

Google Earth Activity

Objectives

Students will be able to understand the concept of using remote sensing capabilities to gather useful information. Students will be able to answer conservation questions related to potential marine debris issues in their area by familiarizing them with Google Earth's basic tools.

Introduction

Just as people who don't live near the ocean can still contribute to the problem of marine debris, there are tools that allow people to understand and evaluate ocean pollution issues even if they are far away. This allows scientists and marine debris problem solvers to come from anywhere in the world! This Google Earth activity can also be a great way to familiarize students with their study site before using the Urban Trash Monitoring Protocols.

Next Generation Science Standards

Science and Engineering Practices

- Planning and carrying out investigations
- Constructing explanations and designing solutions

Crosscutting Concepts

- Systems and system models
- Scale, proportion, and quantity
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Disciplinary Core Ideas

- ESS3.C: Human impacts on Earth systems
- ETS2.B: Influence of science, engineering, and technology on society and the natural world

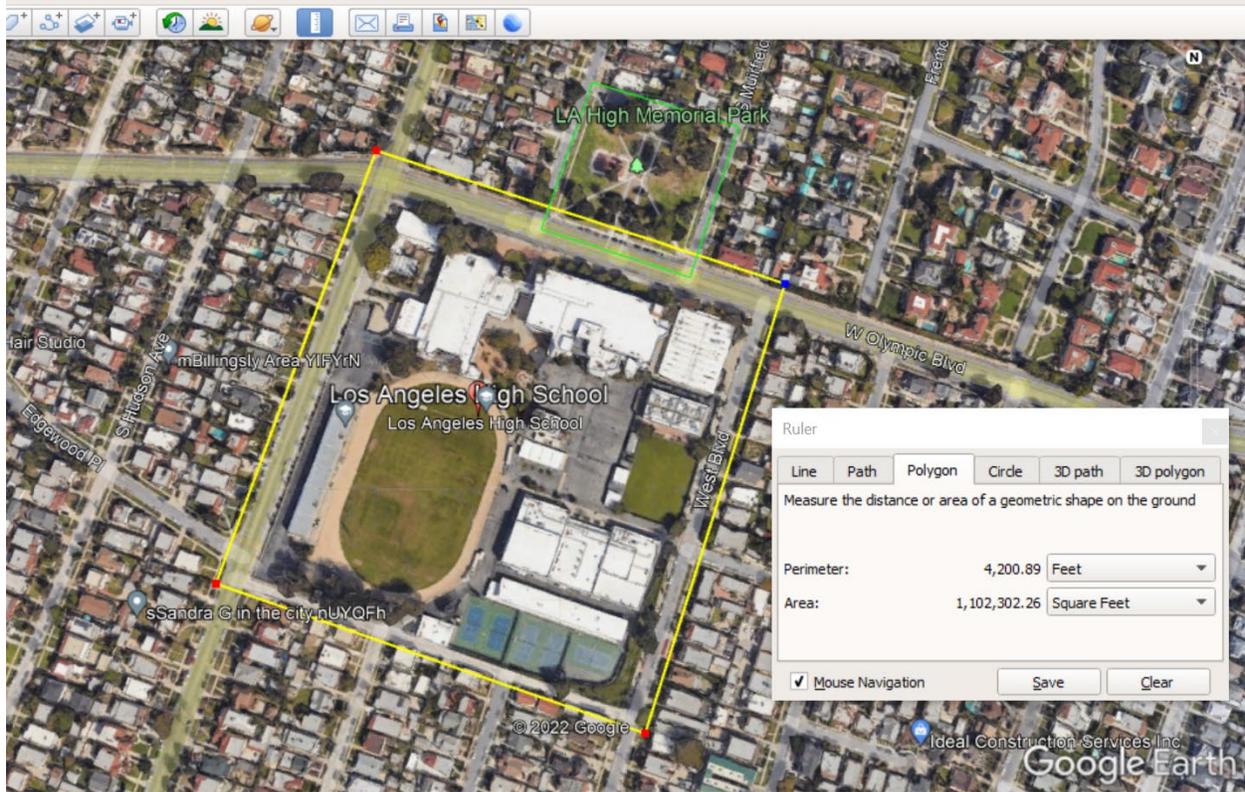
Supplies

- [Desktop Google Earth](#) (Free)
 - Some but not all of the procedures can be done using the [web version](#)
- School, park, or home address, zip code, or city name

Procedure

- 1. Intro.** Remote sensing is obtaining information of an object, area, or phenomenon from a distance (such as from an aircraft, spacecraft, satellite, or ship) that allows us to understand and research without physically being in that location. Remote sensing tools are extremely useful and a growing field in science today. Remote sensing tools are used by scientists to track the movements of marine debris throughout the ocean, identify debris hotspots or accumulation zones in the Los Laureles Canyon River, and monitor how much debris there is in the Great Barrier Reef.
 - Show video explaining remote sensing
 - [What is Remote Sensing? Understanding Remote Sensing 2018 - YouTube](#)

