

Appendix

System Requirements	Appendix A
System Requirements	A.01
Having Trouble Registering?	A.02
Curriculum-Framing Questions	Appendix B
Sample Elementary Grade Questions	B.01
Sample Middle School Questions	B.04
Sample High School Questions	B.07
A Project Approach to Learning	Appendix C
Sample Topic Ideas	C.01
Sample Project Descriptions, Questions, and Prompts	C.03
Sample K-3 Unit Plan with Three Thinking Tools: Birds, Birds, Birds!	C.24
Assessment Resources	Appendix D
Sample Assessment Plan: Fraction Quest	D.01
Sample Assessment Plan: Storm Watch	D.03
Sample Assessment Plan: Great Thinkers	D.06
Sample Assessment Plan: World War I: The War to End All Wars?	D.08
Visual Ranking Tool Resources	Appendix E
Sample Project Idea: River City Water	E.01
Sample Unit Plan: Grow a Business	E.05
Seeing Reason Tool Resources	Appendix F
Sample Unit Plan: Ecology Explorers	F.01
Index	Appendix G

Appendix A

System Requirements

To take advantage of the online thinking tools, the following system configurations and tests are recommended:

Connection Speed

- 56K modem or faster

Screen Resolution

- 800 x 600 screen resolution

Testing the Computers

Test the *Try the Tool* page for the *Visual Ranking Tool* (www.intel.com/education/visualranking) on each computer to ensure the required, free plug-ins are installed and working. **Do not skip this test!**

Macintosh*	Microsoft Windows*
<p>Hardware</p> <ul style="list-style-type: none"> ▪ PowerPC*-based Macintosh computer for each participant ▪ Apple System Software version OS 8.6* or later ▪ 64MB or more RAM <p>Browser</p> <ul style="list-style-type: none"> ▪ Microsoft Internet Explorer version 6.0 Macintosh Edition* or higher. ▪ Netscape Navigator 6.2* or later version ▪ Mozilla Firefox* 2.0 or later version <p>Plug-ins</p> <ul style="list-style-type: none"> ▪ The online thinking tools use Macromedia Flash Player 7.0* or higher. The newest version of the Flash Player will install automatically if Flash Player 7.0 or higher is not installed. If for any reason you are not able to load the Flash Player, the tools will attempt to run in Java*. If a plug-in needs to be installed, be sure that you are logged in as an administrator. 	<p>Hardware</p> <ul style="list-style-type: none"> ▪ Intel® Pentium® processor 200MHz (performance level or better) or compatible processor for each participant ▪ Microsoft Windows 98*, Windows 2000*, or Windows XP* operating system ▪ 64MB RAM (128+ recommended) <p>Browser</p> <ul style="list-style-type: none"> ▪ Microsoft Internet Explorer 5.0* or later version (Download it at: http://windowsupdate.microsoft.com/) ▪ Netscape Navigator 6.2 or later version ▪ Mozilla Firefox* 1.0.6 or later version <p>Plug-ins</p> <ul style="list-style-type: none"> ▪ The online thinking tools use Macromedia Flash Player 7.0 or higher. The newest version of the Flash Player will install automatically if Flash Player 7.0 or higher is not installed. If for any reason you are not able to load the Flash Player, the tools will attempt to run in Java. If a plug-in needs to be installed, be sure that you are logged in as an administrator.

(Continued)

Appendix A: System Requirements

For the course, the following items are also required:

Macintosh*	Microsoft Windows*
Software <ul style="list-style-type: none">▪ Microsoft Word 2001 for Mac* or above▪ Microsoft Excel 2001 for Mac* or above▪ Microsoft PowerPoint 2001 for Mac* or above▪ Adobe Reader 5.0* or above▪ Archive or file compression software	Software <ul style="list-style-type: none">▪ Microsoft Word 2000* or above▪ Microsoft Excel 2000* or above▪ Microsoft PowerPoint 2000* or above▪ Adobe Reader 5.0* or above▪ Archive or file compression software

Having Trouble Registering at the Intel® Education Web Site?

Are you trying to use a Login ID that is already being used?

The Login ID must be a name that has not been used by anyone who has signed up for any of Intel's services. Try entering your email address as your Login ID on the Registration page. You can change your Login ID at a later time, if desired, by clicking the **Edit Sign In Profile** link on the *Your Projects* page when you are logged in.

Have you registered with Intel before?

If you have registered with another Intel program or newsletter, you may already be registered to use the Intel® Education online tools. If you remember your password from that registration, just enter your email address as your Login ID on the Login page. If you do not remember your password, ask for your password to be mailed to your email address, using the **Recover your Password Now** link in the Instant Help section of the Login page.

Have you forgotten your Login ID?

You can enter your email address as your Login ID on the Login page. After you have signed in, you can retrieve your Login ID by clicking the **Edit Sign In Profile** link on the Your Project page. You can also select the **Recover your Login ID Now** link in the Instant Help section of the Login page to have your Login ID emailed to you.

Have you forgotten your password?

If you have forgotten your password, click the **Recover your Password Now** link in the Instant Help section of the Login page. After you receive your password, either enter your Login ID or enter your email address as your Login ID on the Login page. If you are in a location where you cannot retrieve your email, you may need to register again using a different email address.

