WASHINGTON STATE LASER

Alignment of Washington 6-8 Science Standards by Lesson Number for

FOSS/MS

Chemical Interactions

November 1, 2010

Alignment of Washington 6-8 Science Standards with
FOSS/MS Chemical Interactions ~ Investigation 01

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
INQA	Scientific inquiry involves asking and answering questions and comparing the answer with what scientists already know about the world.	• Generate a question that can be answered through scientific investigation. This may involve refining or refocusing a broad and ill-defined question.	Investigation 1 parts 1 and 2 pp 33-58; Lab Notebook pp 5 and 7; CD-ROM: "Two-Substance Reactions"	**Aligned as designed**	The investigation contains many opportunities to address the standards but the teacher must be intentional in leading students to asking their own questions.
INQB	Different kinds of questions suggest different kinds of scientific investigations.	• Plan and conduct a scientific investigation (e.g., field study, systematic observation, controlled experiment, model, or simulation) that is appropriate for the question being asked. • Propose a hypothesis, give a reason for the hypothesis, and explain how the planned investigation will test the hypothesis. • Work collaboratively with other students to carry out the investigations.	Investigation 1 parts 1 and 2 pp 41-58; Lab Notebook pp 5-11	**Aligned as designed**	The investigation contains many opportunities to address the standards but the teacher must be intentional in allowing the students to experience all parts of the investigation independently.
INQC	Collecting, analyzing, and displaying data are essential aspects of all investigations.	• Communicate results using pictures, tables, charts, diagrams, graphic displays, and text that are clear, accurate, and informative. • Recognize and interpret patterns – as well as variations from previously learned or observed patterns – in data, diagrams, symbols, and words. • Use statistical procedures (e.g., median, mean, or mode) to analyze data and make inferences about relationships.	Investigation 1 parts 1 and 2, pp 41-58; Lab Notebook pp 5-11	**Aligned as designed**	

Alignment of Washington 6-8 Science Standards with
FOSS/MS Chemical Interactions ~ Investigation 01

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
INQF	It is important to distinguish between the results of a particular investigation and general conclusions drawn from these results.	• Generate a scientific conclusion from an investigation using inferential logic, and clearly distinguish between results (e.g., evidence) and conclusions (e.g., explanation). • Describe the differences between an objective summary of the findings and an inference made from the findings.	Investigation part 2 pp 46-58; Lab Notebook pp 7-11	**Aligned as designed**	
INQG	Scientific reports should enable another investigator to repeat the study to check the results.	• Prepare a written report of an investigation by clearly describing the question being investigated, what was done, and an objective summary of results. The report should provide evidence to accept or reject the hypothesis, explain the relationship between two or more variables, and identify limitations of the investigation.	Investigation 1 part 2 pp 46-58; Lab Notebook pp 9-11	**Aligned as designed**	The lesson contains the opportunity for the students to write a procedure leading to a scientific report that could be repeated.
PS2A	Substances have characteristic intrinsic properties such as density, solubility, boiling point, and melting point, all of which are independent of the amount of the sample.	• Use characteristic intrinsic properties such as density, boiling point, and melting point to identify an unknown substance.	Investigation 1 parts 1 and 2 pp 41-58; Lab Notebook pp 5-11	**Aligned as designed**	

Alignment of Washington 6-8 Science Standards with FOSS/MS Chemical Interactions ~ Investigation 01

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
PS2B	Mixtures are combinations of substances whose chemical properties are preserved. Compounds are substances that are chemically formed and have different physical and chemical properties from the reacting substances.	• Separate a mixture using differences in properties (e.g., solubility, size, magnetic attraction) of the substances used to make the mixture. • Demonstrate that the properties of a compound are different from the properties of the reactants from which it was formed.	Investigation 1 parts 1 and 2 pp 51-58; Lab Notebook pp 5-11; CD-ROM: "Two-Substance Reactions"; Resource book pp 97-101	**Aligned as designed**	Teacher must be intentional about use of the terms compound, mixtures, chemical, and physical properties when the students are attempting to identify their mystery mixture.
PS2D	Compounds are composed of two or more kinds of atoms, which are bound together in well-defined molecules or arrays.	• Demonstrate with a labeled diagram and explain the relationship among atoms, molecules, elements, and compounds.	Investigation 1 part 2 pp 48-58; Lab Notebook p 7; Resource book pp 97-101	**Aligned as designed**	Investigations 1, 2, and 3 are learning progressions leading up to Investigation 9. The terms atoms and compounds are not used until Investigation 9.

Alignment of Washington 6-8 Science Standards with FOSS/MS Chemical Interactions ~ Investigation 02

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
SYSA	Any system may be thought of as containing subsystems and as being a subsystem of a larger system.	• Given a system, identify subsystems and a larger encompassing system	Investigation 2 parts 1 and 2 pp 70-81; Lab Notebook p 21	**Aligned with modifications (see comments)**	Teacher must use the vocabulary terms systems and subsystems when discussing atoms and molecules. This investigation is part of a learning progression.
SYSB	The boundaries of a system can be drawn differently depending on the features of the system being investigated, the size of the system, and the purpose of the investigation.	• Explain how the boundaries of a system can be drawn to fit the purpose of the study (e.g., to study how insect populations change, a system might be a forest, a meadow in the forest, or a single tree).	Investigation 2 parts 1 and 2, pp 70-81; Lab Notebook p 21	**Aligned with modifications (see comments)**	Teacher must be intentional about using the vocabulary words boundaries and system when referring to elements and substances. The lesson is an integral part of a learning progression.
SYSF	The natural and designed world is complex; it is too large and complicated to investigate and comprehend all at once. Scientists and students learn to define small portions for the convenience of investigation. The units of investigation can be referred to as "systems."	• Given a complex societal issue with strong science and technology components (e.g., overfishing, global warming), describe the issue from a systems point of view, highlighting how changes in one part of the system are likely to influence other parts of the system.	Investigation 2 parts 1 and 2 pp 70-81; Lab Notebook pp 21; Resource book pp 90-91	**Aligned as designed**	Teacher must be intentional about use of systems vocabulary.

Alignment of Washington 6-8 Science Standards with
FOSS/MS Chemical Interactions ~ Investigation 02

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
INQE	Models are used to represent objects, events, systems, and processes. Models can be used to test hypotheses and better understand phenomena, but they have limitations.	• Create a model or simulation to represent the behavior of objects, events, systems, or processes. Use the model to explore the relationship between two variables and point out how the model or simulation is similar to or different from the actual phenomenon.	Investigation 2 parts 1 and 2, pp 70-81; Lab Notebook p 17; CD-ROM: "Periodic Table"	**Aligned as designed**	Teacher has multiple opportunities to reinforce the concept that this is a model of a system.
APPA	People have always used technology to solve problems. Advances in human civilization are linked to advances in technology.	• Describe how a technology has changed over time in response to societal challenges.	Resource Book pp 3-8	**Aligned as designed**	The reading in the Resource Book contains many opportunities to address the standards but the teacher must be intentional in leading the discussion towards addressing them.
APPB	Scientists and technological designers (including engineers) have different goals. Scientists answer questions about the natural world; technological designers solve problems that help people reach their goals.	• Investigate several professions in which an understanding of science and technology is required. Explain why that understanding is necessary for success in each profession.	Resource Book pp 3-8	**Aligned as designed**	The reading in the Resource Book contains many opportunities to address the standards but the teacher must be intentional in leading the discussion towards addressing them.