- Explain to students that today they will be using the remote sensing tool, Google Earth (which utilizes satellite imagery), to understand marine debris potential from their area and discuss how their area contributes to the marine debris problem as well as ways to improve.
 - Discuss with students what types of trash they think will be most common in the streets in their area (i.e., what to look out for when navigating Google Earth), what types of human activities in their area would promote greater trash generation (e.g., restaurants, construction, bus stops), what in the area could make trash in the street more likely to become marine debris (e.g., storm drains or nearby streams/rivers/lakes). Leverage student expertise in their local areas.
- 1. Set up.** Split students into teams of at least three and assign a task to each student in each group (one student will look out for and tally trash, one student will look out for and pin storm drains, one student will look out for and record trash cans).
- Open Desktop Google Earth and using the search bar in the upper left corner, navigate to your study area. This could be the address of your school campus or home neighborhood.
 - Use the measuring tool () from the top toolbar to find the perimeter and area of your block. Using the polygon tab (shown below), click the corners of your block to create your study site. Be sure to include both sides of the street and all four intersections. Save as "My Study Site."
 - If at any time during the activity, you need to stop and save your progress, you can do so by clicking File -> save to My Places.



2. Remotely Explore. Using the navigational tools in the top right corner, pick a starting point

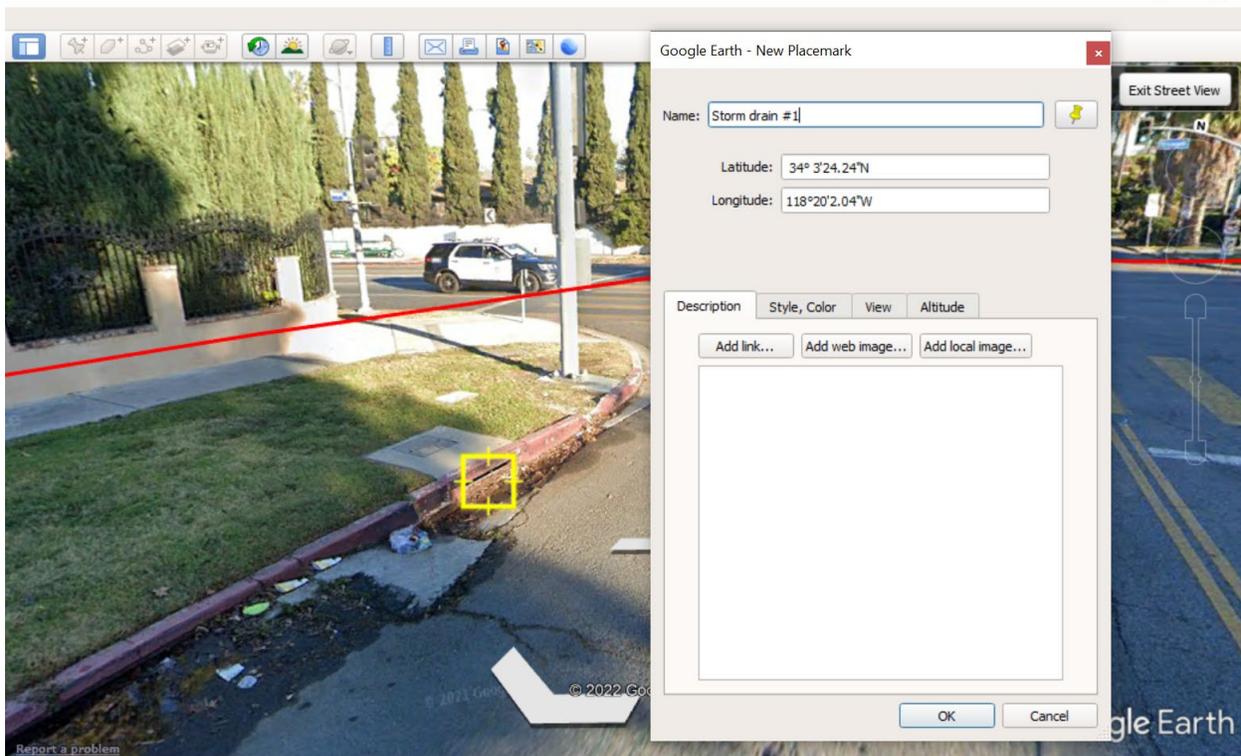
along your perimeter. From your starting point, navigate through “street view” () around the block (following your perimeter) and answer the following questions:

- Are you able to see any trash on the streets? Count how many pieces you can find around your block. Then calculate how many pieces of trash there are per square foot of your block.
- How many storm drains are on your block? Drop a pin () (found on the top toolbar) on every storm drain on your block. Be sure to include drains on both sides of the street and be mindful that some may be blocked by parked cars.

