

Mapping an Understanding-based Curriculum for 21st Century Learning

Schooling
by DESIGN

Mission, Action, and Achievement

Something to consider...



“Do not confine your children to your own learning, since they were born in another time.”

- Chinese proverb

Topic Agenda 

-  **A Systems Framework**
-  **Understanding-based Curriculum**
 - Micro-Level (Unit)
 - Macro Level (District, School, Program)
-  **District Curriculum example (GVSD)**
-  **Curriculum Mapping 2.0 and 3.0**
-  **A Curriculum Review Process**

The Knowledge Doubling Curve
-- Buckminster Fuller and IBM

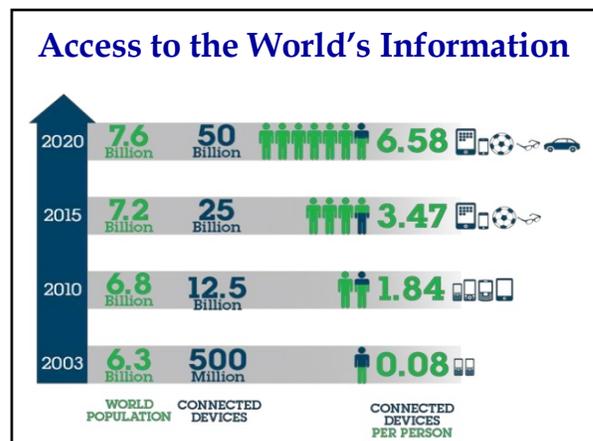
Knowledge doubling curve

- 1900s, Knowledge doubled every century
- 1940s, knowledge doubled every 25 years
- Currently, knowledge doubling every 13 months
- Soon, every 12 hours?

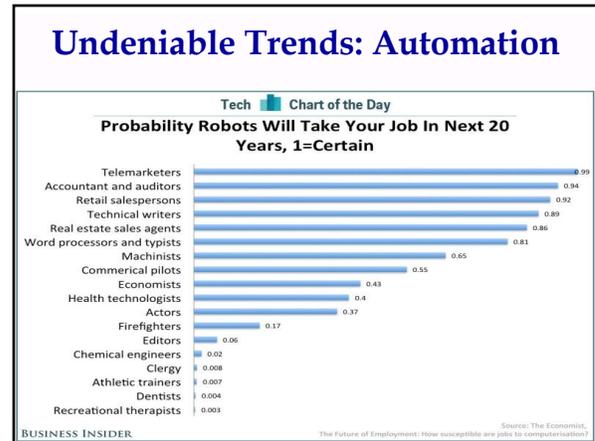
'Transition from the linear growth of human knowledge to the exponential growth of human knowledge has taken place.'



Access to the world's information has never been greater.

Machine to Machine Connections: The Internet of Things



National Association of Colleges and Employers Survey Results

FIGURE 1. Attributes Employers Seek in Job Candidates

Leadership skills	90.1%
Ability to work in a team	78.9%
Communication skills (written)	70.2%
Problem-solving skills	70.2%
Strong work ethic	68.9%
Communication skills (verbal)	67.2%
Initiative	65.8%
Analytical/quantitative skills	62.7%
Flexibility/adaptability	60.9%
Technical skills	59.6%
Interpersonal skills (relates well to others)	58.4%
Computer skills	55.3%
Detail oriented	52.8%
Organizational ability	48.4%
Friendly/outgoing personality	35.4%
Strategic planning skills	26.7%
Creativity	33.3%
Tactfulness	18.6%
Entrepreneurial skills/risk-taker	18.6%

Source: National Association of Colleges and Employers, (2016). Job Outlook 2016.

Picture the Graduate

Try to envision the type of person we wish to develop as a result of 12+ years of schooling.

What capabilities and qualities do we seek in our graduates?

