



## Outdoors

<b>Debris Flow Safety in our Neighborhood</b>	
<b>Short Description</b>	<p>This is a field trip that corresponds with the “Debris flows in California” classroom lesson where students can visit a local example of how California works to prevent debris flow damage. This field trip is best taught after the classroom lesson, but can be modified to be taught on its own.</p> <p>This field trip was developed for Sierra Madre Elementary School to visit Bailey Canyon Debris Basin. However, every canyon in the Los Angeles area has a debris basin. The field trip can be modified to visit the closest debris basin to the school where it is being taught. A new version of the handout may need to be created.</p>
<b>Grade level</b>	2-5
<b>Related Standards (NGSS)</b>	<p>2-ESS1-1. Use information from several sources to provide evidence that Earth events can occur quickly or slowly.</p> <p>2-ESS2-1. Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.</p> <p>4-ESS2-1. Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation. .</p>
<b>Learning Outcomes</b>	<p>By the end of the field trip, students will be able to:</p> <ol style="list-style-type: none"> <li>1. Describe two ways to decrease the risk of debris flows.</li> <li>2. Identify the presence of a debris basin in their own neighborhood!</li> </ol>
<b>Duration</b>	2.75 hours
<b># students</b>	5-30
<b>Location</b>	<p>Bailey Canyon Wilderness Park:  <a href="https://goo.gl/maps/6Jur4WboxnAZ2DsLA">https://goo.gl/maps/6Jur4WboxnAZ2DsLA</a>            There is a bathroom available at the park with a flush toilet and a sink.</p> <p>This field trip can be modified to occur at a different debris basin if needed.</p>

<b>Materials and Equipment</b>	<ul style="list-style-type: none"> <li>• Optional: nametags for each student and markers</li> <li>• One handout for every student (included below)</li> <li>• One pencil for every student</li> <li>• About 30 feet of rope, cord, or yarn to use for the game Just Passing Through</li> </ul>
<b>Accessibility</b>	This trip includes walking on uneven surfaces, making visual observations, and playing a game with physical movements.
<b>Safety Awareness</b>	Potential hazards may include: <ul style="list-style-type: none"> <li>• Uneven ground, potential trip hazards</li> <li>• Poky plants and possibly poison oak</li> <li>• Local wildlife (e.g. rattlesnakes, bears, mountain lions—unlikely but possible)</li> </ul>
<b>GO-Outdoors Missions</b>	At GO-Outdoors, we emphasize the following missions: <ul style="list-style-type: none"> <li>• Instructor/Caltech volunteer will encourage students to follow Leave No Trace principles and share information about the Ten Essentials for outdoor recreation.</li> <li>• Instructor/volunteer will work to engage all students in each activity with an awareness of their abilities and interests.</li> </ul>

### **Field trip activities**

This is a 2.75 hour trip and is walkable from Sierra Madre Elementary School to the field trip location. The following schedule is based on a fieldtrip between 8:15am - 11am.

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 Week before trip:

- Instructor should tell students and parents about the trip. Students should wear good shoes for walking and sunscreen.
  - Make sure all parties involved (teacher, volunteers, etc.) know trip details and schedule (including when chaperones and/or GO-Outdoors volunteers will arrive at the school if relevant)
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#### **Field trip schedule**

**8:00-8:15am:** Volunteers meet teacher @ Sierra Madre Elementary School –Yolanda Munoz. Ask students to put on nametags (optional).

**8:15-8:50am:** Volunteers introduce themselves to the class. Depart Sierra Madre ES and walk to Bailey Canyon.  
 (35 minutes)

**8:50-9:05am:** Arrive in the parking lot of Bailey Canyon Wilderness Park.

- Arrange students to stand in a circle (in shade if possible).
- Remind students about the classroom lesson where we learned about debris flows together. Facilitate students sharing out loud one at a time

around the circle. Ask each student to share one word that comes to mind when they think about debris flows.

- When the students have gone all the way around the circle, verbally synthesize some of the words or ideas that students brought up.
- Announce: today, we are going to learn about two different ways that debris flows can be slowed down and prevented from coming into our neighborhoods!

**9:05-9:45am:** Walk to the back left (west) gate leading from the park onto the road. Lead students up toward the chain link fence along the side of the debris basin, where they can see well into the whole basin.