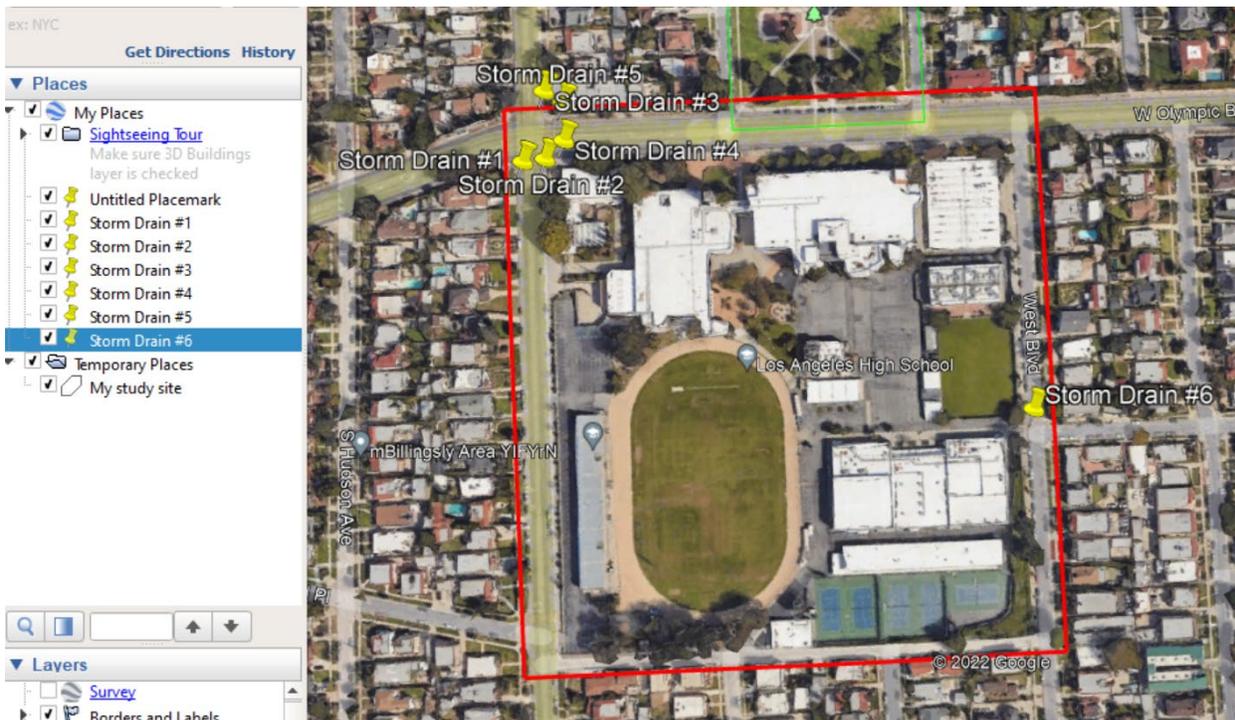
Taking it to the Streets!

Urban Trash Educational Toolkit

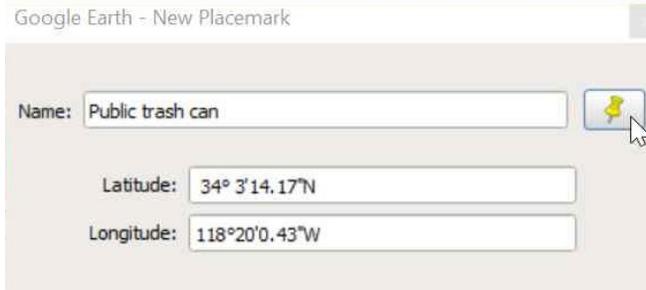
Remote Sensing with Google Earth



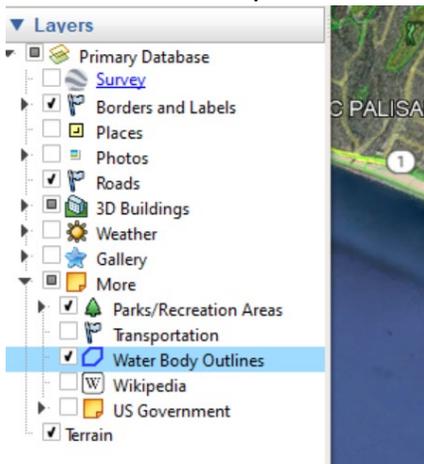
- o Exit “street view” to see your pins on the map. How many storm drains are on your block? Where are your storm drains located? Why do you think they are located where they are? Do you see any trash near the storm drains?