ISD Portrait of a Graduate

- *Communicator*
- *Global Citizen*
- *Critical Thinker*
- *Creative Innovator*
- *Leader & Collaborator*

A Sample School Mission #2

_____ High School is a school where students are invited to meet the challenges of a rich and rigorous **college preparatory program**. The academic program features variety and rigor, and includes the International Baccalaureate **Diploma Programme** along with opportunities for **service learning**.

A Sample School Mission #3

The mission of the _____ School is to prepare all children to be *successful citizens* in the 21st century. This includes educating them to *read with comprehension, communicate clearly, compute accurately, work well with others, and effectively apply critical and creative thinking.*

A Study Of/In _____



The rainforest = A study of **a complex ecosystem**

World War I = A study of **unintended consequences**

A Study Of/In _____



Decimals, Fractions, Percents = A study of **equivalence**

Weight training = A study of **proper technique**

A Study Of/In _____



Frog and Toad are Friends = A study in **relationships**

The Catcher in the Rye = A study of **author's style**

A Study Of/In _____



Insects = A study in **structure and function**

Native Americans = A study of **identity and survival**

Research Finding...



A “**guaranteed and viable** curriculum is the #1 school-level factor impacting student achievement.”

-- Marzano, *What Works in Schools*

Curriculum...



"The course to be run"

Curriculum = a plan to achieve designated goals.

Curriculum ≠ a list of topics and related activities.

Long-Term Transfer Goal

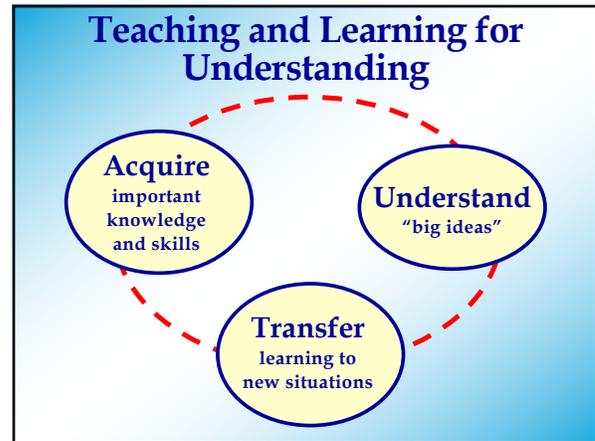


"Students will be able to independently use their learning to ..."

An effective curriculum equips learners for autonomous performance ... by design!

Stage 1 – Desired Results			
Established Goals What Content Standards, Program and/or Mission related goal(s) will this unit address?	Transfer Students will be able to independently use their learning to... What kinds of long-term, independent accomplishments are desired?		
	Meaning <table border="1"> <tr> <td> UNDERSTANDINGS Students will understand that... What specifically do you want students to understand? What inferences should they make? </td> <td> ESSENTIAL QUESTIONS Students will keep considering... What thought-provoking questions will foster inquiry, meaning making, and transfer? </td> </tr> </table>	UNDERSTANDINGS Students will understand that... What specifically do you want students to understand? What inferences should they make?	ESSENTIAL QUESTIONS Students will keep considering... What thought-provoking questions will foster inquiry, meaning making, and transfer?
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Acquisition of Knowledge & Skill <table border="1"> <tr> <td> Students will know... What facts and basic concepts should students know and be able to recall? </td> <td> Students will be skilled at... What discrete skills and processes should students be able to use? </td> </tr> </table>	Students will know... What facts and basic concepts should students know and be able to recall?	Students will be skilled at... What discrete skills and processes should students be able to use?	
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Jig Saw Reading



