Session 1: Big Ideas of CCSS and Understanding by Design Framework

UbD Elements	Characteristics of Elements
Unit A *unit focuses on a major topic, process, theme, or performance based on established goals and standards, and typically lasts 10 - 25 class periods.*	Units are framed in terms of intended student outcomes and achievements, not in terms of content covered. The unit focuses on the use of content, and the selection of activities and their sequencing reflects a focus on outcomes not inputs.
Established Goals **Standards**: *National and state standards that focus the unit.* **Other Goals**: *Can include District or School Mission or goals other than academic Standards (e.g., community contributor, 21st century skills)*	If listed, targeted goals should be: o Taught and assessed within the unit o Feasible with existing time frame and resources o "Unpacked" and used to focus engaging lessons and assessments. (They are not the curriculum.)
Transfer Goals *Long-term performances that we want learners to eventually be able to accomplish on their own. Transfer goals establish purpose and relevance.*	o Long-term in nature o Emphasis is on independent and contextualized performance o Help to establish purpose and relevance by answering common student questions such as: "Why should I learn this? "What can I do with this?"
Understandings *Specify transferrable ideas and processes that students should come to understand.*	o Are inferences students should realize or derive as a result of the work of the unit o Are framed as full sentences (specific generalizations) in response to the prompt, "The students will understand THAT…" o Help learners make sense of otherwise discrete facts and skills; they "connect the dots" o Cannot be simply transmitted; they must be "earned" by the learner
Essential Questions *Open-ended questions that focus instruction on the big ideas, align instruction with assessment. By exploring essential questions students develop and deepen their understanding.*	o Encourage active meaning-making by the learner about important ideas and issues o Are open ended; have no simple right answer o Are meant to be investigated, argued, looked at from different points of view in and across units o Raise other important questions o Naturally arise in every day life and/or "doing" the subject o Are meant to recur; can be fruitfully asked over time
Knowledge and Skills *Specify what students should know and be able to do as a result of the unit.*	o Content knowledge and skill should be means, *not* an end in themselves o Only list enabling knowledge and skills that will be explicitly taught and assessed in this unit
Performance Tasks *Ask students to apply knowledge and skills to a new situation (transfer) to show evidence of understanding.*	o Demand thoughtful application of knowledge and skills, not just recall o Establish authentic contexts for performance o Are open-ended; they do not have a best answer or a right way to complete the task o Yield tangible products and performances as evidence of understanding and transfer (Stage 1 goals)

UbD Elements	Characteristics of Elements
Other Evidence *Additional summative assessments that are aligned with and measure Stage 1 goals.*	o Identifies needed assessments of all Stage 1 goals o Includes conventional tests, assignments and observations to supplement the evidence from the performance tasks
Criteria ***The basis for evaluating student performance***	o Valid criteria and indicators based on Stage 1 goals o Aligned with CCSS qualifiers or other performance standards o Are used to develop more detailed rubrics
Learning Plan *Intended to equip students to achieve the goals of Stage 1and perform well on the Stage 2 assessments.*	A set of learning events that are designed to help students: o Acquire targeted knowledge and skills o Make meaning of important ideas o Equip students to transfer their learning o Use textbooks and other materials as resources. (The textbook should support the unit, not be the unit.) o Learn in a sequence that best supports understanding and engagement

Session 2: Seeing the Forest *and* the Trees — Designing a coherent learning experience

Draft Subject Area Transfer Goals
Students will be able to independently use their learning to:

Career and Technical Education

- Compete in the marketplace through their training, experience, and certification (as appropriate)
- Communicate effectively based on purpose, task, and audience using appropriate vocabulary
- Develop a career pathway by exploring and pursuing viable options based on interests, experience, and aspirations
- Demonstrate professionalism through exhibiting attentiveness, growing from feedback, continuing to make a good impression, and adhering to industry standards

Fine Arts

- Communicate effectively based on purpose, task, and audience using appropriate vocabulary
- Find meaning and interest in varied works and performances of art
- Create a work or performance to evoke mood and emotion through application of technique and methodology
- Evaluate a work or performance to determine its value
- Demonstrate professionalism through exhibiting attentiveness, growing from feedback, continuing to make a good impression, and adhering to industry standards
- Create a portfolio of accomplishments through documenting training and experience to promote themselves as an artist
- (Advanced High School Courses ONLY) Develop a career pathway by exploring and pursuing viable options based on interests, experience, and aspirations

Science

- Communicate effectively based on purpose, task, and audience using appropriate vocabulary
- Demonstrate professionalism through functioning like a scientist: exhibiting attentiveness, adhering to safety standards, collaborating with others, and growing from feedback
- Observe and explore a given system or concept to deepen scientific understanding
- Design and conduct a sound investigation to test a hypothesis and draw a conclusion based on the data
- Evaluate scientific claims and analyze issues to verify the credibility of the source, data, and/or methodology
- Analyze data to seek out patterns and/or make predictions

Library

- Demonstrate professionalism through functioning like a researcher: crafting and continuing to refine a driving question, seeking out appropriate sources, adhering to policy standards, collaborating with others, and growing from feedback
- Evaluate source(s) for credibility and usefulness and then take applicable notes with appropriate citation(s)
- Make sense of information and ideas based on the task specifications and driving question
- Communicate effectively based on purpose, task, and audience using appropriate vocabulary

