

## 9<sup>th</sup> Explore Cheat Sheet

### Introduction (15 min)

- Welcome to Torrey Pines!
  - Reserve is over 1,500 acres
  - Includes miles of beaches below us, the lagoon and the bluffs
  - Out of the 279 state parks, there are only 14 reserves, so Torrey Pines is special!
  - How do you think the reserve got its name?
  - Reserves are protected! We will practice Leave No Trace = being respectful and being our best self
- Community Agreements: Be curious, Be respectful, Be safe!
- Preview of the Day
  - Today's theme is: Who does science?
  - Ongoing projects in the reserve: PINC Project (dye the river pink to track run off), Bee monitoring project, coastal erosion
  - Today we are going to join them and perform our own Project as science leaders
  - (Show Science Discovery Process Poster) Which part do you think we will be doing today?
  - Hiking! Has anyone gone hiking before? Where did you go? What did you enjoy about it? What was challenging?
    - Opportunity to hike two trails in Torrey Pines! Encourage one another, keep pushing yourself and enjoy this beautiful place.
- Introduce Explore Backpacks
  - Tools: preview each, give warning about transect getting tangled
  - Pass out backpacks and water

### Data Collection (55 min)

- 🕒 Walk (5 min) ; Intro + Overview (15 min); Collection (30 min); Debrief (5 min)
- 🕒 Introduction
  - Torrey Pines, the nation's rarest pine tree!
  - What is impacting Torrey Pines? .. Habitat loss, climate change: increased wildfires, stress from droughts, bark beetle infestation
  - Bark beetles: native but due to droughts, the trees are not able to produce enough sap to protect themselves as the beetles bore into the trees and lay eggs.
  - Point out sap (injury of the tree), tiny holes (males bore, females lay eggs), tracks (larvae tracks as they eat), red frass and yellow frass (mix of beetle scat and sap)
  - As a science leader, what data would you want to collect about Torrey Pines?

- We are going to collect data to provide to CA National Parks!
- Collecting data in two ways: Mapping and Growth

#### 📋 Data Collection Methods

- Tree Mapping: practice with 1 tree with students
  - Hand out iPhones, show them where to find GPS, have them record on the practice tree
  - Try not to mark the same tree as another group: frog leap
  - Input data: end of the trail, sit / stand in a circle, demonstrate 123Survey
- Tree Growth: practice with 1 tree with students
  - Review each protocol on the practice tree, place label on tree
  - Pass out iPhones. Goal: 2-3 trees
  - Label other trees in the area
  - Sit in circle, use whiteboard to record all data for Tree # \_\_
    - What should we do with all this data if we want the most accurate tree height and circumference?
    - Take an average! Have students record the average down
    - Repeat for the rest of the trees
    - Assign each group a tree # to put in the data for the survey

#### 📋 Debrief:

- What did you notice/observe while collecting data today?
- What is one way we could improve our data collecting?
- Why do you think some trees are impacted by bark beetles and some are not?
- Should these trees be protected?

#### **Trail Walk** (20 min + sit spot 5 min)

- City Heights is connected to the Pacific Ocean through the Pueblo watershed
- Area was formed by a combination of uplift, changing sea levels, sedimentation and erosion
- Layers in the cliffs called stratigraphy
- Some of the rocks in the park are over 48 million years' old
- Magnetite in the sand – show on white paper
- Kumeyaay: ate the pine seeds of the Torrey Pines (raw or cooked), ground and cooked pinole for flavoring, use Torrey Pine pitch for glue, pine needles to create baskets
- Pheromone traps
- Torrey pines
  - Wind pollinators: require wind to transport the seeds

- Grow leaning due to salt pruning: salty air from the ocean is drive ashore by winds and degrades the foliage
- Torrey pines plantings in turquoise plastic
- Needles can absorb water from morning fog – this was proven by a 13 year old during a science fair project. That discovery is leading scientist to create similar devices to capture water in areas of drought.

□ Sit spot:

- A moment to sit silently, take it all in. Try using all your senses: sight, hearing, taste, feel and smell - this might be uncomfortable, you will hear giggling but try to settle yourself
- Sit students 4 feet apart. Eyes open first 2 minutes, eyes closed 2 minutes
- Come back together. [How did that feel?](#)

**Self-Reflection (15 min + full group 4 min)**

- Reflection is a part of the experience, allows to process and share your thoughts and what you learned
- Separate into the 3 periods. Count off students 1 – 2. Sit in small circle
- Think – Pair – Share : Finish the sentence
  - Today, I felt like I was doing science when...
  - I think science is important because...
  - After today, one way I see being a science leader differently is...
  - I think I may or may not be a science leader in the future because...

**Whole Group Debrief**

- I am very proud of each and everyone of you!
- All of you were doing science today
  - Out in the field collection data, sharing observations
  - Plan to analyze the data next week in the classroom

- All the data you contributed is important because it will be a part of a long-term data set that all 9<sup>th</sup> grade students at Hoover High will contribute to... then we can track the health of the Torrey Pines and protect them.

□ ... Now... I want all of you to answer a question... Who does science? I DO