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Appendix B Curriculum-Framing Questions

Sample Elementary Grade Questions

Essential Questions	Unit Questions	Content Questions
What is the price of life?	<p>If you were an African animal, which one would you most like to be and why?</p> <p>Are all animals worth protecting?</p> <p>If you could talk to “your animal” and understand everything it had to say, how would it describe itself and its life in Africa?</p>	<p>How are living things connected in their habitat and in what ways do they need each other to survive?</p> <p>How do animals in Africa adapt to their environment?</p> <p>What do African animals need to survive?</p> <p>What are the characteristics of African animals?</p>
Why do people say “there is no place like home”?	<p>What makes Arizona a state worth visiting?</p> <p>How has Arizona’s past affected what it is like today?</p>	<p>What makes the regions and counties in Arizona unique?</p> <p>What important landmarks and geographic features are in Arizona?</p> <p>How have people adapted to life in Arizona?</p> <p>How have people changed what Arizona is like today?</p>
What’s your story?	<p>How does the way an author writes make a story more interesting?</p> <p>Why aren’t my favorite books your favorite books?</p>	<p>What are the elements of a story?</p> <p>What are the six+1 traits of writing?</p> <p>What traits of writing does the author use?</p>
Does accuracy really matter that much?	<p>Are fractions important or would we be better off without them?</p> <p>How are fractions used on the job and are they needed to get the job done right?</p> <p>How can understanding fractions make your life easier?</p>	<p>What is a fraction?</p> <p>How do you add, subtract, multiply and divide fractions?</p> <p>What is the difference between a numerator and a denominator?</p> <p>How do you change a mixed numeral into an improper fraction?</p>
Who will help today?	<p>Why do we need community helpers?</p> <p>Which community helper would you most like to be and why?</p>	<p>Who are our community helpers and what do they do?</p> <p>Who should you call for help?</p>

Appendix B: Curriculum-Framing Questions

Essential Questions	Unit Questions	Content Questions
How does an organism's structure enable it to survive in its environment?	<p>What is special about frogs that helps them survive?</p> <p>What are some ways that frogs are different from me and like me?</p>	<p>What are the basic structures of the frog?</p> <p>What adaptations do frogs have that allow them to live in their environment?</p> <p>What are amphibians?</p> <p>What kinds of frogs are there?</p>
How do I get from here to there?	<p>Why use a map, if I can still get lost?</p> <p>Is one route always better than another? How do I decide which route to take?</p> <p>What can maps tell us about people, places, and environments?</p>	<p>Where in the world am I?</p> <p>What symbols and location identifiers are found on a map?</p> <p>How does each one help you to read a map?</p> <p>How do you measure using a map?</p> <p>What is the difference between a map, an atlas, and a globe?</p>
How can we make a difference?	<p>How can humans and endangered species share a region?</p> <p>What can our school do to help save an endangered species?</p>	<p>What makes an animal an endangered species?</p> <p>How is an owl different from other birds?</p> <p>What is needed in your owl species' habitat?</p> <p>Where in nature would we find your owl?</p>
Are you prepared?	<p>Can I go outside and play today?</p> <p>Should we believe the weather report?</p> <p>Where in the world can the best weather be found?</p>	<p>Where does rain come from?</p> <p>What causes the seasons of the year?</p> <p>What are some of the destructive forces of nature and what whether conditions can you expect with each?</p> <p>What are some things people do to prepare for different weather conditions?</p>
How can something so small be capable of so much?	<p>Should we be afraid of bugs?</p> <p>Are insects more helpful or harmful?</p> <p>Do we really need insects?</p>	<p>What makes an insect an insect?</p> <p>How are insects the same and different?</p> <p>How do insects grow and change?</p> <p>What are some ways that insects can be helpful and harmful?</p>
What changes do you see?	<p>What can shadows tell us?</p>	<p>What causes a shadow?</p> <p>How do you measure your shadow?</p> <p>How does your shadow change?</p> <p>What causes your shadow to change?</p>

Essential Questions	Unit Questions	Content Questions
Where can we find order and patterns?	Is it time to rhyme? Why rhyme?	What is rhyme? What words sound the same? How can you tell words that rhyme?
Is it possible to conquer the impossible?	Without magic beans, what would it take to grow a bean stalk to the giant's house? What are the perfect conditions for growing a bean plant?	What are the different parts of a plant? What does a plant need to live? What are the functions of different plant structures? What is photosynthesis?
Where's it going?	Could a volcano erupt in my backyard? What type of mountain would make the best building site and why?	What are the different layers of the earth? What are three different types of volcanoes? How are mountains made? How do we know that a volcano is dormant?
Is there such a thing as happily ever after?	Of all the fairy tales ever written, why has the story of Cinderella been the one to capture the hearts of so many generations and cultures? How would the Cinderella fairy tale change if a different character told the story? What would happen in a modern day Cinderella story?	What are the elements of a fairy tale? What is point of view? What is the moral of the Cinderella story? In what ways are all of the Cinderella stories from around the world similar? In what ways are the main characters in the various versions of Cinderella the same, and in what ways are they different?

Sample Middle School Questions

Essential Questions	Unit Questions	Content Questions
How does music reflect history, society, and culture?	How do the times in which a composer works affect his or her music? How much does music change throughout time?	Who were some famous composers from different time periods and countries? What was your composer's life like? What are some different musical styles?
How has science made an impact on our lives?	Why is the Renaissance special? How does the Renaissance still impact us today?	Why was the time in which Leonardo Da Vinci lived called the Renaissance? What values were reflected in the Renaissance? What ideas, discoveries, and inventions happened in the Renaissance? What were Leonardo Da Vinci's accomplishments?
How has science made an impact on our lives? Why explore?	What can we learn from the experiences of the early explorers that is useful in modern times? Did the early explorers fail?	What motivated the Spanish and Portuguese explorations? What were significant people and events in the exploratory voyages of the 14th-16th centuries?
How can I help protect wildlife?	How can we reduce the impact of modern society on urban wildlife? How can statistics help us understand a problem?	What birds live in our community? What are the greatest risks to the birds in our community?
Is it worth the hassle and expense?	Where should we go this year and why? How do you select the best place? Where does "culture" come from?	What is the difference between a passport and travel visa? What large budgetary items need to be considered when planning a one to two week trip abroad? What monetary system is used in the region and what is the exchange rate?
What changes do you see?	Where does this rock in my hand fit into my life? Why are rocks and minerals important to us? Why look further than your own backyard?	What are igneous, sedimentary, and metamorphic rocks? How are different rocks formed? Where do they fit into the rock cycle? Why are rocks different? What are some properties of minerals?