Social Studies

- Evaluate claims and analyze issues to verify the credibility of that point of view
- Analyze documents and data to establish generalizations, make predictions, or draw conclusions
- Determine relevance of historical lessons (e.g. ideas, documents, tactical errors, and events) and apply to a given situation, problem, or challenge
- Evaluate the interdependent nature for a given situation or conflict
- Communicate effectively based on purpose, task, and audience using appropriate vocabulary

English Language Arts, English as a Second Language

Consumption of text

- Comprehend *any* text by inferring and tracing the main idea, critically appraising use of language and imagery, and making connections (text to text, text to self, text to world)
- Analyze an author's/speaker's/artist's theme(s) through examination of figurative language, sentence structure, and tone
- Analyze textual evidence to make predictions, draw conclusions, or establish generalizations
- Evaluate claims and analyze motivations to verify the credibility of that point of view
- Develop insight into the nature of language and the concept of culture and realize there are multiple ways of viewing the world

Production of text

- Communicate effectively based on purpose, task, and audience using appropriate vocabulary and conventions
- Carefully draft, edit, and polish work to make it publishable

Mathematics

- Based on an understanding of *any* problem, initiate a plan, execute it, and evaluate the reasonableness of the solution
- Examine and apply a variety of methods to accurately and efficiently solve problems
- Use appropriate tools to deepen understanding of mathematical concepts
- Articulate how mathematical concepts relate to one another in the context of a problem or abstract relationships
- Communicate effectively based on purpose, task, and audience using appropriate vocabulary

Special Education

- Function in the community through their training and experience
- Communicate effectively based on purpose, task, and audience using appropriate vocabulary
- Develop a pathway by exploring and pursuing viable options based on interests, experience, and aspirations
- Demonstrate professionalism through exhibiting attentiveness, growing from feedback, continuing to make a good impression, and being mindful of social/cultural norms
- Advocate based on personal needs (academic, behavioral, emotional, and physical) to determine an appropriate solution

Unit on Maps: Grade 1

Stage 1 Desired Results

CCSS

Text Types and Purposes:
W.Gr. 1.2 Write informative/explanatory texts in which they name a topic, supply some facts about the topic, and provide some sense of closure.
Production and Distribution of Writing:
W.Gr. 1.6With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers.
Comprehension and Collaboration:
SL.Gr. 1.1Participate in collaborative conversations with diverse partners about *Grade 1 topics and texts* with peers and adults in small and larger groups.
Presentation of Knowledge and Ideas:
SL.Gr. 1.4 Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly. Produce complete sentences when appropriate to task and situation

Transfer

Students will be increasingly able to independently use their learning to…

- Accurately and vividly describe location of a place and its defining characteristics.
- Produce clear and coherent instructions considerate of listener/reader following along
- Use collaboration to open up thinking and explore alternate pathways when faced with a messy problem

Meaning

UNDERSTANDINGS

Students will understand that...

- The location of a place can be shown and described in a variety of ways (e.g. directions, images, maps, drawings)
- People communicate ideas and information in a variety of ways (orally, visually and in writing) to expand knowledge and build curiosity.
- To be effective, informative text must provide relevant details in a clear and organized sequence.
- How one communicates is influenced by audience and purpose.
- Effective speakers use a recursive process (e.g. planning, drafting, revising, editing, and publishing) to improve communication. (more emphasis on feedback; more overt understanding on collaboration; communicators instead of speakers)

ESSENTIAL QUESTIONS

Students will keep considering…

- Where is this place located? How can I describe its location?
- How do I use maps and map tools to learn about my world?
- What makes writing and illustrations informative?
- How do I know if I've been understood?
- How do we work together to develop our plan (using resources and listening to one another) to complete the task?

Acquisition

Students will need to know…

- Key vocabulary: town/city, state, United States, continent, Earth, legend, compass rose, north, south, east, west, landmarks, positional words: left, right, up, down, over, under, forward, backward, straight, near, far
- Different types of maps (e.g. change order to go from local to global: Globe, World map, U.S. map, Google Earth, Google Maps, neighborhood maps, campus map, class map)

Students will develop skill at…

- Selecting and using pictures for a software program
- Describing location of places
- Working together to complete a task (both in the production phase and in the revision phase)
- Following a set of directions to find a location
- Using map symbols to distinguish location
- Identifying landmarks and using them as a reference point
- Creating labels to identify a location
- Using voice recording features to execute the task

<table>
<tr><th colspan="2">Stage 2 - Evidence</th></tr>
<tr><th>Evaluative Criteria</th><th>Assessment Evidence</th></tr>
<tr><td>Student performance will be evaluated in terms of…

Task #1:
• clarity of directions using appropriate domain specific vocabulary
• collaborates effectively through the drafting and revision process
Task #2:
• accurately describes the location of landmarks through images, words, and labels
• collaborates effectively to ensure individual part is aligned with other parts so it can be combined as part of a larger class display/walking tour</td><td>PERFORMANCE TASKS:
Students will demonstrate their understanding through…
Task #1, Version 1: In pairs, create a set of written directions from your classroom to a mystery location in the school (e.g. main office, library). Test out and revise (if necessary) for your classmates. Then, test it out and revise (if necessary) for grownups. Accuracy, clarity, completeness (thorough), and collaboration

Task #1, Version 2: In small groups, create a set of directions to explain how visitors go from the main office to a specific location within the school (each small group should pick a different location). Then, create a QR code for visitors to scan to access directions. The sets of directions and related QR codes can be housed in the main office. Visitors should be encouraged to give feedback on the directions so that students can continue to make improvements.
ALIGNMENT CHECK: TG 1-3; U 1-5; Q 1, 3-5; K 1, 2; S 2, 3, 4, 8

