

PARTNERSHIP FOR AMBITIOUS SCIENCE TEACHER LEADERS

PASTL is a unique collaboration between Puget Sound ESD, Olympic ESD, Northwest ESD, University of Washington's Ambitious Science Teaching Development Group, the Physics Education Research Group at Seattle Pacific University, Federal Way School District and Bellevue School District.



201 Summer Institute Summary

This summer, 50 science teachers participated in a cross-district/cross-regional two-week summer institute purposed at developing the Partnership for Ambitious Science Teacher Leaders, “PASTL”, a Math-Science Partnership Grant-funded project. Teachers experienced, learned and began collaborating around a set of high-leverage teaching practices, aligned to NGSS, that support teachers in developing a highly rigorous and equitable learning environment.

Teacher Learning was Focused on Seven Elements of Ambitious Science Teaching

1. **ANCHOR LEARNING:** *Teachers anchor students’ on-going learning experience in the press to understand complex and puzzling science phenomena.*
2. **STUDENTS’ IDEAS USED AS RESOURCES:** *Students’ everyday ideas, experiences, and questions are treated as resources for the classroom community to advance everyone’s thinking.*
3. **COMPLEX UNDERSTANDINGS GET BUILT OVER TIME:** *Learning experiences are sequenced to help students build toward cumulative understandings of “big science ideas.”*
4. **TALKING IS THINKING:** *Teachers provide varied opportunities for students to reason through talk.*
5. **STUDENTS ENGAGE IN SCIENCE PRACTICES FOR PURPOSE:** *Students are apprenticed into using ensembles of scientific practices to test ideas they believe are important to their developing explanations and models.*
6. **MAKING THINKING VISIBLE AND “WORKING ON IDEAS” TOGETHER:** *Student thinking is made visible and subject to critique by the classroom community*
7. **SCAFFOLD TALK, WRITING & PARTICIPATION:** *Students have access to specialized tools and routines that support their attempts at science-specific forms of writing, talk, and participation in activity. Everyone participates, no one is left behind.*

WHAT TO EXPECT DURING THE SCHOOL YEAR

You should see your students doing more...

- *Talking, modeling and explaining science ideas to make sense of complex real-world phenomena.*
- *Student-to-student talk purposed at asking questions, and interpreting data to re-think their initial science ideas and explanations.*
- *Students developing explanations for how and why a science phenomenon happens.*
- *Engaging in productive struggle to develop understanding about complex science phenomena.*

You should see students doing less...

- *Memorizing vocabulary and regurgitating facts*
- *Copying tons and tons of notes*

Teachers will begin to...

- *Shift their role from “answer giver” to “learning facilitator” or “discussion coordinator”*
- *Structuring units of instruction around real-world phenomena.*
- *Trying out strategies, scaffolds and systems to support rigorous student science talk.*
- *Eliciting and instructionally responding to student thinking over the course of a unit.*
- *Continuously engaging in formative assessment practices where students assess their own learning.*
- *Collaborate in a networked community to deepen their understanding of Ambitious Science Teaching Practices.*

2015-16 JOB-EMBEDDED PROFESSIONAL DEVELOPMENT DAYS

Participating teachers will attend 5 job-embedded professional development days in the 2015-16 school year.

	Federal Way + Bellevue	Olympic ESD Region	Northwest ESD Region
Reflective Planning Day 1	September 29	October 13	October 20
Studio Day 1	November 3 December 2 Nov 19* Bellevue	November 17	November 10
Reflective Planning Day 2	January 12	January 19	January 21
Studio Day 2	February 23 March 1 March 7* Bellevue	February 25	February 4
Reflective Planning Day 3	March 23	March 14	March 17

ONGOING COLLABORATION

Throughout the school year, the PASTL team will support teachers through personal email communication, via the AST Facebook site and through closed virtual sharing spaces (under construction) on the Ambitious Science Teaching website. Through these means, we hope to collaboratively develop, share and reflect on common tools and resources aligned to the AST framework and the NGSS.

PASTL Team

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Facebook (Jump on and Share! It's a PRIVATE Facebook page!)

Name of Page: *Advancing Ambitious Equitable Practice*

Website

<http://AmbitiousScienceTeaching.org>

LOGISTICS SUPPORT

Your partners from the Educational Service Districts, School Districts and Universities will support each of the Reflective Planning and Studio Days. However, if you have any logistics-related or concerns questions, please contact:

PASTL Project Manager

Kat Laxton, PSESD Regional Science Coordinator and K-12 Science Program Manager, klaxton@psed.org,

