Land Use Introduction

The MEECS Land Use Unit will help students observe and analyze land use and land use planning challenges our society faces; the unit will also engage them in considering some of the possible solutions to these challenges. The unit is designed for grades 4 - 6 and supports Michigan Content Standards aligned science and social studies curricula. Lessons and activities can be adapted for other grades as well as for non-formal education programs.

Topics addressed in the unit include using air photos to identify land uses, mapping and measuring the land use changes in a community, comparing changes in agricultural land use in Michigan, comparing changes in forest land cover in Michigan, using tables and graphs to analyze changes in land use in Michigan counties, analyzing how land use conflicts are resolved in a democratic society, examining the values that different people hold for different types of land uses, and evaluating the role of land use as it interacts in the environment with air and water.

The land use choices that Michigan residents make, now and in the future, will have global environmental, economic, and social impacts for individuals and for our communities, the State of Michigan, and the United States. How can Michigan residents, businesses, and industry continue to meet their needs without compromising the ability of future generations to meet their needs? In order to ensure a sustainable future, Michigan residents must have the knowledge and skills necessary to make informed, data-based decisions about how one of our most important natural resources, the land, is being used currently and how it will be used in the future.

The land use challenges that we face as a state and as a country are increasing consumption and competition for the limited amount of available land. While our population is increasing at single digits, the amount of land being consumed for residential and suburban development is increasing in the double digits. Michigan’s land is rapidly changing in the way it is used, and citizens of the State must be certain that the smartest possible choices are being made regarding how this valuable natural resource is used. Students will be encouraged to explore possible solutions to these challenges through a smart growth approach to land use planning.

The unit is designed using the following “Enduring Understandings”:
Upon completion of the unit students will understand that:
1. Land is a vital natural resource that individuals and groups of people impact in many different ways.
2. Land is a limited natural resource and informed decisions must be made regarding how it is used.
3. Evidence suggests that land may be used in positive or negative ways.
4. Land use issues are addressed through government policies and rule of law in order to solve problems.
5. Knowledge of land use practices is often associated with water quality, ecosystem diversity, quality of life, and other environmental issues.
6. Individuals and organizations are responsible for rational and long-term land use planning within the community.
7. Individuals and organizations make choices in using natural resources such as land, and those choices have different impacts

The future of Michigan’s environment, economy, and natural resources depends on the decisions that will be made by today’s youth as tomorrow’s decision-makers. The MEECS Land Use Unit will help Michigan students gain the knowledge and skills they need to become stewards of Michigan’s environment and to help keep the Great Lakes State GREAT!
## Land Use Overview

<table>
<thead>
<tr>
<th>Essential Questions</th>
<th>Core Lesson</th>
</tr>
</thead>
</table>
| How was the air photo taken?  
What does the air photo show? | 1. **Observing Land Use** – Students identify land uses on aerial photographs of a location, taken at two different times. They discuss the changes between the two photographs and why these changes occurred. |
| How do people use the land?  
How can land use be measured?  
How can land use be classified? | 2. **Measuring Land Use** – Students identify different land uses on an aerial photograph, classify land uses, and measure area. They discuss the use of science and technology in classifying and measuring land use. |
| How is the land in Michigan used?  
Who owns the land? | 3. **Classifying Land Use** – Students analyze information about Michigan land use. The information is then classified and presented in graphs, tables, and diagrams. |
| Why do people use land differently?  
Why do land use conflicts occur?  
How do different land uses impact plant and animal life and people? | 4. **Reflecting on How the Land Is Used** – Students read short vignettes for information about land use. They engage in a discussion about why land use is important in Michigan. |
| How is land use changing?  
Why is land use changing?  
Are the land use changes positive or negative? | 5. **Analyzing Land Use Changes: State** – Students inquire about the changing agricultural land use in Michigan. Data for Michigan land use are graphed and analyzed to reveal past changes and project future changes. |
| How is land use changing?  
How is land use changing in different kinds of counties?  
Are the land use changes positive or negative? | 6. **Analyzing Land Use Changes: County** – In this lesson students examine and graph data about land use patterns and trends in their local county. |
| Why do conflicts over land use occur?  
How are conflicts resolved in a civil society? | 7. **Solving Land Use Conflicts** – This lesson introduces students to the process that people in the local community follow when they request a change in land use zoning. |
| What is the relationship between land use, water, and air?  
How does a change in land use affect water and air? | 8. **Investigating Land Use, Water, and Air Relationships** – Students study the interactions of land use, water, and air that result in an ecosystem that reflects both human and natural impacts on land use. |
## Enhancements/Extensions