Task#2, Version 1: Create a map of the street where your home is located. Identify key landmarks on the map through pictures and labels (e.g. your house or apartment, a neighbor's house, a store on your street that you like to visit, your bus stop for school). Your map will be included as part of a larger class display called "where we live." Add a sentence about common symbols, scale, colors)

Task #2, Version 2: Create a narrated vodcast, with guidance and support, of a particular location (e.g. your town, the United States, Washington, D.C.). You will be given a choice of a particular landmark. Then, describe its location (drawings or digital images) and provide a brief description about why the landmark is significant and/or how it is used. Your part of the vodcast will be included as part of a larger walking tour that the class produces. The vodcasts will be shared online so that it can benefit a broader audience as well as give students opportunities to see the impact of their work as well as opportunities for revision.
ALIGNMENT CHECK: TG 1-3; U 1-5; Q 1, 3-5; K 1; S 1, 2, 3, 6, 7</td></tr>
<tr><td>• accurately follows directions on a map using Compass Rose and counting</td><td>OTHER EVIDENCE:
Students will demonstrate Knowledge, Skill, and Understanding (remainder of Stage 1 Desired) through…

Students will be given a map with gridlines and locations on them. Then each student needs to follow the directions using positional words (e.g. move two blocks South, move one block East) and then describe where they are (yellow house, neighborhood park).
ALIGNMENT CHECK: K 2; S 2, 4, 5</td></tr>
</table>

Unit on Solving Problems Related to Computer Maintenance (Middle or High School Unit)

Stage 1 Desired Results

CCSS

Text Types and Purposes

WHST.Gr.9-10.2.d. Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers.

Production and Distribution of Writing

WHST.Gr.9-10.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

WHST.Gr.9-10.5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.

WHST.Gr.9-10.6. Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.

Transfer

Students will be increasingly able to independently use their learning to…

- Diagnose a hardware problem and communicate to a user on how to repair it
- Produce a series of multimedia informative texts to offer assistance to computer users

Meaning

UNDERSTANDINGS	**ESSENTIAL QUESTIONS**
Students will understand that...	*Students will keep considering…*
• Effective troubleshooting is grounded in knowing the key components of the equipment and how each interfaces with the rest of the device.	• How do I figure out what's wrong?
• Audience and purpose influence a writer's choice of organizational pattern, level of detail, and supporting illustrations. • Different publishing media (e.g. digital, multi-media) influence SUBJECT, structure, and style.	• What is my purpose? Who is my audience? How does that affect what and how I write? • How do I communicate technical information to a range of computer users (novice to sophisticated)? How do I know if my writing was helpful? • How does *where* I publish influence *how* I write?

Acquisition

Students will know…	*Students will be skilled at…*
• Function and interaction of basic computer components and peripherals, including: Motherboards, Memory, Powers Supplies, Ports, and Expansion Slots • Relationship among computer hardware, networks and operating systems	• Installing and configuring computer hardware and software components • Designing and assembling systems that use computer programs to interact with hardware • Interacting with others in a way that demonstrates respect for their skill level and compassion for their concern • Produce technical descriptions that are accurate and detailed

Stage 2 - Evidence	
Evaluative Criteria	**Assessment Evidence**
Student performance will be evaluated in terms of… ***Task #1*** • effective use of medium (Summarized: email, phone, or in-person inquiries; amplified: on-line operator, message board) • clear explanation of the problem and suggested steps for fixing it • use of grammar and mechanics appropriate to audience (which may be a novice user or an experienced user) ***Task #2*** • identify questions based on experience and research • clear explanation and sequence of how to solve problems • use of grammar and mechanics appropriate to audience (which may be a novice user or an experienced user)	**PERFORMANCE TASKS:** *Students will demonstrate their understanding through…* ***Task #1*** Respond to a series of email requests for troubleshooting a diagnosis by providing multi-step solutions. NOTE: This task is typically part of an enterprise program in the school where people from the community can get their computers fixed. ***Task #1 + This Task*** Respond to a series of email requests for troubleshooting a diagnosis by providing multi-step solutions. Create a feedback forum online as part of an ongoing improvement plan to ensure that the solutions met the need of the customer. ***ALIGNMENT CHECK: TG 1-2; U 1-2; Q 1-4; K 1-2; S 1-4*** ***Task #2, Version #1*** Create a Frequently Asked Questions (FAQ) manual that is posted online so visitors can use it as a reference tool to diagnose their own computer problems. ***Task #2, Version #2:*** Create a YouTube series as an extension of the FAQ manual that includes solutions that people can access to diagnose their own problems as well as ask more specific questions around their computer issues to inform future video development and revision. ***ALIGNMENT CHECK: TG 1-2; U 1-3; Q 1-4; K 1-2; S 1-4***
• clear explanation and sequence of how to solve problems	**OTHER EVIDENCE:** *Students will demonstrate Knowledge, Skill, and Understanding (remainder of Stage 1 Desired) through…* Written and hands-on test diagnosing and repairing maintenance problems. ***ALIGNMENT CHECK: U 1; Q 1; K 1, 2; S 1, 4***

Unit on Water: Policies for Conservation and Use

Stage 1 Desired Results

CCSS — Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Construct viable arguments and critique the reasoning of others.
3. Model with mathematics.
4. Use appropriate tools strategically.
5. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

CCSS — Mathematics Domains

ACED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

ACED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.

