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OER Outdoor Ellipse Multicultural (Easter Island) Activity

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Outdoor Activity: Laying out a Model of a Hare Paenga (Boat House) Foundation from Easter Island (Rapa Nui)

Description: In this outdoor hands-on activity, students are able to apply the definition of an ellipse (the curve consisting of the set of points with a constant sum of the distances to two fixed points, called foci or focal points) by modeling the laying out of the foundation for a hare paenga (boat house) from Easter Island (called Rapa Nui by the inhabitants). Due to invading slave traders, disease, and the passage of time, the knowledge of how the prehistoric Rapanui laid out the hare paenga foundations has been lost. The method in this activity is one that they might have used. This activity can be done together in a class or in groups of 3 to 6 students. A sand volleyball pit would be an ideal location. A parking lot or another flat area would also work.

Introduction to hare paenga (boat houses) of Rapa Nui (Easter Island)

The Rapanui people of Rapa Nui, also known as Easter Island, at one time had a system of “writing” called Rongorongo. Unfortunately, the ability to read Rongorongo has been lost. So currently archaeology and oral tradition are the only available sources for information about the early people of the island. Oral tradition states that the houses originally had upside down canoes for their roofs, and thus they are called hare paenga, or in English, boat-houses. The foundations of the boat-houses are elliptical in shape, with the foci very close to the ends of the major axes. In this activity, we will investigate the shape of archaeological remains of the boat houses by constructing a full-scale model of the foundation based on the definition of an ellipse.



(Left) Dr. Ximena Catepillán exiting a replica hare paenga. (Right) Replica hare paenga showing the stone foundation with holes for attaching the thatched roof. (Below) Archaeological remains of a stone foundation of a hare paenga. Photos by Dr. Cynthia Huffman, 2019, Easter Island.

Supplies:

- 37 – 42 feet of rope
- 2 stakes or poles
- 1 or 2 Hammers
- Sand volleyball pit
- Stick or pole for tracing out the ellipse
- Rake to smooth out the sand (optional)



Foundation model construction

Step 0 (optional): Smooth out the area for the model in the sand volleyball pit with a rake.

Step 1: Tie the rope to the 2 stakes so that when it is stretched out taut, the stakes are 35 to 40 feet apart.

Step 2: With one person at each stake, pull the rope taut.



Step 3: Move each stake in towards the other the width of 3 or 4 fingers and hammer the stakes into the sand. These 2 points will be the foci of the ellipse. Notice there is now some slack in the rope.



Step 4: With the stick perpendicular to the ground, and keeping the rope taut, trace out one side of the ellipse in the sand.



Step 5: Repeat step 4 to trace out the other side of the ellipse.



A video demonstrating the activity can be found at <https://youtu.be/KneYljB1Dho> .

Alternatives:

If no sand volleyball pit is available, the activity could be done in a snow-covered open area or in a flat dirt field. Another possibility is to use a parking lot with the rope tied to 2 poles held stationary by people or somehow weighted down. Then sidewalk chalk could be used to trace out the ellipse.

