Teacher-Scientist Partnerships (TSP)

Invitations for teachers to design a solution to a proposed problem aligned with PNNL’s mission

The Six Takeaways of TSPs...

1. TSPs are a powerful form of professional development for both teachers and scientists
2. Office of STEM Education forms a critical “bridge” linking teachers and scientists
3. Teachers benefit when setting aside their role as “educator” and embracing the role of “learner”
4. Learning should be interactive in nature, not just lecture-based
5. Teachers experience the nature of science as it is done at a national laboratory
6. Scientists link their work to what is being taught in schools

Goal: Accelerate sustainable STEM workforce improvement through the professional development of teachers in an adult oriented, real-life, problem-based immersion in partnership with PNNL scientists and engineers. The experience is designed to impact the teaching and curriculum delivered to students in the classrooms of those teachers.

History of PNNL TSPs

More than 30 years of TSPs at PNNL
Elementary, middle, and high school teachers
Federal and private funding sources

TSP General Model

Program Structure
- Three part teams: PNNL researchers, OSE Science Education Specialist, and classroom teachers
- One to two week summer program

Scientist Professional Development
- Work with Science Education Specialist to develop scenario
- Design constructive learning experiences
- Review research on TSPs and lessons learned

Scenario Development
- Scenario similar to the research done at PNNL
- Solvable within a week
- Aligned with Next Generation Science Standards (NGSS)

Classroom Teachers
- Coming in teams of at least two per school
- Teachers, as “learners”, engage in problem-based learning
- Continuous reflection on experience

After Action Review
- All members of the team assess their experience
- Teachers evaluate experience alignment with NGSS
- Feedback is used to refine future TSPs

Monday
- Preparation for the week (Laboratory Record Books, Collaboration Norms, Learner hat)
- Introduction to scenario

Tuesday
- Field site visits
- Utilize hands-on scientific tools and techniques to collect data

Wednesday
- Additional data collection in field and classroom
- Begin data analysis

Thursday
- PNNL Lab visits
- Data analysis and development of final presentation

Friday
- Final teacher presentations
- Reflections on NGSS
- Development of ideas for classroom impact
Teacher-Scientist Partnerships: 2019 Association of Washington Business Institute

The Scenario
Evaluate options for reintroduction of salmon and steelhead above Chief Joseph and Grand Coulee dams: Examine different methods for tracking movements of fish; Incorporate elements from geology, chemistry, biology and engineering

Teacher Testimonials

"Greatest professional development I have attended in my 25 years. Relevant to where I am and my teaching of students."

"This specific scenario is ideal for my classroom, but better. Walking through the process of project-based research as a student allows me the backbone of implementation."

Demographics*

<table>
<thead>
<tr>
<th>School District</th>
<th>Hockinson</th>
<th>Mount Vernon</th>
<th>Rainier</th>
<th>Sequim</th>
<th>Sunnyside</th>
<th>Walla Walla</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Minority (State Average: 47%)</td>
<td>14</td>
<td>61</td>
<td>22</td>
<td>24</td>
<td>94</td>
<td>42</td>
</tr>
<tr>
<td>% Low Income (State Average: 46%)</td>
<td>21</td>
<td>65</td>
<td>48</td>
<td>49</td>
<td>86</td>
<td>56</td>
</tr>
<tr>
<td>% Pass Rate for Science (State Average: 47%)</td>
<td>46</td>
<td>36</td>
<td>52</td>
<td>53</td>
<td>30</td>
<td>48</td>
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Impact Summary

Number of Students Impacted: 3000*  
Number of Teachers Impacted: 12  
Average % Minority: 42.8  
Average % Pass Rate for Science: 54.2  
Average % Low Income: 44.2

*Arrows indicate whether percentage is above or below state average

"Giving back through STEM outreach has been a crucial component of my career. Participating in the AWB Teacher-Scientist Partnership helped improve my communication skills, and looking at our work from a teacher’s perspective reminds me how cool the work we do really is! I especially enjoy working with teachers because the impact will be amplified 1000x as they carry this knowledge back to their classrooms."

+ Number of students impacted were estimated from 2019-2020 school year class sizes and does not include students impacted in future years

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