Pre-Kindergarten → Kindergarten				
	Who	**How**	**Gaps/ Our Roles/Possible Actions**	**Input from the Field and Research**
Offer STEM Integrated Curricula. Provide rich, exploratory environments for young children.	Pre-K →K Teachers Early Childhood STEM Professionals CTE Early Childhood Interns Business Partners Higher Education Researchers Environmental Ed providers Informal Educators LASER Head Start Title I Leadership networks across the state with common goals	Use environmental education standards aligned with STEM curricula; select appropriate readers. Develop models of instruction; Correlate/Coordinate with math and ELA common core standards. Provide parity in opportunities for children of all backgrounds. PD for teachers and administrators; sample activities aligned to selected books. Higher education developed activities. Alignment work. Identify research on how children learn as a rationale for pre K- 5 science content instruction integrated with math and literacy.		15% of instructional time will be on science per week in grades K-2. Provide pre-K experiences in STEM as part of its "ready for kindergarten" effort. Offer science instructional and pedagogical content to practicing elementary, middle and HS teachers. Develop an on-going relationship with informal institutions to promote professional development in content areas. Each student will be in a future that will involve science-related decision-making at various levels, whether mundane (e.g., choosing to purchase organic or inorganic vegetables) and/or momentous (e.g., choosing to support/oppose stem cell research, making a choice between cancer treatments for oneself or a loved one, choosing a career path). It is our responsibility to prepare today's students to enter this world prepared for advanced educational opportunities, to contribute as productive participants in the workforce, and with personal skills as scientifically literate citizens. To obtain this reality each student needs quality science experiences and instruction beginning in kindergarten and consistently accessible through high school. "Learning is situated in broad socio-economic and historical contexts and is mediated by local cultural practices and perspectives" (Center for Multicultural Education, UW 2007, p.15).

Kindergarten → Grade 3				
What	**Who**	**How**	**Gaps/ Our Roles/Possible Actions**	**Input from the Field and Research**
Refocus direction of early elementary to include science oriented STEM projects.	Grade K-3 Teachers ESDs Move coaches to elementary Math Specialists STEM Professionals Business Partners LASER Title I Env. Educators ELL Educators Higher Education Researchers	Re-align STC and FOSS kits to common core standards. Focus on a Washington flavor in the alignment. Use journals and interactive notebooks for writing. Retool activities to be project based; ID appropriate readers. Focus on student engagement and enjoyment of science and scientific phenomena. PD for teachers and administrators. Align with common core math and ELA. Use PBL learning for integration. Higher education for STEM integration activities. Alignment to learning progression data. Accountability "?" for third grade students performance.		At the lower grade levels, science activities and lessons should take advantage of the natural inquisitiveness and creativity of children. Elementary: science EVERY DAY; not as an afterthought, but as an integrated key component along with math and reading. Make research based instructional materials available to all. 20% of instructional time will be spent on science per week in grades 3-5. Integrate digital technologies. Good teachers must have up to date knowledge and skills. Systems must be developed to continue to educate new teachers and provide continuous training for in-service educators. Integrate with math and writing. Develop strong formative assessments that unite all three. "..Teachers will speak of trying to get across ideas or that students didn't get it. In this mode, writing in school science rarely transcends the copying of information from the board to the students' notebook. It is rare to see any collaborative writing or work that involves the construction of an argument" (Osborne & Dillon, 2008, p.9). Pedagogy should be one of engagement and not transmission, should include both informal and formal contexts, and provide a continuum of experiences (Osborne & Dillon).

Grades 4-5				
What	**Who**	**How**	**Gaps/ Our Roles/Possible Actions**	**Input from the Field and Research**
Address content standards. Real focus on content integration with systems, applications and inquiry	Grade 4 – 5 teachers ESDs Coaches STEM Professionals Environmental Educators LASER Engineering Societies Title 1 ELL Educators	STC, FOSS kits, teacher developed materials. Use online OERs aligned materials for linkage to common core curricula. Use Interactive notebooks and journals. Model how to increase rigor in materials. Develop Washington flavor in course materials. ID appropriate readers. Write model lessons. Develop formative assessments. Use Curriculum Topic Study. Align with common core math and ELA. Use PBL learning for subject matter integration. Identify learning progression data. Convey message to ES administrators. Participate in Science Olympiad. Benchmarking alignment. Analyze NAEP Test for 4th graders; Hold schools accountable for teaching science. Provide boundaries for content standards.		20% of instructional time will be spent on science per week in grades 3-5. Increase access to real-time information including research data. Develop power of various technologies to help learners visualize and understand key ideas and concepts. Increase sophistication of learning and teaching tools (both in and out of school). Build capacity to integrate what were once disparate types of knowledge and skills into real-life scenarios that meet personal and societal needs/wants; science should “come alive” for more students and it must more purposely connect with the TE&M of STEM. Develop STEM learning teams. Focus on collaborative working groups who share a common goal to improve and enhance learning and teaching in STEM areas, by providing real-world connections, expertise, examples and roles models. Create dynamic and rich learning environments. Align learning targets and science kits. Focus on big ideas in FOSS modules to increase content understanding, teach science, and reduce #or length of modules. Integrate digital technologies. “Most students develop their interest in and attitudes towards school science before the age of 14” … Interest in science with no gender differences is highest at age 10 (Osborne & Dillon, 2008, p.8). “Learning takes place not only in school but also in the multiple contexts and valued practices of everyday lives across the life span” (Center for Multicultural Education, UW 2007, p.17).

