Alive & Growing - Making the schoolyard garden essential:
Part 1: Standards

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Thoughts on the Continual Evolution of Standards, the Current State of Science Education and finding a place in your School’s Curriculum for a Garden to Grow and Thrive.
Curriculum – what is it?

Example - Science

• **State Standards** – guide curriculum – performance expectations

• **Content Materials**
  
  Science Kits – FOSS, STC, Delta, Seeds of Science, textbooks

• **Assessments**
  
  » Summative and formative

• **Instructional Strategies** - pedagogy – art/how of instruction
Science Curriculum & Standards

Milestones

Pre- Sputnik

1960’s – ESS & SCIS – Guides

Topics

Explorations of our world

Child-centered

Refined over the years

Lasted in Minneapolis into 1990’s

Examples:
Science Curriculum & Standards – Milestones

1983 - Nation at Risk Report – American schools are failing, touched off a wave of local, state, and federal reform efforts.

1985 – Science for All Americans – Project 2061 – set out to identify what was most important for the next generation to know and be able to do in science – Science Literate Citizens (NSF Funded programs to advance this)

1990’s - FOSS/STC Appeared (both NSF funded)

1992 - Minnesota Legislature committed itself to establishing a “Rigorous Results Orientated Graduation Rule for Public School Students” – Profile of Learning – Set Graduation Requirements for 9th Graders in 1996-7 School Year
Science Curriculum & Standards – Milestones

• December 19, 2003 Minnesota Academic Standards – Science K-12 Released
  – Grade Level Specific
    Strands  Nature and History of Science - Physical - Earth - Life
    Sub-Strand
    Standard
    Benchmark- Examples 2nd Grade Earth Science, Life Science
  – 1. The student will observe and describe rocks, soils, water and air.
  – 1. The student will describe life cycles of plants and animals.

• 2009 Science Standards Revised
• Added Practice of Science & Engineering, Contributions of Native Americans, MN specific Industries
Purpose of 2009 Minnesota Academic Standards

• The standards and benchmarks for a particular grade level describe the science content that is to be mastered by all students by the end of that grade level.

• In accordance with Minnesota statutes, (MS 120B.030) “state tests must be constructed and aligned with state academic standards.” These are the statewide MCA tests that are administered each year in science in grades 5, 8, and high school.

• The standards and benchmarks also guide school districts in designing science curricula. The standards and benchmarks have been intentionally written to provide a progression of learning for students. K-8 curriculum and high school course requirements should include the opportunity for students to engage in all of the standards and benchmarks at each grade level.
Science K-12
2009

Physical Science
- Matter
- Motion
- Energy
- Human Interactions

Earth & Space Science
- Earth Structure & Processes
- Interdependence in Earth System
- The Universe
- Human Interactions

Life Science
- Structure & Function
- Interdependence in Living Systems
- Evolution
- Human Interactions
Building on the Past; Preparing for the Future

Phase I

Phase II

Phase III

State Standards

1990s

1990s-2009

1/2010 - 7/2011

7/2011 – March 2013

2017-18
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<tbody>
<tr>
<td>1. Asking questions (for science) and defining problems (for engineering).</td>
<td><strong>Physical Sciences</strong></td>
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<td>2. Developing and using models.</td>
<td>PS 1: Matter and its interactions</td>
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<td>3. Planning and carrying out investigations.</td>
<td>PS 2: Motion and stability: Forces and interactions</td>
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<td>4. Analyzing and interpreting data</td>
<td>PS 3: Energy</td>
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<td>5. Using mathematics and computational thinking.</td>
<td>PS4: Waves and their applications in technologies for information transfer</td>
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<td>6. Constructing explanations (for science) and designing solutions (for engineering).</td>
<td><strong>Life Sciences</strong></td>
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<td>7. Engaging in argument from evidence</td>
<td>LS 1: From molecules to organisms: Structures and processes</td>
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<td>8. Obtaining, evaluating, and communicating information</td>
<td>LS 2: Ecosystems: Interactions, energy, and dynamics</td>
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<th>2. Crosscutting Concepts: unify the study of science and engineering through their common application across fields (ES-1)</th>
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<tr>
<td>1. Patterns</td>
<td><strong>Earth and Space Sciences</strong></td>
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<td>2. Cause and effect: Mechanism and explanation</td>
<td>ESS 1: Earth’s place in the universe</td>
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<td>3. Scale, proportion, and quantity</td>
<td>ESS 2: Earth’s systems</td>
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<td>4. Systems and system models</td>
<td>ESS 3: Earth and human activity</td>
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<tr>
<td>6. Structure and function</td>
<td>BTS 1: Engineering design</td>
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<td>7. Stability and change</td>
<td>BTS 2: Links among engineering, technology, science, and society</td>
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Aligning Gardens to Standards