Essential Questions	Unit Questions	Content Questions
Does my contribution to society make a difference?	What kind of contributions did feudal characters make?	Who were the major and minor characters of Feudal Society during the Middle Ages? What roles did they play in their society? What choices did they make on a daily basis?
Have things really changed that much?	Is our life anything like that of the Ancient Egyptians?	Why was the River Nile so important to the ancient Egyptian civilization? How were the religious beliefs of the ancient Egyptians reflected in their art and architecture? What religious traditional, cultural, and scientific contributions were established by the ancient Egyptians?
How is life replicated?	How is a cell like a system? How are cells different from one another?	What is a cell? What is a system? What are the parts of a cell? What are the differences between animal and plant cells?
Why is it important to learn from our past?	Can we live on another planet other than Earth? How can we conserve and maintain a planet's natural resources?	How does acid rain travel through the water cycle and what dangers does it pose? What affect does pH have on our water quality and aquatic life? What is ozone? What is causing the destruction of the Earth's ozone layer? What are some ways that population growth affects the world's ecosystems?
How do the choices we make now affect us later?	Is disease inevitable? How can a person living with a disease lead as normal a life as possible? Is prevention really the best medicine?	What are the functions and weaknesses of each of the body systems? How does food affect your body systems? What benefits do we get from exercise? What are diseases?
How do you measure quality?	Are the ponds in our community healthy? What makes a healthy pond?	What organisms exist in ponds? What are the components of a pond? How do we measure a pond's health?
What causes people to consider new alternatives to solve old problems?	Should solar energy be considered as an alternative to fossil fuels? How can you capture the energy of the sun?	What are the factors that limit the use of solar heat? What effect does solar energy have on different materials and how can we make use of these effects? How is heat transferred? How do the earth's rotation and the sun's position affect heat and temperature on earth?

Appendix B: Curriculum-Framing Questions

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Why is it important to learn from our past?	Can we live on another planet other than Earth? How can we conserve and maintain a planet's natural resources?	How does acid rain travel through the water cycle and what dangers does it pose? What affect does pH have on our water quality and aquatic life? What is ozone? What is causing the destruction of the Earth's ozone layer? What are some ways that population growth affects the world's ecosystems?
How do the choices we make now affect us later?	Is disease inevitable? How can a person living with a disease lead as normal a life as possible? Is prevention really the best medicine?	What are the functions and weaknesses of each of the body systems? How does food affect your body systems? What benefits do we get from exercise? What are diseases?
How do you measure quality?	Are the ponds in our community healthy? What makes a healthy pond?	What organisms exist in ponds? What are the components of a pond? How do we measure a pond's health?
How can math help me understand my world?	Why might you need to know the metric system? What difference does it make if you use inches or centimeters?	What are the different metric measurements? How is measurement used in the real world? How is estimation useful?

Sample High School Questions

Essential Questions	Unit Questions	Content Questions
What brings about the rise and fall of great civilizations?	What factors in Mayan society most contributed to its demise? What factors in present day Mayan society contribute to its continued survival?	What are the basic cultural institutions of a society? What factors may have led to the Mayas abandoning their cities before 900 A.D.?
Am I my brother's keeper, and who are my brothers?	Can famine be prevented? What should be the U.S. role in the prevention and relief of famine? How do different professional perspectives influence prevention and relief recommendations?	What is famine? What causes famine? What is currently being done by the U.S. and other countries to eliminate famine? How does famine in one country affect food resources in another country?
How do we know something exists if we cannot see it?	Must all things repeat in nature? Does our current use of waves make our lives better?	What is a wave? What is a transverse wave and what are its characteristics? What is a compressional wave and what are its characteristics? What is the relationship between the frequency and wavelength in a wave? What is the relationship between intensity and loudness and frequency and pitch?
How does your opinion matter?	What can polls tell us and how can they help us identify trends in public opinion? How can the numbers from one poll be interpreted in many different ways? In what ways can polls be misleading?	What are demographics and how do candidates use them to target voters? What are the steps in conducting a poll?
How can we harness the Earth's power?	Why is electricity important? How is electricity used on the job?	What is electricity? What are the parts of an electric circuit? What is Ohm's Law?
What does the past tell us about the future?	What variables limit or sustain the continuation of a trend? How does a trend affect people's choices? What will our quality of life be like in the future?	What is an exponential regression, a curve of best fit, and a correlation coefficient? What are the advantages and limitations of linear regression for analysis of data?

