Grade 3 - Systems and Design: Communities

"How Are You A Systems Thinker?"

PROGRAM ENDURING UNDERSTANDINGS	UNITS OF STUDY	SYSTEM THINKING CONCEPTS/TOOLS	CURRICULUM CONTENT/SKILLS	ASSURED LEARNING EXPERIENCES	COMMON CORE STATE STANDARDS
Systems Thinking and Change ● A system is a set of specifically organized, interdependent parts which serve a purpose. ● Understanding the behavior of one system creates a framework to understand other systems. ● Systems serve specific purposes within larger systems. ● Systems thinkers use particular vocabulary and tools to understand the short term and long term impact of patterns and events. ● Systems thinkers observe, discuss and connect information in order to understand systems. ● Systems seek stability. ● Change in one system causes change in another system. The real world often operates in circular causality, not just cause and effect. (Feedback) ● Designing effective change requires understanding of systems thinking. **Interpersonal/Intrapersonal Knowledge** ● Becoming knowledgeable about yourself gives you the power to make choices and decisions about personal actions. ● Collaboration, communication, and contribution are necessary in order to be an effective self advocate, learner and citizen. **Producing and Presenting** ● To communicate a message it must be received. ● Presenting your knowledge in organized, insightful, and engaging ways purposefully informs and educates your audience	**Defining Systems** ● Systems Stories ● Connections **Analyzing & Recognizing Systems** ● biological ● environmental ● ecological ● man made **Impacts to System** ● Mangrove Forests ● The Lorax ● Horse Crabs & Red Knots ● Invasive Species **Creating a Sustainable Systems** ● Designing sustainability ● What does an animal need to sustain itself?	**What is a system?** ● Heap vs. System ● Types of Systems ● Identifying Systems ● Elements ● Purpose **Systems Thinking** ● Mind Maps ● Habits of a System thinker ● Connection circles ● Causal/Feedback Loops ● Behavior Over Time ● Stock and Flow	**Natural Systems** ● You! as a system ● environmental ● Mangrove Forests ● The Lorax ● Creating systems **Created Systems** ● properties of systems that sustain ● Sustainable Design of systems **Skills:** ● Problem Finding and Solving ● Questioning ● Creative Thinking ● Research ● Discussion ● Connective Thinking ● Interpersonal/Intrapersonal	**Formative Assessments** ● group discussion ○ Reflection ○ Connection ○ Question ● Create mini presentation on a topic involves systems ● Use Systems tools to show evidence of content understanding ● Create systems tools (either with pencil and paper or using online tools) to collect information about how systems are interrelated. ● Participate in discussions about the interconnectedness of systems. ● Create Behavior Over Time Graphs, Causal Loops, and Stock and Flow Diagrams **Performance Assessment** ● Create a presentation about a specific system. ● Create and present a design for a sustainable habitat	**Defining Systems -** RL. 3. 1,3,5,7 RI.3.1,4,7 SL 3.1,2,4 **Analyzing Systems -** RL. 3. 1,3,5,7 SL 3.1,2,4 W 3.7 Math.Content.3.MD.3 **Designing Systems -** SL 3.4 W 3.7-8 http://static.clexchange.org/ftp/CommonCoreStandards.pdf

Grade 4 - Systems and Design: Change and Change Agents

"How do Systems Manage Change?"

