

Maple Magic-Grade 3

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Before the Field Trip

- Lesson 1: The Dirt on Dirt
- Lesson 2: From Leaves to Roots

Before and After the Field Trip

- Lesson 3: All About the Maple Tree

Maple Magic Lessons Overview

By Brittney Clark and Jasmine Thomas

Standards:

- Science standards
 - (3.2.2) Observe the detailed characteristics of rocks and minerals. Identify rocks as being composed of different combinations of minerals.
 - (3.2.3) Classify and identify minerals by their physical properties of hardness, color, luster and streak.
 - (3.2.5) Describe natural materials and give examples of how they sustain the lives of plants and animals.
 - (3.3.1) Identify the common structures of a plant including its roots, stems, leaves, flowers, fruits and seeds. Describe their functions.
 - (3.3.2) Investigate plant growth over time, take measurements in SI units record the data and display the data in graphs. Examine factors that might influence plant growth.
 - (3.4.1) Choose and use the appropriate tools to estimate and measure length, mass and temperature in SI units. (this lesson will only touch on length)
 - (3.2.5) Describe natural materials and give examples of how they sustain the lives of plants and animals.
 - (3.2.6) Describe how the properties of earth materials make them useful to humans in different ways. Describe ways that humans have altered these resources to meet their needs for survival.
- Math standards
 - (3.2.1) Add and subtract whole numbers up to 1,000 with or without regrouping, using relevant properties of the number system.
- English Standards
 - (3.6) Students write using Standard English conventions appropriate to this grade level.

Activities

- Collect and test soil samples while making observations and reflecting in a journal.
- Plant a tree and make measurements and predictions of the tree's growth over time.
- Group reflection, collaboration, and discussion using journals.

Name: The Dirt on Dirt

Grade: Three

Standards:

- Science Standards 2010:
 - (3.2.2) Observe the detailed characteristics of rocks and minerals. Identify rocks as being composed of different combinations of minerals.
 - (3.2.3) Classify and identify minerals by their physical properties of hardness, color, luster and streak.
 - (3.2.5) Describe natural materials and give examples of how they sustain the lives of plants and animals.
- English Standards
 - (3.6) Students write using Standard English conventions appropriate to this grade level.

Materials:

- Teacher materials:
 - Nonfiction picture book “Dirt” by Steve “The Dirtmeister” Tomecek and illustrated by Nancy Woodman.
- Student’s materials:
 - Five soil test kits that measure pH levels (we will use Rapitest® pH soil test)
 - Five trowels or and small shovels
 - Five different colored survey flags
 - Distilled water
 - Soil samples (they will collect)
 - Their science journals
 - Pencils
 - Five Dixie cups

Objectives: The students will be able to:

- test soil pH levels correctly using a pH tester
- understand how the pH affects the nutrients in the soil and that it is connected to plant growth
- write and describe observations in a journal
- write and draw results from an experiment in a journal
- observe conditions ideal for maple trees to grow
- understand how soil forms and why it is so important
- Identify the four different types of sediment and their characteristics

Procedures:

- INTRO: Ask the students what they know about dirt by having a class discussion about anything that comes to their mind when we say “dirt” and their experiences with it. Ask questions such as “do you know where dirt comes from and how it forms; do you think that dirt is important?” Ask them to imagine the world without dirt and what they think their life would be like without it.

- **BOOK:** Now introduce the book listed above and tell how it can help the class answer the questions that they talked about in discussion.
- **CONTENT:** Ask the students to think of something that relies on soil and dirt to survive (hinting to them that the answer is plants). As a part of the class activity, they will plant a maple tree, but first they need to determine the quality of the soil and where that type of tree will grow best.
 - Have the students get out their journals.
 - Go over the PowerPoint presentation provided (It is a separate document, titled Soil Concept Exploration). Have the students write down the preferred soil and growing environment conditions for maple trees.
- **ACTIVITY:** The student's job is to find the perfect and most ideal location to plant our tree. They will test the soil of their chosen location, and we will determine which location is best based on soil test results and surrounding environment.
 - They will need to get into five different groups and find an area on the school campus that would be an ideal location for a maple tree to grow (keeping in mind the conditions and soil types listed in the PowerPoint).
 - Once they have an area picked out, they will test the soil using the soil test kit.
 - They will record data in their journal and come up with a small speech about why we should plant our tree there.
 - The students will use the attached worksheet to complete the task.
 - Once they have completed the activity, the class will join together again and the students will give their presentations. The class will then vote on the best location to plant our new tree.