Appendix B: Curriculum-Framing Questions

Essential Questions	Unit Questions	Content Questions
Is a picture worth a thousand words?	<p>What can photographs tell us?</p> <p>How can photographs help us to interpret the past?</p> <p>How can a single photograph communicate many different messages?</p> <p>How can photojournalism impact a nation's views?</p>	<p>When viewing a photograph how do you differentiate between positive and negative space?</p> <p>What is one of the rules of composition and how is it applied to photography?</p>
How does literature help us better understand ourselves?	How does Shakespeare still speak to a 21st century audience?	<p>How do you read and understand Shakespeare's Elizabethan English?</p> <p>What are some important things to know about Shakespeare's time period?</p> <p>Who are the characters in <i>Romeo and Juliet</i> and how do they contribute to the deaths in the play?</p> <p>What is imagery?</p> <p>What is iambic pentameter?</p>
What makes a leader great?	<p>What was the impact of conquest on the ancient world?</p> <p>What effect did empires have on daily life in the ancient world?</p>	<p>What did your historical figures have in common?</p> <p>How were they unique?</p> <p>How did your historical figures become so famous?</p> <p>What were their accomplishments?</p>
What are the advantages and limitations of defining situations mathematically?	Can all cyclical situations be defined mathematically?	<p>What do sine and cosine equations show you?</p> <p>What is the general form of a sine/cosine function?</p> <p>What are parameters and are they calculated?</p> <p>Where do you find cyclical situations?</p>

Appendix C

A Project Approach to Learning

Sample Topic Ideas

Discipline	Subject	Content Topic that Could Benefit from Online Thinking Tools
The Arts	Art	Inspiration of artists Art and culture Political artwork Fashion and culture
	Film	Movies' effect on culture Reality TV shows
	Music	Influence of protest songs Inspiration of musicians Importance of folk music Bootleg music
Health	Health	Substance abuse Vaccines (e.g., smallpox) Herbal remedies Diet aids / Eating disorders Cosmetic practices Accidents
Language Arts	Reading	Plot development Character development Biographies—evolution of human knowledge Mysteries An author's influence (e.g., Shakespeare)
	Writing	Commonalities of languages & their people Piracy and counterfeiting Phenomena
Math	Economics	Stock market trends Economic cooperation Entrepreneurship Budgeting and expenses Marketing
	Analysis	Attitudinal differences Population trends

(Continued)

Appendix C: A Project Approach to Learning

Discipline	Subject	Content Topic that Could Benefit from Online Thinking Tools
Science	Earth Science	Geologic formations Climate change Extreme weather Space travel Global warming
	Physical Science	Fuel for the future Energy conservation Elements of the future Chemical safety Water quality Aerodynamics Health risks of bigger, faster roller coasters
	Life Science	Analysis of globalization Developing ocean resources Air pollution Solid waste issues Water usage/pollution Illnesses Genetics/cloning Adaptations/evolution
Social Studies	Geography	Human-Environment interactions Movement Phenomena
	History	Wars Prejudice/Racism/Intolerance Progress Traditions of a culture Middle East peace project Civil Rights Movement Tourism

Sample Project Descriptions, Questions, and Prompts

The following projects include a *Visual Ranking* Prompt, a *Seeing Reason* Research Question, and a *Showing Evidence* Prompt. This does not mean that all tools would be used in that project. Instead, these examples are provided to show how each of the online thinking tools could be integrated into each project.

The Arts

Learning Objectives

- Identify and assess what influences the style of artists
- Select and defend an art form
- Construct a piece of modern art that embodies a previous artistic period

Project Description

Art conveys meaning and emotion, often reflecting society. In understanding the history and style of any period of art, we have to understand the balance between the issues and developments of that particular era. Each and every period is affected by the history before it, which includes the previous philosophies, social and economic conditions, as well as the political, spiritual, and artistic influences. Create a piece of modern art that shows the influence of a previous artistic period and write an editorial on the impact of that period on a specific modern artist.

Possible Question or Prompts

Visual Ranking Prompt: Rank the following influences on an artist from most influential to least. OR, rank the following artists as to those who were most influential on modern art.

Seeing Reason Question: How has the _____ artistic period influenced modern art?

Showing Evidence Prompt: Which art form has contributed most to the current culture in this country?

Civics

Learning Objectives

- Measure the importance of volunteers to the community
- Debate the use of volunteers to provide essential services
- Persuade a targeted audience to volunteer in their local community

Project Description

There are over 65 organizations in our county that rely on volunteers to provide help to those in need. Why should we give up our free time to help others? Can one person really make a difference anyway? Determine the effects volunteering can have in your community, then create a brochure explaining the needs and benefits of volunteering in order to encourage people to volunteer locally.

Possible Question or Prompts

Visual Ranking Prompt: Rank the reasons for volunteering in relationship to their effects on the community.

Seeing Reason Question: How does volunteer effort impact my community?

Showing Evidence Prompt: Would paid workers be a better way to ensure quality staffing of nonprofit organizations?

Learning Objectives

- Examine factors that affect voter turnout and rank the impact of each
- Research the impact of allowing voters to affect complex policy
- Persuade a particular section of the population to vote

Project Description

Voter turnout across the globe rose steadily between 1945 and 1990—increasing from 61% in the 1940s to 68% in the 1980s. But post-1990, the average has dipped back to 64%. Since 1945, Western Europe has maintained the highest average turnout (77%), and Latin America the lowest (53%); North America and the Caribbean have the third lowest turnout rate. Since voting is one of the cornerstones of a democracy, why is it that people do not vote? What can be done to improve voter turnout? Create a presentation and/or brochure directed to different segments of society to encourage participation in the voting process.

Possible Question or Prompts

Visual Ranking Prompt: Rank the following in order of those items that have the most impact on whether people vote.

Seeing Reason Question: What affects voter turnout?

Showing Evidence Prompt: Should voters be allowed to vote on complex policy issues?

