CURRICULUM UNIT FOR THIRD GRADE

"TRIGGERS OF CHANGE"

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  ⇒ To look at current problems in our world and consider what caused them, and how they might be solved (cause-effect, problem-solving)

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  ⇒ To envision how a future community might develop on a Mars colony, or in a space station. (Would early life on a Mars colony be more like the Pioneer life in Colonial times if electricity was not available?) Compare the technology used in the future on Mars (or on a Space Station) with what we use today, or what was used in the past.

GOAL (DESIRED RESULT)	ASSESSMENT (ACCEPTABLE EVIDENCE)			ACTIVITIES (HOW TO ACHIEVE DESIRED RESULT)
To introduce the concept of "cause and effect" by demonstrating that every action has a reaction. (For something to "cause" change, to have an "effect," there has to be a BEFORE and an AFTER.)	Students demonstrate that…			A. Using an ice cube or snowball, and a pan of water, students watch the water take new forms after melting and evaporating. (for heat, use heater in classroom?)
	SCIENCE: Matter, Energy, Force		• When matter is heated, its particles move faster and the state of matter (solid, liquid, gas) may change.	
			• When matter is broken up into smaller pieces, there is a physical change (It looks different).	B. Students cut up different types of matter (i.e. paper, grass, rubber bands, etc.) and observe that the material stays the same even though its shape looks different.
			• When two types of matter are mixed together, they may stay separate, or they may mix but not irreversibly, or they may undergo a chemical change to a different type of matter.	D. Students run experiments of mixing different ingredients together, and observe if the change is reversible or not. (i.e. make Blobber or Oobleck)
			• When matter is heated, there may be a chemical change resulting in a new kind of matter.	C. Students watch what happens when something that needs to be kept cold (i.e. milk) is kept at room temperature (changes to sour milk).
			• When force (i.e. gravity, friction) is applied, the object moves and/or changes direction.	E. *Discovery Works unit C:* Activities C46, C60-61, C62-63: Experiments that show the effect of friction and gravity on the movement of objects.
			• A simple machine (lever, fulcrum, inclined plane, wheel and axle, pulley) changes the size or direction of a force. Another resource for activities: *Gizmos & Gadgets: Creating Science Contraptions that Work (& Knowing Why)*	F. *Discovery Works unit C:* Activities C68-69, C70-71 G. *Science Around the World*: p. 3-7 Demonstration of how force, friction, and simple machines were used to help make the pyramids in Egypt. H. *Pyramids! 50 Hands-On Activities to Experience Ancient Egypt*: Make a Sledge (p. 42) I. *Technology in the Time of the Vikings*: Make a Viking Ship (p. 19)
	CHARACTER		• Every choice has a consequence.	J. Students make a diagram (family tree style) that details how different paths, based on different choices, can branch out from one starting point. K. Students read a story to the point where a character makes a choice, and then write their own ending based on the character making a different choice.
	LITERATURE		• Events in a story (i.e. the actions of a trickster) may cause someone or something to change.	L. Students read a pourquois or trickster story, fill out a cause/effect graphic organizer, and write a one-paragraph analysis of cause/effect in the story.
	MATH		• When we find out how many people are eating, we can change the recipe so that it makes enough for everyone.	M. Students problem-solve how to change a recipe to have an increased number of servings that will feed a certain amount of people. N. Students (in small groups) prepare a recipe for whole class.
			• When a number is added to, taken away from, multiplied, or divided into parts, the number changes. (problem-solving)	O. Students create their own story problems that demonstrate how the action in the story causes the number to change.

GOAL	ASSESSMENT		ACTIVITIES
(DESIRED RESULT)	(ACCEPTABLE EVIDENCE)		(HOW TO ACHIEVE DESIRED RESULT)
To consider the "triggers of change" in communities: past, present, and future (How communities grow and change)	SOCIAL STUDIES	By writing a report about the effect that new technology has on one's life, students demonstrate an understanding of "cause and effect" in real life. If students are able to "experience" the technology from long ago, their comprehension of "change over time" will be increased by "doing." How the student answers the T.A.G. questions demonstrates level of comprehension and reflection.	Students use a modified T.A.G. (Technology Assessment Guide) to think about a specific type of technology: What was life in a community like before and after this piece of technology was introduced? Did the technology solve any problems? Did it create or cause any new problems or needs? In other words, what effect did the technology have on life in the community? Students research a piece of technology, take notes on a Main Idea/Detail graphic organizer, and write a one-paragraph report about how the technology changed (had an effect on) life in a community (prove a change from BEFORE the technology to AFTER). R. Depending on the technology, students may give a demonstration of how it is used. • SOCIAL STUDIES book p. 188 – 195: Transcontinental Railroad, Telegraph and Telephone, Lightbulb, Radio and Television, Automobile and Airplane, Satellite P. • SCIENCE book p. C66-67 (wheel) Q. • *Technology in the Time of Ancient Egypt* (plow, irrigation canal, loom, clock, calendar, potter's wheel, writing pens and paper…) • *Technology in the Time of the Vikings* (plow, underground or clay ovens, rotary quern, Viking ships, the Oseberg sled, the Oseberg wagon, skates, Ironsmith tools, loom…) • *Secrets in Stone: All About Maya Hieroglyphs*: (zero and a number system, writing system – hieroglyphics, rubber ball) • Other ideas: telescope, microscope, computer, sewing machine, printing press…
To look at current problems in our world and consider what caused them, and how they might be solved (cause-effect, problem-solving)	SOCIAL STUDIES	Rubrics for the graphic organizers assess the students' ability to discern the actions that cause a problem, and what actions can help solve the problem.	Using SOCIAL STUDIES book p. 176 – 181 (lesson 4: problem of pollution in Mexico City): S. • Students complete a cause/effect graphic organizer to show what caused the pollution. • Students complete a problem/solution graphic organizer to show what the city has done to help solve the problem of technology. • Students write one paragraph from each graphic organizer to create a 2-paragraph report. • Students draw "before" and "after" pictures of a town square with and without pollution.