Alignment of Washington 6-8 Science Standards with
FOSS/MS Chemical Interactions ~ Investigation 02

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
APPC	Science and technology are interdependent. Science drives technology by demanding better instruments and suggesting ideas for new designs. Technology drives science by providing instruments and research methods.	• Give examples to illustrate how scientists have helped solve technological problems (e.g., how the science of biology has helped sustain fisheries) and how engineers have aided science (e.g., designing telescopes to discover distant planets).	Resource Book pp 3-8	**Aligned as designed**	The reading in the Resource Book contains many opportunities to address the standards but the teacher must be intentional in leading the discussion towards addressing them.
PS2C	All matter is made of atoms. Matter made of only one type of atom is called an element.	• Explain that all matter is made of atoms, and give examples of common elements—substances composed of just one kind of atom.	Investigation 2 parts 1 and 2, pp 70-81; Lab Notebook pp 13, 16, and 17	**Aligned as designed**	Investigations 2 and 3 are part of a learning progression. The term atom will be introduced in Investigation 9.
PS2D	Compounds are composed of two or more kinds of atoms, which are bound together in well-defined molecules or arrays.	• Demonstrate with a labeled diagram and explain the relationship among atoms, molecules, elements, and compounds.	Investigation 2 part 1 pp 70-74; Lab Notebook p 13	**Aligned as designed**	Investigations 1, 2, and 3 are learning progressions leading up to Investigation 9. The terms atoms, molecules, and compounds are not used until Investigation 9.

Alignment of Washington 6-8 Science Standards with
FOSS/MS Chemical Interactions ~ Investigation 02

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
ES2A	The atmosphere is a mixture of nitrogen, oxygen, and trace gases that include water vapor. The atmosphere has different properties at different elevations.	• Describe the composition and properties of the troposphere and stratosphere.	Resource book pp 9-13	**Module/Unit requires changes (see comments)**	This is a good Earth Science connection and discusses the composition of air but not how the atmosphere changes with elevation. The teacher could make the connection however with their Earth Science module.

Alignment of Washington 6-8 Science Standards with FOSS/MS Chemical Interactions ~ Investigation 03

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
SYSA	Any system may be thought of as containing subsystems and as being a subsystem of a larger system.	• Given a system, identify subsystems and a larger encompassing system	Investigation 3 part 2 pp 99-107	**Aligned with modifications (see comments)**	Teacher must use the vocabulary terms systems and subsystems when discussing the syringe system.
SYSB	The boundaries of a system can be drawn differently depending on the features of the system being investigated, the size of the system, and the purpose of the investigation.	• Explain how the boundaries of a system can be drawn to fit the purpose of the study (e.g., to study how insect populations change, a system might be a forest, a meadow in the forest, or a single tree).	Investigation 3 part 2 pp 99-107	**Aligned with modifications (see comments)**	Teacher must be intentional about discussing the terms system and boundaries of a system when working with the syringe system.
SYSD	In an open system, matter flows into and out of the system. In a closed system, energy may flow into or out of the system, but matter stays within the system.	• Given a description of a system, analyze and defend whether it is open or closed.	Investigation 3 part 1 pp 91-98	**Aligned with modifications (see comments)**	The teacher needs to be intentional about discussing the standard.

Alignment of Washington 6-8 Science Standards with
FOSS/MS Chemical Interactions ~ Investigation 03

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
INQB	Different kinds of questions suggest different kinds of scientific investigations.	• Plan and conduct a scientific investigation (e.g., field study, systematic observation, controlled experiment, model, or simulation) that is appropriate for the question being asked. • Propose a hypothesis, give a reason for the hypothesis, and explain how the planned investigation will test the hypothesis. • Work collaboratively with other students to carry out the investigations.	Investigation 3 part 1 pp 92-98; Lab Notebook pp 22-23	**Aligned as designed**	The investigation contains many opportunities to address the standards but the teacher must be intentional about allowing the students to write their own investigation using the scientific method terms in the standard. Students should be given the opportunity to do the write-up independently, replacing the lab notebook p 22.
INQC	Collecting, analyzing, and displaying data are essential aspects of all investigations.	• Communicate results using pictures, tables, charts, diagrams, graphic displays, and text that are clear, accurate, and informative. • Recognize and interpret patterns – as well as variations from previously learned or observed patterns – in data, diagrams, symbols, and words. • Use statistical procedures (e.g., median, mean, or mode) to analyze data and make inferences about relationships.	Investigation 3 part 1 pp 92-98; Lab Notebook pp 22 and 23	**Aligned as designed**	
INQD	For an experiment to be valid, all (controlled) variables must be kept the same whenever possible, except for the manipulated (independent) variable being tested and the responding (dependent) variable being measured and recorded. If a variable cannot be controlled, it must be reported and accounted for.	• Plan and conduct a controlled experiment to test a hypothesis about a relationship between two variables. Determine which variables should be kept the same (controlled), which (independent) variable should be systematically manipulated, and which responding (dependent) variable is to be measured and recorded. Report any variables not controlled and explain how they might affect results.	Investigation 3 part 1, pp 92-98; Lab Notebook pp 22-23	**Aligned with modifications (see comments)**	The investigation contains many opportunities to address the standards but the teacher must be intentional in addressing reactants as variables.

Alignment of Washington 6-8 Science Standards with
FOSS/MS Chemical Interactions ~ Investigation 03

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
INQF	It is important to distinguish between the results of a particular investigation and general conclusions drawn from these results.	• Generate a scientific conclusion from an investigation using inferential logic, and clearly distinguish between results (e.g., evidence) and conclusions (e.g., explanation). • Describe the differences between an objective summary of the findings and an inference made from the findings.	Investigation 3 part 1 pp 92-98; Lab Notebook pp 22, 23	**Aligned as designed**	
PS2C	All matter is made of atoms. Matter made of only one type of atom is called an element.	• Explain that all matter is made of atoms, and give examples of common elements—substances composed of just one kind of atom.	Investigation 3 parts 2 and 3 pp 99-113; Resource book pp 14-15	**Aligned as designed**	Investigations 2 and 3 are part of a learning progression. The term atom will be introduced in Investigation 9.
PS2D	Compounds are composed of two or more kinds of atoms, which are bound together in well-defined molecules or arrays.	• Demonstrate with a labeled diagram and explain the relationship among atoms, molecules, elements, and compounds.	Investigation 3 part 3 pp 108-113; Resource book pp 14-15	**Aligned as designed**	Investigations 1, 2, and 3 are learning progressions leading up to Investigation 9. The terms atoms, molecules, and compounds are not used until Investigation 9.