| 1 | Practice interpreting air photos.  
|   | - *My Neighborhood: How has it changed? This land is Your Land* (Kent Co. and MSU Extension).  
|   | - Creating a Bird’s-Eye view of my house and yard.  
|   | - Identifying “land uses” at home  
|   | - Land use/land cover interpretation quiz  
| 2 | Investigating land use globally.  
|   | - *Land Uses – There are so many! This land is Your Land* (Kent Co. and MSU Extension).  
| 3 | Ownership vs. stewardship.  
| 4 | Identifying values that impact land use.  
|   | - Farmland development.  
|   | - Investigating land use research.  
|   | - E-mail discussion with local resource planner.  
|   | - Opposing viewpoints on land use planning  
| 5 | Research in farmland conservation/protection.  
|   | - Advocating a position on land stewardship.  
|   | - Examining what Michigan wants.  
| 6 | Visit from a local official.  
|   | - Learning about counties.  
|   | - Design your own suburb.  
|   | - Walking neighborhood surveys.  
| 7 | *Landopoly Surveys, This Land Is Your Land* (Kent Co. and MSU Extension)  
|   | - *Hear Ye! Hear Ye! This Land Is Your Land* (Kent Co. and MSU Extension)  
|   | - Land use debate.  
|   | - Interview a public official.  
|   | - Visit a local planning board.  
| 8 | Exploring water and air quality in depth.  
|   | - Investigating Smart Growth.  
|   | - Visit from an environmental journalist  
|   | - *Dragonfly Pond This Land Is Your Land* (Kent Co. and MSU Extension)  
|   | - Creating a booklet on land use, water, and air.  
|   | - Investigating historic changes in land use  
|   | - Brownfields & Greenfields  

---
<table>
<thead>
<tr>
<th>Michigan Curriculum Standards and Benchmarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Generate questions about the world based on observation (SCI.I.1.E.1; SCI.I.1.MS.1).</td>
</tr>
<tr>
<td>2. Use sources of information in support of scientific investigations (SCI.I.1.MS.5).</td>
</tr>
<tr>
<td>3. Describe positive and negative effects of humans on the environment (SCI.III.5.E.4).</td>
</tr>
<tr>
<td>4. Describe ways in which humans alter the environment (SCI.III.5.MS.6).</td>
</tr>
<tr>
<td>5. Describe major features of the earth’s surface (SCI.I.V.1.E.1).</td>
</tr>
<tr>
<td>6. Organize social science information to make maps, graphs, and tables (SS.V.I.LE.2).</td>
</tr>
<tr>
<td>7. Construct charts and graphs and prepare summaries of observations (SCI.I.1.E.6).</td>
</tr>
<tr>
<td>10. Describe the location, use, and importance of different kinds of resources and explain how they are created and the consequences of their use (SS.II.2.LE.2).</td>
</tr>
<tr>
<td>11. Organize social science information to make maps, graphs, and tables (SS.V.I.LE.2).</td>
</tr>
<tr>
<td>Extension Lesson 6</td>
</tr>
<tr>
<td>12. Generate questions about the world based on observation (SCI.I.1.E.1; SCI.I.1.MS.1).</td>
</tr>
<tr>
<td>15. Develop an awareness of the need for evidence in making decisions scientifically (SCI.II.1.E.1).</td>
</tr>
<tr>
<td>17. Describe the location, use, and importance of different kinds of resources and explain how they are created and the consequences of their use (SS.II.2.LE.2).</td>
</tr>
<tr>
<td>18. Organize social science information to make maps, graphs, and tables (SS.V.I.LE.2).</td>
</tr>
<tr>
<td>Extension Lesson 8</td>
</tr>
<tr>
<td>19. Generate questions about the world based on observation (SCI.I.1.E.1; SCI.I.1.MS.1).</td>
</tr>
<tr>
<td>22. Describe the location, use, and importance of different kinds of resources and explain how they are created and the consequences of their use (SS.II.2.LE.2).</td>
</tr>
<tr>
<td>23. Organize social science information to make maps, graphs, and tables (SS.V.I.LE.2).</td>
</tr>
</tbody>
</table>

