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**Soil & Nutrition**

4. **Garden Soil Exploration** *(K-12)*

- Introduction to Soil Composition and Types
- Plant soil nutrient needs
- Hydrology – water cycles
- Geological Creation of Soil
- Agriculture
- Composting
- Field Testing of Soil – Ribbon Test
- Engineering – Constructing Soil Drainage Systems
- Standardized Science Measurements
- Recording Scientific Data in Tables
- Small Scale construction of a Compost System
- Drawing Conclusions from Experimentation

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5. **The Right Diet for Your Plants** *(6-8)*

- Soil Composition and Types
- Plant soil nutrient needs
- Fertilizers
- Human nutrient needs
- Plant nutrient needs

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• Fertilizers  
• Nutrient Deficiencies in Plants  
• Nutrient Deficiencies in Humans  
• Plant Nutrient Toxicities  
• Macronutrients and Micronutrients  
• Nitrogen Fixation  
• Organic vs. Commercial Fertilizers  
• Humanity Against Hunger – Social Concerns  
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• Plant Life Cycles  
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• Photosynthesis  
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- pH, Acidity, and Alkalinity Testing  
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• Plant Dynamics (circulation and nutrient uptake)  
• pH, Acidity, and Alkalinity Testing  
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• Introduction to Fisheries (biology and care)  
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<tr>
<th>Lesson</th>
<th>Key Topics</th>
<th>State of AK</th>
<th>NGSS</th>
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</table>
| **23. Exploring Aquaponics** (K-2) | • Introduction to Aquaponics  
• Introduction to Fisheries (anatomy, biology, and care)  
• Water Quality and Monitoring  
• Plant Dynamics (circulation and nutrient uptake)  
• pH, Acidity, and Alkalinity Testing  
• Recording Scientific Data  
• Standardized Science Measurements  
• Small Scale construction of an Aquaponic System  
• Drawing Conclusions from Experimentation (hands-on, observation, and note-taking) | K-LS1-1  
K-ESS3-1  
K-2-ETS1-2  
1-LS1-1  
2-PS1-4 | K-LS1-1  
K-ESS2-2  
K-ESS3-1  
1-LS1-1  
1-LS1-2  
1-ESS1-2  
2-PS1-2  
2-LS2-1  
2-LS4-1  
2-ESS2-2  
K-2-ETS1-2 |
| **24. Exploring Aquaponics** (3-5) | • Introduction to Aquaponics  
• Introduction to Fisheries (anatomy, biology, and care)  
• Water Quality and Monitoring  
• Plant Dynamics (circulation and nutrient uptake)  
• pH, Acidity, and Alkalinity Testing  
• Recording Scientific Data  
• Standardized Science Measurements  
• Small Scale construction of an Aquaponic System  
• Drawing Conclusions from Experimentation (hands-on, observation, and note-taking) | 3-LS3-2  
3-5-ETS1-3  
4-LS1-1  
4-PS3-4  
5-PS3-1  
5-LS1-1  
5-LS2-1 | 3-LS1-1  
3-LS3-2  
3-LS4-3  
3-LS4-4  
4-LS1-1  
5-PS3-1  
5-LS1-1  
5-LS2-1  
3-5-ETS1-1 |
| **Composting** | • Introduction to Composting  
• Life Cycle and Anatomy of Worms  
• Decomposition of Vegetation  
• Composition of Compost (Macro and Micro Organisms, Oxygen and Aeration, Temperature)  
• Recording Scientific Data  
• Standardized Science Measurements  
• Medium Scale construction of a Compost System  
• Drawing Conclusions from Experimentation (hands-on, observation, and note-taking) | K-LS1-1  
K-ESS3-1  
K-2-ETS1-2  
1-LS1-1  
2-LS4-1  
3-LS4-3  
3-5-ETS1-1  
4-LS1-2  
5-PS3-1  
5-LS2-1  
MS-LS1-3  
MS-LS1-8  
MS-LS2-1  
MS-LS2-2 | K-LS1-1  
K-ESS2-2  
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1-ESS1-2  
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2-LS2-1  
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2-ESS2-2  
K-2-ETS1-2  
3-LS1-1  
3-LS3-2  
3-LS4-3  
3-LS4-4  
4-LS1-1  
5-PS3-1  
5-LS1-1  
5-LS2-1  
3-5-ETS1-1  
3-LS1-1  
3-LS3-2  
3-LS4-3  
3-LS4-4  
4-LS1-1  
4-LS1-2  
4-LS1-1  
4-LS1-2  
5-PS3-1 |
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| 26. The Rotten Truth (3-5) | • Introduction to Composting  
• Life Cycle and Anatomy of Worms  
• Decomposition of Vegetation  
• Biodegradation  
• Composition of Compost (Macro and Micro Organisms, Oxygen and Aeration, Temperature)  
• Recording Scientific Data  
• Standardized Science Measurements  
• Small Scale construction of a Compost System  
• Drawing Conclusions from Experimentation (hands-on, observation, and note-taking) | MS-LS2-5  
MS-ESS3-3  
MS-ETS1-1 | 3-LS4-3  
3-5-ETS1-3  
4-LS1-1  
5-PS3-1  
5-LS2-1 | 3-LS1-1  
3-LS3-2  
3-LS4-3  
3-LS4-4  
4-LS1-1  
4-LS1-2  
5-PS3-1  
5-LS2-1  
3-5-ETS1-1 |