Extension Activity: If the students finish early and are done before others they should go to this website and play the games to review information.

- <http://www.harcourtschool.com/activity/dirt/>

Special Needs: Have special needs students sit in the front of the class during the presentation and have them paired in a group that is collaborative. Always follow and accommodate the students IEP.

Closure: Ask the students what they think life would be like without soil now that they know more about it. Since they know more about soils and know how to test it and interpret results, they can plant their own tree. During the next lesson, the students will plant the maple tree on the campus and observe it growing over a period of time.

The Dirt on Dirt: Soil Testing Activity

Step 1: Find a location on the school property that would be a good location to plant the tree.

- Keep in mind the conditions we discussed in class.
- Write about your location in your journal observing what the area is like and how it fits the criteria of preferred conditions.

Step 2: Once you have an area selected, we need to collect the soil.

- First dig a small hole in the soil with the small shovel. Next, collect some of the dirt in the Dixie cup to take back to the class.
- Cover the hole back up. Place a survey flag in the hole so that we know where you collected your sample.
- Write in your journal about the soil and its characteristics: is it wet, clay, sandy, dry?

Step 3: Test the soil.

- Use the pH soil test kit directions on the back of the package to test the sample. The soil will turn a certain color depending on the pH level, and it will tell you if the soil is neutral, acidic, or basic.
- Collect the data and results of the test and write it down in your journal. Write and describe the process you took to test the soil.

Step 4: Reflect

- Write in your journal why you think that your spot would be a good location for the tree to be planted.
- Present to the class your findings and your journal entries for each step.



Name: From Roots to Leaves

Grade: Three

Standards:

- Science Standards 2010
 - (3.3.1) Identify the common structures of a plant including its roots, stems, leaves, flowers, fruits and seeds. Describe their functions.
 - (3.3.2) Investigate plant growth over time, take measurements in SI units record the data and display the data in graphs. Examine factors that might influence plant growth.
 - (3.4.1) Choose and use the appropriate tools to estimate and measure length, mass and temperature in SI units. (this lesson will only touch on length)
- Math Standards
 - (3.2.1) Add and subtract whole numbers up to 1,000 with or without regrouping, using relevant properties of the number system.
- English Standards
 - (3.6) Students write using Standard English conventions appropriate to this grade level.

Materials:

- Teacher materials:
 - A ready to plant maple tree, medium to small size
 - Shovel
 - Large boards for the teacher to write on, such as a chalk board or dry erase board.
 - Tree anchor kit (something to hold the tree up once it is planted to control growth)
 - Gallon of water
 - “Are Trees Alive?” by Debbie S. Miller and illustrated by Stacey Schuett.
- Student’s materials:
 - Five tape measurers
 - Children’s science journals and pencils

Objectives: The students will be able to...

- Draw and label the structure of a tree and functions of each structure
- Understand what nutrients that plants get to help them grow
- Be able to list the steps in planting a tree

Procedure:

- INTRO: First, ask the students if they think trees are alive. Ask the students to guess how many different kinds of trees there are and see if they can name some of them. There are over 750 different types of trees in the United States and over 100,000 in the world according to *Real Trees 4 Kids*. Ask the students if they have ever planted a tree and if they know that each part of the tree has a specific task.
- BOOK: “Let’s read the story and see what we think afterwards.” Read them the story, stopping often to ask questions.

- CONCEPT: Now that we have read the story, we can definitely see that trees are alive and that they have parts of their body that help them grow and be strong just like we do. “Can anyone name one of the parts of a tree that we heard about in the book?”
 - Use this question to start discussion on the parts of a tree and then write them on the board as they are brought up by the class (you may need to give them hints or ask questions to get them thinking):
 - Trunk=carries water, nutrients, and food from the roots to the branches and leaves, and also carries the food made by the leaves to the rest of the tree. (side note: a trunk can also be homes to animals such as animals and birds)
 - Branches=where the leaves grow, and a passageway for nutrients and food between the roots, trunk, and leaves
 - Leaves=absorb and take in the sunlight to produce energy. They use the energy and combine it with carbon dioxide and water to produce food for the tree.
 - Roots=hold the tree in the ground and draw water and nutrients out of the soil to nourish the tree
 - “Now that we know the parts of a tree we need to understand what helps them grow. What do you think that a tree needs in order to grow and stay healthy?”
 - Sun=feeds the tree through the leaves, but be careful, we do not want too much or too little
 - Water=the tree needs water that is soaked up through the roots. It serves as a way of travel for nutrients.
 - Nutrients=the tree soaks up nutrients such as nitrogen from the soil.
- ACTIVITY:
 - We will plant a maple tree on the school campus and observe its growth over time. In the last lesson, we found a spot that we thought the tree would grow the best.
 - Take the class outside to the location and gather the shovel, tree, and tree supports. The children will need their science journals and a pencil.
 - They will get back in their groups from the soil testing lesson (five groups) and each group will get a tape measure.
 - First start with the students observing the tree before it is put in the ground. They should write in their journals what they see and what it looks like.
 - They need to draw a picture of the tree on an entire page and label the parts of the tree that we discussed in class.
 - Dig the hole. If desired, have each student help in the digging process. Place the tree in the hole.
 - Once the tree is in the ground pick a child to put the dirt back into the hole until it is filled completely.
 - Show the students how to anchor and support the tree with the tree support kit supplied. If you are not familiar with this, just read the directions on the package.
 - Discuss the things that the tree needs and have someone pour a gallon or more of water on the ground.