**Land Use**

**Introduction**

Michigan Environmental Education Curriculum Support
### Land Use Master Materials List

#### Lesson 1. Observing Land Use

<table>
<thead>
<tr>
<th>Reproducible Materials</th>
<th>Materials in MEECS kit</th>
</tr>
</thead>
<tbody>
<tr>
<td>per class</td>
<td>per class</td>
</tr>
<tr>
<td>• Understanding Air Photographs (transparency master)</td>
<td>• MEECS Land Use CD-ROM  (teacher resources)</td>
</tr>
<tr>
<td>• 1980 A-1 Air Photo Discussion in Pairs (answer key)</td>
<td>• Shelby Township, MI, 1980 Air Photo</td>
</tr>
<tr>
<td>• 1995 A-2 Air Photo Discussion in Pairs (answer key)</td>
<td>• Shelby Township, MI, 1995 Air Photo</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>per pair of students</th>
<th>To be supplied by teacher</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Kite View Air Photograph (student resource)</td>
<td>• A Bird’s-eye View (optional teacher resource)</td>
</tr>
<tr>
<td>• Shelby Township, MI, 1980 Air Photo (student resource)</td>
<td>• hand lens (optional)</td>
</tr>
<tr>
<td>• 1980 A-1 Air Photo Discussion in Pairs (student activity)</td>
<td></td>
</tr>
<tr>
<td>• Shelby Township, MI, 1995 Air Photo (student resource)</td>
<td></td>
</tr>
<tr>
<td>• 1995 A-2 Air Photo Discussion in Pairs (student activity)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>per student</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Keeping Track (student activity)</td>
<td></td>
</tr>
</tbody>
</table>

#### Lesson 2. Measuring Land Use and Land Cover

<table>
<thead>
<tr>
<th>Reproducible Materials</th>
<th>Materials in MEECS kit</th>
</tr>
</thead>
<tbody>
<tr>
<td>per class</td>
<td>per class</td>
</tr>
<tr>
<td>• Air Photo 1 or Map 1: Land Use and Land Cover: The Imprint of People (transparency master)</td>
<td>• MEECS Land Use CD-ROM  (teacher resources)</td>
</tr>
<tr>
<td>• Air Photo 1 or Map 1: Land Use and Land Cover: The Imprint of People (answer key)</td>
<td>• Shelby Township, MI, 1995 Air Photo</td>
</tr>
<tr>
<td>• Dot Planimeter (transparency master)</td>
<td>• Air Photo 1 or Map 1: Land Use and Land Cover: The Imprint of People</td>
</tr>
<tr>
<td>• Amount of Area for Each Land Use/Land Cover (answer key)</td>
<td>To be supplied by teacher</td>
</tr>
<tr>
<td>• Bar Graph of Land Use/Land Cover (answer key)</td>
<td>per class</td>
</tr>
<tr>
<td>• Air Photo 2: Land Use/Land Cover Assessment (answer key)</td>
<td>• Dot Planimeter</td>
</tr>
<tr>
<td>• Amount of Each Land Use/Land Cover Assessment (answer key)</td>
<td>• A Bird’s-eye View (optional teacher resource)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>per pair of students</th>
<th>per pair of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Air Photo 1 or Map 1: Land Use and Land Cover: The Imprint of People (student resource)</td>
<td>• a photograph or poster of a familiar person</td>
</tr>
<tr>
<td>• Dot Planimeter (transparency master)</td>
<td>• acetate pen</td>
</tr>
<tr>
<td>• Amount of Area for Each Land Use/Land Cover (student activity)</td>
<td></td>
</tr>
<tr>
<td>• Bar Graph of Land Use/Land Cover (student activity)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>per student</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Air Photo 2: Land Use/Land Cover Assessment (student assessment)</td>
<td></td>
</tr>
<tr>
<td>• Amount of Each Land Use/Land Cover Assessment (student assessment)</td>
<td></td>
</tr>
</tbody>
</table>
### Lesson 3. Classifying Land Use