Grades 6-8				
What	**Who**	**How**	**Gaps/ Our Roles/Possible Actions**	**Input from the Field and Research**
Integrated science approach recommended with strong emphasis on physical science. Identify college readiness standards. Identify ES, LS and PS content standards, system, appl and inquiry EARLs. Incorporate PhET simulations and Concord Consortia activities to support instruction. Identify career readiness.	Grade 6 – 8 teachers ESDs Coaches STEM professionals Environmental Educators LASER Engineering Societies Title 1 ELL Educators	Use higher education to determine the structure of formative assessments. Research learning progressions. Use business/corporations for local challenges; use agriculture, technology, environmental ed and engineering applications. Provide students with menu of projects to conduct; Use PBL/inquiry. All students work on Google science fair projects to some extent; study contemporary issues. Employ research developed formative assessments. Incorporate environmental education standards and curricula contextualized in students' everyday lives. Administrators must support student engagement in science activities; students must be able to "stretch" to college ready standards if they are capable. PISA, TIMMS, NAEP 8th grade accountability? Encourage schools to conduct their own internal checks; provide exposure to STEM career opportunities. Identify appropriate pre-AP/IB curricula. Excellent assessment. Avoidance of contracting of curricula and teaching to test. Provide professional development.		20% of instructional time will be spent on science per week in grades 6-8. Work closely with CTE to craft a true career oriented science education for all students. Concrete learning experiences to include internships or other community-based job experiences. Science should have more relevancy to students' lives. Recognize the role of outside- of-school learning as a key driver that encourages student interest in STEM and the desire to peruse STEM careers. At middle school provide more experiential learning/kits, less emphasis on text based instruction. Make explicit connections to the essential understandings for teachers and students. Integrate digital technologies. "Science pedagogy and curricula are failing to engage young people with further study of science" (Osborne & Dillon, 2008, p.7). Include opportunities for students to "use their home and community language resources as the basis for expanding their linguistic repertoires" (Center for Multicultural Education, UW 2007, p.20).

Grades 9-12				
What	**Who**	**How**	**Gaps/ Our Roles/Possible Actions**	**Input from the Field and Research**
Science content to be integrated with systems/application/ Inquiry EALRs. Career focus. Preparation for science majors. Alignment to college readiness and STEM careers. Preparation for EOCs	High school teachers ESDs Coaches STEM professionals Environmental Educators LASER Engineering Societies Title 1 ELL Educators	Develop volunteer corps for students. Provide one academic credit for volunteer work in STEM related enterprise. Focus on PBL; revamp curricula; insert 21st century contemporary science; eliminate outdated; insert contextualized topics; dual credit; mentoring for students; internships. IPod generation not the blast furnace generation of the past. ACOT2 six design principles for the 21st century high school: 21st century skill outcomes; relevant and applied curriculum; informative assessments; social and emotional connections; culture of creativity; and innovation and 24/7 access to tools and resources. 3 years of science; Mentors; companies willing to work with high school students. Work with parents. Communication of policy standards to educators and administrators. Develop feedback loops that ensure contributions from educators in the field. Keep science graduation requirement. PD for teachers/ focused pedagogy.		Revamp “typical” science sequence in grades 6-12, how teachers are trained, and a changing emphasis on what is most important for our students to learn to be successful in life should be our vision for the next 10 years. Determine what students should know and be able to do in the STEM fields when they graduate from high school, as well as what knowledge and skills are best left for college and career to develop. Develop a strong messaging (even marketing) effort that builds common vision, goals and commitments among all those who have a stake in helping Washington State be a leader in innovation and productivity in the 21st century. Science credits reflect quality learning where science and Career & Technical Education courses are conceptually rigorous and programmatically coherent in nature so that cross-crediting or dual crediting is possible. Students in grades 9-12 will earn 3 credits in science (2 lab-based) per Core 24. Recognize the role of outside- of-school learning as a key driver that encourages student interest in STEM and the desire to peruse STEM careers. Integrate digital technologies. Five areas of concern in the future include: “feeding the world’s populations, controlling disease, supplying potable water, generating sufficient energy, and global climate change” (Osborne & Dillon, 2008, p.18).

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