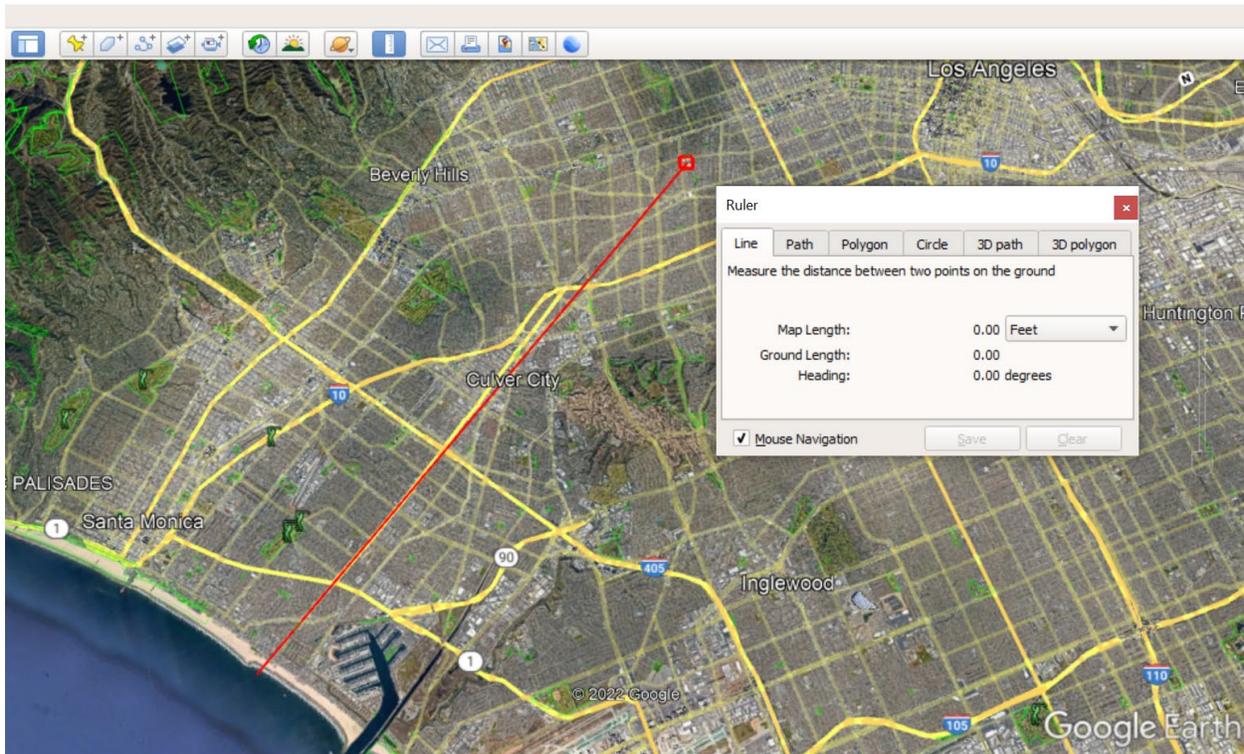
- Are there any trash cans on the streets? How many? How many are public trash cans versus residential? Were any trash cans overflowing?
 - Drop a  on any public trash can but change the color to red. Do this by following the above steps and clicking on the yellow pin icon to change the color before saving.



- What else did you notice around your block that might be the source of marine debris (e.g., construction, restaurant to-go containers, etc.)? How many debris sources exist around your block?
- Exit “street view” and zoom out from your study area. Find the nearest waterway: river, lake, ocean. Make sure the Water Bodies Outlines layer is checked ON in the left hand column labeled Layers.



- Use the measure tool () again, under the Line tab to find out how far away it is from your study site. How many miles does trash from your area travel to the nearest waterway?



4. Discussion.

- What characteristics of your block influence the potential of items to become marine debris? What characteristics of your block helped prevent marine debris?
 - Are these characteristics infrastructure related? Or human activity related? How could this differ in other areas?
 - What could be improved?
- Is it possible to predict sources and quantities of marine debris without being near the beach?
- How do you see this tool or other remote sensing tools helping the marine debris issue?

5. Assessment.

- Record student answers to the discussion questions to gauge understanding of the connection between infrastructure and potential marine debris.
- Assess student understanding of the remote sensing skills by assigning a new location with predetermined qualities, or having them choose their own location and recording their analysis independently.

6. Extension. Repeat the steps with the nearest waterway as the study site. Look for things in the area that would contribute to or prevent marine debris. How do these results differ from the first study site?

Other Resources

- [What is Remote Sensing? 2011 - YouTube](#)