PROGRAM ENDURING UNDERSTANDINGS	UNITS OF STUDY	SYSTEM THINKING CONCEPTS/TOOLS	CURRICULUM CONTENT/SKILLS	ASSURED LEARNING EXPERIENCES	COMMON CORE STATE STANDARDS
Systems Thinking and Change ● A system is a set of specifically organized, interdependent parts which serve a purpose. ● Understanding the behavior of one system creates a framework to understand other systems. ● Systems serve specific purposes within larger systems. ● Systems thinkers use particular vocabulary and tools to understand the short term and long term impact of patterns and events. ● Systems thinkers observe, discuss and connect information in order to understand systems. ● Change happens; systems respond. ● Systems seek stability. ● Change in one system causes change in another system. The real world often operates in circular causality, not just cause and effect. (Feedback) ● Designing effective change requires understanding of systems thinking. **Interpersonal/Intrapersonal Knowledge** ● Becoming knowledgeable about yourself gives you the power to make choices and decisions about personal actions. ● Collaboration, communication, and contribution are necessary in order to be an effective self advocate, learner and citizen. **Producing and Presenting** ● To communicate a message it must be received. ● Presenting your knowledge in organized, insightful, and engaging ways purposefully informs and educates your audience	**Recognizing Change within Systems:** Natural and Man Made **Analyzing Change within Systems** Change Process and Types of Change **Analyzing & Evaluating Change: Its Causes and Impacts** Historical Change and Change Agents **Designing Change** The World Our Minds Invent: Invention	**How Do Systems Change?** ● Patterns of change(cyclical, steady, random, and chaotic) ● Naturally ● Man Made Designed ● Leaders ● Ideas ● Popular (critical mass and tipping point) **Systems Thinking** ● Mind Maps ● Habits of a System Thinker ● Causal/ Feedback Loops ○ Balancing ○ Reinforcing ● Behavior Over Time ● Stock and Flow (basic) **Change and Growth: How Do Systems Manage Change** ● Types of Change: Steady, Cyclic, Random, Chaotic ● Categories of Change: Social, Political, Ecological, Biological, Technical ● Designing Change ● Individual's Passion or Idea ● Common/ Community Problem	**Change Happens; Systems Respond** ● Wolves of Yellowstone / Wolves of Isle Royale ● Neurology/ neuroplasticity ● What happened to the Mammoths? ● Change ● Changes throughout History ○ Social ○ Political ○ Ecological ○ Biological ○ Technical ● Change Agents ● Inventors, Inventions and Inventing **Skills:** ● Problem Finding and Solving ● Questioning ● Creative Thinking ● Research ● Discussion ● Connective Thinking ● Interpersonal/Intrapersonal	**Formative Assessments** ● Participate in class discussion/ written response -Reflections -Connections -Questions ● Create mini presentation on a topic involves change ● Use systems tools to describe change in systems **Performance Assessments** ● Create and Present research of Change Agent Designers. (Self-Evaluation) ● Invention surveying, research, plan, design, presentation, marketing skill	**Recognizing Change within Systems -** RL 4.1, 3 RI 4.1,2 3,4 SL 4.1-2 W 4.9 **Analyzing Change -** RL 4.1, 3 RI 4.1,2 3,4,,7,9 SL 4.1,2,4, 5 W 4.7-8 Math.Content.4.MD.4 **Designing Change -** Sl 4.1,4,5 W 4.7 http://static.clexchange.org/ftp/CommonCoreStandards.pdf

Grade 5 – Systems and Change: Systems Explorations

"How do Systems Manage the Ripple Effects of Change?"

PROGRAM ENDURING UNDERSTANDINGS	UNITS/THEMES OF STUDY	SYSTEMS THINKING CONCEPTS/TOOLS	CURRICULUM CONTENT/SKILLS	ASSURED LEARNING EXPERIENCES	COMMON CORE STATE STANDARDS
Systems Thinking and Change ● A system is a set of specifically organized, interdependent parts which serve a purpose. ● Understanding the behavior of one system creates a framework to understand other systems. ● Systems serve specific purposes within larger systems. ● Systems thinkers use particular vocabulary and tools to understand the short term and long term impact of patterns and events. ● Systems thinkers observe, discuss and connect information in order to understand systems. ● Change happens; systems respond ● Systems seek stability. ● Change in one system causes change in another system. The real world often operates in circular causality, not just cause and effect. (Feedback) ● Designing effective change requires understanding of systems thinking. **Interpersonal/Intrapersonal Knowledge** ● Becoming knowledgeable about yourself gives you the power to make choices and decisions about personal actions. ● Collaboration, communication, and contribution are necessary in order to be an effective self advocate, learner and citizen. **Producing and Presenting** ● To communicate a message it must be received. ● Presenting your knowledge in organized, insightful, and engaging ways purposefully informs and educates your audience	Systems thinkers Investigate the Ripple Effects of Change **The Cause of the Problem is Within the System: Population Dynamics and Ecosystems** **Independent Systems Research Project** **Historical Simulation** **Hidden Systems: Infrastructure and Underlying Structures** When time allows: **Metaphoric Thinking: Lewis Carroll**	**Systems Thinking Concepts and Vocabulary** ● Habits of Systems Thinking ● Oscillation ● Sustainable ● Escalation/Decline ● Introduce Systems Archetypes **Systems Thinking Tools** ● Guided Dynamic Modeling ● Feedback Loops ● Behavior Over Time Graphs/ Change over time ● Causal/Feedback Loops: ○ Balancing ○ Reinforcing ● Stock and Flow (basic) ● Iceberg Diagram (basic) ● Mind Maps	**Review Sustainability and Change** **Ecosystems** ● Creative Learning Exchange Simulations ● Science Seekers Simulation ● Invasive Species Research/Presentation **Systems Thinking Allegories** ● Review of Tip of the Iceberg ● Billibonk and the Thorn Patch ● Billibonk and the Big Itch **Historical Simulation** ● Sustainable Communities Over Time ● Timeline of the Common Era **Metaphorical Thinking** ● Lewis Carroll's Alice's Adventures in Wonderland **Skills** ● How to Give a Presentation ● Verbal Logic of Analogies, Similes and Metaphors ● Logical Thinking Using Syllogisms ● Grammar ● Interpersonal/Intrapersonal	**Formative Assessments** Students will: ● Complete Learning Log ○ Reflection ○ Connection ○ Question ○ Creation ○ Conclusion ○ Systems Thinking ● Participate in class discussions using specific content and criteria. ● Read, discuss and respond to systems allegories and other literature ● Be able to diagram a simple sentence. ● Use Systems Thinking Tools to exhibit understanding of: ○ Circular causality ○ Behavior Over Time ○ Stock and Flow **Performance Assessments** ● Create Presentation to provide opportunity for public speaking ● Brainstorm possible systems to investigate; Explore chosen system; Identify problems and possible solutions; Create presentation of chosen system **Creative Experiences** ● Work collaboratively to participate in systems simulation. ● Develop reasoning skills as they create and analyze syllogisms. ● Contribute to class blog	RL.5.1-4, RI.5.1-10 W.5.1,2,4,7.8,10 SL.5.1-6 Math.Content.5.MD.2 http://static.clexchange.org/ftp/CommonCoreStandards.pdf