**Reproducible Materials per class**
- Land Use in Michigan (transparency master)
- Who Owns Michigan’s Forests? (transparency master)
- Classifying Land Use Lesson Assessment (answer key)

**Materials in MEECS kit per class**
- MEECS Land Use CD-ROM (teacher resources)
- Michigan Land Stewardship & Land Use/Cover map
- Michigan Land Stewardship & Land Use/Cover map (desktop size)

**per pair of students**
- Land Use Measuring Stick for Michigan (student activity)
- Classifying Land Use Lesson Assessment (student assessment)

**per student**
- Threats to the Forest (student activity)

### Lesson 4. Reflecting on How the Land Is Used

**Reproducible materials per class**
- Analyzing Land Use Readings (answer key)
- Analyzing the Impacts of Land Uses (answer key)

**Materials in MEECS kit per class**
- MEECS Land Use CD-ROM (teacher resources)
  - Student readings are recorded on the MEECS Land Use audio CD: A Farm in Michigan, A Visit to Comerica Park, A Visit to Seney National Wildlife Refuge, and Using the Forest in Many Ways
- Photo of farm, Comerica Park, Seney National Wildlife Refuge, and forest on MEECS Land Use CD-ROM

**per small group**
- Enough copies of the following readings for one-fourth the class to have each: A Farm in Michigan, A Visit to Comerica Park, A Visit to Seney National Wildlife Refuge, and Using the Forest in Many Ways (student resource)

**per student**
- Analyzing Land Use Readings (student activity)
- Analyzing the Impacts of Land Uses (student activity)
- Lesson Assessment (student assessment)

**To be supplied by the teacher per student**
- highlighter
### Lesson 5. Analyzing Land Use Changes: State

<table>
<thead>
<tr>
<th>Reproducible materials (per class)</th>
<th>Materials in MEECS kit (per class)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Table 1: State of Michigan Agricultural Lands (transparency master)</td>
<td>- MEECS Land Use CD-ROM (teacher resources)</td>
</tr>
<tr>
<td>- Line Graph of Changes in Michigan’s Agricultural Lands (transparency master, answer key)</td>
<td>- Connecting Farm to City (extension)</td>
</tr>
<tr>
<td>- Government’s Role in Land Stewardship (transparency master)</td>
<td></td>
</tr>
<tr>
<td>- Michigan’s Urban and Built-Up Land Use (transparency master, answer key)</td>
<td></td>
</tr>
<tr>
<td>- Table 2: State of Michigan Urban and Built-Up Land Use, 1978-2004 (transparency master)</td>
<td></td>
</tr>
<tr>
<td>- State of Michigan Farmlands (Acres) (answer key)</td>
<td></td>
</tr>
</tbody>
</table>

| Reproducible materials (per student) | |
|--------------------------------------| |
| - Table 1: State of Michigan Agricultural Lands (student resource) | |
| - Line Graph of Changes in Michigan’s Agricultural Lands (student activity) | |
| - Table 2: State of Michigan Urban and Built-Up Land Use, 1978-2004 (student resource) | |
| - Michigan’s Urban and Built-Up Land Use, 1978-2004 (student assessment) | |
| - Michigan’s Tart Cherry Production, 1999-2003 (student activity) | |
| - Tart Cherry Farms in Michigan (student activity) | |
| - State of Michigan Farmlands (Acres) (student activity) | |

