

Teacher-Scientist Partnerships (TSP)

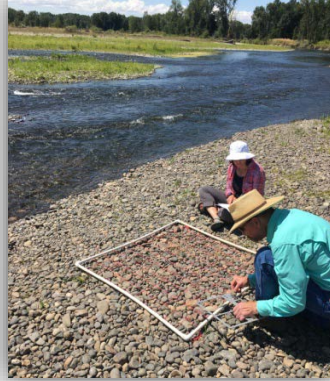
Invitations for teachers to design a solution to a proposed problem aligned with PNNL's mission



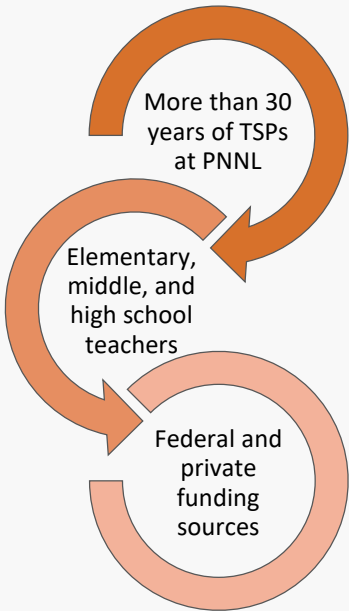
The Six Takeaways of TSPs...

- 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



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 | Tuesday | Wednesday | Thursday | Friday |
|--|---|--|--|---|
| <ul style="list-style-type: none"> • Preparation for the week (Laboratory Record Books, Collaboration Norms, Learner hat) • Introduction to scenario | <ul style="list-style-type: none"> • Field site visits • Utilize hands-on scientific tools and techniques to collect data | <ul style="list-style-type: none"> • Additional data collection in field and classroom • Begin data analysis | <ul style="list-style-type: none"> • PNNL Lab visits • Data analysis and development of final presentation | <ul style="list-style-type: none"> • Final teacher presentations • Reflections on NGSS • Development of ideas for classroom impact |

Teacher-Scientist Partnerships:

2019 MESA Institute



The Scenario

Environmental Impacts of Groundwater Storage System: Evaluate the effects of groundwater storage on land use, habitat quality, water quality, and fish; Incorporate elements from geology, ecology, botany, and data science

Teacher Testimonials



"My thinking changed after working with the scientists/engineers by enabling me to see the bigger picture of where my instructional practices may benefit my students. I did not realize there are so many local issues to pull from in regards to project-based experiences and phenomena."



"I am in awe of your collaboration and partnerships. I always thought of science as being competitive. Your teamwork is inspiring."

Scientist Testimonials



"Activities involving mentoring, outreach, and education have always been some of the most fulfilling work for me as a scientist. Working with teachers to help them prepare the next generation is a really special opportunity, both to assist the teachers and also to learn from their shared experiences and different perspectives."

Demographics*

*Arrows indicate whether percentage is above or below state average

School District:	Kennewick	Othello	Pasco	Prosser	Richland
% Minority (State Average: 47%)	47 ↑	97 ↑	76 ↑	69 ↑	29 ↓
% Low Income (State Average: 46%)	57 ↑	83 ↑	71 ↑	71 ↑	40 ↓
% Pass Rate for Science (State Average: 47%)	33 ↓	23 ↓	29 ↓	37 ↓	44 ↓

Number of Students Impacted

Average % Minority

Average % Pass Rate for Science

Impact Summary

3600+

19

63.6

64.4

33.2

Number of Teachers Impacted

Average % Low Income

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