Lead Facilitator and Coordinator for Studio Days & Reflective Planning Days

Karin Lohwasser, University of Washington, loh2o@uw.edu

PARTICIPATING TEACHERS

Bellevue School District

International Middle School

Luke Moorhead

Cheryl McClure

Tyee Middle School

Hailey Gurrad

Janel Hershey

Bremerton School District

Bremerton High School

Jessica McBride

Kieth Langholff

Edmonds School District

College Place Middle School

Amy Peterson

Collen LaMotte

Federal Way School District

Totem Middle School

Amy Scott

Leslie Hargraves

Adrienne McKay

Gwen Roland

Sequoya Middle School

Heather Laprade

David Chernicoff

Zachary McCauley

Kilo Middle School

P.J. Williams

Teresa Lee

Illahee Middle School

Jamie Johnson

Randy Kemman

Franklin Pierce School District

Morris Ford Middle School

Josh Simondet

Highline Public Schools

Ann Morris

Lynden School District

Lynden Middle School

Sue Brooks

Alexis MacNevin

North Mason School District

North Mason High School

Anna Munkres

Ramey Leroy

*Julie Engberg**

Chinook Middle School

Scott Gregorich

Odle Middle School

Stacia Bible

Interlake High School

Faith Iverson

Central Kitsap School District

Top Ridge Jr High School

Laura Rarig

Kellie Ashley

The Brighton School

Kitten Vaa

Saghalie Middle School

Matt Tipton

Venu Bhat

Lakota Middle School

Brittney Clerget

Nathan Santo

Decature Middle School

Ted Gustin

Todd Beamer High School

Alan Semrau

Thomas Jefferson High School

Elizabeth Copeland

Milana Michalec

Matt Clouser

Northshore School District

Canyon Park High School

Jeff Armentrout

Bothell High School

Chris Asmann

Snohomish School District

Glacier Peak High School

Brian Hill

Christina Scott

Sedro-Wooley School District

Sedro-Wooley High School

Scott Conlan

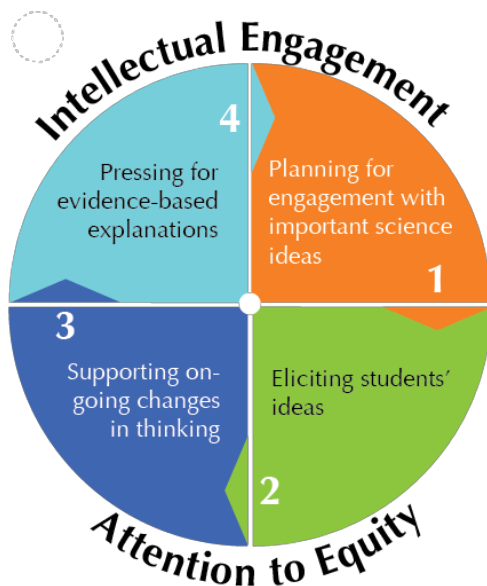
Laura Schmidt

Wa He Lut Indian Tribal School

Emily Dernbach

Ambitious Science Teaching

We provide here a vision of ambitious teaching—teaching that is effective, rigorous and equitable. But more than that, we provide a framework of research-based teaching practices that are consistent with this vision and a wide range of tools that can transform how students learn in your classroom. The vision, practice, and tools will furnish a common language about teaching for a group of science educators committed to the improvement of teaching. You will be able to identify “what we will get better at” and how to get started.



Ambitious teaching aims to support students of all racial, ethnic, and social class backgrounds in deeply understanding science ideas, participating in the talk of the discipline, and solving authentic problems. This teaching comes to life through four sets of teaching practices that are used together during units of instruction. These practices are powerful for several reasons. They have consistently been shown through research to support student engagement and learning. They can each be used regularly with any kind of science topic. And finally, because there are only four sets of practices, we can develop tools that help both teachers and students participate in them, anyone familiar with the practices can provide feedback to other educators working with the same basic repertoire, teachers can create productive variations of the practices, and everyone in the science education community can share a common language about the continual improvement of teaching.

The four Ambitious and Equitable Science Teaching Practices are summarized in the below.

Practices	What does it LOOK like?
Planning for engagement with important science ideas	<ul style="list-style-type: none"> Planning a unit that connects a topic to a phenomena that it explains (Chemical Reactions – Bike Rusting, Photosynthesis – Seed Becoming a Tree) Teaching a topic within a real-world context
Eliciting students' ideas	<ul style="list-style-type: none"> Asking students to explain HOW and WHY they think a phenomena happens (How did the bike change? Why did it change? What is happening at the unobservable level?)
Supporting on-going changes in thinking	<ul style="list-style-type: none"> Using ALL activities/lessons to explain the phenomena. Giving students opportunities to revise their thinking based on what they're learning
Pressing for evidence-based explanations	<ul style="list-style-type: none"> Allowing students to create a final model or explanation about the phenomena Pressing students to connect evidence to their explanation

How will science education change with NGSS? \$

Implications of the Vision of the Framework for K-12
Science Education and the Next Generation Science Standards ,

SCIENCE EDUCATION WILL INVOLVE LESS:	SCIENCE EDUCATION WILL INVOLVE MORE:
Rote memorization of facts and terminology	Facts and terminology learned as needed while developing explanations and designing solutions supported by evidence-based arguments and reasoning.
Learning of ideas disconnected from questions about phenomena	Systems thinking and modeling to explain phenomena and to give a context for the ideas to be learned
Teachers providing information to the whole class	Students conducting investigations, solving problems, and engaging in discussions with teachers' guidance
Teachers posing questions with only one right answer	Students discussing open-ended questions that focus on the strength of the evidence used to generate claims
Students reading textbooks and answering questions at the end of the chapter	Students reading multiple sources, including science-related magazine and journal articles and web-based resources; students developing summaries of information.
Pre-planned outcome for “cookbook” laboratories or hands-on activities	Multiple investigations driven by students' questions with a range of possible outcomes that collectively lead to a deep understanding of established core scientific ideas
Worksheets	Student writing of journals, reports, posters, and media presentations that explain and argue
Oversimplification of activities for students who are perceived to be less able to do science and engineering	Provision of supports so that all students can engage in sophisticated science and engineering practices

Source: National Research Council. (2015). *Guide to Implementing the Next Generation Science Standards* (pp. 8-9). Washington, DC: National Academies Press. <http://www.nap.edu/catalog/18802/guide-to-implementing-the-next-generation-science-standards>