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## Lesson Plan: Systems Mapping (Grades K-2) Teacher: Grace Lazzarini, Sequoyah School, Pasadena, Calif.

### Context & Background

[CLICK HERE](#) for a Google Slide Deck to accompany this lesson!

#### Snapshot

This lesson is focused on the process of systems mapping and can be used at any point in the year and addressing any topic. Systems mapping is an essential tool that makes your students' thinking visible. *The specific content in this lesson is **the garden system**.*

Consider posting systems maps on classroom walls so that students may later engage, interact, add, or even challenge ideas from the documented discussion. Teachers may refer to these maps to add to earlier discussions or as starting points for new topics for exploration.

#### What prior knowledge can students tap?

Before creating a system map, consider scaffolding student thinking through reading topical books, investigating realia, or taking observational walks around campus or the neighborhood.

#### Prepare essential questions to guide discussion and mapping

Garden system example:

- What other kinds of systems (i.e. insects, pollinators, water) are connected to the garden system?
- How do those systems work?
- What would happen if we did not have the (i.e. insect, pollinators, worm) system?
- Which other systems are connected to the garden system?

### Standards & Goals

#### Related Next Generation Science Standards

- **K-LS-1:** Organization for Matter and Energy Flow in Organisms: All animals need food in order to



Grace Lazzarini

live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow.

- **K-ESS2-2:** Human Impacts on Earth Systems: Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things.
- **2-LS2-1 & 2:** Interdependent Relationships in Ecosystems: Plants depend on water and light to grow. Plants depend on animals for pollination or to move their seeds around.

### Related Common Core Standards

- **ELA: RI1:** Ask and answer questions about key details in a text.
- **ELA: RI4:** Ask and answer questions to help determine or clarify the meaning of words and phrases in a text.
- **ELA: RI17:** Use the illustrations and details in a text to describe its key ideas.
- **ELA: SL1:** Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups.
  - Follow agreed-upon rules for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion).
  - Build on others' talk in conversations by responding to the comments of others through multiple exchanges.
  - Ask questions to clear up any confusion about the topics and texts under discussion.

### Related UN Sustainable Development Goals

- **Goal #2:** End hunger, achieve food security and improved nutrition
- **Goal #3:** Ensure healthy lives

### Related Systems Principles

- Systems are connected
- Systems have parts
- Systems work together
- Systems can be invisible or visible

### Other Goals

- Collaboration: Work with one another on a common task
- Oral Communication: Students will be able to explain and defend their thinking



Grace Lazzarini

- [Up in the Garden, Down in the Dirt](#) by Kate Messner
- Large poster or butcher paper and markers for in-person teaching
- Or, drawing tool such as Google Drawing for distance lessons with teacher recording
- Or, online interactive platform such as Jamboard or Padlet for older students to record their responses
- Partnering community organizations around gardening and sustainability (to extend the lesson)

## Instruction

1. Prepare the large poster board/butcher paper with Garden System labeled at the top, and Dirt System labeled at the bottom.



2. Begin the lesson by saying, "We have been reading many books about the garden system. We know that gardens have flowers, plants, and soil, and that gardens need water to grow and thrive. I'm wondering how other systems are connected to the garden system- and I'm thinking especially about systems that we cannot see. These are called Invisible Systems, things we can't see but we know are working! While I'm reading *Up in the Garden, Down in the Dirt*, I want you to notice systems you can see and systems you cannot see."

Throughout the story, teachers may want to pause and ask students about what systems they notice and ask them if it is a visible or invisible system.

