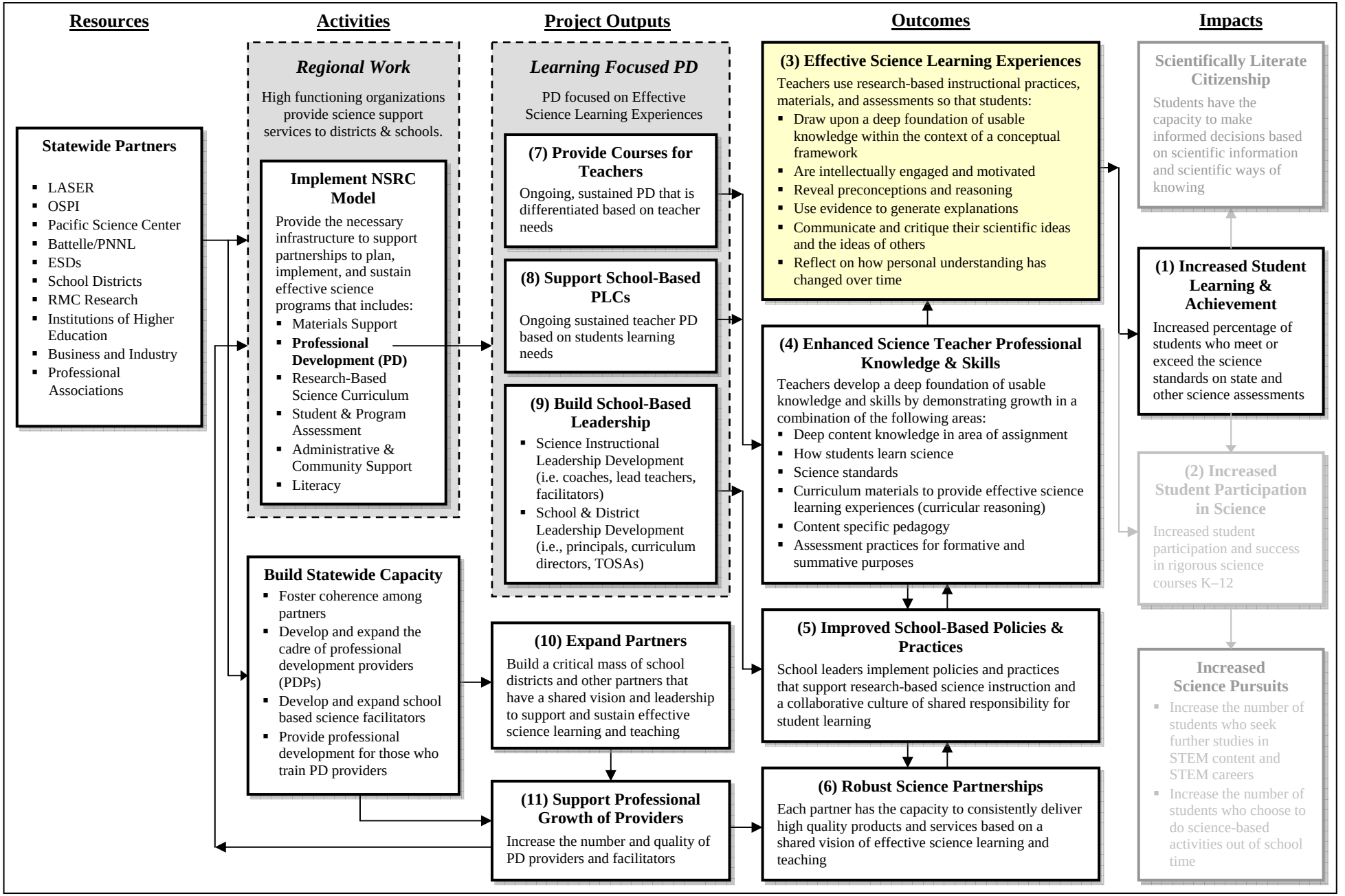
Washington State Logic Model for Science Professional Development



