



Pattern & Disruption: Diné Lifeways and Embedded Mathematics **Discussion prompts for ART 1210: Function + Practice**

These discussion prompts are intended to be used **after** you explore the virtual exhibition *Pattern & Disruption: Diné Lifeways and Embedded Mathematics*.

ART 1210 course description: Students investigate modes of creative research and methodologies of art and design to inform and expand their own practice. Their own concepts and designs are transformed through tool explorations, shifting modalities, application of technologies, and material experimentation. Through a range of exercises, this course explores the physical, metaphorical, and cultural significance of art and design's function in society.

The practice of Navajo (Diné) weaving is over two centuries old. Mathematics are integral not only to the designs, but also to Diné views of how they exist in the world.

The voices represented in this exhibition reflect the conversations between the curators as they selected weavings from KMA's collection of over 700 Navajo textiles.

This selection of seven weavings dates from the 1800s to the late 1900s. Their labels reflect the multiple voices of the curators: the "math" voice, the "cultural" voice, sometimes a personal narrative, and sometimes a reference to you, the viewer. Select any of these seven weavings and consider how and what you respond to in the exchange between voices.

General question to consider with each weaving:

As you look at the weaving, what do you respond to most in the exchange of voices in the label?



Two Grey Hills Weaving

Unknown weaver

c. 1910

Bob: This was the very first weaving that Henry, Shimá and I looked at together. As it was unrolled, Shimá brought her hands to her face as she absorbed the impact of this weaving. Shimá explained that this weaving had the most power of any of the weavings in the catalog. We watched Shimá take out a small pouch and loosen the strings. She withdrew a pinch of corn pollen and offered a blessing to the weaving. Her offering of pollen re-energized the weaving.

Henry: Shimá says that the arrows point out to radiate the energy of the weaving. The weaver was engaged in great hardships that required deep connection with the Holy People. Her story of struggle is part of the weaving. The arrow that pierces the center of the rug is for both healing and protection.

Bob: As you view this weaving, consider how that first quick glance suggests reflection symmetries. Deeper inspection shows that the weaving is full of asymmetries—perhaps reflecting, as Shimá says, the aspirations of the weaver to heal and to find her way from struggle to *hózhó* (balance).

How do the narratives by both Bob and Henry affect your perception of this weaving?

How does the comparison between personal struggle and asymmetry resonate with you? Explain.



Teec Nos Pos Rug

Unknown weaver

1915 - 20

Bob: The border disrupts what would be horizontal and vertical symmetries. I see the border as a loop, or even a rotational symmetry mapped onto the rectangle. The border invites the eyes into motion around the weaving while the middle uses symmetry to emphasize the center – the one fixed point that the rotational and reflection symmetries share. This is a symmetry around an origin—a mathematical origin story.

Shimá/Henry: Feathers are used to communicate with the super-beings. Everyone has a feather—a spiritual connection that grounds who we are as an individual. The rug is a living, spiritual being. The more symmetry it has, the more whole you are going to be as a person. Usually the four mountains are mentioned in our stories, but there are really six mountains and they all are found in this weaving. The whole rug is the Universe. The center is the Earth—the Earth also has to have alignment and symmetry as balance. The borders are the cosmos, including the clouds and the stars.

Bob: I see several places where the weaving should be symmetrical but is not. In one location (see if you can find it) there is a shape with three points whereas the reflected image is not the same.

Shimá/Henry: The Navajo people say that where irregularity is happening, the Holy People will help you fix that asymmetry. You always give the Holy People room to do correction. We are not symmetrical people in life—we make mistakes. So, where that occurs, there is a struggle taking place in our life. We leave a little room for a higher being to help us construct that symmetry.

Think about the idea of expecting symmetry as you view a design and then encountering asymmetry: is it a mistake or is it intentional?

Do you respond more strongly to symmetry or asymmetry?

Burntwater Wall Hanging

Philomena Yazzie

20th c.