Grade 6 – Systems and Change: Origins and Endings

"How Do Systems Develop Over Time?"

PROGRAM ENDURING UNDERSTANDINGS	UNITS OF STUDY	SYSTEMS THINKING CONCEPTS/TOOLS	CURRICULUM CONTENT/THEMES/ SKILLS	ASSURED LEARNING EXPERIENCES	COMMON CORE STATE STANDARDS
Systems Thinking and Change ● A system is a set of specifically organized, interdependent parts which serve a purpose. ● Understanding the behavior of one system creates a framework to understand other systems. ● Systems serve specific purposes within larger systems. ● Systems thinkers use particular vocabulary and tools to understand the short-term and long-term impact of patterns and events. They observe, discuss and connect information in order to understand systems. ● Systems seek stability. ● Change in one system causes change in another system. The real world often operates in circular causality, not just cause and effect. (Feedback) ● Designing effective change requires understanding of systems thinking. **Interpersonal/Interpersonal Knowledge** ● Becoming knowledgeable about yourself gives you the power to make choices and decisions about personal actions. ● Collaboration, communication, and contribution are necessary in order to be an effective self advocate, learner and citizen. **Producing and Presenting** ● To communicate a message it must be received. ● Presenting your knowledge in organized, insightful, and engaging ways purposefully informs and educates your audience	Systems Thinkers Seek the Bird's Eye View **Time, Perspectives and Ambiguity** **Caves and Shadows: Plato's Allegory of the Cave** **Geologic Time Scale** **Early Man** **Are We Our Heroes? An exploration of the Hero Cycle through Gilgamesh** **Mesopotamia: First Civilizations** **Ancient India** **The Beginning of Western Civilization: Egypt, Greece, Rome** --- **Patterns, Trends, Big Ideas: What Does the Future Hold?**	**Systems of Historical Thinking** ● Visualize History (The Big Picture ● Mental Models: Geographic Determinism; Origins Determine Mental Models; stories/beliefs/religion/philosophies ● Built and Underlying Systemic Structures:survival strategies; rules/ laws/ government; art/culture/architecture; economics; understanding of unknown ● Patterns and Trends of Behavior within and throughout the Natural World and Civilizations: ● Events as Tipping or Turning Points **Systems Thinking Tools** ● Ladder Of Inference ● Iceberg Diagram ● Behavior Over Time Graph ● Causa/Feedback Loops: ● Balancing ● Reinforcing ● Stock and Flow ● Habits of a Systems Thinker ● Complex Systems Thinking ● System Archetypes	**Content** ● Allegory of the Cave ● Geologic Time ● Early Man ● Gilgamesh ● Mesopotamia ● Ancient India ● Ancient Egypt, Greece, Rome **Themes** ● Climate Change and Extinction ● Evolution and Adaptation ● Social Adaptation ● Story or Truth: Oral Tradition vs. Scientific Method ● Mental Models ● Heroes Over Time **Skills** ● Perspective/ Interpretation ● Thinking Processes or Framework Thinking ● Discussion ● Collaboration ● Connective-Metaphoric Thinking ● Writing: ○ Story ○ Argument ● Trend and Event Analysis and Prediction ● Interpersonal/Intrapersonal ● Presentation **Systems Thinking Allegories** ● Shadows of the Neanderthal	**Formative Assessments** ● Participate in class discussions: whole class, fishbowl and small group. ● Investigate Plato's Allegory of the Cave and create a metaphoric interpretation of the "Cave" in his or her life. ● Develop timelines marking events for each content area in order to visualize history. ● Memorize and be able to "tell the story" of man's history through "Landmark Dates." ● Analyze and evaluate maps for each content area. ● Work collaboratively to research and use systems tools to analyze ancient accomplishments and participate in simulations. **Performance Assessments** ● Write narrative of Early Man evolution to provide evidence of comprehension and metaphoric thinking. ● Create products to compare/ contrast and connect the heroic traits of various characters. ("Allegory of the Cave," Shadows of the Neanderthal, Gilgamesh,"Ramayana") ● Demonstrate lower and higher order thinking through traditional assessments (multiple choice, matching, short answer, argument and expository essays). **Creative Experiences** ● Explore abstract concepts (time, perspective, ambiguity, metaphoric thinking, historical thinking skills) with an open mind. ● Create a Timeline of the Future to connect all "big ideas" learned throughout the year. ● Contribute to Class Blog	RL.6.1-4 RI .6.1-8 SL.6.1a-d,2-6 W.6.1-6 (7-8) 9a-b,10 http://static.clexchange.org/ftp/CommonCoreStandards.pdf