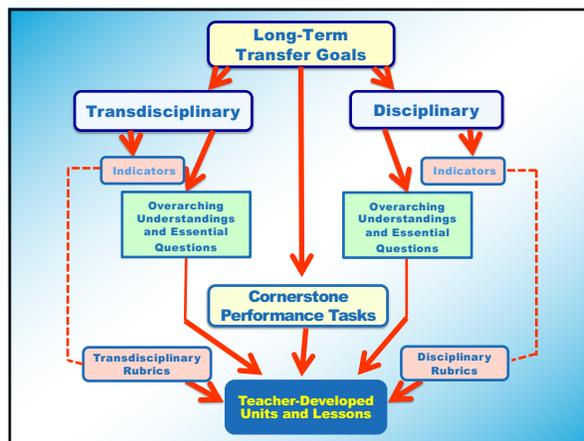
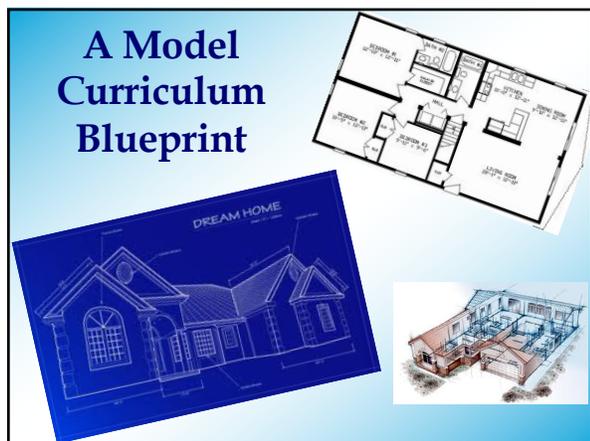
Divide into 5 groups.

Part 1 - Individually, read designated section and highlight key points.

Part 2 - Meet with like #erd groups to discuss key points and implications.

Part 3 - Re-group to summarize key points from each section of the article.






Characteristics of Transfer Goals...

- *Long-term (Exit Outcomes)*
- *Performance based*
- *Highlight Autonomy*
- *Distinguish means from ends*

Transfer Goal: Writing

Students will be able to independently use their learning to:

- **Effectively write in various genres for various audiences and purposes (inform, explain, entertain, persuade, guide, or challenge/change things).**

Transfer Goals: Mathematics

- **Make sense of never-before-seen, “messy” problems and persevere in trying to solve them.**
- **Construct viable arguments and critique the reasoning of others.**

Transfer Goal: History/SS

- **Use knowledge of patterns of history to better understand the present and prepare for the future.**
- **Critically appraise historical claims and analyze contemporary issues.**

Transfer Goals: Science

- Use knowledge and reasoning to evaluate scientific claims or arguments and analyze current issues involving science or technology.
- Conduct an investigation following established scientific protocols.

Transfer Goal: World Languages

Students will be able to independently use their learning to:

- Effectively communicate with varied audiences and for varied purposes while displaying appropriate understanding of culture and context.

Transfer Goal: Visual and Performing Arts

- Create purposeful artistic expressions through various media and styles.
- Value, and participate in, the arts throughout one's life.

21st Century Skills are Long-Term Transfer Goals!

- *Critical Thinking*
- *Communication*
- *Collaboration*
- *Creativity*

Practice vs. The Game



Learning and practicing

- knowledge
- skills
- strategies



Requires transfer

- autonomous application



A coherent curriculum spirals around a set of "big ideas" and recurring essential questions.

Mathematical Modeling

“Big Idea” Understandings

- **Mathematicians create models to interpret and predict the behavior of real-world phenomena.**
- **Mathematical models have limits and sometimes they distort or misrepresent.**

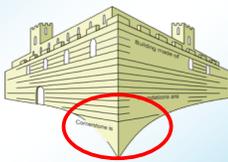
Mathematical Modeling

Essential Questions

- *How can we best model this (real-world phenomena)?*
- *What are the limits of this model?*
- *How reliable are its predictions?*

corner-stone (n):

1. the first stone laid at a corner where two walls begin and form the first part of a new building
2. something that is fundamentally important to something




Cornerstone Tasks

- Anchor the curriculum in important, recurring tasks.
- Require understanding and transfer of learning.
- Integrate 21st century outcomes.
- Provide evidence of authentic accomplishments.

