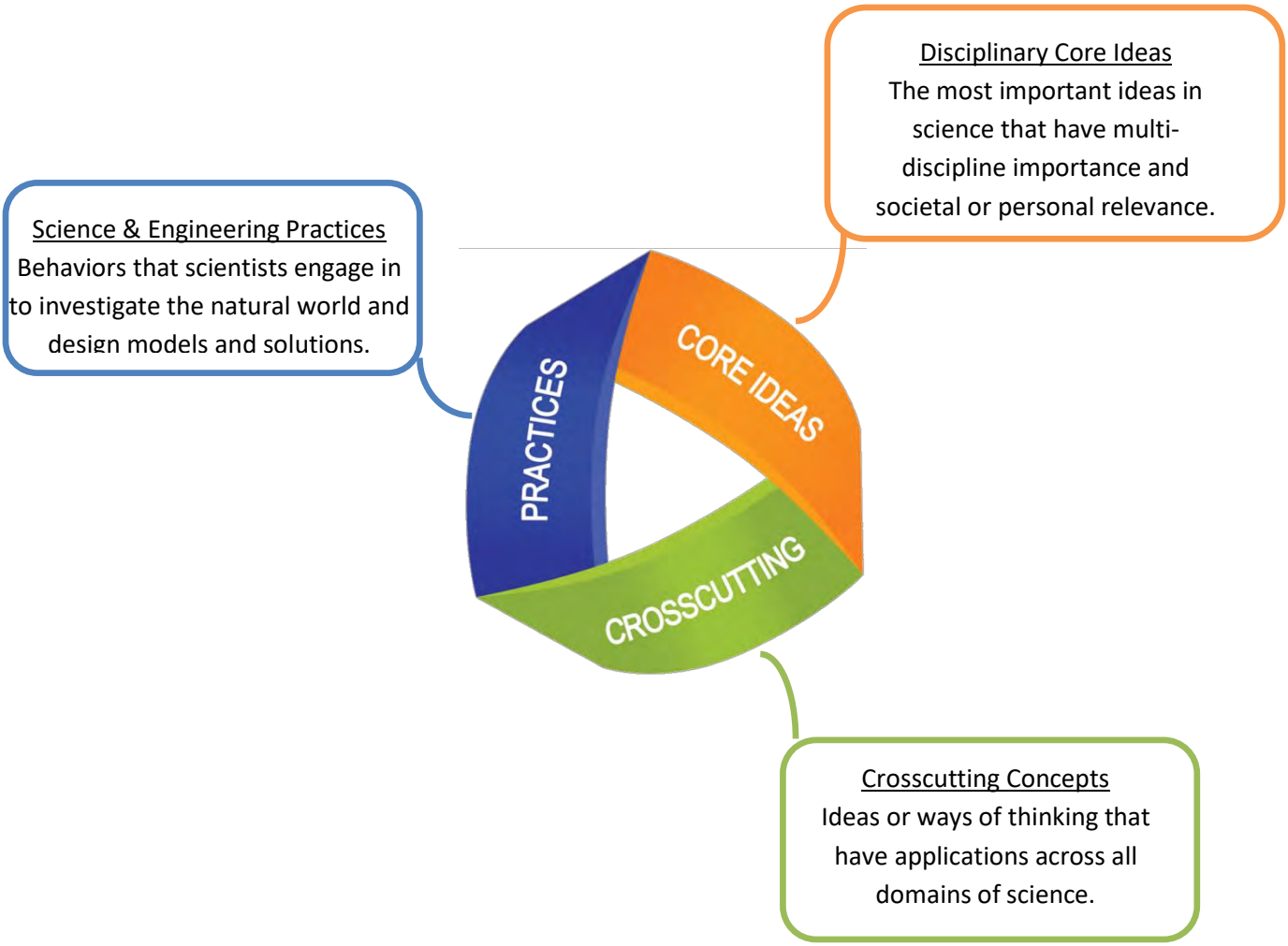
Next Generation Science Standards and _Common Core_ alignment with

King County Level One Waste Reduction and Recycling Best Practices Guide

High School

Next Generation Science Standards (NGSS) Categories



Level One - Waste Reduction and Recycling

High School

The connections between the **Next Generation Science Standards** (NGSS) and **King County Level One Best Practices Guide** uses the matrices created by the National Science Teachers Association (NSTA) available at http://ngss.nsta.org/ngss-tools.aspx.

Note: In this reference sheet an italicized number and title refers to a specific action choice in the Best Practices Guide. For example, *"10. Climate change connections"* on page 3 is for schools that choose #10 in the Education and Outreach section of the Best Practices Guide as one of their Level One actions.