Adapted by ESD Science Coordinators and LASER Alliance Directors from original work of Kennedy and Weaver

Washington State Science Professional Development

Theory of Action

If all science professional development is focused on helping teachers use research-based instructional practices, materials, and assessments so that students:

- Draw upon a deep foundation of usable knowledge in the context of a conceptual framework,
- Are intellectually engaged and motivated,
- Reveal preconceptions and reasoning,
- Use evidence to generate scientific explanation,
- Communicate and critique their scientific ideas and the ideas of others, and
- Reflect on how personal understanding has changed over time,

Then:

- Student science learning & achievement would increase;
- More students would enroll and successfully complete challenging and advanced science courses at the high school level;
- More students would seek further studies beyond high school in STEM content and would seek STEM careers;
- More students will seek to be engaged in STEM-related activities in out-of-school time, and;
- More students would have the capacity to make informed decisions based on scientific information and scientific ways of knowing.

Logic Model Column Definitions

Resources—The personnel and financial resources that support the work

Activities—What regional partners do

Outputs—Evidence that the activities were carried out

Outcomes—The targets of the activities and outputs

Impact—The results of carrying out the logic model

Reference List

American Association for the Advancement of Science (1991). *Science for all Americans.* Washington D.C.: AAAS.

Banilower, E., Cohen, K., Pasley, J., & Weiss, I. (2008). *Effective science instruction: What does research tell us?* Portsmouth, NH: RMC Research Corporation, Center on Instruction.

Cohen, D. K., Raudenbush, S. W., & Ball, D. L. (2003). Resources, instruction, and research. *Educational Evaluation & Policy Analysis 25*(2), 119-142.

Donovan, S. M., & Bransford, J. D. (2005). *How students learn: history, mathematics, and science in the classroom*. Washington DC: The National Academies Press.

Fullan, M., Hill, P., & Crévola, C. (2006). *Breakthrough*. Thousand Oaks, California. Corwin Press.

Kennedy, A. (2009). *Mathematics Educators Professional Growth Continuum*, Vancouver, WA: SMERC.

Koellner, K., et al. (2007). The problem-solving cycle: A model to support the development of teachers' professional knowledge. *Mathematical thinking and learning*, 9(3), 273-303.

Loucks-Horsley, S., Love, N., Stiles, K. E., Mundry, S., & Hewson, P. W. (2003). *Designing professional development for teachers of science and mathematics* (2nd ed.). Thousand Oaks: Corwin Press.

McDuffie, A. R., & Mather, M. (2009). Middle school mathematics teachers' use of curricular reasoning in a collaborative professional development project. In J. Remillard, B. A. Herbel-Eisenmann & G. M. Lloyd (Eds.), *Mathematics teachers at work: connecting curriculum materials and classroom instruction* (pp. 302-320). New York: Routledge.

McLaughlin, M. W., & Talbert, J. E. (2006). Building school-based learning communities: professional strategies to improve student achievement. New York, N.Y.: Teachers College Press.

Michaels, S., Shouse, A., & Schweingruber, H. (2008). *Ready, Set, Science: Putting Research to Work in K-8 Science Classrooms.* Washington D.C: National Academies Press.

National Research Council. (2000). *Inquiry and the National Science Education Standards: A Guide for Teaching and Learning.* Washington D.C: National Academy Press.

National Research Council. Bransford, J.D., Brown, A.L., & Cocking, R.R. (Eds.). (2003). *How People Learn: Brain, Mind, Experience, and School*. Washington, DC: National Academy Press.

National Research Council.(1996). *National science education standards*. Washington, DC: National Academies Press.

Shulman, L. S., & Shulman, J. H. (2004). How and what teachers learn: a shifting perspective. *Journal of Curriculum Studies*, *36*(2), 257-271.