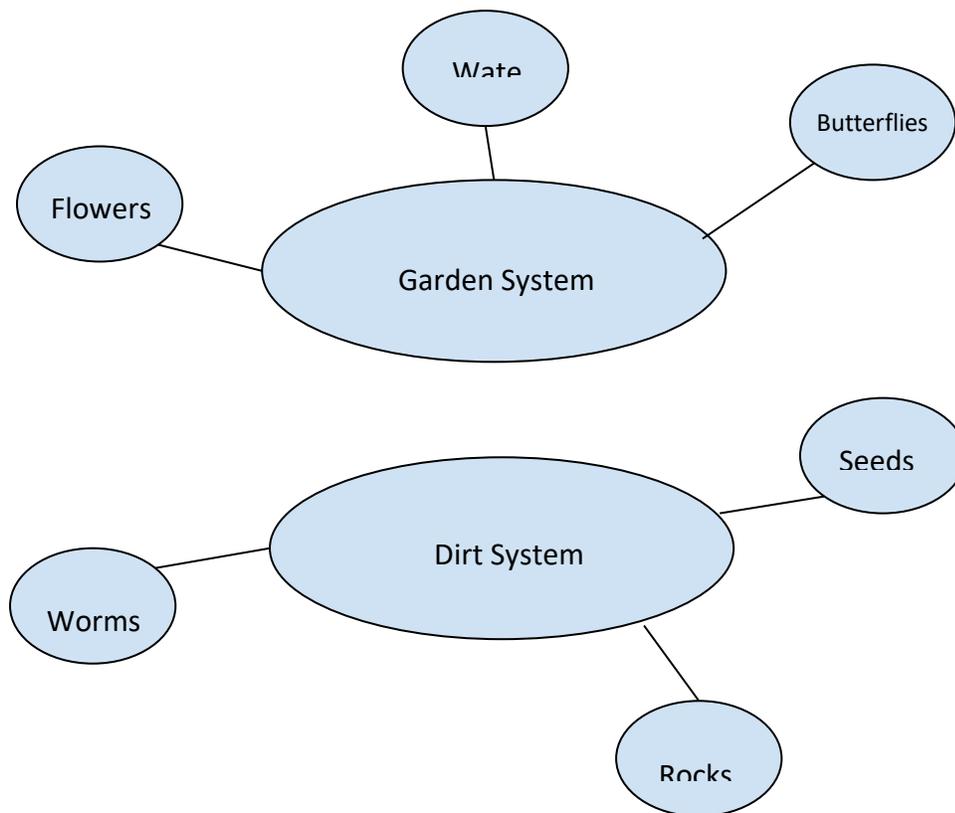


Grace Lazzarini

3. When you are finished with the story, ask students:

- Which systems are connected to the garden system?
- How do those systems work?
- Could a garden thrive or grow without it?
- What would happen if we did not have the (i.e. insect, pollinators, worm) system?
- What other kinds of (i.e. insects, pollinators, water) are part of the garden system?

As you ask these questions, scribe and add student ideas and thoughts to the map. Your map may look something like this:



4. To end the lesson, you might say, “Wow! We know so much about the Garden System and we even know so much about systems we can’t always see, unless we dig down in the dirt! If you want to add more to our chart, let’s find another time and we will come back to this again.”

#### Ways for students to access & process knowledge



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- Most whole group Systems Mapping lessons are a wonderful way for students to listen, connect, and even challenge their peers.
- At first, students may need teacher modeling for how to listen and build upon what others are sharing.

### **Differentiation: e.g., content, process, product, & learning environment**

- Some students will take to Systems Mapping very quickly. It will just make sense to them. Other students need time to process what is being shared and may be more of an observer and listener.
- Some students may need more time to understand how something is a system.
- Every student can bring something to the discussions, even if it is naming one system they noticed in a story, or showing how two (or more!) systems might be connected.

## So What?

### **Relevance and/or immediacy for this learning and this work**

- Students need to see how systems are connected to other systems in a concrete way, in order to apply it to abstract ideas.
- By giving students this foundation, they will begin to see the principles everywhere!

Levels of importance (e.g., school, local, global)

- School: This lesson will help the class in maintaining or creating a school garden.
- Local: Students learn how gardens (family, school, and community) benefit the greater community and how they can play a role.
- Global: This work is connected to the United Nations Goals of ending world hunger and living healthy lives.

## Assessments

Formative assessments

- How are students participating in the whole group lesson?
- Are all students sharing at least one system?
- When students participate, are they elaborating, connecting, or adding new ideas?



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### Summative assessments

- Do my students understand the systems principles: systems are connected and systems can be invisible/visible? You may want to note students' initials next to their ideas on the systems map to help you evaluate their understanding.

## Applications

- Actions to take because of or in service to learning (or the 'so what?')
  - Nurturing of the school garden
  - Connecting with community gardening programs
- Build on the systems map by
  - Creating posters about some aspect of garden systems
  - Teaching other classes about how systems connect in the garden