

Lego Land Cover

Activity Guide



Overview

Participants build a land cover map with blocks or Legos.

Purpose

- Learn how to classify land cover in a grid
- Visualize a pixel and match land cover to the pixel scale
- Explore the purpose of land cover mapping; see the value of satellite-based mapping

Audience

This activity is extremely flexible and may be used with young children to adults. The description includes variations based on audience level. Since all variations use the same materials, it may be used as a tabling activity that is modified based on the group that comes to the table.

Engagement Time

2-10 minutes

Materials

- Square blocks, such as Legos, Megablocks, Duplos, etc. It works well to have 3-4 colors matching land cover, though can be modified so color does not matter
- Mat for building
- Satellite image of your location or a photo of mixed land cover in your region (a park works well)
- Grid printed on clear transparency paper

Background

Land cover is what is on the surface of the land. It includes things like trees, grasses and flowers, rocks, cultivated land, and urban land. Land cover defines our homes and the homes of wildlife. What is on the land contributes to a community's vulnerability to hazards like floods, fires, and landslides. Land cover also plays a role in many processes on Earth such as the water cycle, the way energy is distributed around the planet, and the carbon cycle. Scientists map land cover to study all of these things and to help communities make good decisions about the way they use the land.

Younger Children and Family Groups

Preparation

- Make blocks available.

Steps

1. Ask the child to build a park using the blocks (color doesn't matter, let the child be creative).
2. Ask the child to tell you about the park. Where are the trees? What else is in the park?
3. Ask the child to imagine that she or he is drawing a picture of the park sitting in one section. Would they be able to see the whole park from one place?
4. If you used blocks on a mat, hold the park up so the child can look at it as if she were seeing it from above. Imagine drawing a picture of the park from an airplane or hot air balloon. Would it be easier to see the whole park? What might you miss? Could you see under the trees? Can you tell how many blocks are in the park?
5. Look at the block model on the table as if you're in the park again. Can you tell how many blocks are in the park now? If the blocks are plants, and you wanted to know how much plant material (carbon, for adults) is in the park, which perspective might be easier to use?
6. NASA maps from space, so we can see a big area all at once, but that makes it harder to see some of the details. It's hard to see how tall trees are or if there's grass or a sidewalk under the trees. We need information from the ground too.
7. Message to parents or adults, if present: You can help us see the details by mapping the land with GLOBE Observer.

Elementary Students

Preparation

- Print a photo of a park or some place familiar to the audience.
- Print the grid on a transparency film.

Steps

1. Provide a photo of a park or some place familiar to the audience. Place the transparency grid over the photo. Each square in the grid corresponds to a single square block.
2. Place a block in every grid that has plants. Leave bare ground or paved areas blank. Stack two or more blocks to represent trees or shrubs. Block colors don't matter in this variation of the activity.
3. Ask the child to imagine that she or he is drawing a picture of the park sitting in one section. Would they be able to see the whole park from one place?
4. If you used blocks on a mat, hold the park up so the child can look at it as if she were seeing it from above. Imagine drawing a picture of the park from an airplane or hot air balloon. Would it be easier to see the whole park? What might you miss? Could you see under the trees? Can you tell how many blocks are in the park?
5. Look at the block model on the table as if you're in the park again. Can you tell how many blocks are in the park now? If the blocks are plants, and you wanted to know how much plant material (carbon, for adults) is in the park, which perspective might be easier to use?
6. NASA maps from space, so we can see a big area all at once, but that makes it harder to see some of the details. It's hard to see how tall trees are or if there's grass or a sidewalk under the trees. We need information from the ground too.

7. Message to parents or adults, if present: You can help us see the details by mapping the land with GLOBE Observer.

Upper Elementary and Middle School Students

Preparation

- Print a photo of a park, museum grounds, etc.
- Print the grid on transparency film.
- Sort the blocks by color. Assign each color to a land cover type. It is helpful to print a key for reference.

Steps

1. Provide a photo of a park or some place familiar to the audience. Place the transparency grid over the photo. Each square in the grid corresponds to a single square block.
2. Using dark green blocks for trees, light green for grasses and flowering plants, gray for pavement or buildings, and tan for bare ground, make a map of the park. If there is more than one kind of land cover in a square, choose the land cover type that is dominant. (You may use whatever color combination you have on hand, however, children respond better when the colors match the land cover type.)
3. How many squares are trees? How many squares are the other land cover types? What kind of land cover is there most of in the block model?
4. If you had to assign one land cover type to the entire scene, what would it be? (The most dominant land cover wins. So, if you had more trees than any other kind of land cover, the scene would get a tree land cover classification.)
5. NASA maps from space, so we can see a big area all at once, but that makes it harder to see some of the details. If there's mixed land cover, NASA assigns the primary type to that area. What might we miss by mapping that way?
6. Message to parents, adults, or older teens if present: You can help us see the details by mapping the land with GLOBE Observer.

Teens and Adults

Preparation

- Print a satellite image of your location, a national park, or some other place familiar to or valued by your audience. The Earth Observatory is a good site to find satellite images. Mapping programs that use a satellite base layer are also a source of satellite data.
- Print the grid on transparency film
- Sort the blocks by color. Assign each color to a land cover type. It is helpful to print a key for reference.

Steps

1. Provide the satellite image. Place the transparency grid over the image. Each square in the grid corresponds to a single square block.
 - a. NOTE: You may have to discuss how to recognize what might be on the ground. Colors generally correspond to land cover types in natural color satellite imagery, so forests are dark green, grasses are lighter green, cities are gray, etc.

2. Using dark green blocks for trees, light green for grasses and flowering plants, gray for pavement or buildings, and tan for bare ground, make a map of region. If there is more than one kind of land cover in a square, choose the land cover type that is dominant.
3. What are the advantages to mapping land cover this way? What are the disadvantages? What might we miss?
4. Discussion questions to understand the value of mapping land cover:
 - Based on your land cover map, where do you think it will be hottest on a warm day? Where will it be coolest?
 - Where are you most likely to find mosquitoes?
 - Where is the greatest fire risk?
 - How will water flow through the area? Where is the greatest flood risk?
 - How does elevation influence land cover?
5. NASA maps from space, so we can see a big area all at once, but that makes it harder to see some of the details. If there's mixed land cover, NASA assigns the primary type to that area. What might we miss by mapping that way?
6. You can help us see the details by mapping the land with GLOBE Observer. GLOBE Observer provides verification for satellite-based mapping.

Note

In all variations of the activity, you may substitute dry erase markers for blocks. Simply color the land cover type on the transparency. Or, you may print the grid on standard paper, and ask participants to color the grid with crayons, colored pencils, or markers. The tactile blocks work extremely well, but coloring the grid can work too. One library suggested using carpet squares to build a large land cover map with a group. Feel free to adapt the concept to your local resources.



