# Science in the Learning Gardens (SciLG)
## Factors that Support Racial and Ethnic Minority Students' Success in Low-Income Middle Schools

Hundreds of gardens across the country are underutilized as contexts for active academic engagement in middle grades. School gardens provide important cultural milieus while addressing environmental and food issues. Equally significant, they are sites for learning school subjects.

The Science in the Learning Gardens (SciLG) project brings underrepresented middle-school youth from Portland Public Schools (PPS) into underused school gardens at a critical time in their intellectual development, to broaden the factors that support their interest and motivation in STEM learning.

Oregon was one of the states actively involved in writing the Next Generation Science Standards (NGSS). Thus, SciLG is ideally positioned to advance integration of core NGSS concepts with science in schools.

## SciLG PROJECT FEATURES

- 6th-8th grade curriculum is aligned with NGSS
- School gardens are utilized as context for learning
- Student success in science proficiency and motivational engagement is investigated
- Co-designed by PPS middle school science teachers, Portland State University (PSU) faculty, and an advisory team that includes representation from garden educators and communities of color

SciLG also utilizes PSU graduate students in the Leadership for Sustainability Education Program as interns and garden educators who work alongside PPS middle-school science teachers. This creates a notably low adult-to-student ratio, leading to better instructional enrichment.

SciLG is pilot-tested in grades 6, 7, and 8 at two schools in the Portland Public School (PPS) district. Portland State University (PSU) faculty and graduate students support participating PPS science teachers with NGSS-aligned science curriculum design and use of their schools' gardens for instruction.
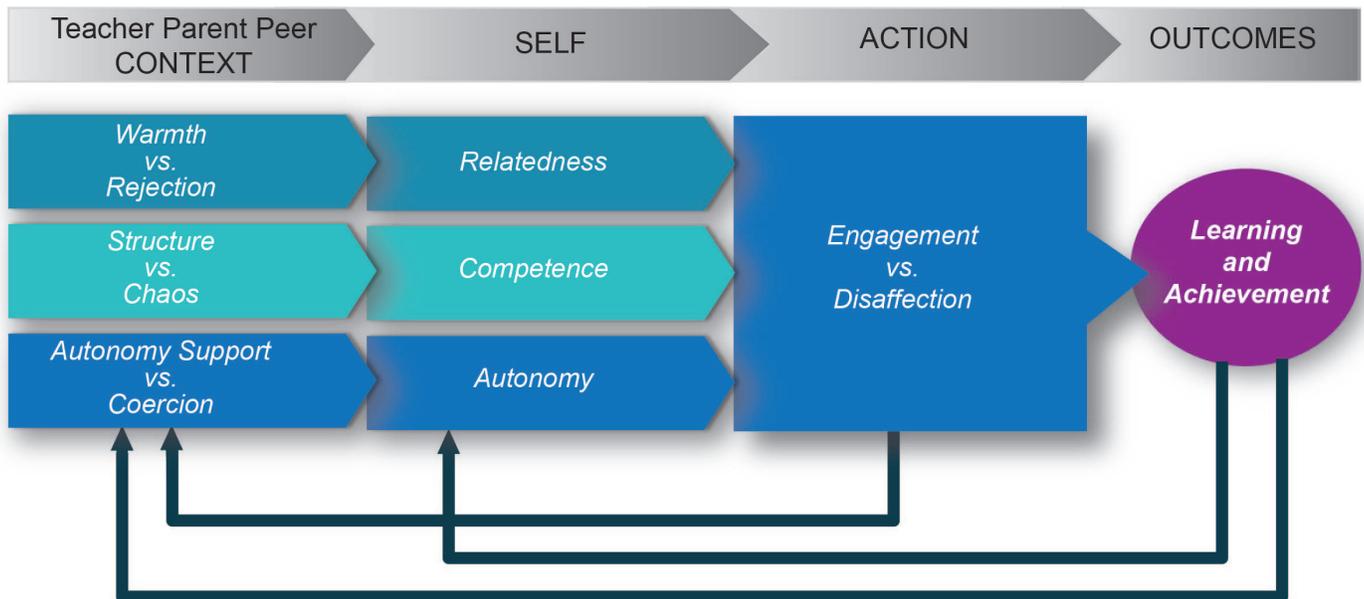
The research team studies how learning gardens can serve as an effective pedagogical strategy for NGSS-aligned science curriculum. The data collected measure students' learning and academic performance in science and their identification with STEM fields, as well as students' motivational experiences as informed by Self-Determination Theory (SDT) in gardening and science-class settings.

The SDT motivational model holds that schools can either support or undermine children's fundamental psychological needs, which include the needs for:

- **Relatedness** (to feel they are welcome and belong)
- **Competence** (to feel they are efficacious)
- **Autonomy** (to feel self-determined in their learning)

Engagement with academic work is constructive, enthusiastic, willing, emotionally positive, and cognitively-focused participation in learning activities.

## SELF-DETERMINATION THEORY



| Teacher Parent Peer CONTEXT | SELF | ACTION | OUTCOMES |
| --- | --- | --- | --- |
| Warmth vs. Rejection | Relatedness | | |
| Structure vs. Chaos | Competence | Engagement vs. Disaffection | Learning and Achievement |
| Autonomy Support vs. Coercion | Autonomy | | |

Any opinions, findings, and conclusions or recommendations in these materials are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.



**The SciLG project is a partnership between the Portland State University Graduate School of Education and Portland Public Schools.**

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**To learn more about the SciLG project, view the NSF Teaching and Learning video showcase:**
**http://resourcecenters2015.videohall.com/presentations/542**

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