Learning Objectives

- Assess community needs
- Debate the possible uses of public land
- Propose a plan for a park that meets community needs and addresses safety

Project Description

As urban growth continues, the need for parks and recreation areas increases. Planning commissions must look at many different things when planning a park. They must design the park to meet the needs of the community. They must keep safety in mind and devise a set of rules for the park. You and your group must set up a proposal for the community leaders regarding the new park that will be built in your community.

Possible Question or Prompts

Visual Ranking Prompt: Rank the items you think are most important to be in your new community park.

Seeing Reason Question: How should we plan a park so it is safe and fun?

Showing Evidence Prompt: Should we use public land for golf courses which return dollars to the community?

Learning Objectives

- Identify and assess rules in society that are essential to keeping people safe
- Weigh the balance between personal rights and societal laws

Project Description

We live with rules all around us—in our homes, at school, in our community. Some rules are determined by age limit, some by association in a group. Think about all the rules that impact your life right now. How will these rules change as you get older? What rules are necessary to help a community to function well and keep everyone safe? You are part of a committee that will propose rules for a new community that is going to be created on the planet Mars. Determine the problems or dangers that can occur in a community, and then suggest the appropriate rules to help keep people safe.

Possible Question or Prompts

Visual Ranking Prompt: List the rules, from most important to least important, that you think are necessary to have in your community to keep people safe.

Seeing Reason Question: How do rules help keep us safe?

Showing Evidence Prompt: What legal activity on Earth should be banned on Mars?

Economics

Learning Objectives

- Identify and assess items necessary to a successful and safe work environment
- Propose solutions to improve substandard migratory work practices

Project Description

Migrant workers often labor for very long hours, often under hazardous conditions, living in substandard conditions, and receiving very little pay. Throughout the years, many social activists have organized protests to bring to light the migrant worker conditions. You have been assigned to a task force to examine the issue of substandard working and living conditions for migrant workers in your assigned county. You must evaluate the reasons for these conditions and put together a proposal to help bring about a better living and working environment for these workers.

Possible Question or Prompts

Visual Ranking Prompt: List the items that are necessary for a good working environment, from most to least important.

Seeing Reason Question: What generates migratory work and produces the current practices/conditions associated with it?

Showing Evidence Prompt: Should employers be responsible for the living conditions of migrant workers?

Learning Objectives

- Understand how competition, demand, profit, and loss are involved in a company's decision making process
- Recommend ways to improve working conditions in various industries

Project Description

A basic tenet of our labor laws is that workers should earn a living wage in a safe, decent work environment. Many countries around the globe either do not have strict labor laws or do not enforce them. Many workers, especially in the garment industry, work long hours for little pay in substandard working conditions. Social advocate groups have raised the level of concern regarding these issues. Should we continue to buy garments and other items from companies that knowingly produce their products in "sweatshops"? How can we help to bring about positive change for these workers?

Economics (Continued)

Possible Question or Prompts
<p>Visual Ranking Prompt: Rank the following in order of their influence on how a company runs its factories.</p> <p>Seeing Reason Question: What influences how and where factories are located?</p> <p>Showing Evidence Prompt: Should we continue to buy garments and other items from companies that knowingly produce their products in “sweatshops”?</p>

Foreign Language

Learning Objectives
<ul style="list-style-type: none"> ▪ Formulate, investigate, and evaluate all aspects surrounding world languages ▪ Understand the differences and similarities among Francophone countries ▪ Examine patterns and structures to formulate generalizations
Project Description
<p>Most people want to travel at some time in their lives. Now it’s our turn! We have all learned so much French and now we want to put it to good use! We need to figure out which Francophone region we want to visit. Through this project, you will be working as a travel agent. You have many important decisions to make so that we have a successful trip. Your job as a travel agent is to advise others on where they should travel and why. Research the ten Francophone destinations, based on your understanding of that region, as well as the goals of your client to make executive decisions on the destination.</p>
Possible Question or Prompts
<p>Visual Ranking Prompt: Rank the ten Francophone countries from most to least desirable destination based on your understanding of that region and the goals of your client.</p> <p>Seeing Reason Question: Considering the diverse cultures of the Francophone countries, why do they continue to use the French language as one of their primary languages?</p> <p>Showing Evidence Prompt: Could we ever have one universal language used throughout our world?</p>

Foreign Language (Continued)

Learning Objectives

- Identify reasons why bilingualism and/or learning a second language benefits them and society

Project Description

There are many purposes and uses of foreign languages. Some students study another language in hopes of an international or government career. Others are interested in deepening their understanding of other people and cultures. Many study a foreign language to fulfill a graduation requirement. In this project, you will explore reasons why it is important to study foreign languages and create a presentation to our School Board, sharing the results of your research. Determine what action you will request they consider, such as requesting that foreign language requirements be emphasized or increased in our school district.

Possible Question or Prompts

Visual Ranking Prompt: Why is it good to be bilingual? Rank according to your assigned perspective.

Seeing Reason Question: What are the outcomes of learning a second language?

Showing Evidence Prompt: Does learning a second language increase student learning and achievement in other subject areas?