ACED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.

F.IF.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.

F.IF.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

F.BF.1 Write a function that describes a relationship between two quantities

CCSS—Writing

Production and Distribution of Writing

W.Gr.9-12.4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

Students will be increasingly able to independently use their learning to…

- Use functions to model relationships among quantities
- Analyze and interpret data/evidence to form predictions, discern patterns or recommend actions

Meaning

UNDERSTANDINGS

Students will understand that...

- Numbers, objects, or elements may repeat in predictable ways (patterns).
- Recognition of predictable mathematical patterns supports the analysis of functional relationships and the prediction of future data.
- Common sense restricts the kinds of patterns that should be detected in real-world data.
- A function can represent how quantities in the real world relate to one another.
- Errors arise when a model, tool, or strategy is inappropriate or incorrectly applied.
- Evaluating arguments creates clarity about the problem, the model, and the viability of the solution.
- The choice of strategy/tool is dictated by the information you have and the information you want.
- An answer is a value or a set of values that, together with the information you already have, fits the model.
- To solve the problem accurately, units of measurement have to abide by the relationships in the model.
- Patterns capture regularities.
- Changes in one value/object drive changes in others.
- Relationships in the model provide values that may not otherwise be available.
- Audience and purpose influence a writer's choice of organizational pattern, level of detail, and supporting illustrations.

ESSENTIAL QUESTIONS

Students will keep considering...

- How much drinkable water is there in the world?
- What is each person's and government's obligation for conserving potable water?
- What kinds of values would be reasonable answers to this problem? (sign, size, integer)
- What kind of relationship is likely between these two quantities?
- How can I represent this relationship between quantities as a function?
- Does my argument make sense? If an argument doesn't make sense how can I/we rethink it?
- Is there enough information to solve the problem? If not, what's the right question to ask/research?
- What tool(s)/strategies go with the model? How do I choose one?
- How do I use the model to solve the problem?
- What are the units of measurement here? Are they uniform? OR How can I make them uniform?
- How precise does the *input* need to be? How precise does the *output* need to be?
- What's the pattern here (in this problem)? Do I have enough information to establish the pattern?
- What is my purpose? Who is my audience? How does that affect what and how I write?

	Acquisition	
	Students will need to know…	*Students will develop skill at…*
	• Where appropriate data is housed and how to collect it • How to model data that changes over time • How to use a model to predict the future • Relationship between two quantities may not be linear and be subject to constraints (ceilings on use) • Cost functions may not be continuous	• Interviewing people to access data • Evaluating data for its credibility • Sampling the data appropriately • Plotting change over time (consumption, cost, fraction of town budget devoted to water cost) to determine patterns • Recommending future policies and practices based on establishment of patterns

<table>
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<tr><th>Evaluative Criteria</th><th>Assessment Evidence</th></tr>
<tr><td>Student performance will be evaluated in terms of…
Task #1
• Analysis and evaluation of current water practices
• Realistic predictions based on findings
• Preparation of briefing/proposal
Task #2
• Analysis and evaluation of current water practices
• Realistic predictions based on findings
• 5 year projections based on trends
Task #3
• Analysis and evaluation of current water practices
• Realistic predictions based on findings
• Proposal of at least two policies
Task #4
• comparative (Amplified only) analysis and evaluation of current water practices
• usage of multimedia resources
• realistic predictions based on findings
• preparation of briefing/proposal
• grammar and mechanics appropriate to audience</td><td>PERFORMANCE TASKS:
Students will demonstrate their understanding through…
Task #1
Water is becoming an increasingly valuable and scarce resource. Your job is to evaluate water uses in a given community (your town or someplace else) and prepare a briefing /proposal for a town hall meeting with recommendations on future water policy and practices for the next 50 years. This briefing should analyze the amount of current drinkable and non-drinkable water, predictions about the amount of drinkable water in the future, and the status of current water practices, such as:
• Historical water usage by categories (i.e. drinking, showering, lawn care, manufacturing, recreational)
• Historical cost per gallon to deliver water to a household or business
• How much water is wasted each day in homes, cities, countries
• Historical share of community taxes that subsidize water
• Age of the water infrastructure and projected need for repair
• Existing water treatment plants and related operational cost and capacity
• Historical population changes in the community

NOTE: Teacher can expedite the first task through giving them data rather than finding it on their own.
ALIGNMENT CHECK: TG 1-3; U 1-4, U11; Q 1-15; K 1-2, 4; S 1-3, 5
Task #2
The briefing should predict what will happen over the course of the next fifty years if there is no change to water policy and practices. Identify trends in the bullets listed above. Then make projections every five years for the next fifty years.
ALIGNMENT CHECK: TG 1-3; U 1-4, U11; Q 1-15; K 1-5; S 1-5
Task #3
The briefing must propose at least two government policies that would conserve water. Consider both the costs and the benefits of each policy. For example, possible recycling of wastewater into potable water.
ALIGNMENT CHECK: TG 1-3; U 1-4, U11; Q1-3, 14; K 1-5; S 1-5
Task #4
Investigate water practices in two other towns/cities around the world with comparable populations to the initially selected town/city. Using a combination of print resources, online resources, and interviews with people from the chosen countries via Skype. Create a digital presentation to host on a social website such as Slideshare, Prezi, etc. that compares water practices in different countries. Your audience is the World Water Council and your presentation should propose recommendations on future water policy and practices for the next 50 years.
ALIGNMENT CHECK: TG 1-3; U 1-4, U11; Q 1-15, 14; K 1-2, 4; S 1-3, 5</td></tr>
<tr><td></td><td>OTHER EVIDENCE:
Students will demonstrate Knowledge, Skill, and Understanding (remainder of Stage 1 Desired Results) through…</td></tr>
</table>

Session 4: What does an Understanding look like? How do I write one?

