Field Trip Assignments

This package contains assignments that we ask you to complete during your stay at La Push. Some of the activities are individual activities, and some of them are group activities. We will be asking you to record much of this work in a "field journal". You may use the back section of your sketch book for this purpose. Make sure you clearly title each activity in your field journal. If you have any questions about any of the assignments come and find one of us on the beach!

Scavenger Hunt

(Individual Activity, but images will be shared with the group)

Collect images of phenomena listed below. Doing this will create a store of material that you can mine during the rest of the program. **Draw and take a digital photo** of each specimen you find. Remember, this is a National Park, so you may not remove anything from the area. You may move something to a different location on the beach if it makes it easier to document, but, especially if it's living, please put it back where you found it afterwards. Log every drawing or photo you take in your **sketch book**.

1. Objects with symmetry: We haven't discussed symmetry yet, but based on what you know; find as many different kinds of symmetry as you can. Document eight different specimens per person in the group. Each person should describe in their field journal how the objects they have documented are symmetrical.
2. Growth patterns of different kinds: Look carefully at plants and animal life. What do you think their growth pattern is? (Gnomonic, branching, spiral, etc). Document four different kinds of growth patterns per person in the group. Each person should document several different examples of each type of growth pattern they find (think of the possibility of using these in an animated sequence, for example). Each person should describe in their field journal the growth process they think has taken place for each set of objects documented. Choose one growth pattern to study in depth. Make a series of measurements (six or seven) that show the change in length or size of the object over time. For example, in branching growth, you might record the length and circumference of each section of the branch. In a shell you might measure its radius or perimeter at each stage of growth. (Use string to measure curves) Record your data in a clearly labeled table using diagrams to illustrate the quantities you measured
3. Document different examples of life forms reflecting the Fibonacci series. As a group, try to find three specimens per number in the series. Document an object you think might be in the series first, then count it to see if it is. Note in your field journal the result.
4. Find and document evidence of order and patterns in natural, but inanimate structures, including, but not limited to rock strata, waves, water or wind erosion, cloud forms, etc.. Describe them in your field journal and speculate what forces or processes caused the patterns. On one of these examples make measurements of the spatial or temporal order. For example, If you notice a regular spacing of ridges along the beach, make multiple measurements of the distance between them to help determine the degree of regularity.

Qualities of Sound

(Individual Activity)

For this assignment, each group member works with an MD recorder by themselves. Organize a schedule within your group so that everyone has the opportunity to do this Tuesday or Wednesday. At the beginning of each take state your name, the part of the assignment, the date, the time and your specific location. Each part of this exercise is a separate recording, so that at the end you'll have a number of takes on one disk.

1. Ambient sound: For this part, go somewhere in the vicinity of the beach where you can be alone. Record five minutes of ambient sound, listening carefully and taking note of the kinds of sound you hear in your **field journal**. Listen to the recording a second time and from it choose a single sound to focus on. By repositioning yourself or the microphone, record that sound more specifically, so that is more easily distinguished from the other noises that made up the original ambient recording. Note in your field journal why you chose this sound, what the source of the sound is, and what it makes you think of.
2. Dynamic and non-dynamic sounds: Dynamic sounds are those you make to be recorded intentionally (footsteps, knocking objects together, etc.). Non-dynamic sounds occur naturally. Record three examples of each. Listen to each after recording. In your field journal, note what made the sound, what you think it sounds like, whether there are any patterns or rhythms in it and what those are.
3. Non-representational sounds: These are sounds the source of which we can't easily identify. Listen for or create a sound you couldn't easily identify. Record it. Log it in your field journal and note what the sound reminds you of and the cause if you know it.
4. Record 10 minutes of continuous sound coming from the waves breaking on the shore. As you record your 10 minutes, listen carefully and try to hear differences in amplitude from wave to wave. Do you hear any patterns? In your field journal, note the time and location of the recording and any observations about the wave sounds.
5. In your **field journal**, think about and describe the experience of recording these sounds; what you noticed about your own hearing, what connections you made with themes we've discussed, what things you might have seen while recording, etc..
6. (Optional). If there are sounds that would work well with the footage you have shot, or plan to shoot, record these as well.