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		Level of thinking and comprehension assessed by the ideas and connections that the student expresses orally or in writing (for individual work). For group work: Students must present evidence of a contribution to the group (i.e. each student has a role to perform). Individual assessment by having students individually fill out a reflection sheet after their presentation or report.	Extension: T. Students (individual or cooperative group) present an opinion (written or oral) about the cause and effects of space junk: • What is the cause of 6,209 pieces of "space junk" currently orbiting the earth? • How might the "space junk" affect us in the future? • What are some possible solutions to this problem?
To consider what effect current triggers (inventions, discoveries, actions) may have on the future (and if the effect is a problem, to consider possible solutions)	SOCIAL STUDIES/SCIENCE	Rubrics for the graphic organizers assess the students' ability to discern the actions that cause a problem, and what actions can help solve the problem. The "AFTER" on the cause/effect graphic organizer, and the EVENTS and SOLUTION on the problem/solution graphic organizer demonstrate the students ability to be a thinker, problem-solver, and visionary for the future.	Example: U. 1. Students fill out a **cause/effect** graphic organizer: ⇒ WHAT: Arctic Circle ⇒ BEFORE: Describe what it is like, arctic animals live there, etc. ⇒ CAUSE of change: Drilling for Oil ⇒ AFTER: Hypothesize or predict what might happen as a result of drilling – i.e. arctic animals die 2. Students fill out a **problem/solution** graphic organizer where the problem is the effect (the AFTER) from the cause/effect graphic organizer: ⇒ PROBLEM: i.e. Drilling for oil ruined the home for many arctic animals. ⇒ EVENTS: Student must problem-solve – consider some steps that might help solve the problem (no right or wrong answer) ⇒ SOLUTION: What does the student envision as the solution to this problem? How would the student like to see it end up? (opinion) 3. Students turn each graphic organizer into a paragraph of a 2-paragraph op-ed report. Other possible topics: • People produce more and more trash, and the Earth runs out of room for landfills or dumps. (solution: recycling) • The earth runs out of oil. (solution: alternative sources of energy) • Most of the rainforests are destroyed causing the Greenhouse Effect (less rain in the world, more dry, more deserts, less trees, less oxygen in the air)
	LITERATURE	Reading or Listening comprehension is assessed by the ideas expressed orally by the students. Does what one person say serve as a springboard for others, so that they think of something based on what someone else just said? Do they take risks?	V. Read Just a Dream by Chris Van Allsburg Fill out graphic organizer (student choice for type) Students discuss story in a Socratic Seminar.

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	SCIENCE	Does student understand how his/her invention works? Does student use his/her imagination to consider how his/her invention could be helpful to others, or how it could result in a new need or problem? Does student put effort into problem-solving the effect his/her invention may have? What does the student's attitude about his/her invention seem to be? Does the work appear to have been done as neatly as possible?	**Invention Convention**. Students (individually or with a partner) come up with an invention. In addition to describing how their invention works, and how it could be helpful to people (a positive effect), students think about whether their invention could result in a new need or problem, and how that could be solved. (oral or written)

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THEN		NOW
	Shelter	
	Source of Food	
	Source of Water	
	Clothing (how do they get it)	
	Protection from predators	
	Transportation	
	Writing	
	Communication	
	Light	
	Music	
	Games/Sports	

3. Student (or teacher) selects 3 of the categories from the Double-T graphic organizer.

B.

4. Student writes a report to compare and contrast how people lived (particularly in regards to what technology was used) in the past vs. today.