Alignment of Washington 6-8 Science Standards with FOSS/MS Chemical Interactions ~ Investigation 03

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
PS2E	Solids, liquids, and gases differ in the motion of individual particles. In solids, particles are packed in a nearly rigid structure; in liquids, particles move around one another; and in gases, particles move almost independently.	• Describe how solids, liquids, and gases behave when put into a container (e.g., a gas fills the entire volume of the container). Relate these properties to the relative movement of the particles in the three states of matter.	Investigation 3 part 3, pp 108-113; Lab Notebook pp 26-27, 31; CD-ROM: "Gas in a Syringe"; Resource book pp 16-22	**Aligned as designed**	Investigation 3 part 3 is part of a conceptual sequence that introduces the particle movement of gas.
PS2F	When substances within a closed system interact, the total mass of the system remains the same. This concept, called conservation of mass, applies to all physical and chemical changes.	• Apply the concept of conservation of mass to correctly predict changes in mass before and after chemical reactions, including reactions that occur in closed containers, and reactions that occur in open containers where a gas is given off.	Investigation 3 parts 1 and 2 pp 92-107; Lab Notebook pp 26, 27; CD-ROM: "Gas in a Syringe"	**Aligned as designed**	The teacher needs to be intentional about discussing the standard.
ES2A	The atmosphere is a mixture of nitrogen, oxygen, and trace gases that include water vapor. The atmosphere has different properties at different elevations.	• Describe the composition and properties of the troposphere and stratosphere.	Investigation 3 parts 2 and 3 pp 99 and 113; Lab Notebook p 24	**Aligned with modifications (see comments)**	This is a good Earth Science connection and discusses the composition of air but not how the atmosphere changes with elevation. The teacher could make the connection however with their Earth Science module.

Alignment of Washington 6-8 Science Standards with
FOSS/MS Chemical Interactions ~ Investigation 04

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
SYSD	In an open system, matter flows into and out of the system. In a closed system, energy may flow into or out of the system, but matter stays within the system.	• Given a description of a system, analyze and defend whether it is open or closed.	Investigation 4 part 2 pp 130-138; Lab Notebook pp 34-35	**Aligned with modifications (see comments)**	The teacher needs to be intentional about discussing the standard.
SYSE	If the input of matter or energy is the same as the output, then the amount of matter or energy in the system won't change; but if the input is more or less than the output, then the amount of matter or energy in the system will change.	• Measure the flow of matter into and out of an open system and predict how the system is likely to change (e.g., a bottle of water with a hole in the bottom, an ecosystem, an electric circuit).	Investigation 4 part 2 pp 130-138; Lab Notebook pp 34-35	**Aligned with modifications (see comments)**	Teacher must be intentional about discussing that the amount of matter does not change, just the amount of energy which is what is affecting the system.
INQB	Different kinds of questions suggest different kinds of scientific investigations.	• Plan and conduct a scientific investigation (e.g., field study, systematic observation, controlled experiment, model, or simulation) that is appropriate for the question being asked. • Propose a hypothesis, give a reason for the hypothesis, and explain how the planned investigation will test the hypothesis. • Work collaboratively with other students to carry out the investigations.	Investigation 4 parts 1-3 pp 122-142; Lab Notebook pp 32-35	**Aligned as designed**	The investigations contain many opportunities to address the standards but the teacher must be intentional in pointing out that the type of investigation varies with state of matter that is being investigated.

Alignment of Washington 6-8 Science Standards with
FOSS/MS Chemical Interactions ~ Investigation 04

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
INQC	Collecting, analyzing, and displaying data are essential aspects of all investigations.	• Communicate results using pictures, tables, charts, diagrams, graphic displays, and text that are clear, accurate, and informative. • Recognize and interpret patterns – as well as variations from previously learned or observed patterns – in data, diagrams, symbols, and words. • Use statistical procedures (e.g., median, mean, or mode) to analyze data and make inferences about relationships.	Investigation 4 parts 1 and 2 pp 122-138; Lab Notebook pp 32-35	**Aligned as designed**	
INQD	For an experiment to be valid, all (controlled) variables must be kept the same whenever possible, except for the manipulated (independent) variable being tested and the responding (dependent) variable being measured and recorded. If a variable cannot be controlled, it must be reported and accounted for.	• Plan and conduct a controlled experiment to test a hypothesis about a relationship between two variables. Determine which variables should be kept the same (controlled), which (independent) variable should be systematically manipulated, and which responding (dependent) variable is to be measured and recorded. Report any variables not controlled and explain how they might affect results.	Investigation 4 part 2 pp 130-138; Lab Notebook pp 34-35	**Aligned with modifications (see comments)**	The investigation contains many opportunities to address the standards but the teacher must be intentional in addressing the variables.
INQE	Models are used to represent objects, events, systems, and processes. Models can be used to test hypotheses and better understand phenomena, but they have limitations.	• Create a model or simulation to represent the behavior of objects, events, systems, or processes. Use the model to explore the relationship between two variables and point out how the model or simulation is similar to or different from the actual phenomenon.	Investigation 4 part 2 pp 130-138; Lab Notebook pp 34-35	**Aligned as designed**	Students are asked to assemble a water thermometer (referred to as a bottle system).

Alignment of Washington 6-8 Science Standards with FOSS/MS Chemical Interactions ~ Investigation 04

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
INQF	It is important to distinguish between the results of a particular investigation and general conclusions drawn from these results.	• Generate a scientific conclusion from an investigation using inferential logic, and clearly distinguish between results (e.g., evidence) and conclusions (e.g., explanation). • Describe the differences between an objective summary of the findings and an inference made from the findings.	Investigation 4, parts 1-2 pp 122-138; Lab Notebook pp 32-35	**Aligned as designed**	
INQG	Scientific reports should enable another investigator to repeat the study to check the results.	• Prepare a written report of an investigation by clearly describing the question being investigated, what was done, and an objective summary of results. The report should provide evidence to accept or reject the hypothesis, explain the relationship between two or more variables, and identify limitations of the investigation.	Investigation 4 parts 1 and 2 pp 122-138; Lab notebook pp 32-35	**Aligned as designed**	The opportunity for writing a repeatable procedure is there if the teacher allows students more independence beyond the lab notebook.
PS2E	Solids, liquids, and gases differ in the motion of individual particles. In solids, particles are packed in a nearly rigid structure; in liquids, particles move around one another; and in gases, particles move almost independently.	• Describe how solids, liquids, and gases behave when put into a container (e.g., a gas fills the entire volume of the container). Relate these properties to the relative movement of the particles in the three states of matter.	Investigation 4 parts 1-3 pp 122-142; Lab Notebook pp 34-37; CD-ROM: "Particles in Solids, Liquids, and Gases"; Resource book pp 23-27	**Aligned as designed**	Investigation 4 is strong in use of kinetic theory to explain expansion and contraction in the three states of matter.

Alignment of Washington 6-8 Science Standards with FOSS/MS Chemical Interactions ~ Investigation 04

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
PS3A	Energy exists in many forms: heat, light, chemical, electrical, motion of objects, and sound. Energy can be transformed from one form to another and transferred from one place to another.	• List different forms of energy (e.g., thermal, light, chemical, electrical, kinetic, and sound energy). • Describe ways in which energy is transformed from one form to another and transferred from one place to another (e.g., chemical to electrical energy in a battery, electrical to light energy in a bulb).	Investigation 4 parts 1-3 pp 122-142; Resource book pp 23-27	**Aligned with modifications (see comments)**	Teacher needs to be intentional about discussing different energy forms. These investigations discuss energy transfer but not transformation and only address heat energy.
PS3C	Heat (thermal energy) consists of random motion and the vibrations of atoms and molecules. The higher the temperature, the greater the atomic or molecular motion. Thermal insulators are materials that resist the flow of heat.	• Explain how various types of insulation slow transfer of heat energy based on the atomic-molecular model of heat (thermal energy).	Investigation 4 parts 1-3 pp 122-142; Lab Notebook pp 34-37; Resource book pp 23-27	**Aligned with modifications (see comments)**	Teacher must intentionally discuss thermal insulators at some point in the module.