(“Doing the subject” and “playing the game”)

example:

How To Perform a Task

Since you are an accomplished _____, you have been asked to develop **step-by-step directions** to help **other kids** learn how to do it.

Your directions should include **words** and **pictures** to help others learn how to _____ like you.

Three-Minute Pause

Meet in groups of 3 - 5 to...

- ✓ summarize key points.
- ✓ add your own thoughts.
- ✓ pose clarifying questions.

It's Time for Curriculum Mapping 3.0

First generation = Diary mapping

Second generation = Consensus mapping against standards

Third generation = Mapping performance backward from long-term transfer goals

First generation = Diary Mapping

Year-Long Course Map Sixth Grade – Social Studies

	1 st 9 Weeks			2 nd 9 Weeks			3 rd 9 Weeks			4 th 9 Weeks	
	August	September	October	November	December	January	February	March	April	May	
Economics Preview	Europe				Latin America			Canada	Australia & Oceania		Preview 7 th Grade Curriculum
Social Studies Skills Matrix											
Notes											

Second generation = Consensus Mapping from Standards

SAUSD Common Core Aligned Curriculum Map: Math Grade 5 Year at a Glance

Title	Time	Performance Task	Big Idea	Essential Questions	Core Texts
Unit 1: Whole Numbers and Decimals (Number & Operations Base Ten)	5 weeks	Compare populations of whole numbers by counting them to millions with decimal notation.	Different values can be represented in many ways.	• How are numbers represented in our base-ten system? • How does the position of a number affect its value? • How can we simplify the problem solving process? • What kinds of models can be used to represent numbers?	HM Chapter 3
Unit 2: Addition & Subtraction of Decimals (Operations & Algebraic Thinking/ Number & Operations Base Ten)	5 weeks	Find a 100 for your family, adding the mileage between cities, using decimal notation.	Real-world problems can be solved by combining or separating groups.	• How are real-world problems represented by objects, pictures, words, and numbers? • How are real-world problems combined or separated? • How are real-world problems represented in our world situations?	HM Chapter 5, 12
Unit 3: Addition and Subtraction of Fractions (Number & Operations Fractions)	5 weeks	Choose the items you would take with you on an overnight trip to Europe where each person is allotted a certain weight for all their belongings.	Real-world problems can be solved by combining or separating groups.	• How are real-world problems represented by objects, pictures, words, and numbers? • How are real-world problems combined or separated? • How are real-world problems represented in our world situations?	HM Chapters 4, 7, 8, 9
Unit 4: Multiplication and Division of Whole Numbers (Number & Operations Base Ten)	4 weeks	Compare the areas of various shapes in various units.	Real-world problems can be solved by combining or separating groups.	• How are real-world problems represented by objects, pictures, words, and numbers? • How are real-world problems combined or separated? • How are real-world problems represented in our world situations?	HM Chapters 1, 6, 21
Unit 5: Volume (Measurement & Data)	3 weeks	Estimate the number of linking cubes that will fill a classroom.	Objects can be measured and compared by their attributes.	• How are objects measured? • How are objects compared? • How are objects measured and compared with cubic units? • How do volume change when you change the measurement unit? • How can you find the volume of solid and liquid objects? • How is it important to know how to measure volume?	Getting to the Core Volume Unit