- Have each group measure how tall the tree is from the ground up to the top of the tree. They should draw a data table such as the one below and write down the height in inches in the “at planting” column.

| Maple Tree | At Planting | Week One | Week Two | Week Three | Week Four |
|------------------|-------------|----------|----------|------------|-----------|
| Height in inches | | | | | |

- Now that the tree is planted, have the students get their journals back out and write what they observe and how the tree looks. They should draw another picture of the tree with the supports holding it up.
- Once the tree is planted, go back into the class and have the students predict how big the tree will be in one week. Have them make a prediction on how tall the tree will be in inches compared to the last measurement they made.
- They will go out each week and measure the tree and write it down on the table making journal entries of observations and predictions of growth and watering the tree if it needs it.
 - They will also take their prediction and subtract it from the actual height to see how far off they were.
 - They will need to draw the tree also and label the parts in their journal.
- After 4 weeks, they will measure the tree for the last time and figure how much in inches the tree has grown since they planted it.
 - They will make a final journal entry about the project as a whole.

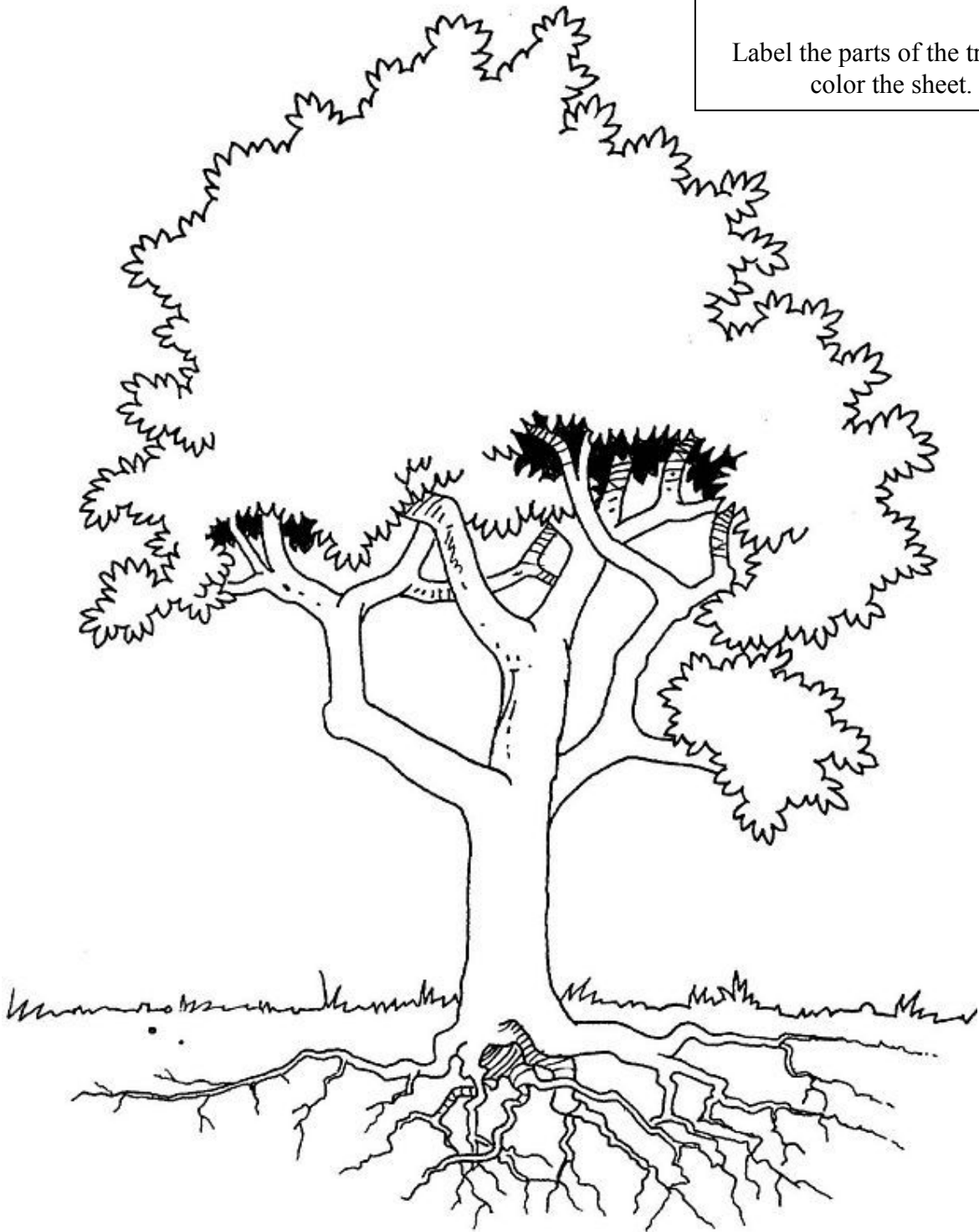
Extension Activity: If the students finish before others, they can use the color sheets attached to color the leaves and label the parts of the tree to take home and share with their parents.