Alignment of Washington 6-8 Science Standards with FOSS/MS Chemical Interactions ~ Investigation 05

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
INQC	Collecting, analyzing, and displaying data are essential aspects of all investigations.	• Communicate results using pictures, tables, charts, diagrams, graphic displays, and text that are clear, accurate, and informative. • Recognize and interpret patterns – as well as variations from previously learned or observed patterns – in data, diagrams, symbols, and words. • Use statistical procedures (e.g., median, mean, or mode) to analyze data and make inferences about relationships.	Investigation 5, part 1 pp 153-158 and part 3, pp 165-171; Lab Notebook pp 43, 48-51.	**Aligned as designed**	
INQD	For an experiment to be valid, all (controlled) variables must be kept the same whenever possible, except for the manipulated (independent) variable being tested and the responding (dependent) variable being measured and recorded. If a variable cannot be controlled, it must be reported and accounted for.	• Plan and conduct a controlled experiment to test a hypothesis about a relationship between two variables. Determine which variables should be kept the same (controlled), which (independent) variable should be systematically manipulated, and which responding (dependent) variable is to be measured and recorded. Report any variables not controlled and explain how they might affect results.	Investigation 5 part 3 pp 165-171; Lab Notebook pp 48-51	**Aligned with modifications (see comments)**	The investigation contains many opportunities to address the standards but the teacher must be intentional to address hot and cold water as variables. The temperature of the water is the independent variable and the final temperature is the dependent variable.
INQE	Models are used to represent objects, events, systems, and processes. Models can be used to test hypotheses and better understand phenomena, but they have limitations.	• Create a model or simulation to represent the behavior of objects, events, systems, or processes. Use the model to explore the relationship between two variables and point out how the model or simulation is similar to or different from the actual phenomenon.	Investigation 5 parts 2 and 3 pp 159-171; CD-ROM: "Energy Transfer by Collision," "Mixing Hot and Cold Water," "Thermometer," and "Energy Flow"	**Aligned as designed**	Investigation 5's multimedia contains many opportunities to simulate particle movement with an animated model. Teachers must be intentional about discussing the standard while using the multimedia.

Alignment of Washington 6-8 Science Standards with
FOSS/MS Chemical Interactions ~ Investigation 05

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
INQG	Scientific reports should enable another investigator to repeat the study to check the results.	• Prepare a written report of an investigation by clearly describing the question being investigated, what was done, and an objective summary of results. The report should provide evidence to accept or reject the hypothesis, explain the relationship between two or more variables, and identify limitations of the investigation.	Investigation 5 part 1 pp 153-158; Lab Notebook p 43	**Aligned as designed**	The lesson contains the opportunity for the students to write a procedure leading to a scientific report that could be repeated.
PS3A	Energy exists in many forms: heat, light, chemical, electrical, motion of objects, and sound. Energy can be transformed from one form to another and transferred from one place to another.	• List different forms of energy (e.g., thermal, light, chemical, electrical, kinetic, and sound energy). • Describe ways in which energy is transformed from one form to another and transferred from one place to another (e.g., chemical to electrical energy in a battery, electrical to light energy in a bulb).	Investigation 5 parts 1-3 pp 153-171; Lab Notebook pp 43-53; Resource book pp 32-37; CD-ROM: "Energy Transfer, Energy Flow"	**Aligned with modifications (see comments)**	Teacher needs to be intentional about discussing different energy forms. These investigations discuss energy transfer but not transformation and only address heat energy.
PS3B	Conduction, radiation, and convection, or mechanical mixing, are means of energy transfer.	• Use everyday examples of conduction, radiation, and convection, or mechanical mixing, to illustrate the transfer of energy from warmer objects to cooler ones until the objects reach the same temperature.	Investigation 5 parts 1-3 pp 153-171; Lab Notebook pp 43-53; Resource book pp 32-37; CD-ROM: "Thermometer", "Energy Flow"	**Aligned as designed**	

Alignment of Washington 6-8 Science Standards with
FOSS/MS Chemical Interactions ~ Investigation 05

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
PS3C	Heat (thermal energy) consists of random motion and the vibrations of atoms and molecules. The higher the temperature, the greater the atomic or molecular motion. Thermal insulators are materials that resist the flow of heat.	• Explain how various types of insulation slow transfer of heat energy based on the atomic-molecular model of heat (thermal energy).	Investigation 5 parts 1-3 pp 153-171; Lab notebook pp 43-53; Resource book pp 32-37; CD-ROM: "Thermometer"	**Aligned with modifications (see comments)**	Teacher must intentionally discuss thermal insulators at some point in the module.

Alignment of Washington 6-8 Science Standards with
FOSS/MS Chemical Interactions ~ Investigation 06

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
INQA	Scientific inquiry involves asking and answering questions and comparing the answer with what scientists already know about the world.	• Generate a question that can be answered through scientific investigation. This may involve refining or refocusing a broad and ill-defined question.	Investigation 6 part 1 pp 173-187; Lab Notebook pp 54-55	**Aligned as designed**	The investigation contains many opportunities to address the standards but the teacher must be intentional in leading students to asking their own questions.
INQC	Collecting, analyzing, and displaying data are essential aspects of all investigations.	• Communicate results using pictures, tables, charts, diagrams, graphic displays, and text that are clear, accurate, and informative. • Recognize and interpret patterns – as well as variations from previously learned or observed patterns – in data, diagrams, symbols, and words. • Use statistical procedures (e.g., median, mean, or mode) to analyze data and make inferences about relationships.	Investigation 6 part 1 pp 178-187; Lab Notebook pp 54 and 55	**Aligned as designed**	
INQD	For an experiment to be valid, all (controlled) variables must be kept the same whenever possible, except for the manipulated (independent) variable being tested and the responding (dependent) variable being measured and recorded. If a variable cannot be controlled, it must be reported and accounted for.	• Plan and conduct a controlled experiment to test a hypothesis about a relationship between two variables. Determine which variables should be kept the same (controlled), which (independent) variable should be systematically manipulated, and which responding (dependent) variable is to be measured and recorded. Report any variables not controlled and explain how they might affect results.	Investigation 6 part 1 pp 178-187; Lab Notebook pp 54-55	**Aligned with modifications (see comments)**	The investigation contains many opportunities to address the standards but the teacher must be intentional in addressing the variables.