### Lesson 6. Analyzing Agricultural Land Use Changes: County

<table>
<thead>
<tr>
<th>Reproducible materials (per pair of students)</th>
<th>Materials in MEECS kit (per class)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- County Land Use Data Bank: Agriculture (student resource)</td>
<td>- MEECS Land Use CD-ROM (teacher resources)</td>
</tr>
<tr>
<td>- Acreage in Farmland by County (student activity)</td>
<td></td>
</tr>
<tr>
<td>- Community Data Sheet 1: Dexter (student resource)</td>
<td>- Human World, Michigan County map</td>
</tr>
<tr>
<td>- Community Data Sheet 1: Utica (student resource)</td>
<td></td>
</tr>
<tr>
<td>- Community Data Sheet 1: Ypsilanti (student resource)</td>
<td></td>
</tr>
<tr>
<td>- Comparing Two Michigan Communities (student activity)</td>
<td></td>
</tr>
<tr>
<td>- Land Use Grid (transparency master/student activity)</td>
<td></td>
</tr>
</tbody>
</table>

- MEECS Land Use CD-ROM (teacher resources)
- Human World, Michigan County map
- Human World, Michigan County map (desktop size)
### Extension Lesson 6. Analyzing Forestland Changes: County

<table>
<thead>
<tr>
<th>Reproducible materials per pair of students</th>
<th>Materials in MEECS kit per class</th>
</tr>
</thead>
<tbody>
<tr>
<td>• County Land Use Data Bank: Forests (student resource)</td>
<td>• MEECS Land Use CD-ROM (teacher resources)</td>
</tr>
<tr>
<td>• Number of Acres of Forests in _______ County (student activity), three copies</td>
<td>• Michigan Forest History Time Line and Activities from Green Gold</td>
</tr>
<tr>
<td>• Forest Land Change, 1993-2003 map (student resource)</td>
<td>• Human World, Michigan County map</td>
</tr>
<tr>
<td></td>
<td>• Michigan Land Stewardship &amp; Land Use/Cover map</td>
</tr>
</tbody>
</table>

To be supplied by the teacher per pair of students
- Calculator

### Lesson 7. Solving Land Use Conflicts

<table>
<thead>
<tr>
<th>Reproducible materials per class</th>
<th>Materials in MEECS kit per class</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The Case of the Parking Spaces play script (student resource), 11 copies</td>
<td>• MEECS Land Use CD-ROM (teacher resources)</td>
</tr>
<tr>
<td>• Zoning Board of Appeals Minutes (teacher resource)</td>
<td></td>
</tr>
<tr>
<td>• Questions from the Play (transparency master)</td>
<td></td>
</tr>
<tr>
<td>• Questions from the Play (answer key)</td>
<td></td>
</tr>
<tr>
<td>• Making a Land Use Decision: Hidden Forest Estates (transparency master)</td>
<td></td>
</tr>
<tr>
<td>• Making a Land Use Decision: Hidden Forest Estates Assessment Scoring Guide (teacher resource)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>per student</th>
<th>To be supplied by the teacher per student</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Making a Land Use Decision: Hidden Forest Estates (student assessment)</td>
<td>• Small paper ballot</td>
</tr>
</tbody>
</table>
## Lesson 8. Investigating Land Use, Water, and Air Relationships

**Reproducible materials**

*per class*
- *Mini-Poster: Obtaining Information* (answer key)
- *Land Use Effects on Water and Air* (answer key)
- *Scoring Small Group Discussions* (teacher resource)
- *Performance Criteria for Assessing Discussion* (teacher resource)