Time Lapse/Stop Motion in the Field
(Group Activity)

For this assignment, your group will work together to shoot footage on the Animac that contrasts temporal phenomena on the beach, and explores or expresses pattern, order, complexity and/ or scale of the beach environment somehow. The footage you shoot must include both time lapse and stop motion animation (not necessarily in the same shot). You'll have the Animac for about 3 hours. You could divide up the time and do a few shots, or focus all your time on just one continuous shot. You can also use a digital still camera to collect still image sequences to edit into your istopmotion footage when we get back.

1. As a group, come to a consensus about what you'll try to do. Prioritize the shots so if you run out of time (or battery juice) you will have gotten the most important ones done.
2. Divide up the tasks: Designate someone in the group to storyboard your ideas and then make a list of the shots you want. Designate someone to maintain a camera log. Designate someone to run the camera and animac (this includes managing and labeling footage files you create), someone to "direct" (make sure things are in the frame and communicate with anyone in front of the camera), and two or more people to animate. Depending on what you do, you may need someone to "police" the scene so that unsuspecting people don't wander into the shot by mistake. If you plan multiple shots, you could rotate these positions.
3. Make simple storyboards (thumbnails are fine) of what you want to do. Think about screen direction, timing, paths of action, and types of shots (for example, close-ups to introduce objects, wide shots to establish the scene.)
4. For Time Lapse, determine what it is you want to shoot, how much time you want it to take, what interval you will record it at. Record this information in the camera log.
5. For Stop-motion, you can use replacement animation, moving objects, pixilation or a combination of these. Use only objects found on the beach. (These can be natural or man-made detritus. Remember, this is a National Park, so you may move something to a different location on the beach if it makes it easier to shoot, but, especially if it's living, please put it back where you found it afterward.) You could also work with another group while they do the Tide Measurement to animate their building of marking sculptures.
6. After shooting, look at the sequences as a group and talk about what you see. Does it reflect the group's intentions, or did something else happen? Were there any mistakes or accidents that made it more interesting? How does the time lapse make the original movement feel? What ideas does it give you for more time lapse work? How do the shots fit together? What order should they play in? After this discussion, each person should describe their own responses in their **field journal**.
7. In the evening after returning to La Push your footage files will be backed up onto an external drive, so make sure they are clearly labeled with your Group #.

Tide Marking

(Group Activity)

Introduction

The tide is the regular rise and fall of the water level at the seashore due chiefly to the gravitational interaction between the earth and the moon. Seasonal variations in the tide are caused by the sun. The complete cycle between two high tides takes just over 12 hours so we would expect that it should take about 6 hours for the tide to rise from low to high. In this activity we will investigate how the rate at which the tide rises changes over time.

Procedure

Each group will be measuring the position of the tide for a 6 hour duration, from low to high tide. It is important to start the measurements at or close to the low tide mark so please start recording at the designated time (7:35 on Tuesday and 8:35 on Wednesday).

Drive a piece of wood into the sand at the low tide mark. Next place 12 additional markers evenly distributed along a line from the low tide level up to the approximate high tide line.

In the back of your Field Journal create a clearly labeledtable in which you record the following data:

- the distance of each marker from the low tide marker.
- the time at which the tide reaches each marker.
- the elevation of marker above the water low tide line.

Since the tide does not rise in a continuous way, due to waves, you should decide a consistent standard for determining when the tide has reached a particular marker. You might record when the first wave reaches a maker, or you might record when the marker is completely submerged. Perhaps both measurements would be useful.

Sculpture Building

We would like this exercise to also have an artistic component. At every other marker build a sculpture that has some visual impact. Put some time and effort into the design of your sculptures. Use material that you find at the beach. Suggestions for sculptures include, stones piled in tetrahedral or square pyramids (how high can you make them?), small logs formed into a log cabin scaffold, sand sculptures, leaf mosaics etc. Think about and discuss in your group what you will build and how you will build the sculptures before starting them. Try to incorporate the ideas and themes of the program such as number patterns, symmetry, spirals, gnomonic growth etc into your artwork.

While sculptures are being built members of the group with cameras should keep a photographic record of their construction.