Alignment of Washington 6-8 Science Standards with
FOSS/MS Chemical Interactions ~ Investigation 06

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
PS3A	Energy exists in many forms: heat, light, chemical, electrical, motion of objects, and sound. Energy can be transformed from one form to another and transferred from one place to another.	• List different forms of energy (e.g., thermal, light, chemical, electrical, kinetic, and sound energy). • Describe ways in which energy is transformed from one form to another and transferred from one place to another (e.g., chemical to electrical energy in a battery, electrical to light energy in a bulb).	Investigation 6 pp 178-187; Lab Notebook pp 54-59; Resource book pp 38-41	**Aligned with modifications (see comments)**	Teacher needs to be intentional about discussing different energy forms. These investigations discuss energy transfer but not transformation and only address heat energy.
PS3B	Conduction, radiation, and convection, or mechanical mixing, are means of energy transfer.	• Use everyday examples of conduction, radiation, and convection, or mechanical mixing, to illustrate the transfer of energy from warmer objects to cooler ones until the objects reach the same temperature.	Investigation 6 pp 178-187; Lab Notebook pp 54-59; Resource book pp 38-41	**Aligned as designed**	

Alignment of Washington 6-8 Science Standards with
FOSS/MS Chemical Interactions ~ Investigation 07

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
SYSA	Any system may be thought of as containing subsystems and as being a subsystem of a larger system.	• Given a system, identify subsystems and a larger encompassing system	Investigation 7 parts 4 and 5 pp 222-234; Lab Notebook p 73	**Aligned with modifications (see comments)**	Teacher must explain that the vial of water is the subsystem and the entire apparatus is the system. The vial of water is part of the larger system.
SYSB	The boundaries of a system can be drawn differently depending on the features of the system being investigated, the size of the system, and the purpose of the investigation.	• Explain how the boundaries of a system can be drawn to fit the purpose of the study (e.g., to study how insect populations change, a system might be a forest, a meadow in the forest, or a single tree).	Investigation 7 parts 4 and 5 pp 222-234; Lab Notebook p 73	**Aligned with modifications (see comments)**	Teacher must be intentional when discussing the setup for these 2 inquiries as being a system and that the boundaries of the system are the setup. Students should not consider the environment outside of the setup as part of the system.
SYSC	The output of one system can become the input of another system.	• Give an example of how output of matter or energy from a system can become input for another system	Investigation 7 parts 4 and 5 pp 222-234; Lab Notebook p 73	**Aligned with modifications (see comments)**	In this investigation the teacher must be intentional about pointing out the different systems. In part 4, the water vial outputs energy to the cup. In part 5 the cup of water outputs to the cup of ice.

Alignment of Washington 6-8 Science Standards with
FOSS/MS Chemical Interactions ~ Investigation 07

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
SYSD	In an open system, matter flows into and out of the system. In a closed system, energy may flow into or out of the system, but matter stays within the system.	• Given a description of a system, analyze and defend whether it is open or closed.	Investigation 7 parts 4 and 5 pp 222-234; Lab Notebook p 73	**Aligned with modifications (see comments)**	Teacher must be clear in parts 4 and 5 that the energy is going from the water to the ice, but there is no additional input. These should be considered closed systems.
SYSE	If the input of matter or energy is the same as the output, then the amount of matter or energy in the system won't change; but if the input is more or less than the output, then the amount of matter or energy in the system will change.	• Measure the flow of matter into and out of an open system and predict how the system is likely to change (e.g., a bottle of water with a hole in the bottom, an ecosystem, an electric circuit).	Investigation 7 parts 4 and 5 pp 222-234; Lab Notebook p 73	**Aligned with modifications (see comments)**	Teacher must be intentional about discussing that the amount of matter stays the same, it is the energy that is flowing.
INQA	Scientific inquiry involves asking and answering questions and comparing the answer with what scientists already know about the world.	• Generate a question that can be answered through scientific investigation. This may involve refining or refocusing a broad and ill-defined question.	Investigation 7 part 3 pp 215-221; Lab Notebook p 64	**Aligned as designed**	This investigation contains many opportunities to address the standards but the teacher must be intentional in leading students to ask their own questions.

Alignment of Washington 6-8 Science Standards with
FOSS/MS Chemical Interactions ~ Investigation 07

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
INQF	It is important to distinguish between the results of a particular investigation and general conclusions drawn from these results.	• Generate a scientific conclusion from an investigation using inferential logic, and clearly distinguish between results (e.g., evidence) and conclusions (e.g., explanation). • Describe the differences between an objective summary of the findings and an inference made from the findings.	Investigation 7 parts 1 and 4 pp 204-209 and 223-228; Lab Notebook pp 61, 70, and 71	**Aligned as designed**	
APPE	Scientists and engineers often work together to generate creative solutions to problems and decide which ones are most promising.	• Collaborate with other students to generate creative solutions to a problem, and apply methods for making tradeoffs to choose the best solution.	Investigation 7 part 4 pp 222-228; Lab Notebook pp 69-71	**Aligned as designed**	This investigation contains the opportunity to discuss the use of salt to change the freezing point so roads are safer in the winter.
PS2A	Substances have characteristic intrinsic properties such as density, solubility, boiling point, and melting point, all of which are independent of the amount of the sample.	• Use characteristic intrinsic properties such as density, boiling point, and melting point to identify an unknown substance.	Investigation 7 parts 1-4 pp 204-228; Lab Notebook pp 61, 63, 64, and 69-71	**Aligned as designed**	Investigation 7 is strong in melting points.

Alignment of Washington 6-8 Science Standards with
FOSS/MS Chemical Interactions ~ Investigation 07

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
PS2E	Solids, liquids, and gases differ in the motion of individual particles. In solids, particles are packed in a nearly rigid structure; in liquids, particles move around one another; and in gases, particles move almost independently.	• Describe how solids, liquids, and gases behave when put into a container (e.g., a gas fills the entire volume of the container). Relate these properties to the relative movement of the particles in the three states of matter.	Investigation 7 parts 1-5 pp 204-234; Lab Notebook pp 61, 64, 65, and 67; Resource book pp 42-48; CD-ROM: "Particles in Solids, Liquids, and Gases"	**Aligned as designed**	
PS3A	Energy exists in many forms: heat, light, chemical, electrical, motion of objects, and sound. Energy can be transformed from one form to another and transferred from one place to another.	• List different forms of energy (e.g., thermal, light, chemical, electrical, kinetic, and sound energy). • Describe ways in which energy is transformed from one form to another and transferred from one place to another (e.g., chemical to electrical energy in a battery, electrical to light energy in a bulb).	Investigation 7 parts 1-5 pp 204-234; Lab Notebook p 73; Resource book pp 42-48; CD-ROM: "Particles in Solid, Liquid, and Gas"	**Aligned with modifications (see comments)**	Teacher needs to be intentional about discussing different energy forms. These investigations discuss energy transfer but not transformation and only address heat energy. In Part 3 there is a nice opportunity to discuss energy transformation.
PS3B	Conduction, radiation, and convection, or mechanical mixing, are means of energy transfer.	• Use everyday examples of conduction, radiation, and convection, or mechanical mixing, to illustrate the transfer of energy from warmer objects to cooler ones until the objects reach the same temperature.	Resource book pp 42-48	**Aligned as designed**	

Alignment of Washington 6-8 Science Standards with
FOSS/MS Chemical Interactions ~ Investigation 07