Learning Objectives

- Engage in conversations in Spanish in order to provide and obtain information, express feelings and emotions, and exchange opinions
- Understand and interpret written and spoken language in Spanish
- Understand the relationship between the practices and perspectives of the culture

Project Description

Hay muchas culturas en el mundo que hablan español. ¿Cómo son similares? ¿Cómo y por qué son diferentes? Utilice las Herramientas para el pensamiento para ayudarle a aprender estas culturas y a practicar el español. ¡Escriba sus respuestas y comentarios en español! [There are many cultures around the world that speak Spanish. How are they similar? What makes them different? Use the thinking tools to help you learn about these cultures and practice your Spanish. Be sure to write your answers and comments in Spanish!] Students will use the Spanish version of the thinking tools:

<http://www97.intel.com/cr/ThinkingTools/VisualRanking>

<http://www97.intel.com/cr/ThinkingTools/SeeingReason>

<http://www97.intel.com/cr/ThinkingTools/ShowingEvidence>

(Continued)

Foreign Language (Continued)

Possible Question or Prompts

Visual Ranking Prompt: Priorice los alimentos más importantes para una típica familia española. Defienda con explicaciones sus elecciones de cada alimento. [Rank the foods that are most important to a traditional Spanish family. Provide reasons for each food's position.]

Seeing Reason Question: ¿Por qué es única la cultura mexicana? [What makes the Mexican culture unique?]

Showing Evidence Prompt: Todos estos países de habla español (México, Cuba, la Republica Dominicana, Puerto Rico y España) tienen culturas distintas. ¿Son más semejantes estos países a sí mismos o más semejantes a otros países cuyas lenguas vienen del latín? ¿Piensa Ud. tal vez que haya otros elementos más significantes que la lengua común? Explíquese. [All Spanish-speaking countries (such as Mexico, Cuba, Dominican Republic, Puerto Rico, and Spain) have distinct cultures. Are their cultures more similar to each other than to other countries with a Latin-based language? Or are the other elements of culture more significant than a common language?]

Geography

Learning Objectives

- Identify and analyze population migration and growth
- Assess geographical characteristics in areas of early settlements
- Plan a new city based on geographical elements

Project Description

Alexandria, Egypt; Athens, Greece; and Shanghai, China are a few cities that were early settlements in their areas and continue to be important cities today. Of all the wide open spaces available, why did people choose to build homes and businesses in those locations? In this project, you will choose a major city with historical significance and write a report that discusses the geographical reasons as to why the city was founded in that location. You will apply that knowledge by creating a model of a new city in a location that would be most beneficial to its growth and prosperity.

Possible Question or Prompts

Visual Ranking Prompt: Why do you think your location is best for your city? Rank the reasons for choosing this location that would be most beneficial to its growth and prosperity.

Seeing Reason Question: What affects a city's location, selection, and growth?

Showing Evidence Prompt: What is the most important factor in locating a new city in this century?

Health

Learning Objectives

- Identify and assess important safety rules
- Identify factors that affect bicycle safety
- Persuade a targeted audience to wear bicycle helmets

Project Description

In 2002, 660 people were killed in bicycle accidents across the United States. Eighty-five percent of these bicyclists reportedly weren't wearing helmets. Another alarming statistic is that bicycle deaths are highest among 14 year-old males. Many of these deaths could have easily been prevented. What can we do to keep ourselves safe when riding our bicycles? Create a presentation, drama, or storybook for students in lower grades to educate them on how to be safe when riding their bicycles.

Possible Question or Prompts

Visual Ranking Prompt: In communicating bicycle safety, what are the most important rules to remember? Rank the following rules with the most important listed first.

Seeing Reason Question: What factors affect bicycle safety?

Showing Evidence Prompt: Does the safety factor of requiring helmets justify restricting a cyclist's freedom?

History

Learning Objectives

- Understand the events that brought about social and political change in the 1960s and how it continues to impact us today
- Evaluate social progress

Project Description

The '60s was a decade of social and political turmoil. When looking back at this decade, we find that many of the social issues of that time are still being dealt with today, such as civil rights, women's rights, the peace movement, and others. Have we made any progress in the last 40 years? Prepare a commentary explaining how a specific social issue of today is a reflection of issues from the 1960's and how these issues have resolved, changed, or stayed the same.

History (Continued)

Possible Question or Prompts

Visual Ranking Prompt: Rank the following social issues in order of their importance today.

Seeing Reason Question: What prompted the _____ movement/issue of the 1960s and how has that movement/issue continued to impact our lives today.

Showing Evidence Prompt: Have we made any progress in the last 40 years?

Learning Objectives

- Assess the impact of revolutions based on their population growth
- Compare and contrast the impact of the Agricultural and Industrial Revolutions
- Examine the causes and effects of the Agricultural and Industrial Revolutions

Project Description

Two of the greatest changes in the use of the earth’s resources that have had a significant effect on the world population were the Agricultural and the Industrial Revolutions. The Agricultural Revolution made large-scale agricultural production possible. The Industrial Revolution, beginning in the 18th century in Europe and still happening in many parts of the world today, provided mass production of consumer goods. One of the differences between these two revolutions was their impact on population growth and distribution. Write an essay that compares and contrasts these important stages that have shaped today’s world.

Possible Question or Prompts

Visual Ranking Prompt: List the following inventions/processes that were created in the 18th century in order of their impact on population growth and distribution.

Seeing Reason Question: What initiated the Neolithic (Agricultural) revolution and how has it influenced our world today? What initiated the Industrial Revolution and how has it influenced our world today?

Showing Evidence Prompt: What revolution had the most impact on the people of that time period—the Agricultural Revolution or the Industrial Revolution?

History (Continued)

Learning Objectives

- Analyze events, literature, and philosophies that influenced the start of the American Revolution
- Present evidence and reasons logically in order to persuade an audience

Project Description

The Boston Tea Party was a dramatic event that “started” the American Revolution; but surely, there must have been more than a simple tax on tea that caused early America to start down the road to a bloody war. In teams, present a debate staged in 1773 as to whether America should break its ties with Britain.

Possible Question or Prompts

Visual Ranking Prompt: List the correct chronological order of events of the American Revolution.