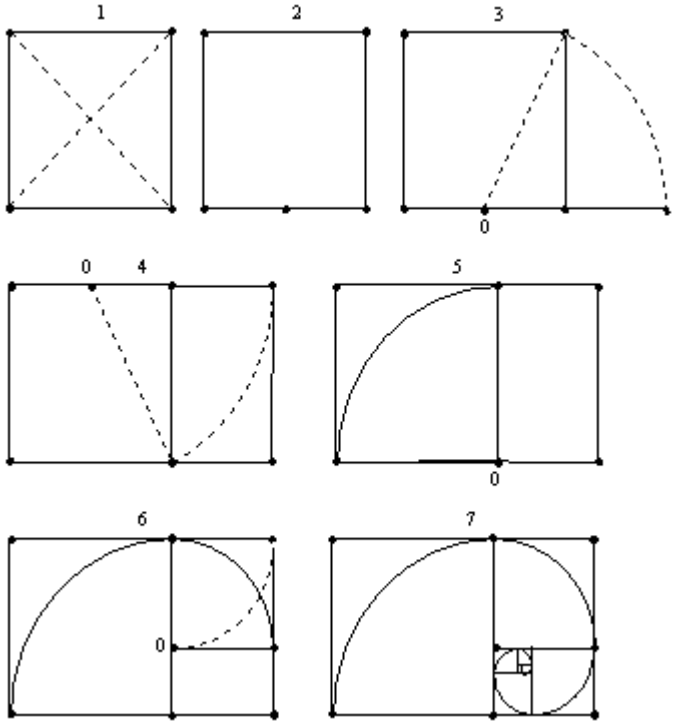
Analysis

We will analyze this data on return from La Push so make sure everyone in the group records the data in their field journal and include relevant details, such the slope of the beach, the range of the waves, the amount of wind etc . Also, write down your reflections on this activity in you writing journal.

Golden Spiral Construction
(Group activity)

In this activity you will use a rope and stakes to complete a geometric construction of a Golden Spiral. Follow the instructions with the aid of the diagram below to complete the construction. Take care. Precision is the road to beauty. When you are finished, enhance your spiral artistically and document it..

1. Create a square in the sand with stones at the corners (make the sides about 10 m). To ensure you have a square and not a rhombus adjust the corners until the diagonals are equal.
2. Place a stone at the midpoint of the base of your square. You can find the midpoint by marking out the side with a string and folding it in half.
3. Measure out a section of string from the midpoint to the top corner of the square as shown in fig. 3 and use this length string to extend the base as shown. Place a stone at the end.
4. Repeat this process on the top side of your square and complete the rectangle as shown in fig. 4. Satisfy yourself, using Pythagoras's theorem that this is the Golden Rectangle.
5. Use stakes and a string with length equal to the length of the large square to draw an arc in the sand as shown in fig. 5.
6. Use the width of the small rectangle to locate the point marked *0* in diagram 6, and then draw an arc center on *0* as shown.
7. Repeat this process for 4 more steps, until you have created the golden spiral.



Perspective on the Beach
(work in pairs)

Procedure
Find 4 Logs which are approximately equal in length and no taller than your eye level. Find a level stretch of beach, far from other groups. Stand the smoothest log on end in the sand (you may need to find some way to support it. This is your target log. Draw or carve lines on the log at a distance halfway, quarter way and one eighth of the way down from the top of the log. Stand 2 m from the target log and place a stone on the sand to mark your position. Stand with you line of sight level with the top of the log. Get your partner to erect a second log far enough behind the target log so that the base of this log appears to be at the halfway marker on your target log when viewed in perspective. Repeat this process with the next two logs, placing them so that their bases are at the one quarter and one eighth and marker respectively. Draw the resulting pattern of logs in your field journal. Label the logs and record their lengths, and their distances from your viewing position in a clearly labelled table in your field journal. Describe the type of sequence these distances follow. Take a photograph of your log pattern.