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
PS3C	Heat (thermal energy) consists of random motion and the vibrations of atoms and molecules. The higher the temperature, the greater the atomic or molecular motion. Thermal insulators are materials that resist the flow of heat.	• Explain how various types of insulation slow transfer of heat energy based on the atomic-molecular model of heat (thermal energy).	Investigation 7 parts 1, 3, and 5, pp 204-209, 215-221, and 229-234; Lab Notebook pp 60-61, 64-65, 67, and 73; Resource book pp 42-48; CD-ROM: "Particles in Solids, Liquids, and Gases"	**Aligned with modifications (see comments)**	Investigation 7 part 1 contains the opportunity to introduce the thermal insulator concept. After completing the Dissolve or Melt investigation in part 1, lab notebook p 61, teachers need to ask students to explain what would happen if another material was used to create the cup. If time allows, students can conduct the same investigation with the foam cups and compare the results to the foil cup.
ES2A	The atmosphere is a mixture of nitrogen, oxygen, and trace gases that include water vapor. The atmosphere has different properties at different elevations.	• Describe the composition and properties of the troposphere and stratosphere.	Resource book pp 42-48	**Module/Unit requires changes (see comments)**	This is a good Earth Science connection and discusses the composition of air but not how the atmosphere changes with elevation. The teacher could make the connection however with their Earth Science module.
ES2C	In the water cycle, water evaporates from Earth's surface, rises and cools, condenses to form clouds and falls as rain or snow and collects in bodies of water.	• Describe the water cycle and give local examples of where parts of the water cycle can be seen.	Investigation 7 parts 1-5 pp 189-234; Lab Notebook p 73; CD-ROM: "Particles in Solids, Liquids, and Gases"	**Aligned with modifications (see comments)**	This investigation teaches evaporation and condensation which is a nice connection to the water cycle. The teacher would have to be intentional about making the connection to the water cycle.

Alignment of Washington 6-8 Science Standards with
FOSS/MS Chemical Interactions ~ Investigation 08

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
INQB	Different kinds of questions suggest different kinds of scientific investigations.	• Plan and conduct a scientific investigation (e.g., field study, systematic observation, controlled experiment, model, or simulation) that is appropriate for the question being asked. • Propose a hypothesis, give a reason for the hypothesis, and explain how the planned investigation will test the hypothesis. • Work collaboratively with other students to carry out the investigations.	Investigation 8 parts 2 and 3 pp 256-268; Lab Notebook pp 78, 79, and 83	**Aligned as designed**	The investigations contain many opportunities to address the standards but the teacher must be intentional in pointing out that the type of investigation varies with what is being investigated.
INQC	Collecting, analyzing, and displaying data are essential aspects of all investigations.	• Communicate results using pictures, tables, charts, diagrams, graphic displays, and text that are clear, accurate, and informative. • Recognize and interpret patterns – as well as variations from previously learned or observed patterns – in data, diagrams, symbols, and words. • Use statistical procedures (e.g., median, mean, or mode) to analyze data and make inferences about relationships.	Investigation 8, parts 1-3 pp 248-268; Lab Notebook pp 74, 75, 78, 79, and 83	**Aligned as designed**	
INQD	For an experiment to be valid, all (controlled) variables must be kept the same whenever possible, except for the manipulated (independent) variable being tested and the responding (dependent) variable being measured and recorded. If a variable cannot be controlled, it must be reported and accounted for.	• Plan and conduct a controlled experiment to test a hypothesis about a relationship between two variables. Determine which variables should be kept the same (controlled), which (independent) variable should be systematically manipulated, and which responding (dependent) variable is to be measured and recorded. Report any variables not controlled and explain how they might affect results.	Investigation 8 part 2 pp 256-262; Lab Notebook pp 78-79	**Aligned with modifications (see comments)**	This investigation presents a great opportunity for students to address variables when writing a procedure.

Alignment of Washington 6-8 Science Standards with FOSS/MS Chemical Interactions ~ Investigation 8

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
INQF	It is important to distinguish between the results of a particular investigation and general conclusions drawn from these results.	• Generate a scientific conclusion from an investigation using inferential logic, and clearly distinguish between results (e.g., evidence) and conclusions (e.g., explanation). • Describe the differences between an objective summary of the findings and an inference made from the findings.	Investigation 8 parts 2 and 3, pp 258-268; Lab Notebook pp 78, 79, and 83	**Aligned as designed**	
INQF	It is important to distinguish between the results of a particular investigation and general conclusions drawn from these results.	• Generate a scientific conclusion from an investigation using inferential logic, and clearly distinguish between results (e.g., evidence) and conclusions (e.g., explanation). • Describe the differences between an objective summary of the findings and an inference made from the findings.	Investigation 8 parts 2 and 3 pp 258-268; Lab Notebook pp 78, 79, and 83	**Aligned as designed**	
INQG	Scientific reports should enable another investigator to repeat the study to check the results.	• Prepare a written report of an investigation by clearly describing the question being investigated, what was done, and an objective summary of results. The report should provide evidence to accept or reject the hypothesis, explain the relationship between two or more variables, and identify limitations of the investigation.	Investigation 8 part 2 pp 256-262; Lab Notebook pp 78-79	**Aligned as designed**	The investigation contains an opportunity to address the standards but the teacher must be intentional in allowing students to independently write an accurate procedure.

Alignment of Washington 6-8 Science Standards with
FOSS/MS Chemical Interactions ~ Investigation 08

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
PS2A	Substances have characteristic intrinsic properties such as density, solubility, boiling point, and melting point, all of which are independent of the amount of the sample.	• Use characteristic intrinsic properties such as density, boiling point, and melting point to identify an unknown substance.	Investigation 8 part 1 pp 248-255; Resource book pp 49-53	**Aligned as designed**	Investigation 8 is strong in solubility.
PS2B	Mixtures are combinations of substances whose chemical properties are preserved. Compounds are substances that are chemically formed and have different physical and chemical properties from the reacting substances.	• Separate a mixture using differences in properties (e.g., solubility, size, magnetic attraction) of the substances used to make the mixture. • Demonstrate that the properties of a compound are different from the properties of the reactants from which it was formed.	Investigation 8 part 1 pp 248-255; Resource book pp 49-53; CD-ROM: "Explore Dissolving"	**Aligned as designed**	This investigation defines mixtures, but the teacher should still be using the vocabulary words compound, physical properties, and chemical properties.
ES2A	The atmosphere is a mixture of nitrogen, oxygen, and trace gases that include water vapor. The atmosphere has different properties at different elevations.	• Describe the composition and properties of the troposphere and stratosphere.	Resource book pp 49-53	**Module/Unit requires changes (see comments)**	This is a good Earth Science connection and discusses the composition of air but not how the atmosphere changes with elevation. The teacher could make the connection however with their Earth Science module.

Alignment of Washington 6-8 Science Standards with
FOSS/MS Chemical Interactions ~ Investigation 08

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
ES2D	Water is a solvent. As it passes through the water cycle, it dissolves minerals and gases and carries them to the oceans.	• Distinguish between bodies of saltwater and fresh water and explain how saltwater became salty.	Investigation 8 parts 1-3 pp 248-265; Resource book pp 49-53; CD-ROM: "Explore Dissolving"	**Aligned with modifications (see comments)**	This investigation is about solubility and the teacher needs to be intentional about making connections to the standard.