English Language Arts: Reading, Key Ideas and Details (CCSS)

- Effective readers use appropriate strategies (as needed) to construct meaning from texts.
- Fluency leads readers to the comprehension of increasingly challenging texts.
- Identifying a text's genre, purpose, point of view, and organizational structure helps readers analyze and comprehend the text.
- Readers support their conclusions (inferences and interpretations) by citing appropriate evidence within the text.
- Readers recognize that authors do not always say things directly or literally; sometimes they convey their ideas indirectly (e.g., metaphor, satire, irony, connotation).
- Great literature is intentionally crafted to explore enduring human themes transferrable across time and place.
- Critical readers (reflect on and) question the text, consider different perspectives, and look for author bias.

Mathematics: Geometry (CCSS)

- Objects in the world can be described by their shape.
- Every shape has properties that define it.
- Shapes in different categories may share attributes that can define a larger category.
- The properties of a shape do not change when it is reflected, rotated, or translated.
- If one object can be dilated into a second object and a uniform change of scale, then the two objects are similar.
- Every geometric theorem or formula is an established relationship that can be applied to a specific set of figures.
- Analytic geometry allows you to visualize algebraic relationships.

Music

- **Preparation and Practice:** The way you practice has a predictable effect on your level of proficiency.
- **Critique:** Critique strengthens development both in performance and in understanding of the elements.
- **Range of Music:** Exposure to a range of music opens us up to how we perceive and perform music.
- **Communication:** Musicians employ a core but critical set of verbal and nonverbal vocabulary to produce a desired result.

Science: *Developed by Katy, TX*

Force, Motion, and Energy

- Unbalanced forces cause change in motion/position.
- Force and motion have direction and magnitude and are measurable.
- Motion is relative depending on frame of reference.
- Energy is neither created nor destroyed, it just changes forms.
- Energy can be transferred from one system to another causing change.

Inquiry and Communication

- Scientific Inquiry is a thoughtful and coordinated attempt to search out, describe, explain and predict natural phenomena.
- Tools are used to collect data which can be used to determine characteristics, predict future events and provide evidence to support theories.

- Scientific knowledge is derived from and supported by the results of many individual experiments to establish patterns in the data, draw conclusions, and push the thinking of the scientific community.
- The way scientists conduct an investigation affects its safety, accuracy, precision, reliability and reproducibility.
- The terminology used in science has precise meanings both in the investigation and communication of scientific phenomenon.
- Models are used to represent aspects of the natural world and have limitations of size, scale and properties.
- Scientific information evolves with the addition of newly acquired data, rethinking of existing data, and/or the advancement of tools.

Health: ***Developed by Weston, CT***

- Regardless of how old you are, you are capable of looking out for yourself.
- The best time to develop an emergency plan is before the emergency happens.
- The way you conduct yourself during stressful situations affects your ability to get out safely.
- A feeling is neutral: the "good" or "bad" come from what actions you take or thoughts you attach to it.
- Regardless of how old you are, you are the best person to know what you are thinking and how you are feeling.
- The words you choose affect the people around you.
- The routines you follow have a predictable impact on your overall health.
- The information you pass on about other people can have a negative impact on both how people see you and them.

Special Education: ***Developed by Grayslake ISD, Illinois***

Advocacy

- Appropriately accessing internal and external resources develops independence.
- Asking for help requires clarity of the problem, willingness to improve, and ownership of the solution.

Vocational Plan

- Setting realistic and desirable goals gives focus to current and future experiences.
- The way I present myself impacts the way people treat me and the opportunities I get**.**

Collaboration

- Powerful collaboration requires meaningful contributions from everyone and the ability to focus on the task instead of the personalities.
- The way I present myself impacts the way people treat me and the opportunities I get.

World Languages: ***Developed by Newport News, VA***

- Positive impressions are grounded in understanding the customs, the appropriate use of language, and sincere intentions.
- Every culture has universal needs but the ways they meet those needs are similar, different, or extremely different compared to our own culture.
- Learning languages creates independence in your personal and professional life, providing a direct connection to people and cultures.
- Effective descriptions paint a picture for the audience so that we see one another's perspective.
- Where people live impacts personal and professional opportunities.

Session 5: What does an Essential Question look like? How do I write one?
Samples from Topeka, KS

Science: *Cross Cutting Ideas from Next Generation Science Standards*

- **Patterns:** Based on _____ what's the pattern/trend here? Based on the pattern, what predictions/conclusions can you make?
- **Scale, Proportion, and Quantity:** How do I use numbers to describe this _____ (object/phenomenon)?
- **Stability and Change:** In what way do(es) _____ change over time?
- **Cause and Effect: Mechanism and Explanation:** How does _____ (this variable) affect _____ (system/relationship)? Why does it?
- **Energy and Matter: Flows, Cycles, and Conservation:** In a(n)_____ how does energy/matter change and flow?
- **Structure and Function:** How is this part connected to its job? K-3 How is the structure of _____ related to its function? 3-12
- **Systems and System Models:** K-12 How do models show what is happening (in the system)? + 5-12 What limitations does the model have?