Shadow Drawing
(work in pairs)

Introduction
As the sun moves across the sky the shadow that an object creates by blocking the sun's rays changes shape and moves. At local noon (the time when the sun is highest in the sky) the shadow is at its shortest and it points in a particular direction. The shortest length of the shadow, and the time at which the shadow is shortest can be used to determine latitude and longitude of the location where the experiment is being carried out. You will only be able to complete this activity if the sun is out.

Procedure
In this exercise one partner should stand **straight up on a horizontal section** of beach and have the other partner trace the shape of their shadow in the sand. They should have their shadow traced at regular intervals (every 15 minutes) between 12 noon and 2:00 pm. (Note: at La Push at this time of year local noon is actually closer to 1:00 pm then 12:00). There is no need for the person being drawn to stand in one place the entire time, as long as they return to the same place every 15 minutes and strike the same pose for their shadow to be drawn.

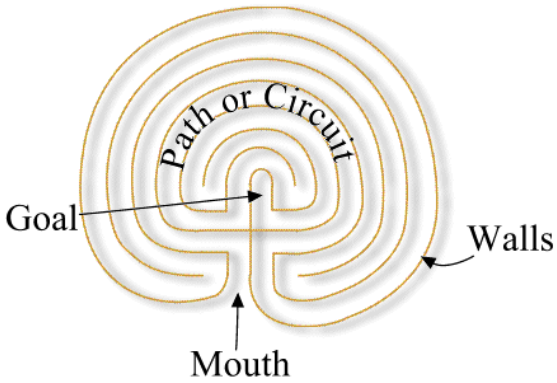
Measure and record in your field journal the height of the person whose shadow is being drawn, the length of each shadow drawn and the time the measurement is made. Use the group's compass to determine the direction the shadow points when it is shortest. Record this in your lab notebook. On our return we will plot length of shadow versus time and use this curve to determine the latitude and longitude at La Push.

Take a photograph of the shadow drawing when you are finished.

Labyrinth Building

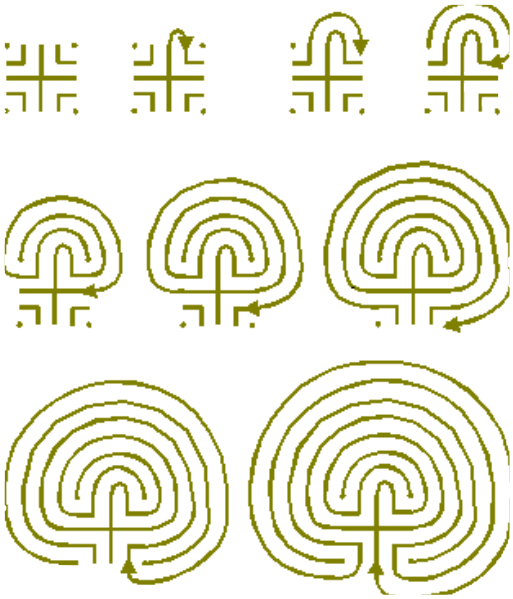
(Group Activity – cloudy day alternative to shadow drawing)

A labyrinth is an early form of maze with a single convoluted path, without junctions. These labyrinths were not puzzles, but instead were for ritual walking, running and processions.



The Classical Seven Circuit Labyrinth

The mouth is where you enter. You walk on the paths or circuits. The walls keep you on the path. The goal is in the middle of the labyrinth. When you reach it, you have gone half the way. You need to turn around and walk out.



For this project the object is to construct a simple labyrinth using beach materials. On the right are instructions for creating a seven circuit labyrinth starting from a simple seed. Record the creation of your labyrinth using photographs and drawings in your field trip journal

Other sample seeds for growing labyrinths, using a similar technique to the one given above shown on the right. Investigate the labyrinths these seeds generate. Design your own Labyrinth using a seed of your own creation, and sketch it in your field trip journal.