Seeing Reason Question: What were the factors that led America into war with Britain?

Showing Evidence Prompt: Should the American colonies break their ties with Britain?

Learning Objectives

- Examine and assess the causes of World War II
- Identify the important events of World War II and argue their impact
- Analyze wars in modern times and generalize and appraise their justification

Project Description

When World War I ended, an estimated 10 million were dead and 20 million wounded. The immense suffering from this war gave rise to a general revulsion to any kind of war. Many thought the need to fight a similar war would never come again. Yet a short twenty years later, World War II began. What could possibly have happened to plunge the world into another, even more devastating, world war? How can understanding the causes of World War II help us work toward a more peaceful world?

Possible Question or Prompts

Visual Ranking Prompt: Rank the most significant events of World War II that made an impact on the outcome.

Seeing Reason Question: What were the causes of World War II? [Each group will investigate a segment of this question: economic, political, social, nationalistic, etc.]

Showing Evidence Prompt: Are any wars justified?

Language Arts

Learning Objectives

- Analyze human nature in light of fictional literature
- Compare and analyze the roots of violence in literature with that found in history and modern day

Project Description

The incomprehensible brutality in WWII, the bombing of Japan, and the following Cold War made many people wonder about the true nature of humankind. In *Lord of the Flies*, William Golding paints a bleak representation of the world. Over fifty years later, similar atrocities continue. Are we destined to live in a world of violence? Do the characters in *Lord of the Flies* represent us?

Possible Question or Prompts

Visual Ranking Prompt: List the events in order of their impact on the boys' descent into savagery.

Seeing Reason Question: What causes the breakdown of civilized behavior in *Lord of the Flies* and what are the consequences?

Showing Evidence Prompt: Do the characters in *Lord of the Flies* represent us?



Learning Objectives

- Analyze the impact of a character's actions on the story
- Explain how the actions of one character affect another
- Predict how character actions could alter the outcome of the story

Project Description

Characters in [book title] make decisions throughout the course of the story. These decisions can have negative, positive, or no affect on other characters in the story. Select a main character from the book and write a letter to this character describing how his/her actions affected someone else in the story.

Possible Question or Prompts

Visual Ranking Prompt: Rank the actions that made the most impact in the story.

Seeing Reason Question: How does a character's words or actions impact others?

Showing Evidence Prompt: Would the world [community, family] be different today had the character made the opposite choice?

Language Arts (Continued)

Learning Objectives

- Determine what impacts school safety
- Deliberate what effect requiring uniforms would have on a school
- Persuade an audience using well-reasoned evidence

Project Description

A safe and disciplined learning environment is the first requirement of a good school. Students who have to worry about wearing the right colors so as not to be affiliated with a gang or the latest fashion in order to fit in are not in a “safe” environment in which to learn. In response to the need for student safety, many parents, teachers, and school officials are calling for uniforms. Does requiring students to wear uniforms directly affect school environment? You are on a panel that is presenting recommendations to your local school board regarding the possibility of instituting school uniforms at your school.

Possible Question or Prompts

Visual Ranking Prompt: Rank the following in order of their impact on school safety.
Seeing Reason Question: What would be the effects of requiring school uniforms?
Showing Evidence Prompt: Should students be required to wear uniforms?

Learning Objectives

- Assess current school needs
- Analyze a school issue
- Recommend ways to address controversies

Project Description

Many problems and issues affect schools all over our country. Debates about installing computers vs. funding the arts, solving teacher shortages, allowing school prayer, dealing with school violence, ensuring equality, and providing school vouchers are just the tip of the iceberg when it comes to the issues facing today’s schools. Choose a school issue and evaluate its positive and negative aspects. You will serve on a panel of experts to suggest ways of addressing some of these controversies.

Possible Question or Prompts

Visual Ranking Prompt: Rank the expenditures most needed by your school, from most needed to least needed.
Seeing Reason Question: What are the causes and effects of _____ in our schools?
Showing Evidence Prompt Examples: Should student athletes be required to be academically successful in order to play? OR Should we have school vouchers?

Language Arts (Continued)

K-3
Idea

Learning Objectives

- Restate facts and details in text to clarify and organize ideas
- Read and understand grade-level-appropriate material
- Analyze text to make generalizations and recommendations

Project Description

Doctor DeSoto is a mouse who refuses to treat “dangerous” animals or animals who like to eat mice. One day, a fox shows up and begs for help because he has a tooth that is hurting him. Doctor DeSoto and his wife must figure out how to treat the fox without being eaten by the fox. Your job is to decide whether or not the DeSotos should treat the fox. You will then participate in a mock trial to figure out whether the DeSotos discriminated against the fox by refusing to treat him or whether the fox is guilty of secretly wanting to eat the DeSotos.

Possible Question or Prompts

Visual Ranking Prompt: From the dangerous animal list that we generated as a class, list the animals in order from least dangerous to most dangerous using your different perspectives (adult, dog, cat, baby, mice).

Seeing Reason Question: What makes animals dangerous?

Showing Evidence Prompt: Should Doctor DeSoto treat the fox? Would you accept cats and other dangerous animals as patients if you were Doctor DeSoto?

K-3
Idea

Learning Objectives

- Analyze text to make generalizations and recommendations
- Read and understand grade-level-appropriate material
- Write fairy tales based on given criteria

Project Description

Fairy tales are a part of our lives growing up. All around the world, fairy tales are used to delight and instruct children. You will be an author deciding what is important to include in your next best-selling fairy tale. Use the thinking tools to help you think through the most important elements of a fairy tale in order to write your own.