English/Language Arts

Writing: Text Types and Purposes

- How do I say what I mean?
- Why am I writing? What will work best for my audience?
- What makes an argument persuasive? How do I support my argument?
- What makes my story come alive?
- How can I describe/ explain information?

Research to Build and Present Knowledge

- What am I looking for and how do I find it?
- Can this information be trusted?
- How do I collect and organize information, so I can put it together?
- How do I best present and support my findings?
- *Why* and *how* should I document my sources?
- How do I use outside information and still have my voice?

Social Studies (Grades 6-12)

Geography

- How does geography impact where people choose to live?
- How do people interact with and adapt to their environment?
- How does geography impact what people believe and/or how they behave?

Conflict

- What motivates people to fight?
- How much will people and/or nations risk to achieve a goal?
- How do conflicts/wars change the participants/world?
- Is this conflict inevitable/desirable? What is the impact?

- What motivates a nation to expand beyond its borders? What is the impact?

Religion
- What do people do in the name of religion?
- How do religions change in response to society's dissatisfaction?
- How important is religion to this group/civilization/nation?
- How does this religion support/challenge this government/government policy

Mathematics: *Counting and Cardinality, Numbers and Operations in Base 10 (K-5) and Fractions (3-5), Number Systems (6-8), Ratio and Proportional Relationships (6-7), Number and Quantity (9-12)*
- How do I describe this object/number or set of objects/set of numbers?
- How do I classify/compare objects, sets of objects, numbers, or sets of numbers?
- What rule/pattern can I recognize to help me make a prediction or solve this problem?
- (K-5) How does a digit's position affect its value? How can I use my understanding of place value to perform operations and solve problems?
- How can I represent a quantity/numerical relationship in different ways?
- How do I use my understanding of numbers to estimate, perform operations, and solve problems?

Career and Technical Education

Safety:
- What hazards are present in the work environment? (Task: To Differentiate between unsafe conditions and unsafe acts.)
- How do you reduce the risk of injury in the work environment (personal equipment, using these materials, this tool, this piece of equipment, collaborating with others)?

Measurement:
- How precise do I need to be based on the product (and the specs)?
- Which measurement tool (scale) is most appropriate for a given task? (TECHNIQUE: How do I use it properly to produce a quality product?

Adaptability:
- How do I use what I already know to make sense of this current situation?
- How do you adapt techniques if the most appropriate equipment/ingredients/resources aren't available?

Efficiency and Quality:
- How do I increase efficiency without sacrificing quality?
- How do I choose the right material/tool for a task to keep the customer/client happy?

Communication:
- What are the sounds/smells/sights/texture that I sense that indicate there is a problem?
- What professional language (terms and abbreviations and symbols) is common in the work environment? How can I remember?
- What things do I do to show my professionalism? Where do I need to improve?

Feedback:
- Is this good enough? Is it done to a high standard? (different standards in each industry; getting it done right vs. meeting your own high expectations) Could it/How can it be made better?
- How do I know the customer /client/instructor is satisfied with both product and professionalism?

Session 6: What does a Performance Task look like? How do I develop one?
Math Performance Task Categories Developed by Avon, CT; Henry County, VA; Newport News, VA

Performance Task Categories	Illustrative Examples
Mathematical Model: *Develops a model (e.g. number sentences, graphs, tables, equations, arrays, patterns, maps, scatter plots) using appropriate mathematical representations and relationships to draw conclusions.* **Primary College and Career Ready Skills:** Effective Communication, Problem Solving	**Grade 5 (Probability):** You are a kid who wants to make as many 7-Eleven Slurpee® combinations as possible. Below are the flavors: • Banana (B) • Kiwi Strawberry (KS) • Wild Cherry (WC) • Berry Blast (BB) • Mountain Dew (MD) • Coca-Cola (CC) First, identify what combination(s) you would put in your Slurpee®. Second, construct a sample space with all the different combinations. What's the probability that someone in the class would use Mountain Dew? What's the probability that someone in the class would use more than three flavors? NOTE: The teacher may poll the students to determine the actual number of students who selected Mountain Dew. However, this is not a part of the assessment.
Visual Representation: *Produces an illustration for a particular task and purpose (e.g. diagram, graph, 2-D or 3-D sketch, histogram)* **Primary College and Career Ready Skills:** Effective Communication, Problem Solving, Creativity (maybe)	**Grade 4 (Describing Figures)**: Take a virtual gallery walk and identify on M.C. Escher picture that illustrates geometric transformations; such as *reflection, translation*, and *rotation*. Determine what type of transformation(s) he used to make the picture. Then, create your own wallpaper print inspired by an Escher using one or more transformations.
Persuasive Statement: *Assumes a position or point of view on a given problem and supports it through the development and use of evidence, graphics, or annotated work.* **Primary College and Career Ready Skills:** Effective Communication, Problem Solving, Critical Thinking, Creativity (maybe)	**Grade 5 (Describing Figures):** You and a small group of your friends are designing a playground with 1,200 feet of fencing. • Identify the age of the children that will play on it as well as special considerations (e.g.-handicap accessibility, water sources, and natural materials). • Then, identify at least three play areas within that space (e.g.-sandbox, climbers, bridges and ramps, water play, tree house) • The plan must include dimensions and area for each play area within the playground as well as a written/oral statement about why your design should be selected based on your use of space and intended audience You can find sample playgrounds below: Resource 1 Resource 2 Resource 3
Data Collection: *Generate data for a particular purpose; develop a viable collection of data through surveys, experiments or research; and organize data appropriately in preparation for analysis* **Primary College and Career Ready Skills:** Problem Solving, Effective Communication	**Kindergarten (Collect Data):** Using your class weather chart for the previous month, students will tally the various types of weather. What weather occurred the most, least, and the same? (This question is also Analysis - see category below)

<table>
<tr>
<td>Analysis: Interpret quantitative and/or categorical data to make generalizations, predictions, or conclusions.