• Science is the “low hanging fruit”
  – Life & Earth Strands

• Other Areas- All Other Content Areas

• Examples from Literacy, Health, Social Studies
Grade 1 Writing Standard:

• 1.6.7.7  Participate in shared research and writing projects (e.g., explore a number of “how-to” books on a given topic and use them to write a sequence of instructions). (Similar strand across all of K-5) (E.G., Grade 4

• 4.6.7.7  Conduct short research projects that build knowledge through investigation of different aspects of a topic.

Speaking and Listening standards  e.g., grade 1, 1.8.8.8

With prompting and support, create and share an individual or shared multimedia work for a specific purpose (e.g., to share lived or imagined experiences, to present information, to entertain, or as artistic expression.)
Health Standards

• “if the garden includes fruit, vegetables, grains, etc... the following health standards can be met by exploring the nutritional value of the food that is grown, the impact of culture in nutritional decisions, and the decision making process and practice of healthy eating. There are opportunities to go even further into health standards, but these are the most applicable”.
Health Standards

• National standards that fit with this educational opportunity.

• **Standard 7**: Students will demonstrate the ability to practice health-enhancing behaviors and avoid or reduce health risks.

• **Standard 2**: Students will analyze the influence of family, peers, culture, media, technology and other factors on health behaviors.

• **Standard 5**: Students will demonstrate the ability to use decision-making skills to enhance health.
Social Studies Economic and Geography ‘Anchor’ Standards:

**Substrand 4: Microeconomic Concepts**
- Standard 5 Individuals, businesses and governments interact and exchange goods, services and resources in different ways and for different reasons; interactions between buyers and sellers in a market determine the price and quantity exchanged of a good, service or resource.

**Substrand 2: Places and Regions**
- Standard 3 Places have physical characteristics (such as climate, topography and vegetation) and human characteristics (such as culture, population, political and economic systems).
Social Studies Economic and Geography ‘Anchor’ Standards:

- **Substrand 4: Human Environment Interaction**
- Standard 9 The environment influences human actions; and humans both adapt to, and change, the environment.
- Standard 10 The meaning, use, distribution and importance of resources changes over time
- There may also be historic connections to agrarian vs. industrial society and framing vs. nomadic indigenous cultures.
Resources

• Minnesota Department of Education K-12 Academic Standards http://education.state.mn.us/MDE/EdExc/StanCurri/K-12AcademicStandards/

• Minnesota STEM Teacher Center – Frameworks Site http://scimathmn.org/stemtc/

• Minnesota Comprehensive Assessments-Series III (MCA-III) - Test Specifications http://education.state.mn.us/MDE/EdExc/Testing/Test Spec/


• Morning Earth.com http://www.morning-earth.org
Final Thoughts:

• School year versus Seasons
• Curriculum day is extremely crowded
• State Assessments matter for schools
• Alignment process is great way to learn nuts & bolts of standards
• Gardening & outdoor classrooms matter for students/teachers
• Players change
• Facility departments need to be brought along
• Outside groups provide leverage
• Searching for Sugar Man