- Explain to students that they will be given a handout to draw and make observations about the debris basin.
- Pass out one handout and one pencil to each student. Help them find a place to stand or sit where they can see the debris basin.
- Give students 5-10 minutes to draw.
- Invite students to stand in a circle. Allow 20 minutes for this discussion.
- Ask students to point in the direction of the largest boulders they saw. (This is toward the north end of the basin!)
- Ask students to point where they think the boulders come from. (The mountains!)
  - Discuss: how did the boulders get here? How fast did water need to be moving to carry them there? (Can give a range of example speeds like walking speed, bicycle speed, highway speed... note: speeds might be very variable, but the concept to convey is that the water had a lot of force to move the boulders!)
- Ask students to point at the plants at the bottom of the basin.
- Ask students how old they think the plants at the bottom of the basin are. (They are younger than the plants around the basin. They are smaller, not trees, and they look like they grew more recently—this is because the debris basin was excavated, and then sometimes it fills with debris and has to be emptied, so there is a lot of disturbance!)
  - Discuss: how can we tell these plants are younger than the plants growing up next to where we're standing, or the trees growing next to the house across the basin? Why do we think they are younger than the other plants? (described above).
- Ask students to point at the wall at the edge of the basin. Why is it there? (It helps protect our community from debris flows!)
- During the discussion, one volunteer should walk ahead to the next spot to set up the length of rope for the game "Just Passing Through." The rope should be oriented in a straight line parallel to the downhill direction (to represent a river). At the most downhill point, the rope should be laid out to form a ring at one end (to represent a lake or ocean).

**9:45-10:25 am:** Walk students just back down the road over to the large open soil area. We will be playing the game "Just Passing Through".

- Arrange the students so they can all see the area where they will be playing. Tell them you are going to explain and demonstrate the game they will be playing. THEN, when you say “get ready, raindrops”, they will get in place for the game to start.
- Explain the game, using volunteers to act out what the students will do:
  - Students are pretending to be raindrops falling on the ground. When you say “get ready, raindrops,” students will each pick a place for their raindrop to fall.
  - At this point, you will say “rainstorm!” Now, the raindrops will start to fall. Every raindrop will “flow” downhill toward the river and the lake.
  - As the raindrops flow, they will pick up bits of leaves and rocks on the ground and carry them along.
  - All the raindrops will flow down the river until they get to the lake, then they will drop what they picked up and stay still until every raindrop has arrived.
  - Once every raindrop has arrived in the lake, you will say “sun’s out!” Then the students will discuss how long it took for them to flow downhill and how much they were able to carry. Finally, you will give them more directions for the next try.
- Tell the students to get in position saying “get ready, raindrops.” Then start the game, saying “rainstorm!”
- When all the students have arrived, say “sun’s out!” Ask students how much they carried, and how fast they went downhill.
- If this activity was confusing, consider running the game one more time, or stopping at this point. Otherwise, try round 2:
- Explain the rules for round 2, using volunteers to act out what the students will do:
  - Students will do the same thing as in round 1, EXCEPT that now we have planted trees on the hill! The volunteers will be the trees, growing near where the students are running.
  - The trees will tag the water drops as they run downhill. If you get tagged, there are two steps:
    - Drop what you are holding on the ground,
    - And run three circles around the tree.
  - Otherwise, keep running downhill like before.
- Answer any questions. Then, tell the students to get in position saying “get ready, raindrops.” Finally, start the game again, saying “rainstorm!”
- When all the students have arrived, say “sun’s out!” How much did they carry this time? How fast could they run downhill?
- What was the effect of plants on the water moving downhill? What does this have to do with debris flows?

**10:25-11am:** Walk back to Sierra Madre ES.

**Common misconceptions about the concepts**

- Rivers all flow south
- Streams are just water flowing (without any sediments)

- Human activities cannot affect geologic processes
- Floods are rare/atypical (not normal fluvial processes)
- There is no connection between surface water & groundwater

**Opportunities to engage students in planning**

- You may choose to bring along some local field guides so that students can look up plants/animals they find that they are interested in
- Answering unanswered questions on the walk back from the trip—follow-up with any that cannot be answered right then!

**Provided Handouts/Materials**

The handout for drawing observations of the debris basin is included below.

1. Draw the rocks inside the basin. How big are they?
2. Where did the rocks come from? Draw an arrow.
3. Draw the plants inside and around the basin.

