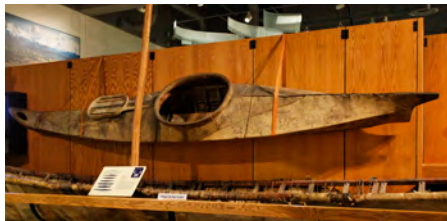


Exploring Symmetry In Alaska Native Design



Let's Begin in the Gallery of Alaska on the museum's first floor.

Step 1: Look for the Kayak suspended above an open boat in the rear of the gallery. For the Yup'ik people of southwestern Alaska, the length of an individual's outstretched arms would equal the length of the kayak's tail (aft gunwale).



UA87-011-0002: Photo: Patricia Fisher; Courtesy of UAMN

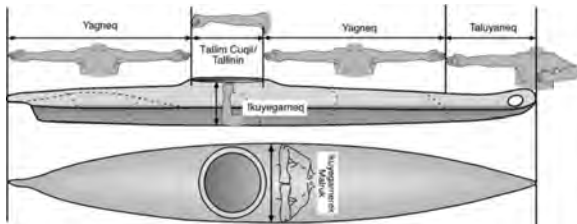


Image: Courtesy of Kayak Scientific Design and Statistical Analysis

Compare the **proportions** of your outstretched arms with the length of the kayak's tail (the end without the handle). Would your custom kayak be the same size?

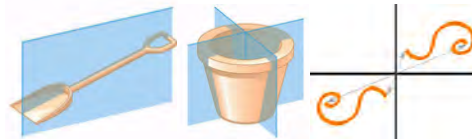
Step 2: Walk into the "Interior" gallery. Inside there is a display case with Athapascan clothing and objects.



Photo: Patricia Fisher; Courtesy of UAMN

Which objects in the case display the three Western types of **symmetrical transformations** (linear, rotational, and point)?

(Hint: All three types are displayed. The example of "point" wraps around the dress.)



Linear, Rotational & Point Symmetry
Courtesy of mathisfun.com

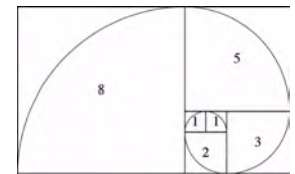
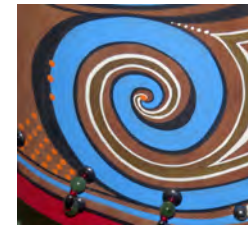
Step 3: Walk towards the "Southwest" exhibit by the gallery entrance. Inside one case is this Sugpiaq hunting hat. It is decorated with bright colors and spiral designs.



UA2006-002-0006: Photo: Courtesy of UAMN

In Western mathematics, the **golden ratio** – where the ratio of a larger part divided by a smaller part equals the sum of the smaller and larger element divided by the larger part – has long been an aesthetically pleasing element of design across cultures. It suggests a natural balance between symmetry and asymmetry.

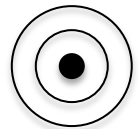
Spirals are one of the shapes that can demonstrate the golden ratio.



Golden Spiral: Courtesy of Wikipedia

UA2006-002-0006 (detail): Courtesy of UAMN

Some scholars believe that the spiral designs on hunting hats are like the circle-and-dot design, and are another way of representing the universe or spiritual sight.



Look for spirals and circle-and-dot designs in the gallery. List two.

(Hint: look in the Western Arctic Coast and Southeast)

Find your way to the second floor
Rose Berry Art Gallery.

Walk past the video and follow the path on the left wall that wraps around the main exhibit space.

Stop 4: Find the drum and drumstick with formline designs.

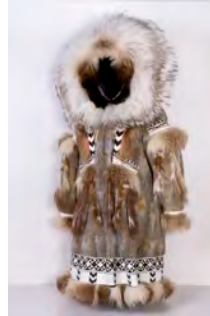


UA2005-023-0003AB: Courtesy UAMN

Compare the designs on the drum with those on the stick. What **similarities** do they share?

Look closely at the rattle face. Do both the painted decoration and the underlying carving possess symmetry?

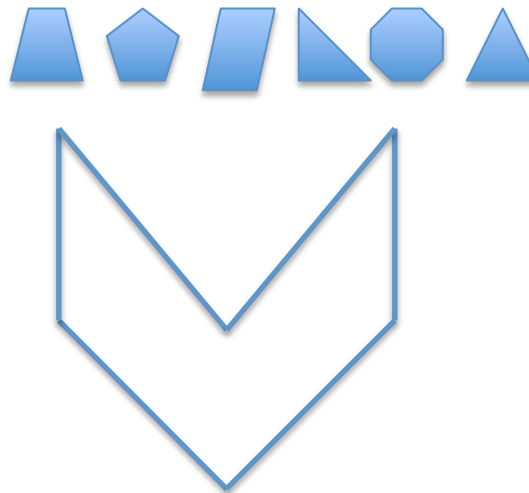
Stop 5: Enter the “Highlights” gallery in the center of the room and find a skin-sewn parka.



UA68-003-0001: Photo: Barry McWayne; Courtesy of UAMN

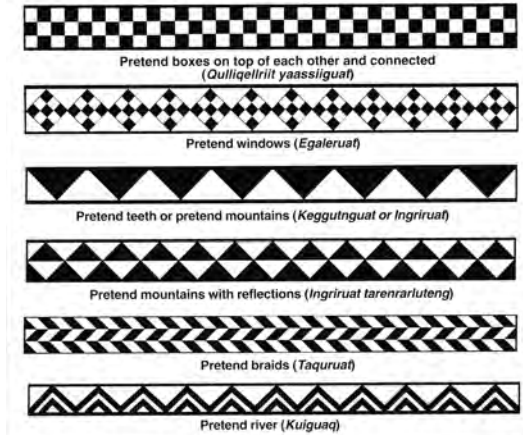
The decoration on the bottom of the parka has repeated shapes without any gaps or overlaps, which is a symmetrical pattern called a **tessellation** in Western mathematics.

All of the shapes below can be repeated or combined with others to construct a chevron. Which individual shapes can fill the chevron?

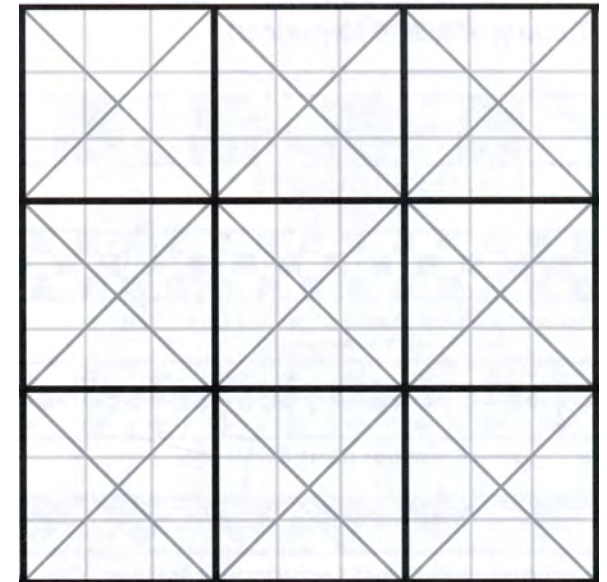


What are other possibilities?

Bonus: Below are some common parka designs. Try creating your own!



Yup'ik Border Patterns & Recording Paper Worksheet :
Courtesy of "Patterns and Parkas" Math in a Cultural Context



Enjoy exploring symmetry in Alaska Native design throughout the museum!