Henry: In doing anything, the Navajo paradigm is to:

- Think
- Plan
- Implement
- Reflect

Bob: Put yourself in the mind of the weaver. If you were the weaver, what would you THINK? What kind of PLAN would you make? Remember that weavings must be done from the bottom up as you IMPLEMENT that plan to bring to life all of the symmetries and patterns. Then stand back and REFLECT on the process of weaving and the product before you. Skillful creativity involves all of these steps in some way. It is the basis of all discovery.



Think about your own creative process. Is it similar to the paradigm Henry describes?

How is it similar or how does it differ?

Is your process different when creating artwork in response to a studio class assignment?



Teec Nos Pos Rug

Unknown weaver

1930 - 40

Bob: The foreground/background is interesting—you can see submerged octagons in the center and even submerged hexagons. The many smaller rotational symmetries make this a very “active” design.

Shimá/Henry: This weaving was done in a good time for the family. There is a lot of expression about hope and prosperity and goodness for that home. There is a duality and the weaver uses that duality symbolically to represent harmony, Mother Earth and Father Sky working in harmony so there will be prosperity for the people, for animals.

The (reflection) symmetry, you get by folding, is bringing together the duality of man and woman to create life for a family. The weaver was really happy when they wove this because of all the colors—multiple colors that were brought in.

**Which aspect resonates with you most:
the “activation” of the design by the application
of mathematical concepts or the discussion of the
relationship between duality and harmony?**

Why?



Variant of a First Phase Chief Blanket

Unknown weaver

c. 1880

Shimá: This blanket was used by males and females, and the jagged middle designs represent rain clouds. The spacing of these lines come from the weaver's use of four fingers and also two fingers. This blanket is from many years ago when there was no convenience to buy blankets for bedding. This was the only way to keep warm and it was used as bedding—not as a blanket but as the actual bed.

Bob: When Shimá talks about the jagged lines as rain clouds, the shifting colors there (coming from variations in the natural dyeing) remind me even more of the rainclouds growing up in New Mexico. The coming of the rain across the Rio Grande valley was so special that it was common to open the garage door and put out lawn chairs to watch the storms roll in. Looking at these jagged lines, I can feel these clouds, and the distinct sheets of rainfall sweep across the valley floor toward the Sandia Mountains.

How does Bob's personal narrative add meaning for the viewer?

Is personal narrative useful in relationship to your own creative process? Explain.



Copy of a White Antelope Chief Blanket

Helen M. Johnson

c. 1990

Henry: This is a foot-path rug. It has designs that aren't closed but remain open so you keep the creative part of your mind open. It also has birds: an eagle, a roadrunner, and other animals.

Bob: The foot-paths, represented in the horizontal bands, remind me of *frieze patterns* (infinite strips with repeated patterns). They use *translation symmetry* or sometimes *glide reflection symmetries*. If you were to hop on one foot on the beach in a straight line, you'd have translation symmetry. If you walk normally (left, right, left, right, etc.) you have glide reflection symmetry. Mathematicians have proven that there are only seven categories of frieze patterns. A nice explanation of these seven can be found here: [How many frieze patterns can you find in this weaving?](#)

Think about what Henry says with the idea of an “open” design keeping the creative part of your mind open.

When you create an artwork, how might you translate that concept of “openness” into a design?



Two Grey Hills Weaving

Rose Tso

1970

Shimá: This is a very special rug because it has spiritual arms that reach toward creativity and innovation—it conveys the art of being yourself, of letting your inside beauty come out.

Bob: The center figures use parallelograms to suggest depth, moving out or in.

Henry: The depth captures the four breaths that we use to meditate—in and out, to bring your creativity to being.

Bob: We asked Shimá if such a special rug, which normally would be stored safely by the family rather than displayed, could be shown in this exhibit. She answered that the rug now calls the Kennedy Museum its home and that the rug now has the unique fire of this place—it demonstrates the ability to adapt to new homes and shows the life and resilience of both the weaving and the Kennedy Museum. As such, Shimá thought it should be displayed for you to appreciate the creativity and resilience in your own life.

Think about how the weaver achieves the sense of depth in this design and how the concept of depth is expressed: moving in and out (visually); moving in and out (as in your breath).

This idea creates layers of meaning in relationship to the object itself as well as in relationship to you, the viewer.

If you shared something about your own creativity and/or resilience, what physical design form might it take?