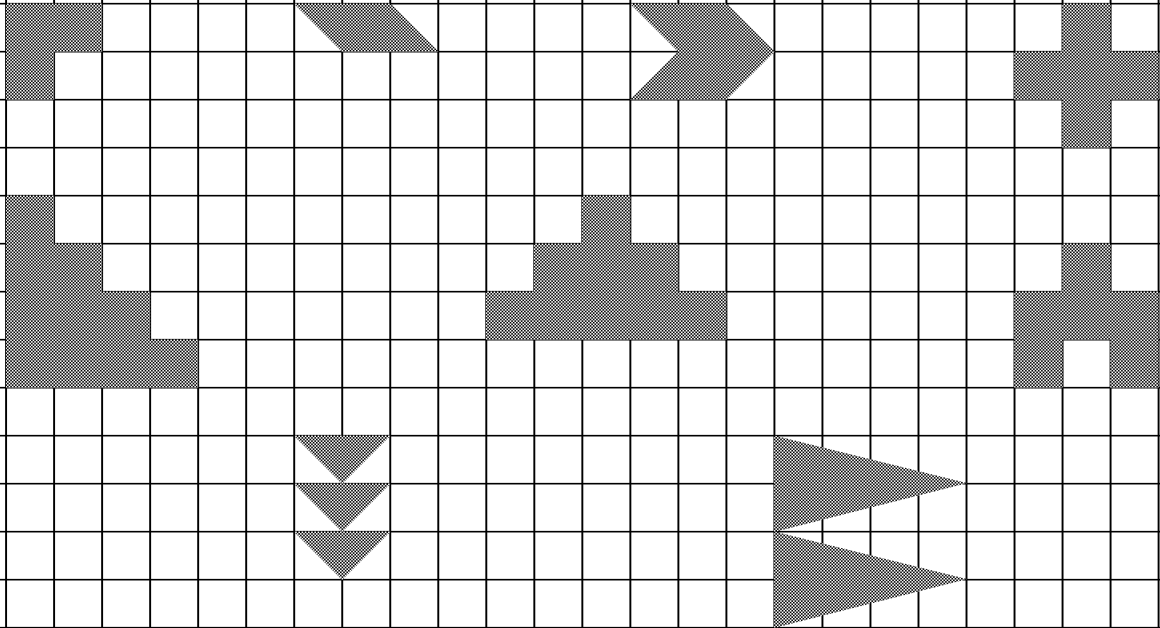
grid paper  
colored markers or pencils

### **The Facts About Navajo Designs**

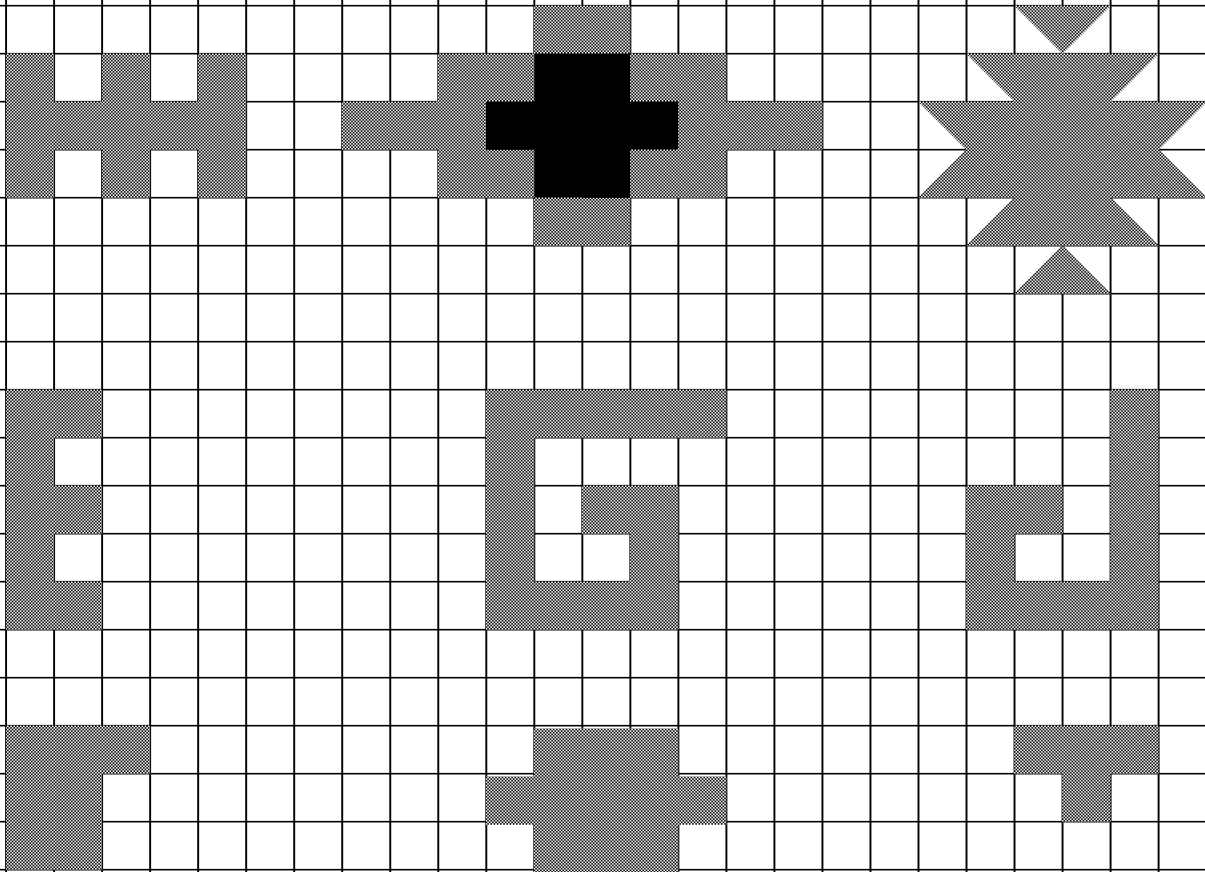
Some designs used by the Navajo are shown on page 7.



Try these first:



Try these for more of a challenge:



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