Primary College and Career Ready Skills: Critical thinking, Effective Communication, Problem Solving</td>
<td>Grade 1 (Equations and Inequalities): We are trying to track how much milk we drink at lunch for an entire week. First, write down our daily tally: chocolate, strawberry, and plain.
Example:
<table>
<tr><td>Days</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr>
<tr><td>choc</td><td>5</td><td>6</td><td>6</td><td>9</td><td>4</td></tr>
<tr><td>straw</td><td>7</td><td>5</td><td>6</td><td>4</td><td>7</td></tr>
<tr><td>plain</td><td>9</td><td>8</td><td>9</td><td>8</td><td>7</td></tr>
</table>
Second, once the week is completed, compare milk totals for each day.
Find out on which days we drank the same amount of milk. Explain your findings.
Example: In the above table Days 1 and 3 are equal, so;
9 + 7 + 5 = 6 + 6 + 9</td>
</tr>
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<td>Information Report: Provides a clear and informative explanation for a given topic, set of conditions, or problem.

Primary College and Career Ready Skills: Effective Communication, Problem Solving</td>
<td>Grade 4 (Measurement): Your mother says that she wants to run errands before going to the movies but you know that sometimes that your mother takes much longer than she originally stated. The movie that you want to see starts at 1:30 PM. Your mom wants to leave the house at 11AM for two hours of shopping. If you need to eat lunch before the movie starts, create a timeline for your outing. Consider the time you will need to travel to the movies, to eat, and to run errands.</td>
</tr>
<tr>
<td>Critique or Review
Evaluate a claim or a possible solution to develop a judgment on its validity and accuracy.

Primary College and Career Ready Skills: Critical Thinking, Effective Communication, Problem Solving</td>
<td>Grade 2 (Equations and Inequalities): A fifth grader is trying to pull a fast one on you. He says “I’ll trade your dollar bill for the change in my hand.” You want to make sure that it is a fair trade. Based on the change in his hand, write the equations using = or ≠. Note: Teachers can read the attached Shel Silverstein poem. The teacher can provide different handfuls of coins for each student.</td>
</tr>
</table>

E/LA Communication Performance Tasks, Grade-Level Bands and Examples, K-5
Performance Task Categories Developed by Avon, CT; Henry County, VA; Newport News, VA

Performance Task Categories	Grade-Level Bands (K-5)	Illustrative Examples
Memoir or Personal Narrative: *Composes in first person to interpret experiences from the past in order to gain and reveal insight.* **Primary College and Career Ready Skills:** Effective Communication, Creativity, Critical Thinking, Technological Literacy (maybe)	• K-2: Select a moment that was important to you, describe what happened using proper sequence and details, and include the lesson learned. • Grades 3+: Select an event or series of events that were important to you. Describe what happened using effective technique, details, and clear event sequences. Provide a conclusion that describes the significance of the event(s).	K-2 example: Pick a moment where you were really happy because something good happened (i.e. new puppy, learned how to ride a bike, got 100% on a spelling test you studied really hard for). Draft the sequence of what happened using a graphic organizer, storyboard, or storytelling circle. Use that sequence to write a story that explained what happened and how it made you feel. (Can be a combination of visual and written text.)
"How To" or Technical Descriptions: *Produces a sequential description of how to complete a particular task through incorporation of research and/or experience that is clear, detailed and informative.* **Primary College and Career Ready Skills:** Effective Communication, Problem Solving, Critical Thinking, Technological Literacy and Media	• Grades K-2: Create a sequential list of instructions to ensure successful completion of a task. • Grades 3-4: Create a sequential set of instructions, using words and phrases to signal event order, to ensure successful completion of a task. • Grades 5+: Create a sequential set of procedures that uses terminology appropriate to the topic (both task and subject matter), test out effectiveness of the set and revise as needed.	Grades 5: Select a musical instrument that you like. (NOTE: For students with little musical instrument experience, bring instruments into the classroom such as bells, maracas, tambourine, drum, recorder OR have the music teacher work on this lesson during the activity period). Describe to someone who has never touched the instrument what to do in order to produce sound. (NOTE: A more sophisticated version would be to describe how to get a range of sounds or to improve the quality of sound. For example, different rhythms on a drum, chords on a piano that harmonize, a note on a recorder without the squeak).
Information Report: *Provides a focused and detailed explanation of a given subject for a target audience and specific purpose.* **Primary College and Career Ready Skills:** Effective Communication, Critical Thinking, Technological Literacy (maybe)	• Kindergarten: N/I — NOT INDEPENDENTLY. (Teachers will model how to find relevant information, identify main ideas and supporting details, and communicate to others about that topic of interest.) • Grades 1-3: Find relevant information, identify main ideas and supporting details, and communicate to others about that topic of interest. • Grades 4+: Locate and evaluate the validity of sources to identify relevant information for a topic (self-selected or teacher-directed) that effectively uses research to develop a concise explanation.	Grades 1-2: Describe a room in the school so that someone reading your report knows exactly what the space looks like, what it is used for and what it feels like to be there.