Grade 7 – Systems and Change: The Common Good

"How Do Systems Compare and Compete Over Time?"

PROGRAM ENDURING UNDERSTANDINGS	UNITS OF STUDY	SYSTEMS THINKING CONCEPTS/TOOLS	CURRICULUM CONTENT/SKILLS	ASSURED LEARNING EXPERIENCES	COMMON CORE STATE STANDARDS
Systems Thinking ● A system is a set of specifically organized, interdependent parts which serve a purpose. ● Understanding the behavior of one system creates a framework to understand other systems. ● Systems thinkers use particular vocabulary and tools to understand the short-term and long-term impact of patterns and events. They observe, discuss and connect information in order to understand systems. ● Systems seek stability. ● Change in one system causes change in another system. The real world often operates in circular causality, not just cause and effect. (Feedback) ● Designing effective change requires understanding of systems thinking. **Interpersonal/Interpersonal Knowledge** ● Becoming knowledgeable about yourself gives you the power to make choices and decisions about personal actions. ● Collaboration, communication, and contribution are necessary in order to be an effective self advocate, learner and citizen. **Producing and Presenting** ● To communicate a message it must be received. ● Presenting your knowledge in organized, insightful, and engaging ways purposefully informs and educates your audience.	*How Do Systems Guide the Development of Civilizations?* *Competing Systems* **Historical Analysis & Systems Thinking** Multiple Intelligences & Systems Thinking Special Topic: The Navajo Code Talkers **Complex Systems** Modern Economics and Governments Globalization **Systemic Change, Adaptation & Evolution** World Geography Geographical impacts on Civilizations Cultural Diffusion Migration/Immigration/Citizenship Ancient & modern China and Russia Novel study: Animal Farm (Orwell) **Complex Systems/Complex Problems** *(When time allows)* Countries of Africa and Foreign Aid	**How Systems Compare?** **Complex Systems** ● Purpose ● Characteristics **Systems Tools** ● Feedback Loops ● Balancing ● Reinforcing ● Behavior Over Time ● Stock and Flow ● Iceberg Diagram **Systems Archetypes** ● Fixes that Fail ● Tragedy of the Commons ● Success to the Successful ● Escalation	**Content** ● World Geography **Systems Within Modern Cultures** ● China ● Russia ● Nations of Africa **Problem-solving** ● Foreign Aid simulation ● Current Events **Skills** ● Discussion ● Interpretation ● Research ● Problem-solving ● Writing ● Social/Emotional ● Presentation	**Performance Assessment** ● Class discussions *All students will participate in small groups to:* ● interpret primary source documents in historical context ● conduct research on political, economic, environments of world cultures ● prepare computer-based and oral presentations *Individually, each student will:* ● provide written responses to questions to show comprehension and connective thinking ● generate literature responses to Animal Farm Essay, Behavior Over Time graphs, Political Cartoons ● provide evidence of competency in Systems Thinking concepts through classwork, quizzes and tests ● analyze current events articles **Creativity** Problem-solving in a simulation of providing foreign aid to nations in Africa	**Complex Systems** – SL.7. 1-3 RI.7. 1,2,4 W.7. 2,4,7,8 **Systemic Change, Adaptation and Evolution** – SL.7. 1-3 RI.7. 1,2,4,6,7,8,10 W.7. 1-10 **Complex Systems/Complex Problems** SL.7. 1-6 RI.7. 1,4,7,8,10 W.7. 2,6,7,8,9 Math.Content.7.R.P.A.2A-B Math.Content.7.S.P.A.1 http://static.clexchange.org/ftp/CommonCoreStandards.pdf

Grade 8 – Systems and Change: Justice and Liberty

"How are Systems Designed to Seek Truth and Justice?"

PROGRAM ENDURING UNDERSTANDINGS	UNITS OF STUDY	SYSTEMS THINKING CONCEPTS/TOOLS	CURRICULUM CONTENT/SKILLS	ASSURED LEARNING EXPERIENCES	COMMON CORE STATE STANDARDS
Systems Thinking ● Understanding the behavior of one system creates a framework to understand other systems. ● Systems thinkers use particular vocabulary and tools to understand the short-term and long-term impact of patterns and events. They observe, discuss and connect information in order to understand systems. ● Systems seek stability. ● Change in one system causes change in another system. The real world often operates in circular causality, not just cause and effect. (Feedback) ● Designing effective change requires understanding of systems thinking. **Interpersonal/Interpersonal Knowledge** ● Becoming knowledgeable about yourself gives you the power to make choices and decisions about personal actions. ● Collaboration, communication, and contribution are necessary in order to be an effective self-advocate, learner and citizen. **Producing and Presenting** ● To communicate a message it must be received. ● Presenting your knowledge in organized, insightful, and engaging ways purposefully informs and educates your audience.	How Are Systems Designed- ● *to accommodate variables?* ● *for a specific goal or purpose?* **Historical Analysis & Systems Thinking** ● 5 Habits of Historical Thinking ● Current Events analysis via Systems Thinking ● Closed v. Open Systems **The Evolution of Systems:** U. S. Constitution: ● Pre-Constitution ○ significant events ○ Articles of Confederation ● Primary Documents Analysis ● Constitution Structure - civics and citizenship - voting rights history - Electoral College - U.S. criminal justice **Landmark Decisions and Moot Court** ● First Amendment: free speech & political cartoons ● "The Big 5": five landmark student free speech cases ○ *from Tinker v Des Moines '69 to B.L. v Mahanoy '21* ● post Civil-War Amendments ○ 14th Amendment & landmark cases throughout history Testing Systems Adaptability: Manifest Destiny Civil War	**Complex Systems** ● Characteristics ● Analysis and comparison of complex systems ● Change Over Time ● Drifting Goals ● Tipping Point within a system **Systems Tools** ● Feedback Loops ● Balancing ● Reinforcing ● Behavior Over Time ● Stock and Flow ● Iceberg Diagram **Systems Archetypes** ● Fixes that Fail ● Success to the Successful ● Escalation	**Content** ● Revolutionary War **Complex System Design and Adaptability:** ● Constitution ● Growth of Political Parties ● Age of Jackson ● Civil War ● Current political events **Skills** ● Discussion ● Interpretation ● Research ● Problem-solving ● DBQ Writing ● Social/Emotional ● Presentation	**Performance Assessment** ● Class discussions *All students will participate in small groups to:* ● interpret primary source documents in historical context ● conduct research on Supreme Court rulings, Civil War era, and current events ● prepare arguments for oral presentations ● prepare for group presentations *Individually, each student will:* ● provide written responses to questions to show comprehension and connective thinking ● complete an assigned roles in Moot Court and Civil War simulation ● self-assess and peer-assess student work in Moot Court and Civil War simulation ● annotate current events articles ● write responsive essays in DBQ format ● analyze/critique news articles	**Complex Systems** – The Constitution SL.8. 1-4 RI.8. 1-4, 6 W.8. 1-2,4,5,8 **Systemic Change, Adaptation and Evolution** – U.S. History through the Reconstruction Era SL.8. 1-3,5 RI.8. 1-4,6,7,8 W.8. 1-2,4,5,8-10 **Complex Systems** – War & Conflict SL.8. 1-3,5 RI.8. 1-4,6,7,8 W.8. 1-2,4,5,8-10 http://static.clexchange.org/ftp/CommonCoreStandards.pdf