*per small group*
- *Mini-Poster: Obtaining Information* (student activity)
- *Land Use Effects on Water and Air* (student activity)
- *Score Sheet for Group or Individual Student Discussion* (student resource)

*per student*
- *Tell the Story of a Pollutant* (student activity)
- *Comparing Land Use, Air, and Water Assessment* (student assessment)

**Materials in MEECS kit**

*per class*
- MEECS Land Use CD-ROM (teacher resources)
- *Michigan’s Land, Air and Water* poster

*per small group*
- *Michigan’s Land, Air, and Water* poster (desktop)
- *Michigan’s Land, Air, and Water* mini-poster

**To be supplied by the teacher**

*per class for pollution demonstrations*
- 2 jars – one for water pollution and one for air pollution
- dish detergent, dirt
- matches and strips of paper
- safety glasses
- table salt, spoon, jar or glass

*per small group*
- self-adhesive notes (4 different colors, 6 notes per group)

---

## Extension Lesson 8. Brownfields and Greenfields

**Reproducible materials**

*per class*
- photographs of brownfield and greenfield lands with captions (transparency masters) or projected photographs from the MEECS Land Use CD-ROM
- *Criteria for Making a Land Use Decision* (transparency master)
- *Making a Land Use Decision* (answer key)

*per pair of students*
- *Lakeside Factory and Green Acres* (student resource)
  (half the class will have each reading)

*per student*
- *Making a Land Use Decision* (student activity)
- *Community Map Analysis* (student assessment)

**Materials in MEECS kit**

*per class*
- MEECS Land Use CD-ROM (teacher resources)
- photographs of brownfield and greenfield lands with captions (transparency masters) or projected photographs from the MEECS Land Use CD-ROM
- *Michigan Land Stewardship & Land Use/Cover* map

**To be supplied by the teacher**

*per class*
- sticky note flags in two separate colors
## Michigan Content Standards and Benchmarks Correlations for Land Use Unit

**X- Addresses/Supports**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>I.1.E.1 Generate questions about the world based on observation</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I.1.E.5 Develop strategies and skills for information gathering and problem solving</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I.1.E.6 Construct charts and graphs and prepare summaries of observations</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>II.1.E.1 Develop an awareness of the need for evidence in making decisions scientifically</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X X X</td>
</tr>
<tr>
<td>II.1.E.2 Show how science concepts can be illustrated through creative expression such as language arts and fine arts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>II.1.E.4 Develop an awareness of and sensitivity to the natural world</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>III.5.E.4 Describe positive and negative effects of humans on the environment</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>V.I.E.1 Describe major features of the earth’s surface</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>VI.1.E.6 Demonstrate a way to conserve natural resources and reduce pollution through reduction, reuse, and recycling of manufactured materials</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>I.1.MS.1 Generate questions about the world based on observation</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I.1.MS.5 Use sources of information in support of scientific investigations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>I.1.MS.6 Write and follow procedures in the form of step-by-step instructions, formulas, flow diagrams, and statements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X X</td>
</tr>
<tr>
<td>II.1.MS.2 Describe some general limitations of scientific knowledge</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>II.1.MS.3 Show how common themes of science, mathematics, and technology apply in real-world contexts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>II.1.MS.5 Develop an awareness of and sensitivity to the natural world</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>III.5.MS.1 Describe common patterns of relationships among populations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>III.5.MS.6 Describe ways in which humans alter the environment</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>V.I.MS.5 Explain how technology changes the surface of the earth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>II.2.LE.2 Describe the location, use, and importance of different kinds of resources and explain how they are created and the consequences of their use</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>V.I.E.2 Organize social science information to make maps, graphs, and tables</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
Land Use Unit Development Team

Land Use Unit Development Coordinators and Lead Writers

Dr. Joseph P. Stoltman
Professor
Western Michigan University

Dr. Lisa M. DeChano
Assistant Professor
Western Michigan University

The development of this unit has involved the dedication and commitment of many individuals and organizations. The writers for this unit would like to acknowledge the time, expertise, and resources provided by the following individuals and groups.