Persuasive Statement: *Assumes a position or point of view on a given subject and supports that through the development of:* • *a logical argument and use of evidence OR* • *a deliberate design intended to provoke a specific action.* **Primary College and Career Ready Skills:** Effective Communication, Creativity, Critical Thinking, Technological Literacy (maybe)	• Grades K-1: Draw and/or write an opinion piece that explains how they feel and the supporting reason(s) why they feel that way. • Grades 2-4: Develop an opinion piece that includes a subject, statement of argument, and supporting reasons through inclusion of evidence and linking words (e.g. because, therefore, for instance). • Grades 5+: Develop a fluent, organized, thesis-driven argument supported by a variety of evidence.	Grades 4-5: Using research from your Virginia history book, choose a side-loyalist or patriot. Write a speech convincing all of your classmates to join your side. Be sure to include as much evidence as possible to support the argument for your political choice.
Analysis of an Aesthetic Text: *Presents the effects that the author's/artist's craft have on the piece and how that communicates and/or evokes a response through the development of an organized interpretation and use of textual evidence.* *NOTE: Can also be a comparative analysis among multiple texts.* **Primary College and Career Ready Skills:** Effective Communication, Critical Thinking, Technological Literacy (maybe)	• Grades K-2: N/I — NOT INDEPENDENTLY. (Teacher models and facilitates discussion of author's/artist's craft through appropriate texts such as Eric Carle, Shel Silverstein, Jan Brett, and Patricia Polacco.) • Grades 3-5: Identify and give examples of the hallmarks of a self-selected author/artist (i.e. use of voice, diction, rhyme, color, subject, pattern, setting, theme) and how that plays out in a range of their work.	Grade 4**:** After reading <u>Because of Winn-Dixie</u> and <u>Sounder</u> make a chart comparing the two authors' portrayal of the main dog in each story. Take note of the authors' choice in the use of voice, diction, rhyme, color, subject, and settings. Then, write a paragraph explaining how the authors' choices influenced your feelings about the dogs.
Creation of an Aesthetic Text: *Develops a piece (e.g. poem, play, film, graphic novel, short story, song, fable) using appropriate devices to communicate and/or evoke a response.* **Primary College and Career Ready Skills:** Effective Communication, Creativity, Critical Thinking, Technological Literacy (maybe)	• Grades K-3: Create text through words, pictures, sounds, and/or actions to communicate a purpose (e.g. entertain, persuade, inform), message, and/or feeling. • Grades 4+: Make deliberate artistic choices through the creation and refinement of text using language, images, sounds, and/or actions to evoke a response from the audience/reader.	Grades 4-5: Students will write an engaging story (i.e. mystery, short story, fairy tale) with a well-developed conflict and resolution, interesting and believable characters, a range of literary strategies (e.g., dialogue, suspense) and devices to enhance the plot, and sensory details that define the mood or tone.

Critique or review: *Using a set of established criteria, evaluates a text, experience, or product to develop a position supported by evidence. NOTE: Can also be a comparative analysis among multiple texts, experiences, or products.* **Primary College and Career Ready Skills:** Effective Communication, Critical Thinking, Technological Literacy (maybe)	• Grades K-1: Using established criteria (e.g. thumbs up/thumbs down, five-star system) provide a review of a particular book, place, product, or experience and explain your rating. • Grades 2-3: Using established criteria that students develop, provide a recommendation about a text, experience, or product that communicates an opinion, uses supporting details, and a concluding statement. • Grades 4+: Develop an opinion about a text, experience, or product and then explore what triggered the opinion based on textual evidence and experience and how that fits in with general opinions they have about what quality looks like.	Grade 1: "My Plate" (http://www.choosemyplate.gov/) Students will design and draw a plate of their favorite lunch or dinner meal. If the favorite meal is not "balanced," students will determine what food items they are missing to make it "balanced" and add those items in. Students will share their drawing in a small group.
Personal Communication: *Communicates through text (e.g., emails, blog statements, interviews, video clips, electronic messaging, letters) for a target audience and specific purpose.* **Primary College and Career Ready Skills:** Effective Communication, Technological Literacy (maybe)	• Grade K: N/I — NOT INDEPENDENTLY. (Teachers will model communication as a class activity.) • Grades 1-5: Use the conventions of a particular format to produce effective and appropriate communication on a self-selected topic (i.e. use of shorthand abbreviations and symbolic language in text messaging vs. emails vs. formal letter writing).	Kindergarten: When grown-ups come in to the classroom to work, teacher will take a picture of the person and post it on the wall. The students will ask the adult the following questions: What is your job? Name one or two responsibilities you have. Students will record their answers and post it underneath the picture.
Portfolio Reflection: *Using a selection of a student's own texts from a predetermined time period, reflects on pre-established goal(s) and growth toward those goals through supporting textual evidence.* **Primary College and Career Ready Skills:** Effective Communication, Critical Thinking, Technological Literacy (maybe)	• Grades K-1: N/I – NOT INDEPENDENTLY. (Teachers will model how students demonstrate growth over time by showing personal and class examples.) • Grades 2-5: Based on an established goal(s) identified at a teacher-student conference at the beginning of the year, reflect on personal growth by reviewing and commenting on a collection of work.	Write a summary of the work that you would like to highlight in the portfolio you have created. Explain how this sample of your work shows the progress you have made during the school year.