Assess and Monitor section of Best Practices Guide

- Define a design problem that involves the development of a process or system with interacting components and criteria and constraints that may include social, technical and/or environmental considerations.
- Manipulate variables and collect data about a complex model of a proposed process.
- Apply percentages in the context of complicated measurement problems.

- Humanity faces major global challenges today, such as the need for supplies of clean water and food or for energy sources that minimize pollution.
- When evaluating solutions it is important to take into account constraints and to consider social, cultural and environmental impacts.
- Criteria may need to be broken down and approached systematically, acknowledging tradeoffs.

- Cause and effect relationships can be suggested and predicted for complex natural and human designed systems by examining what is known about smaller scale mechanisms within the system.
- Feedback (negative or positive) can stabilize or destabilize a system.

Education and Outreach section of Best Practices Guide

• Communicate technical information or ideas (about the proposed process or system) in multiple formats.

3. Waste Audit, 5. Quiz Show, 7. Skit or Video - Make and defend a claim based on evidence about the natural world or the effectiveness of a design solution that reflects scientific knowledge, and student generated evidence.

11. Integrate into classroom lessons- • Ask questions that arise from careful observation of phenomena, to clarify and/or seek additional information. • Plan and conduct an investigation or test a design solution in a safe and ethical manner including considerations of environmental, social, and personal impacts. • Analyze data to optimize relative to criteria for success for real world phenomena. • Apply scientific ideas and/or evidence to solve design problems, taking into account possible unanticipated effects. • Critically read scientific text to obtain technical information to summarize evidence, concepts, processes, or information.

• The sustainability of human societies and the biodiversity that supports them requires responsible management of natural resources.

• Though the magnitudes of human impacts are greater than they have ever been, so too are human abilities to model, predict, and manage current and future impacts.

10. Include climate change- • Moreover, anthropogenic changes can disrupt an ecosystem and threaten the survival of some species. • Changes in the atmosphere due to human activity have increased carbon dioxide concentrations and thus affect climate.

11. Integrate into classroom lessons or 12. Guest speakers - • Humans depend on the living world for the resources and other benefits provided by biodiversity. • Resource availability has guided the development of human society. • Scientists and engineers can develop technologies that produce less pollution and waste.

• When investigating or describing a system, the boundaries and initial conditions of the system need to be defined and their inputs and outputs analyzed and described using models.

Waste Reduction and Recycling section of Best Practices Guide

- Design, evaluate, and/or refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations.

- When evaluating solutions it is important to take into account a range of constraints including cost, safety, reliability and aesthetics and to consider social, cultural and environmental impacts.

- Both physical models and computers can be used in various ways to aid in the engineering design process. Computers are useful for a variety of purposes, such as running simulations to test different ways of solving a problem or to see which one is most efficient or economical; and in making a persuasive presentation to a client about how a given design will meet his or her needs.

- Systems can be designed to cause a desired effect.

- Changes in systems may have various causes that may not have equal effects.

- Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales.

- The total amount of energy and matter in closed systems is conserved.

Common Core alignment

Level One - Waste Reduction and Recycling

High School

English Language Arts - Speaking and Listening

Education and Outreach – Present a short training

CCSS.ELA-LITERACY.SL.**9-12**.4
Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning.

CCSS.ELA-LITERACY.SL.**9-12**.5
Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.

Mathematics

Assess and Monitor – Calculate school's recycling rate

CCSS.MATH.CONTENT.HSN.Q.A.1
Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

CCSS.MATH.CONTENT.HSN.Q.A.3
Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

English Language Arts - Speaking and Listening

Education and Outreach – Include WRR in lessons

CCSS.ELA-LITERACY.RST.**9-12**.1
Cite specific textual evidence to support analysis of science and technical texts.

CCSS.ELA-LITERACY.RST.**9-10**.2
Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.

CCSS.ELA-LITERACY.RST.**11-12**.2
Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.

CCSS.ELA-LITERACY.RST.**9-10**.7
Translate quantitative or technical information expressed in words in a text into visual form and translate information expressed visually or mathematically into words.

Mathematics

Education and Outreach and Waste Reduction- extension ideas

CCSS.MATH.CONTENT.**HS**A.CED.A.1
Create equations and inequalities in one variable and use them to solve problems.

CCSS.MATH.CONTENT.**HS**G.MG.A.2
Apply concepts of density based on area and volume in modeling situations.

CCSS.MATH.CONTENT.**HS**G.MG.A.3
Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints).

CCSS.MATH.CONTENT.HSS.ID.A.2
Use statistics appropriate to the shape of the data distribution to compare center and spread of two or more different data sets.

CCSS.MATH.CONTENT.**HS**S.ID.B.6
Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.