Alignment of Washington 6-8 Science Standards with FOSS/MS Chemical Interactions ~ Investigation 09

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
SYSA	Any system may be thought of as containing subsystems and as being a subsystem of a larger system.	• Given a system, identify subsystems and a larger encompassing system	Investigation 9 parts 2 and 3 pp 288-307; Lab Notebook pp 88-93	**Aligned with modifications (see comments)**	This investigation contains many opportunities to address the standards but the teacher must be intentional in using the terms systems and subsystems.
SYSB	The boundaries of a system can be drawn differently depending on the features of the system being investigated, the size of the system, and the purpose of the investigation.	• Explain how the boundaries of a system can be drawn to fit the purpose of the study (e.g., to study how insect populations change, a system might be a forest, a meadow in the forest, or a single tree).	Investigation 9 parts 2 and 3 pp 288-307; Lab Notebook pp 88-93	**Aligned with modifications (see comments)**	Teacher must be intentional about discussing the boundaries of the system. In part 2 their lungs are part of the system, but in part 3 they are not.
SYSC	The output of one system can become the input of another system.	• Give an example of how output of matter or energy from a system can become input for another system	Investigation 9 parts 2 and 3 pp 288-307; Lab Notebook pp 88-93	**Aligned with modifications (see comments)**	In this investigation, the teacher needs to be intentional about discussing how the air from the body is the input into the lime water, and the acid is the input into the baking soda.

Alignment of Washington 6-8 Science Standards with
FOSS/MS Chemical Interactions ~ Investigation 09

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
SYSD	In an open system, matter flows into and out of the system. In a closed system, energy may flow into or out of the system, but matter stays within the system.	• Given a description of a system, analyze and defend whether it is open or closed.	Investigation 9 parts 2 and 3 pp 288-307; Lab Notebook pp 88-93	**Aligned with modifications (see comments)**	The lesson contains opportunities for the use of terms open and closed systems but it requires the intentional use by teachers.
SYSE	If the input of matter or energy is the same as the output, then the amount of matter or energy in the system won't change; but if the input is more or less than the output, then the amount of matter or energy in the system will change.	• Measure the flow of matter into and out of an open system and predict how the system is likely to change (e.g., a bottle of water with a hole in the bottom, an ecosystem, an electric circuit).	Investigation 9 parts 2 and 3 pp 288-307; Lab Notebook pp 88-93	**Aligned with modifications (see comments)**	In these systems, the teacher has the opportunity to discuss whether or not matter is being added to the system and how that system is changing as a consequence.
SYSF	The natural and designed world is complex; it is too large and complicated to investigate and comprehend all at once. Scientists and students learn to define small portions for the convenience of investigation. The units of investigation can be referred to as "systems."	• Given a complex societal issue with strong science and technology components (e.g., overfishing, global warming), describe the issue from a systems point of view, highlighting how changes in one part of the system are likely to influence other parts of the system.	Investigation 9 parts 1 and 2 pp 280-297; Lab Notebook pp 86, 87, 89; Resource book pp 63-68	**Aligned as designed**	Teacher must be intentional about use of systems vocabulary. Teacher can take this opportunity to discuss how these models represent a small part of the natural world.

Alignment of Washington 6-8 Science Standards with
FOSS/MS Chemical Interactions ~ Investigation 09

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
INQE	Models are used to represent objects, events, systems, and processes. Models can be used to test hypotheses and better understand phenomena, but they have limitations.	• Create a model or simulation to represent the behavior of objects, events, systems, or processes. Use the model to explore the relationship between two variables and point out how the model or simulation is similar to or different from the actual phenomenon.	Investigation 9 part 1 pp 280-287; Lab Notebook pp 86-87	**Aligned as designed**	
INQF	It is important to distinguish between the results of a particular investigation and general conclusions drawn from these results.	• Generate a scientific conclusion from an investigation using inferential logic, and clearly distinguish between results (e.g., evidence) and conclusions (e.g., explanation). • Describe the differences between an objective summary of the findings and an inference made from the findings.	Investigation 9 parts 2 and 3, pp 288-307; Lab Notebook pp 88, 89, and 93	**Aligned as designed**	
INQG	Scientific reports should enable another investigator to repeat the study to check the results.	• Prepare a written report of an investigation by clearly describing the question being investigated, what was done, and an objective summary of results. The report should provide evidence to accept or reject the hypothesis, explain the relationship between two or more variables, and identify limitations of the investigation.	Investigation 9 part 4 pp 308-312; Lab Notebook pp 99	**Aligned as designed**	The lesson contains the opportunity for the students to write a procedure leading to a scientific report that could be repeated.

Alignment of Washington 6-8 Science Standards with
FOSS/MS Chemical Interactions ~ Investigation 09

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
APPA	People have always used technology to solve problems. Advances in human civilization are linked to advances in technology.	• Describe how a technology has changed over time in response to societal challenges.	Resource Book pp 69-72	**Aligned as designed**	The reading in the Resource Book contains many opportunities to address the standards but the teacher must be intentional in leading the discussion towards addressing them.
APPB	Scientists and technological designers (including engineers) have different goals. Scientists answer questions about the natural world; technological designers solve problems that help people reach their goals.	• Investigate several professions in which an understanding of science and technology is required. Explain why that understanding is necessary for success in each profession.	Resource Book pp 69-72	**Aligned as designed**	The reading in the Resource Book contains many opportunities to address the standards but the teacher must be intentional in leading the discussion towards addressing them.
APPC	Science and technology are interdependent. Science drives technology by demanding better instruments and suggesting ideas for new designs. Technology drives science by providing instruments and research methods.	• Give examples to illustrate how scientists have helped solve technological problems (e.g., how the science of biology has helped sustain fisheries) and how engineers have aided science (e.g., designing telescopes to discover distant planets).	Resource Book pp 69-72	**Aligned as designed**	The reading in the Resource Book contains many opportunities to address the standards but the teacher must be intentional in leading the discussion towards addressing them.

Alignment of Washington 6-8 Science Standards with
FOSS/MS Chemical Interactions ~ Investigation 09

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
APPD	The process of technological design begins by defining a problem and identifying criteria for a successful solution, followed by research to better understand the problem and brainstorming to arrive at potential solutions.	• Define a problem that can be solved by technological design and identify criteria for success. • Research how others solved similar problems. • Brainstorm different solutions.	Resource Book pp 69-72	**Aligned as designed**	The reading in the Resource Book contains many opportunities to address the standards but the teacher must be intentional in leading the discussion towards addressing them.
APPF	Solutions must be tested to determine whether or not they will solve the problem. Results are used to modify the design, and the best solution must be communicated persuasively.	• Test the best solution by building a model or other representation and using it with the intended audience. Redesign as necessary. • Present the recommended design using models or drawings and an engaging presentation.	Resource Book pp 69-72	**Aligned as designed**	The reading in the Resource Book contains many opportunities to address the standards but the teacher must be intentional in leading the discussion towards addressing them.
APPH	People in all cultures have made and continue to make contributions to society through science and technology.	• Describe scientific or technological contributions to society by people in various cultures.	Resource Book pp 78-79	**Aligned as designed**	The reading in the Resource Book contains many opportunities to address the standards but the teacher must be intentional in leading the discussion towards addressing them.

