



Children's
Discovery
Museum
of San Jose

California Content Standards

Grade 2

- Science:
3c, 4a, 4b, 4c, 4f, 4g

Kids' Garden

Teacher's Guide: Grade 2



What's Going On?

The **Kids' Garden** is a real working garden where seasonal fruits, vegetables, and herbs are grown. Children can get their hands dirty as they use the five senses to explore the garden and its inhabitants. The activities described in this guide encourage children to use their senses to learn about soil.

Before You Visit

Before You Visit CDM, take some time to examine closely the soil around your school. Students will discover that soil is actually comprised of many different components, including sand, leaves, rocks, and small animals.

During Your Visit

During Your Visit to CDM, encourage children to get their hands dirty as they explore the soil in the Kids' Garden.

After Your Visit

After Your Visit, perform a simple experiment to determine the rate at which soil drains. Soil from different places has different components. The types and amounts of those components affect how plants grow because they influence how much water and oxygen is available to the plant. For example, some sandy soils drain too fast, while other soils hold too much water and plants become waterlogged.



Before You Visit

Examining Soil

Objective:

Students learn that soil is made of both inorganic and organic components and that not all soil is the same.

What you'll need:

- Soil collection jars – empty baby food jar, for example, one per student
- Trowels
- White paper
- Magnifying glasses
- Crayons, pencils, or other writing implements
- Resource materials for labeling insects and other soil matter
- Book about the soil or different types of animals who live in the soil, such as:

Diary of a Worm,
by Doreen Cronin

An Earthworm's Life,
by John Himmelman

Life in a Bucket of Soil,
by Alvin Silverstein

Dirt: Jump into Science,
by Steve Tomacek

A Handful of Dirt,
by Raymond Bial

What to Do:

1. Read one of the books about soil.
2. Choose different sections of the school's grounds – the playground, under a tree, the school garden if you have one, around a planter. Assign a group of children to collect jars of soil from each of the different areas. Each child should have one jar of soil.
3. When you return to the classroom, let each child spread his or her soil sample onto a white sheet of paper. The children can use their magnifying glasses to study the contents of the soil.
4. Have children draw what they see and use school library books, the Internet, or other resources to label their drawings with as much detail as possible. (For example, students can label grains of sand, pill bugs, pieces of rock, or spiders they find in the soil.)
5. When the children are finished, gather them together to show their drawings and talk about their soil observations. Were there any similarities among the soil collected from the same or different areas of the school? What were the differences?

Assessment:

Save the drawings as samples of children's knowledge of soil components.

Extensions:

- Use stacked soil sifters of different sizes to separate the components of soil by size and study the components.
- As a class, compare and contrast the soil found on different parts of the school grounds.
- Try the same experiment on a day when the weather differs (rainy, hot and dry, windy, cold) to determine how the soil compositions change according to the weather.



During Your Visit Guided Exploration of the Exhibit

What you'll need:

- Hands, eyes, and brains

What to do:

Encourage children to get their hands dirty as they explore the soil in the **Kids' Garden**. You may want to use the following items as discussion starters:

- Is the soil in each area of the garden alike? Which soils are sandy? Which are compact? Which are loose? Which are wet? Which are dry?
- What types of plants grow from each of the different types of soil? How are they similar and different?
- Are there plants that appear to be growing without any soil?
- Scoop up a handful of soil to look at under a microscope. What do you see?



After Your Visit

Determining the Best Soil

Objective:

Children will learn which spot on the school ground has the best soil for plant growth.

What you'll need:

For each group of 4 students:

- Funnel
- Two 2 cup liquid measuring cups
- Stopwatch

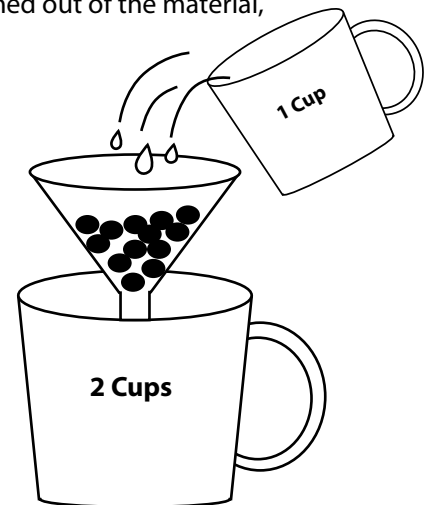
For each student:

- Kids' Garden Student Recording Sheet (at the end of the lesson plan)
- Soil collection jar – empty baby food jar, for example
- Trowel

For the demonstration:

- 4 transparent containers filled with different materials – 1 cup of clay, 1 cup of sand, 1 cup of gravel, 1 cup of rocks

1. Prior to beginning the activity with children, create a chart similar to the Student Recording Sheet on the board, an overhead projector, or chart paper where all of the children can see it.
2. Set the containers of clay, sand, gravel, and rocks in front of the children and ask them to identify the materials. Hopefully, (from the previous activities) they will recognize the materials as some of the components of soil. If not, explain to them that soil contains these different components, in different amounts, in different areas.
3. To test the drainage and flow of clay, sand, gravel, and rocks, put each material in a funnel. Set one funnel over each of 4 liquid measuring cups. Tell the children that you are going to pour water through the funnels. What do they think will happen to each material? To the water?
4. Pour exactly 1 cup of water into each funnel. Use the stopwatch to record the amount of time from the initial pour until the water stops draining from the funnel.
5. Take note of the drainage time on the chart. Enlist a child to read the measuring cup to determine how much water drained out of the material, and again, note the amount on the chart.
6. Repeat the process with the other 3 materials.
7. Discuss the results with the children. Which material drains the fastest? The slowest? Which material lets the most water through? Which material has large particles with a lot of space for water to flow through? Which material has small particles?
8. Now ask children to think about a plant growing in each of the materials. How would it grow? Would it get enough water or too much? Explain that soil from different places can have different levels of sand, silt, clay, etc. and that these levels affect how plants grow because soil needs to hold a proper amount of water and oxygen. Some sandy soils drain too quickly, other soils hold too much water and the plants become waterlogged.
9. The second half of the lesson has the children repeat the experiment with soil collected from around the school.



Determining the Best Soil for Plant Growth (continued)

Kids' Garden Teacher's Guide: Grade 2

Determining the Best Soil for Plant Growth (continued)

10. Choose different sections of the school's grounds. Assign a group of children to collect jars of soil from each of the different areas.
11. When you return to the classroom, place the students in new groups of 4. Each of the children in the group should have soil collected from different areas of the school. Instruct the groups to complete the same soil experiment you performed in steps 2-7, keeping track of results and conclusions on the *Student Recording Sheet*.
12. When all groups are finished, transfer their data onto the class chart to discuss the results. Where in the school has the best soil for planting?

Assessment:

While the children are discussing the results, note whether or not children understand what characteristics of soil make it suitable for plant growth.

Extensions:

- Not all plants need the same type of soil. (For example, spinach grows well in sandy soil; cacti do not need a lot of water.) Have the children research plants that would grow well in the soil they found.
- Provide the children with clay, sand, gravel, rocks, composted leaves, bark, and other soil components. Challenge them to mix their own planting soil and test it by planting seeds in it.

Related CDM Lesson Plans:

- [From Harvest to Home: The Farmer in the Dell](#)



Student Recording Sheet

Put a funnel in a measuring cup. Put your soil in the funnel. Pour 1 cup of water in the funnel and start the stopwatch. Then, fill in the chart.

Soil Location	Drainage Time	Amount of Drainage	Type of Soil

Conclusions: