TEACHING WITH PRIMARY SOURCES—MTSU

LESSON PLAN: Plant Travel: Studying the World through Ecosystems

Grades: 1-3
Subject: Science & Social Studies
Time Required: Two 45- to 60-minute class periods
Author: Ethan Morris, Teaching with Primary Sources—MTSU

OVERVIEW
In the following activity, students will examine and compare the ecosystems depicted in primary source images of plants in Finland, Ireland, and the United States. Students will then use the skills they learned analyzing primary source images to examine the ecosystems of plants around their school building. Students will be judged by their performance recording scientific field notes and answering reflective questions.

UNDERSTANDING GOAL
Students will understand what makes up an ecosystem, how similar ecosystems can be found in different areas of the world, and why some plants can be found in more than one place.

OBJECTIVES
Students will understand how to examine primary sources, ask analytical questions, build critical thinking skills, take scientific field notes, and write and reflect on their actions.

INVESTIGATIVE QUESTION
How is it possible for the same plant or animal to grow successfully in different parts of the world?

Howth and Ireland’s Eye, County Dublin, Ireland
[ca. 1890-ca. 1900]

CURRICULUM STANDARDS
Science
1.LS2: Ecosystems: Interactions, Energy, and Dynamics
1) Conduct an experiment to show how plants depend on air, water, minerals from soil, and light to grow and thrive.
2) Obtain and communicate information to classify plants by where they grow (water, land) and the plant’s physical characteristics.
3) Recognize how plants depend on their surroundings and other living things to meet their needs in the places they live.
3.LS4: Biological Change: Unity and Diversity
1) Explain the cause and effect relationship between a naturally changing environment and an organism’s ability to survive.
2) Infer that plant and animal adaptations help them survive in land and aquatic biomes.
3) Explain how changes to an environment’s biodiversity influence human resources.

Social Studies
• 2.18 Analyze how the location of regions affects the way people live, including their: food, clothing, shelter, transportation, and recreation.
### Lesson Materials
- **Images of Potatoes** (from the Library of Congress)
- **Phone app: Leafsnap** (designed by Columbia University, the University of Maryland, and the Smithsonian Institution)
- Blank, white sheet of paper

### Worksheets:
- **Around the World: Potatoes**
- **Around the World: Drawing** (1st & 2nd grade)
- **Around the World: Reflection** (3rd grade)
- **Around the Schoolyard: Field Notes**
- **Around the Schoolyard: Drawing** (1st & 2nd grade)
- **Around the Schoolyard: Reflection** (3rd grade)

### Procedure

#### Day 1

**Step 1**
If your students are unfamiliar with the term ecosystem, take time to define an ecosystem as the environment in which a plant grows. The environment includes the soil, the availability of water and sunlight, and typical weather patterns. Explain to students that they will be examining ecosystems: where to find them and how to describe them. Write the objective on the board and regularly refer to it during class activities and discussion.

**Step 2**
Direct student attention to the Smart Board or PowerPoint screen. Post the first Library of Congress primary source image of a potato on the board: **Vivian Jarrell digging potatoes**. Connect with students’ current knowledge of soil types by asking them what they think damp, dry, rocky, and fertile soil look like. Define these adjectives if students are unfamiliar with any of them. Encourage them to look at the image on the board in order to find any examples of soil types. If they find examples, ask them to point out those examples and describe how they know the example is damp, dry, rocky or fertile. Some suggested questions you might ask to prompt discussion are:

1. What kind of plants do you see in the picture? Trees? Potatoes?
2. How many of these plants do you see? A lot?
3. If there are so many plants in the picture, is this a good place for plants to grow? (Yes, this is probably fertile soil.)
4. What color is the soil? Light? Dark? (The darker it is, the more damp and fertile it probably is.)
5. What do you see in the soil? Is the soil all one color? Are there specks in the soil? What do you think those specks are? Sand? Rock?

**Step 3**
Repeat the previous step, using the **same image**, for:
1. Land types: asking what are hills and mountains, flat land, land with trees, and grass and scrub land. Some suggested questions you might ask to prompt discussion are:
   1. Is the potato field flat? Sloped? Do you see a mountain anywhere?
   2. What is that in the background?
   3. What is growing all around the potato field? Trees? Grass?
2. Sunlight types: asking what is sunshine, partial sunshine, and total shade. Some suggested questions you might ask to prompt discussion are:
   1. What clothes does the lady in the picture have on? In what season would you wear clothes like that? How much sunshine do we usually get during that season?
   2. What is a shadow? Do you see any shadows?
   3. What is the light source in this picture?
   4. Do you think the trees cause some shade? Are the potatoes under the trees or out away from them? If the potatoes are away from the trees, what would that mean?
<table>
<thead>
<tr>
<th>Step 4</th>
<th>After you finish the activity, tell your students that they are now going to record the observations they just talked about. Distribute the <em>Around the World: Potatoes</em> worksheets to each student.</th>
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<tr>
<td>Step 5</td>
<td>Inform them that they will be recording their observations by putting checkmarks in the appropriate boxes on their worksheets. Explain, for example, if they think the potato is growing in rocky soil, then they will first find the table marked “Soil.” They will place their checks in the space where the “United States” row and the “Rocky” column meet. Make certain your students understand this procedure. If you have an <em>Elmo</em> or document camera, this would be an excellent resource to help demonstrate this procedure. Furthermore, tell your students that you will lead them through the assignment and they will complete the worksheet together as a class.</td>
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<td>Step 6</td>
<td>Now that you have gone over the recording procedure, go back to the potato image looked at earlier. The students should be familiar with the soil, land, and sunlight types in this image and be able to more easily fill in the worksheet in regards to this image. To make sure students know exactly what is going on, have them lead a review of the procedure, explain how to fill in checkmarks on their worksheets, and reexamine the image for soil, land, and sunlight types. Contribute only to correct class-wide misconceptions, prompt further discussion, and ascertain the students are checking in the right boxes.</td>
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<td>Step 7</td>
<td>After you finish looking at the first image of a potato, taken in the United States, inform the students that they will be looking at more pictures of potatoes and their ecosystems, this time in other countries around the world. <em>Note for teachers:</em> There are some images that do not include potatoes but are simply images of foreign landscapes that will help students develop a better understanding of the ecosystems (i.e. the soil, land, and sunlight types) of the countries referenced.</td>
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<td>Step 8</td>
<td>Post the first image of potatoes in Ireland: <a href="http://www.geograph.org.uk/1037744">Howth and Ireland's Eye. County Dublin, Ireland</a>. Show your students where Ireland is on a globe or map. Make sure your students are aware that you will be talking about Ireland so that they are prepared to check in boxes on the row titled “Ireland.” To make sure students know exactly what is going on; again as earlier, have students explain the procedure and restate objectives. As the teacher, only contribute to correct misconceptions, prompt discussion, and make certain the right boxes are checked. Some suggested questions you might ask to prompt discussion are: (1) What color is the grass? Do you think there has been lots of rain? Is this good, fertile ground? (2) What is beyond the land? Is that an ocean? Is Ireland an island? Do you think all that water gets in the soil? (3) Is the land hilly or flat? (4) What are hills made of? Dirt? Rocks? (5) What kinds of plants do you see? Trees? Grass? (5) Do you see any shadows? What does this tell you about the sunlight? (6) What color is the sky? What color is the sun?</td>
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<td>Step 9</td>
<td>Post the second image of potatoes in Ireland: &quot;<a href="http://www.geograph.org.uk/1037744">Harvesting the spuds - geograph.org.uk - 1037744</a>&quot; and repeat the above step. For suggested questions related to this particular image, you might ask:</td>
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</table>
### Step 9 (cont.)

1. What does the soil look like? Does it have lots of specks? What are these specks? Sand? Rocks?
2. Does the soil look wet? How do you know? What could that mean?
3. Is the land hilly or flat?
5. Do you see any sunlight or shadows?

### Step 10

After you have talked about the Irish potatoes, post the first image of potatoes in Finland: [Miscellaneous lot of photographs by Barbara Wright. Finland](#). Show your students where Finland is located on a globe or map. Make sure your students are aware that you will be talking about Finland so that they are prepared to check in boxes on the row titled “Finland.” To make sure students know exactly what is going on, have students once again review and restate the procedure and objectives. As the teacher, only contribute to correct misconceptions, prompt discussion, and make certain the right boxes are checked. Some suggested questions you might ask to prompt discussion are:

1. What kind of plants do you see? Trees? Grass?
2. How many plants do you see? Do you think plants grow well here? Do you think that means fertile soil?
3. Is the land hilly or flat?
4. Do you see any shadows? What does this tell you about the sunlight?
5. Are there any clouds in the sky? Is there anything blocking the sun?

### Step 11

Post the second image of potatoes in Finland: [Finn, kopaiushchil kartofel’](#) and repeat the above step. For suggested questions related to this particular image, you might ask:

1. What kinds of plants do you see? Trees? Grass?
2. Is the land hilly, flat, or both?
3. What does the soil look like? Does it look clean? Is there speck in it? What do you think the specks are? Rocks? Plowed up plants?
4. Do you see any shadows? What does this tell you about the sunlight?
5. Are there any clouds in the sky? Is there anything blocking the sun?

### Step 12

Inform your students they have finished the observation activity. Explain that students will now use their knowledge to draw conclusions about the world’s ecosystems:

**For first and second graders:** Distribute [Around the World: Drawing](#) worksheets. Read the directions aloud to the students and answer any student questions. If the student finish in class, they may turn it in; otherwise they need to finish it for homework. They can hold on to their [Around the World: Potatoes](#) worksheets, since they will need them the following day in class.

**For third graders:** Distribute [Around the World: Reflection](#) worksheets. Working independently, have the students answer the questions. Remind them to use their recorded observations on the [Around the World: Potatoes](#) worksheets to help them answer the questions. Students should turn in their Around the World: Reflection worksheets when they get finished, in class or for homework. They can hold on to their [Around the World: Potatoes](#) worksheets, since they will need them the following day in class.
<table>
<thead>
<tr>
<th>Day 2</th>
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<tbody>
<tr>
<td><strong>Step 1</strong></td>
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<td><strong>Step 2</strong></td>
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<td><strong>Step 3</strong></td>
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<td><strong>Step 4</strong></td>
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<td><strong>Step 5</strong></td>
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<td><strong>Step 6</strong></td>
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<td><strong>Step 7</strong></td>
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<td><strong>Step 8</strong></td>
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<td><strong>Step 9</strong></td>
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<td><strong>Step 10</strong></td>
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<td>Step 10 (cont.)</td>
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<tr>
<td><strong>Step 11</strong></td>
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<tr>
<td><strong>EVALUATION</strong></td>
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<tr>
<td>25% <strong>For first and second graders:</strong> <em>Around the World: Drawing</em>—This worksheet should be graded for adherence to the <em>Around the World: Potatoes</em> worksheet (i.e. the two should match up). <strong>For third graders:</strong> <em>Around the World: Reflection</em>—This reflection should be read, commented on, and returned to help students improve their critical thinking and writing skills. It should be graded for command of the English language (e.g. spelling, grammar, structure, etc.), relevancy to the assigned topic (i.e. ecosystems), a stated awareness of the lesson objective, accuracy, and completion.</td>
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<td>25% <strong>Around the Schoolyard: Field Notes</strong>—This activity should be graded for how well the students filled in the tables and how accurately they judged their plants’ ecosystem (i.e. soil, land, and sunlight types.)</td>
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<tr>
<td>25% <strong>For first and second graders:</strong> <em>Around the Schoolyard: Drawing</em>—This worksheet should be graded for adherence to their <em>Around the Schoolyard: Field Notes</em> worksheet (i.e. the two should match up). This should be considered the summative assessment. <strong>For third graders:</strong> <em>Around the Schoolyard: Reflection</em>—This reflection should be read, commented on, and returned to the student to help improve their critical thinking and writing skills. It should be graded for command of the English language (e.g. spelling, grammar, structure, etc.), relevancy to the assigned topic (i.e. ecosystems), a stated awareness of the lesson objective, accuracy, and completion. This should be considered the summative assessment.</td>
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Images of Potatoes


[Finland: Potatoes] Finn, kopaiushchĭ kartofel’ [1905-1915]

[Ireland: Landscape] Howth and Ireland's Eye, County Dublin, Ireland [ca. 1890-ca. 1900]


[Finland: Landscape] Miscellaneous lot of photographs by Barbara Wright, Finland [ca. 1941]
**AROUND THE WORLD: POTATOES**

**POTATOES**

*Directions:* Look at the soil, land, and sunlight types in each of the images of potatoes. Record your findings in the three tables below. If you think the potatoes in the United States are in damp soil, then put a check-mark in the table titled “Soil,” in the row titled “United States,” and the column titled “Damp.”

<table>
<thead>
<tr>
<th>Potatoes</th>
<th>Soil</th>
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<tbody>
<tr>
<td></td>
<td>Damp</td>
</tr>
<tr>
<td>United States</td>
<td></td>
</tr>
<tr>
<td>Ireland</td>
<td></td>
</tr>
<tr>
<td>Finland</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Potatoes</th>
<th>Land</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hills and Mountains</td>
</tr>
<tr>
<td>United States</td>
<td></td>
</tr>
<tr>
<td>Ireland</td>
<td></td>
</tr>
<tr>
<td>Finland</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Potatoes</th>
<th>Sunlight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sunshine</td>
</tr>
<tr>
<td>United States</td>
<td></td>
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<tr>
<td>Ireland</td>
<td></td>
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<tr>
<td>Finland</td>
<td></td>
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</table>
AROUND THE WORLD: DRAWING

Directions: In the boxes below, draw a picture of the ecosystems in the United States, Ireland, and Finland. Make sure you **DRAW** and **LABEL**:

1. Potato Plant
2. Soil (e.g. If its rocky soil, draw lots of small circles in the soil.)
3. Land (e.g. If its land with lots of trees, draw trees in the background.)
4. Sunlight (e.g. If its partially shady, draw the sun behind a cloud.)
AROUND THE WORLD: REFLECTION

Directions: Answer all of the following questions in the space provided.

1. Using descriptive words, describe the preferred ecosystem of potatoes.

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3. In sentences, explain how the ecosystems of the countries of the United States, Ireland, and Finland are similar or different.

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**NAME: ______________________**

**AROUND THE SCHOOLYARD: FIELD NOTES**

**YOUR PLANT’S NAME: _______________________________**

*Directions:* Write your plant’s name and your school name in the blanks provided on this sheet. Then, look at the soil, land, and sunlight types in your schoolyard. Record your findings in the three tables below. If you think the soil is damp, then put a check-mark in the table titled “Soil” and in the column titled “Damp.”

<table>
<thead>
<tr>
<th>Soil</th>
<th>Damp</th>
<th>Dry</th>
<th>Rocky</th>
<th>Fertile</th>
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</thead>
<tbody>
<tr>
<td>School Name:</td>
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<table>
<thead>
<tr>
<th>Land</th>
<th>Hills and Mountains</th>
<th>Flat</th>
<th>Trees</th>
<th>Grass and Scrub</th>
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<tbody>
<tr>
<td>School Name:</td>
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<table>
<thead>
<tr>
<th>Sunlight</th>
<th>Sunshine</th>
<th>Partial Sunlight</th>
<th>Total Shade</th>
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<tbody>
<tr>
<td>School Name:</td>
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</table>
NAME: ______________________

AROUND THE SCHOOLYARD: DRAWING

Directions: In the space below, draw a picture of the ecosystem your group found in the schoolyard. Make sure you DRAW and LABEL:

1. Your group’s plant and plant name.
2. Soil (e.g. If its rocky soil, draw lots of small circles in the soil.)
3. Land (e.g. If its land with lots of trees, draw trees in the background.)
4. Sunlight (e.g. If its partially shady, draw the sun behind a cloud.)

Schoolyard
AROUND THE SCHOOLYARD: REFLECTION

Directions: Answer all of the following questions in the space provided. Write in complete sentences.

1. How did yesterday’s activity help you complete today’s activity?

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2. What did you learn today?

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3. How can you use what you have learned today away from school?

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