Alignment of Washington 6-8 Science Standards with FOSS/MS Chemical Interactions ~ Investigation 09

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
PS2B	Mixtures are combinations of substances whose chemical properties are preserved. Compounds are substances that are chemically formed and have different physical and chemical properties from the reacting substances.	• Separate a mixture using differences in properties (e.g., solubility, size, magnetic attraction) of the substances used to make the mixture. • Demonstrate that the properties of a compound are different from the properties of the reactants from which it was formed.	Investigation 9 parts 1-4 pp 280-312; Lab Notebook pp 86-93; Resource book pp 63-68, 73-77, and 96	**Aligned as designed**	Investigation 9 contains many opportunities to discuss the differences between the properties of a compound and the reactants from which it was formed.
PS2C	All matter is made of atoms. Matter made of only one type of atom is called an element.	• Explain that all matter is made of atoms, and give examples of common elements—substances composed of just one kind of atom.	Investigation 9 parts 1-3 pp 280-307; Lab Notebook pp 86-87; Resource book p 96	**Aligned as designed**	Investigations 2 and 3 introduce the concept of atoms leading up to this investigation.
PS2D	Compounds are composed of two or more kinds of atoms, which are bound together in well-defined molecules or arrays.	• Demonstrate with a labeled diagram and explain the relationship among atoms, molecules, elements, and compounds.	Investigation 9 parts 1-3 pp 280-307; Lab Notebook pp 86, 87, and 91; Resource book pp 63-68, 73-77, and 96	**Aligned as designed**	Teacher must be intentional about use of the terms atoms, molecules, and compounds. Investigations 1, 2, and 3 are learning progressions leading up to Investigation 9.

Alignment of Washington 6-8 Science Standards with
FOSS/MS Chemical Interactions ~ Investigation 09

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
PS2F	When substances within a closed system interact, the total mass of the system remains the same. This concept, called conservation of mass, applies to all physical and chemical changes.	• Apply the concept of conservation of mass to correctly predict changes in mass before and after chemical reactions, including reactions that occur in closed containers, and reactions that occur in open containers where a gas is given off.	Investigation 9 part 3 pp 298-307; Lab Notebook pp 93-95; Resource book pp 63-68	**Aligned as designed**	The teacher needs to be intentional about discussing the standard.

Alignment of Washington 6-8 Science Standards with
FOSS/MS Chemical Interactions ~ Investigation 10

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
SYSD	In an open system, matter flows into and out of the system. In a closed system, energy may flow into or out of the system, but matter stays within the system.	• Given a description of a system, analyze and defend whether it is open or closed.	Investigation 10 part 2 pp 330-336	**Aligned with modifications (see comments)**	This lesson is a great example of a closed system, but the teacher must be intentional about discussing the standard.
INQF	It is important to distinguish between the results of a particular investigation and general conclusions drawn from these results.	• Generate a scientific conclusion from an investigation using inferential logic, and clearly distinguish between results (e.g., evidence) and conclusions (e.g., explanation). • Describe the differences between an objective summary of the findings and an inference made from the findings.	Investigation 10 part 1 pp 323-329; Lab Notebook p 101	**Aligned as designed**	
APPA	People have always used technology to solve problems. Advances in human civilization are linked to advances in technology.	• Describe how a technology has changed over time in response to societal challenges.	Resource Book pp 80-83	**Aligned as designed**	The reading in the Resource Book contains many opportunities to address the standards but the teacher must be intentional in leading the discussion towards addressing those standards.

Alignment of Washington 6-8 Science Standards with
FOSS/MS Chemical Interactions ~ Investigation 10

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
APPB	Scientists and technological designers (including engineers) have different goals. Scientists answer questions about the natural world; technological designers solve problems that help people reach their goals.	• Investigate several professions in which an understanding of science and technology is required. Explain why that understanding is necessary for success in each profession.	Resource Book pp 80-83	**Aligned as designed**	The reading in the Resource Book contains many opportunities to address the standards but the teacher must be intentional in leading the discussion towards addressing them.
APPC	Science and technology are interdependent. Science drives technology by demanding better instruments and suggesting ideas for new designs. Technology drives science by providing instruments and research methods.	• Give examples to illustrate how scientists have helped solve technological problems (e.g., how the science of biology has helped sustain fisheries) and how engineers have aided science (e.g., designing telescopes to discover distant planets).	Resource Book pp 80-83	**Aligned as designed**	The reading in the Resource Book contains many opportunities to address the standards but the teacher must be intentional in leading the discussion towards addressing them.
APPD	The process of technological design begins by defining a problem and identifying criteria for a successful solution, followed by research to better understand the problem and brainstorming to arrive at potential solutions.	• Define a problem that can be solved by technological design and identify criteria for success. • Research how others solved similar problems. • Brainstorm different solutions.	Resource Book pp 80-83	**Aligned as designed**	The reading in the Resource Book contains many opportunities to address the standards but the teacher must be intentional in leading the discussion towards addressing them.

Alignment of Washington 6-8 Science Standards with
FOSS/MS Chemical Interactions ~ Investigation 10

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
APPE	Scientists and engineers often work together to generate creative solutions to problems and decide which ones are most promising.	• Collaborate with other students to generate creative solutions to a problem, and apply methods for making tradeoffs to choose the best solution.	Resource Book pp 80-83	**Aligned as designed**	The reading in the Resource Book contains many opportunities to address the standards but the teacher must be intentional in leading the discussion towards addressing them.
PS2B	Mixtures are combinations of substances whose chemical properties are preserved. Compounds are substances that are chemically formed and have different physical and chemical properties from the reacting substances.	• Separate a mixture using differences in properties (e.g., solubility, size, magnetic attraction) of the substances used to make the mixture. • Demonstrate that the properties of a compound are different from the properties of the reactants from which it was formed.	Investigation 10 part 2 pp 330-336; Lab Notebook p 103; Video: "Atoms and Molecules"	**Aligned as designed**	Teacher needs to emphasize the colors of the reactants compared to the compound that has formed.
PS2C	All matter is made of atoms. Matter made of only one type of atom is called an element.	• Explain that all matter is made of atoms, and give examples of common elements—substances composed of just one kind of atom.	Video: "Atoms and Molecules"	**Aligned as designed**	

Alignment of Washington 6-8 Science Standards with
FOSS/MS Chemical Interactions ~ Investigation 10

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
PS2D	Compounds are composed of two or more kinds of atoms, which are bound together in well-defined molecules or arrays.	• Demonstrate with a labeled diagram and explain the relationship among atoms, molecules, elements, and compounds.	Resource book pp 80-83; Video: "Atoms and Molecules"	**Aligned as designed**	Investigation reading has the intentional use of the term "well-ordered arrays."
PS2F	When substances within a closed system interact, the total mass of the system remains the same. This concept, called conservation of mass, applies to all physical and chemical changes.	• Apply the concept of conservation of mass to correctly predict changes in mass before and after chemical reactions, including reactions that occur in closed containers, and reactions that occur in open containers where a gas is given off.	Investigation 10 parts 1 and 2, pp 323-336; Lab Notebook pp 101, 103	**Aligned as designed**	The teacher needs to be intentional about discussing the standard.