Special Needs: For a special needs kid who has trouble writing, you can put them in a group where they can share notes and make copies. Also we could provide a worksheet with the tree structures already labeled.

Closure: Have the students write a reflection in their journals about what they learned in this activity and lesson. They should answer questions such as “what do plants need to grow, how the parts of trees function, and what are the steps to planting a tree?”

FROM ROOTS TO LEAVES

Label the parts of the tree and
color the sheet.



Name: All About the Maple Tree

Grade: Three

Standards:

- Science Standards 2010:
 - (3.2.5) Describe natural materials and give examples of how they sustain the lives of plants and animals.
 - (3.2.6) Describe how the properties of earth materials make them useful to humans in different ways. Describe ways that humans have altered these resources to meet their needs for survival.
- English Standards
 - (3.6) Students write using Standard English conventions appropriate to this grade level.

Materials:

- Teacher materials:
 - Nonfiction book “You Are The Earth” by David Suzuki and Kathy Vanderlinden
- Student Materials:
 - Their science journals
 - Pencils

Objectives: Students will be able to:

- state ways that the maple tree helps sustain animal and plant life
- state ways in which humans use the maple tree

Procedures:

- INTRO (Prior to going on field trip): Remind students that tomorrow they will be attending the Maple Magic field trip at Wesselman Nature Preserve. Tell them that while they are on the field trip, you want them to try and discover the answers to the following questions:
 - What types of places in the world does the maple tree grow?
 - What climate does it prefer? What is its life cycle?
 - What animals depend on it for food or homes?
 - Do they see any animals in the tree?
 - Are there any nuts, berries, or flowers on the tree?
 - Do they smell anything when they are around the tree?
 - Do they hear anything?
 - Are there any plants that depend on the maple tree for food and/or shelter?
 - (Questions taken from p. 103 of “You Are the Earth”)
 - Have them write these questions in their science journal. Encourage them to find as many of the answers as possible through observations. For the ones that cannot be answered through observations, encourage them to ask their tour guides.
- FIELD TRIP
- CONTENT (Day after the field trip): Have students discuss the answers to their journal questions in small groups. Compare and contrast their answers. Once they are finished

with their small groups have a grand discussion and have students share their responses. Mention that yesterday they saw humans use the maple tree for its syrup. Have them think of other ways that we might use the maple tree.

- **ACTIVITY:** The students will work in groups to discuss and reflect on the importance of maple trees. They will journal their conclusions and present them to the class. Use the following questions as a guide for discussion:
 - Imagine that there are no more maple trees. How will this affect nature where maple trees are normally located?
 - Think about the animals that depend on the maple tree for food and shelter. Are there other places where they can get food or shelter?
 - What about the flowers and leaves on tree? Are there any insects, animals, etc. that depend on flowers for food? Think about how leaves affect soil? What would happen to the soil without the maple tree leaves?
 - What about the other plants in the forest? How will they be affected? Can they still survive without the maple tree?
 - What about us? Can we get maple syrup from anywhere else? What about the other ways we depend on maple trees? Air? Wood? Paper? Etc. Can we still get these without the maple trees? Will it be harder to get these?
 - Feel free to discuss any other ways that life might be affected.