Special thanks to the following for reviewing, contributions, and project assistance:

Cindy Bloom
Comstock Northeast Middle School

Cindy DeChano
Retired teacher, Warren Public Schools (PA)

Sharon Goralewski
Macomb Intermediate School District

Margo Hall
Houghton Elementary School
Grade 4

Kristy Karis
West Ottawa Middle School

Marty Mater
Teacher in Residence
Michigan Geographic Alliance

Jo Urion
Historian, Keweenaw National Historical Park

Lon VanBronkhorst
Grand Rapids Public Schools
Thanks to the following for serving as field reviewers:

Gretchen Connors  
Sandusky Middle School  
Sanilac ISD/Sanilac County Science and Math Center

Susan Dougherty-Fitzpatrick  
Crosswell-Lexington; Frostick Elementary  
Sanilac ISD/Sanilac County Science and Math Center

Susan Erickson  
Michigan Department of Environmental Quality

Rebecca Josephson-Gorinac  
Sanilac ISD/Sanilac County Science and Math Center

Cheryl Hach  
Kalamazoo Area Mathematics and Science Center

L.D. Hollenbeck  
SMTC

Laura Otten  
West Michigan Academy of Environmental Science

John Pilon  
Michigan Department of Natural Resources-Forest,  
Mineral and Fire MGMT Division

Deborah Rowe  
Oakland Community College

Kendra Wills  
Kent County/Michigan State University Extension

Organization & Agency Focus Groups – 2004

Kevin Richard, Michigan Department of Education  
Mike Johnston, Michigan Manufacturers Association  
Linda Humphreys, Earth Force  
Douglas Finley, Michigan Department of Natural Resources  
Tom Green, Bolles Harbor Mathematics and Science Center  
Monroe Public Schools  
Jason Dinsmore, Michigan United Conservation Clubs  
Jeanne Lipe, Michigan Department of Agriculture  
Andy Such, Michigan Chemistry Council  
Lynn Dominguez, Michigan Alliance for Environmental and Outdoor Education

Educator Focus Groups – 2004

Caroline Wetzler, Symans Elementary School  
Al Lewandowski, Port Huron Northern High School  
Sharon Gorailewski, Oakland Public Schools  
Marjane Baker, Tonda Elementary School  
Lon VanBronkhorst, Grand Rapids Public Schools  
Karen R. Todorov, Michigan Department of Education  
Kathy Dewsbury-White, Ingham ISD  
John Clark, Ithaca Public Schools  
Carol McCaul, Shepherd Public Schools  
Bruce Patterson, Harrison Community Schools  
Tom Wessels, Traverse Bay Area ISD  
David Bydlowski, Wayne RESA  
Becky Goche, U.S. Fish and Wildlife Service
Land Use Field Test Teachers