Unit Title	Unit Content	Thematic Essential Questions	Thematics		Potential Texts (Essential, Author or Genre Alignment)
			Thematic Underpinnings	Performance Task(s)	
September	Relationships Between Characters	• How are people/characters connected? • What shapes relationships between people/characters?	• People/characters are connected through relationships. • Relationships between people/characters are shaped by perspective, position, and experience.	• The Adventure Continues... • Student imagine that a children's character is writing a book or screen play. They prepare a script for one of the characters.	<i>Henry and Percy: King of the Playground</i> <i>Miss Anne the House Clean</i> <i>Book Fair</i> <i>Miss Anne's Kitchen</i> <i>Henry and Percy</i>
October	Characters as Adventurers	• What is an "adventure"? • How are adventures different from other kinds of characters and events?	• An adventure is a sequence of events focused on a goal that is unusual, exciting, or dangerous for the character in the story. • Adventures can be "real" (events that exist in the world) or "imagined" (events that exist in a story).	• What Happens? Students write a sequel of a story they've read in the past of a character in that story. • Two Adventures Students compare and contrast the adventures and experiences of the character from the story they read to the character in another story.	<i>Henry and Percy: King of the Playground</i> <i>Miss Anne the House Clean</i> <i>Book Fair</i> <i>Miss Anne's Kitchen</i> <i>Henry and Percy</i> <i>Henry and Percy: King of the Playground</i> <i>Miss Anne the House Clean</i> <i>Book Fair</i> <i>Miss Anne's Kitchen</i>
November	Real-Life Adventures	• What is an "adventure"? • How are adventures different from other kinds of characters and events?	• An adventure is a sequence of events focused on a goal that is unusual, exciting, or dangerous for the person or people in the story. • An adventure is a sequence of events that is unusual, exciting, or dangerous for the person or people in the story.	• Adventure Award Students explain in writing their favorite "The Most Adventurous Adventure Award" and collaborate with classmates to present their choice to a writing committee. • My Own Adventure Students write a narrative of a real-life adventure of their own.	<i>The Camping Trip that Changed America</i> <i>Let's Make a Leap</i> <i>Children of El Camino January 2010</i> <i>Antioch Explorer/Charles Lindbergh</i>
December	Read This!	Students write a story of their choice, write a letter recommending the story to a peer, read a peer's recommendation, and then give (with) their opinion about the recommended story.			

Unit Topic (in sequence)	Essential Time Frame (Unit)	E-12 Program Standards with Course/Grade Level Standards	E-12 Program Enduring Understandings (For Content)	E-12 Program Essential Questions (For Content)	Unit Assessments (Form & Informal)	Civil Key Vocabulary Concepts
Unit 1 Motion (Chapter 1)	7 periods	Physical Science Motion & Forces Investigate and demonstrate relationships among force, motion, and direction of moving objects. Describe the motion of rectangular plates.	An object's motion is the result of the combined effect of all forces acting on the object. The interaction between energy and matter creates force (pushes and pulls) that produce predictable patterns of change.	What make objects move the way they do? What role do forces play here?	Speed Challenge Lab (Performance Assessment)	mass motion force chemical property hardness mass
Unit 2 Forces (Chapters 2, 3, & 4)	28 periods	Physical Science Motion & Forces Investigate and demonstrate relationships among force, motion, and direction of moving objects. Investigate and describe how forces can affect technological design. Classify simple machines in the human body.	An object's motion is the result of the combined effect of all forces acting on the object. The interaction between energy and matter creates force (pushes and pulls) that produce predictable patterns of change. Machines do not reduce the amount of work that is done, they only change the direction of the force, multiply the force or multiply the distance through which the force is applied.	What make objects move the way they do? What role do forces play here? What happens when a machine is used to do work? Does using this machine make my work easier? How is this machine designed to do work? What is the role of gravity in the universe?	Assessed in Unit 3	work power mass molecule change of state/phase dissolve friction motion energy conservation
Unit 3 Energy (Chapter 5 & 6)	10 periods	Physical Science Matter & Energy Describe and demonstrate how energy can be changed from one form to another. Investigate and describe transfer of heat, light, and sound.	The transfer of energy is required to cause change. The total amount of matter and energy remains constant even though their form and location undergo constant change. Although the various forms of energy seem very different, each can be measured in a way that makes it possible to keep track of how much of one form is converted into another.	How does energy cause change? Where does energy come from? Where does it go? How does energy/matter remain constant even as it changes form?	Motion, Forces, & Energy Assessment (Structured Response Assessment) Cold Fuses Lab (Performance Assessment)	kinetic energy mass reflection periodic table

Ideas for Action



Think big.

Start small.

Go for an "early win" in Iowa.