After discussing the above questions, have the students journal about their group discussions. Have each group share their thoughts with the class. They can use visuals in their presentations if they would like to. If you would like, students can even discuss and journal ways that they can help preserve the maple tree and other forms of nature.

Extension Activity: If the students finish early and are done before others they should go to this website <http://www.peaceread.org/tree-gardening-game.html> and play the game.

Closure: “What do you think that you learned from this field trip? Did you enjoy going to the preserve?” Ask the students questions about what they learned and let them talk. Expand on comments made by the students asking them to recall important information as a review.

Annotated Bibliography

Dirt on Dirt Lesson Plan

Resources for the Lesson Plan:

Tomecek, Steve “The Dirtmeister®”. *Dirt*. Washington, D.C.: National Geographic, 2002.
A nonfiction picture book about how soil formed, the different layer soil, how animals and plants depend on soil, and more.

“Soil Formation.” Harcourt School Publishers. 14 July 2011.

<<http://www.harcourtschool.com/activity/dirt/>>.

A game for students on how soil forms.

Resources for Teachers:

Suzuki, David. *You Are the Earth*. Vancouver: D&M Publishers Inc., 2010.

A nonfiction book with various facts on water, dirt, the sun and other topics related to the earth. Contains legends that relate to these different topics as well as a science activities that can be done in the classroom.

Resources for the Classroom Library:

Bourgeois, Paulette. *The Dirt on Dirt*. Tonawanda, NY: Kids Can Press, 2008.

A nonfiction photograph book with many interesting facts about dirt and cool experiments that can be done with dirt.

Ditchfield, Chrisitn. *Soil*. New York: Children’s Press, 2002.

A nonfiction photograph book on soil what is, the different types of soil, and more.

Oxlade, Chris. *Soil*. Chicago: Heinemann Library, 2002.

A nonfiction photograph book on what soil is, different types of soil, keeping soil fresh and much more on soil.

Stewart, Melissa. *Down to Earth*. Minneapolis: Compass Point Books, 2004.

A nonfiction photograph book that teaches students how to be scientists by detailing different ways they can examine dirt and rocks to draw conclusions.

From Roots to Leaves Lesson Plan

Resources for the Lesson Plan:

“Coloring Activities for Children.” Alexander Racini Junior The World’s Knowledge Explorer.

14 July 2011. <<http://alexanderracinijunior.blogspot.com/2010/03/coloring-activities.html>>.

A tree coloring sheet for students.

Miller, Debbie S. *Are Trees Alive*. New York: Walker & Company, 2002.

Nonfiction picture book that talks about the functions of the parts of the tree and compares it to the human body.

Resources for Teachers:

“Tree Physiology.” *Michigan Forests Forever Teacher Guide*. Michigan State University Extension. 14 July 2011. <http://mff.dsisd.net/Environment/TreePhys.htm>

A website that details the parts of a tree, photosynthesis and all of the factors that affect the growth of a tree.

Resources for the Classroom Library:

Kalman, Bobbie and Kathryn Smithyman. *The Life Cycle of a Tree*. New York: Crabtree Publishing Company, 2002.

Nonfiction photograph book that discusses in depth the functions of the tree parts, how trees grow and what they need to grow.

All About the Maple Tree Lesson Plan

Resources for the Lesson Plan:

Avery, Grace. "Leaf Blight." 2009. PeaceRead.org. 14 July 2011.

<<http://www.peaceread.org/tree-gardening-game.html>>

A strategy game in which students try to keep the maple tree alive by removing unhealthy leaves.

Resources for Teachers:

Suzuki, David. *You Are the Earth*. Vancouver: D&M Publishers Inc., 2010.

A nonfiction book with various facts on water, dirt, the sun and other topics related to the earth. Contains legends that relate to these different topics as well as science activities that can be done in the classroom.

Resources for the Classroom Library:

Purcell, Ann. *Maple Syrup Season*. New York: Holiday House, 2008.

A picture book of a story of a family that collects sap from the maple tree and makes maple syrup and taffy.

Thoennes Keller, Kristin. *From Maple Trees to Maple Syrup*. Mankato, Minnesota: Capstone Press, 2005.

A nonfiction photograph book on the process of how maple sugar is made.