Sona Sand Drawings

(Individual Activity – cloudy day alternative to shadow drawing)

Introduction

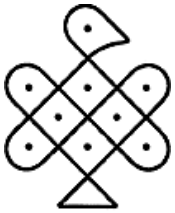
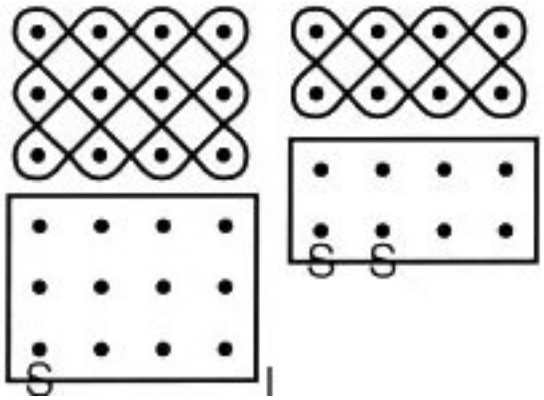


Figure 1

The Tchokwe people of south-central Africa have a tradition of storytelling using geometric drawings in the sand. These drawings are called Sona, and are used as memory aids. Typically these drawings would be traced in the sand winding around a rectangular grid of dots using a finger, while telling the tale. Ideally the entire figure would be traced without having to remove the finger from the sand so that the entire diagram is constructed with a single curve that does not retrace itself. Often the figure could be drawn by following a simple geometric algorithm on a grid with particular dimensions. Below is an example of one of the simplest types of Sona – the plated mat design. To draw the figure one starts at the edge and traces along 45° lines between stones until reaching and an edge. One imagines that the edge of the rectangular grid is like a mirror which reflects lines along the next 45° line.



Try tracing each design, starting at an S and making sure you don't change direction at any intersection. The figure on the left can be traced in one continuous loop but the one on the right requires two loops. Is it possible to determine whether a given diagram can be traced with only one loop? If more than one loop is required how many loops are needed? You will address both these questions in this activity.

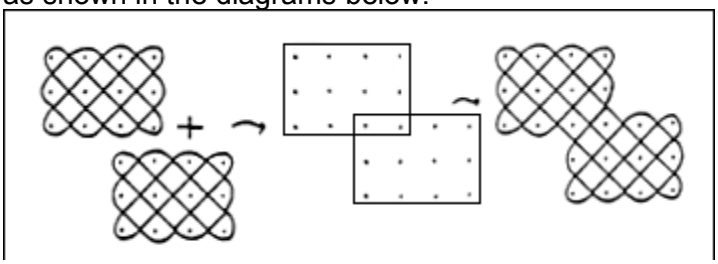
Procedure

Gather enough stones so that you can make a rectangular grid of stones on the sand up to dimension 7x7. Fill in the following table by completing sand drawings for all possible rectangular grids with *c* columns and *r* rows and recording in the table the number of loops that were need to complete the diagram.

r \ c	1	2	3	4	5	6	7
1							
2							
3							
4							
5							
6							
7							

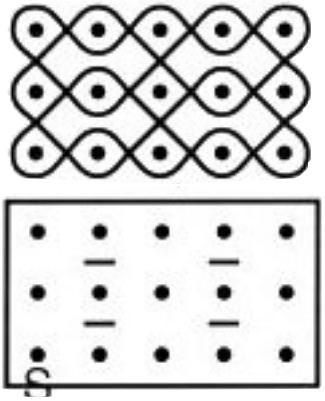
By observing the patterns in your table try to describe how you could determine the number of loops required to trace a *r*x*c* rectangular grid for any given number of rows *r* and columns *c*. Without drawing, determine how many loops are required to trace a 13 by 26 rectangle, A 100 by 105 rectangle, a n by 3n rectangle.

More complicated drawings can be made by choosing different arrangement of stones to trace as shown in the diagrams below.



Investigate whether the number of loops required to trace a diagram changes when you add square arrays of stones to your diagram. Write down your observations.

Some sona designs correspond to light-ray patterns created with the addition of horizontal mirrors between the dots. The result is a pattern known as the lion's stomach. The example shown (right) can be drawn with a single loop.



Trace the diagram on the right. Next try using sticks in the sand to represent mirrors and try to trace diagrams using different sized grids with sticks arrange in an analogous pattern. Does the number of loops required to trace the grid change? Can you always trace the diagram? Write down your observations?

Diagrams are often embellished to symbolize different creatures or events such as shown in the diagrams below. As a final piece of work create your own Sona drawing to tell a simple story about your experience in the program.