Martha Adams  
St. Jude Elementary  
Kent, MI  
Grades 4-5

Jill Brower  
Heritage Elementary  
Huron Valley, MI  
Grade 5

Betty Bushong  
Springview Elementary  
Flushing, MI  
Grade 5

Kathleen Deckert  
Violet Elementary  
Lake Shore Public  
Grade 4

Donna Dunn  
DaVinci Institute  
Jackson, MI  
Grade 4

Crystal Eskin  
Garfield Elementary  
Wyandotte, MI  
Grade 5

Patricia Filippini  
Washington School  
Bessemer, MI  
Grades 3-4

Marilyn Glover  
St. Joseph School  
West Branch/Rose City, MI  
Grades 6-8

Margo Hall  
Houghton Elementary  
Houghton-Portage Twp.  
Grade 4

Lois Hiemstra  
Mendon Elementary  
Mendon, MI  
Grade 4

Ryan Huppert  
SWCC  
Grand Rapids, MI  
Grade 4

Jennifer Illoff  
Lincoln Elementary  
Van Dyke, MI  
Grade 5

Camille Kaye  
Bates Academy  
Detroit, MI  
Grade 4

Deborah Loop  
Hatherly Elementary  
Warren, MI  
Grade 4

Motoko Lynn Maegawa  
Kingsbury School  
Oxford, MI  
Grades 5-8

Karen Morgan  
Hahn Intermediate School  
Davison, MI  
Grade 5

Luanne Nelson  
Grant Elementary  
Grant, MI  
Grade 4

Lisa Ramthun  
Benona Elementary  
Shelby, MI  
Grade 5

Lee Stroschine  
St. Peter’s and St. Paul’s Lutheran  
Hopkins, MI  
Grades 3-5

Rebecca Stroube  
C.S. Sullivan Elementary  
L’Anse Area School  
Grade 4

Kathy Tassier  
Cedarville Elementary  
E. Upper Peninsula  
Grade 5

Janet Watts  
Bates Academy  
Detroit, MI  
Grades 3-4

Vicki Weiss  
City School  
Grand Blanc, MI  
Grades 3-5

Scott Welling  
Buckley Community School  
Buckley, MI  
Grades 3-4

Kathy Wetton  
CLK Elementary  
Public Schools of CLK  
Grade 4

Amanda Wilkie  
Greater Lansing Islamic School  
Ingham, MI  
Grades 5-8
Land Use Teacher Trainers

Kristin Anderson Malloy
Morley Stanwood Community Schools
Stanwood Elementary
Grade 4

Marjane Baker
Plymouth-Canton Community Schools
Tonda Elementary
Grades 3-5

Pam Bunch
Lenawee County K-12 Schools
Stubnitz Environmental Education Center
Adrian, MI
Grades K-12

John Clark
Ithaca Public Schools
Ithaca North Elementary
Grades 3-6

Kathleen Deckert
Lakeshore Public Schools
Violet Elementary School
Grade 4

Kathy Dickens
Elkton-Pigeon-Bay Port Laker Schools
Laker Middle School
Grades K-8

Margo Dill
Regional Math & Science Center
Allendale, MI

Michele Glenn
Detroit Public Schools
Cadillac Middle School
Grades K-8

Greg Jacobs
Clear Lake Education Center
Escanaba, MI

Alissa Jordan
Detroit Public Schools
Clark Elementary School
Grade 4

Becky Josephson-Gorinac
Sanilac County Science/Math Center
at Sanilac ISD
Peck, MI

Constance Josvai
Manistee Area Public
John F. Kennedy Elementary
Grade 5

Terri Laysell
Huron-Clinton Metroparks
Environmental Discovery Center
White Lake, MI

Jennifer Malinowski
Great Lakes Renewable Energy Association
Dimondale, MI
Grades K-12

Emily McKenna
Belding Area Schools
Belding Middle School
Grade 7

Linda O’Brien
Seaborg Center
Marquette, MI
Grades K-9

Bruce Patterson
Harrison Community Schools
Hillside Elementary School
Grade 5th/Preservice (CMU)

Wes Stevenson
Lapeer ISD
Lapeer, MI
Grades 4-5

Michelle Svoboda
Comstock Park Public Schools
Mill Creek Middle School

Lisa Swartz-Medina
St. Mary-Hannah School
Diocese of Gaylord
Grades 4-6

Bob Tallman
SVSU Regional Math/Science Center
Saginaw, MI
Grades K-12

Jennifer Tapolcai
Clear Lake Education Center
Manistique, MI 49854
Grades K-12

Jessica Wagenmaker (Luxford)
Holton Public Schools
Holton Middle School
Grade 7

Betty Jo Winters
Addison Community Schools
Addison Elementary
Grade 4

Tom Yaeger
Angell Elementary
Ann Arbor Public Schools
Grades 4-5