Activity: Students create item from their early community (house, tool, clothing, jewelry, food, sample of writing, art, music). (See Table of Resources for activities)

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To consider where, why, and how communities develop (and how we know about early communities through artifacts) *(lessons 4, 5, 6 from my archaeology unit would be useful here.)*	SOCIAL STUDIES	What ideas do the students come up with for why WATER would be useful to have in or near a community? As students look at example artifacts, what clues do they notice about life was like in the community?	Pose scenarios #4, 5, 6 in Archaeology Unit lesson 4. Main Points: C. • If people are looking for somewhere to build a community, the one thing they HAVE to have access to is WATER. • Sometimes a town is built on top of an older abandoned town. • Artifacts provide us with clues about what life was like in older communities. D. EXTENTION: Look at the artifacts found on the Vasa Warship that sunk off the coast of Sweden. Talk about what we can learn from them. (lesson 5 in archaeology unit) E. ACTIVITY: Create a classroom museum. (lesson 6 in archaeology unit)
	SOCIAL STUDIES	The literal answer for why the Aztecs chose that location is that the "gods gave them a sign." However, a deeper level of comprehension could be assessed if the student says WATER.	SOCIAL STUDIES book p. 171 – 175 (lesson 3: The Aztec community of Tenochtitlan) F. Discussion: Why do you think the Aztecs chose this place for their city? Why did they build canals and causeways? There is an artifact on p. 175. What does it tell us about how the Aztecs lived? (ground corn into flour)
To use the "triggers of change" in the past to help predict what today may become a "trigger of change" for the future (look at the past and see the future)		Assess student's participation in the class discussion.	*Continue…* SOCIAL STUDIES book p. 171 – 175 (lesson 3: The Aztec community of Tenochtitlan) G. Discussion: What caused the change from Tenochtitlan to Mexico City? (war, use of weapons) Could the use of weapons cause our present communities to change? How? Is it a change we want? What are some events that could help solve that problem?
(continued)		The concept of isolation being a problem is very abstract, and may be difficult for some students to grasp. This may be more appropriate as an extension for the students who need an extra challenge.	Students (whole class or small group) brainstorm all the past inventions that have caused people to be more solitary and less part of a community (car, phone, TV, Internet). On overhead, create a cause/effect graphic organizer so that: BEFORE: People are social members of a community. CAUSE of change: 1. Car, 2. Phone, 3. Internet AFTER: People are more isolated. H. Ask students to consider if it is a problem that technology is helping people become more and more isolated from each other. What problems could it create? (People don't learn how to work together.) What new technology do students think will be

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			developed, and do they think it will cause us to be more social or more solitary? Students brainstorm their ideas for how the problem of technology-caused isolation may be solved. ACTIVITY: Students (small groups) create posters to advertise their ideas for encouraging people to work together, be a team, be social.
To envision how a future community might develop on a Mars colony, or in a space station. Compare the technology used in the future on Mars (or on a Space Station) with what we use today, or what was used in the past.	SOCIAL STUDIES, SCIENCE, MATH, TECHNOLOGY, COMPREHENSION SKILLS	The categories being compared are a cumulative list of topics covered over the year in third grade. Assess how well the students are able to take what they have learned, such as about animal adaptations, and apply it to a hypothetical situation – one that requires them to "think," to problem-solve, and to use their imagination – to have a vision for the future. If electricity is not available, do students see a comparison between life on Mars and life in the days of early civilizations with minimal technology? If people moving to the Mars colony are coming from different countries of the world, do students consider the dilemma of which language will be spoken, which measurement system will be used, what type of money they will use (if any), what type of government they will have, etc. EXTENSIONS: Have students design experiments (or have one experiment pre-designed) to show what life on Mars might be like. (i.e. Can a plant live with sunlight and water, but without oxygen?) Does Mars have an alternative source of energy other than oil?	Students hypothesize what life in a colony on Mars might look like (or life in a Space Station). I. • For a colony on Mars, assume there is no electricity available in the beginning. • What does the community need in order to survive? • Would early life on a Mars colony be more like the Pioneer life in Colonial times if electricity were not available? J. Students use a Double-T graphic organizer to observe what the similarities and differences to life on Earth might be. <table><tr><td>MARS</td><td></td><td>EARTH</td></tr><tr><td></td><td>Shelter Food Water Heat Oxygen (air) Climate Animals Plants Landforms Bodies of water Transportation Communication Measurement Money Language Music Electricity Education Government Games/Sports Health Care</td><td></td></tr></table>
	CREATIVE WRITING	Use rubric to assess the Story Map graphic organizer and the story. Does the solution match the problem? Is the problem a result of something to do with technology? Does technology play a role in helping to solve the problem?	Students write a Sci-Fi story about what life on a Mars colony might be like. To help organize the K. story, first create a Story Map that poses a problem, events that help solve the problem, and a solution. **"Letter from Future"** ACTIVITY: Make a diorama of life in a Mars colony.