Possible Question or Prompts

Visual Ranking Prompt: What are the most important things to include in a fairy tale? Rank them from the most important to the least important.

Showing Evidence Prompt: Is the number three important to have in every fairy tale?

Language Arts (Continued)

K-3
Idea

Learning Objectives

- Apply safety rules to life skills
- Understand the importance and purpose of school rules

Project Description

Students will brainstorm the importance of school rules. They will apply these school rules to their school day. They will also understand the consequences when rules are broken.

Possible Question or Prompts

Visual Ranking Prompt: Rank the order of importance of these school rules. Think about which ones are most important for keeping you safe. Explain why the rule helps to keep you safe.

Seeing Reason Question: How do school rules keep me safe?

Showing Evidence Prompt: Choose a school rule. Does this school rule really help to keep you safe?

K-3
Idea

Learning Objectives

- Use evidence from text to support an argument
- Write to defend a point of view about a character
- Use Venn Diagrams to analyze fairy tales

Project Description

Now that we have read the traditional story of The Three Little Pigs and the wolf's version, do you believe the wolf? Why were the pigs so afraid of the wolf? Was the wolf framed or not? You are detectives in search of the truth! You will need to find evidence from the story and then come to agreement as a group as to which opinion you will support. Using the information from both stories, you will rewrite the story again as to what really happened—from the point of view of an unbiased narrator.

Possible Question or Prompts

Visual Ranking Prompt: Rank the evidence against the wolf from the strongest to the weakest.

Seeing Reason Question: What causes the three little pigs to fear that the wolf wants to eat them?

Showing Evidence Prompt: Was the wolf framed in the original story of The Three Little Pigs?

Mathematics

Learning Objectives

- Use linear regression to create a linear function
- Fit linear models to data
- Use the correlation coefficient and residuals to measure the “goodness of fit”
- Use regression lines and the standard error of estimate to answer questions about data

Project Description

You have been hired as a data analyst team to help various companies make marketing and business decisions based on data. In order to do this you will need to analyze the data, make predictions as to whether or not there are linear growth patterns, and make recommendations to your clients. First, using the class data of each student’s shoe size and height, plot the pair (height, shoe size) as a point on the grid. Then use the *Showing Evidence Tool* to evaluate whether it would be reasonable to sell shoes by a person’s height. Use the *Visual Ranking Tool* to help you think about the relationship between a given independent and dependent variable. You will be ranking relationships according to how linear or non-linear (exponential or quadratic) they are. You will then use your graphing calculator to check your answers. After your experience with a variety of scenarios, you will analyze what variables affected your ability to make accurate predictions from data using the *Seeing Reason Tool*. Using this information, you will provide recommendations to your client.

Possible Question or Prompts

Visual Ranking Prompt: Rank the order of the following relationships from the most linear to the least linear. Provide a brief explanation of why you think the given pair of variables is related linearly or non-linearly.

Seeing Reason Question: What variables affect your ability to make accurate predictions from data?

Showing Evidence Prompt: Do you think it would be reasonable to sell shoes by a person’s height?

Mathematics (Continued)

Learning Objectives

- Use strategies, skills, and concepts in finding solutions
- Articulate reasons for choices for selecting problem solving strategies
- Identify ways to improve problem solving skills

Project Description

In this project, you will evaluate your problem solving skills in mathematics. The final goal of this project is a Development Plan in which you will create a 4-week plan, involving a family member and peers, to improve your problem solving skills in specific ways. Your plan and results—along with recognition for accomplishing your goals—will be presented at an awards night and Open House.

Possible Question or Prompts

Visual Ranking Prompt: Based on your previous problem solving experiences, rank the following strategies in order of their value to you in solving mathematics problems.

Seeing Reason Question: What are the causes and effects of being an effective problem solver in mathematics?

Showing Evidence Prompt: Does using different problem solving strategies increase learning and achievement in mathematics?

Learning Objectives

- Itemize factors that affect one's ability to save
- Construct a savings plan
- Apply mathematical concepts to understand the growth of savings

Project Description

There are many options when it comes to money that you receive. Deciding what to do isn't always easy. Should you spend your money right away on that piece of candy, or put your money in a piggy bank to save for something you may need in the future? If you spend all your money right away, what will happen when you see something you want? Investigate further why saving is important, and create your own savings plan.

Possible Question or Prompts

Visual Ranking Prompt: Rank the factors that affect how much you can save, from the most influential to the least.

Seeing Reason Question: What determines how much I can save?

Showing Evidence Prompt: Should you be allowed to spend your own money as you please?

Mathematics (Continued)

Learning Objectives

- Collect data, graph results, find line of best fit, slope and equation of the line
- Identify dependent and independent variables
- Apply understanding of slope to real-world applications

Project Description

What makes roller coasters exciting? There are many factors that could be considered, including speed, drop (including slope), force, and car type. You have been asked to give input on a roller coaster for a new theme park. Before doing so, however, you will learn how to collect data and graph results; find the line of best fit, slope, and equation of the line; and identify dependent and independent variables. [See It's a Wild Ride: A Roller Coaster Design Project (www.intel.com/education/projects/wildride) for more ideas.]

Possible Question or Prompts

Visual Ranking Prompt: What are the most important characteristics of a roller coaster?

Seeing Reason Question: How do speed, drop (including slope), force, and car type influence the thrills associated with a roller coaster?

Showing Evidence Prompt: What limitations should be placed on the development of new roller coasters to ensure safety?

Physical Education

Learning Objectives

- Identify the factors that impact one's physical fitness
- Analyze the food sold at a school for nutritional value
- Create a personal physical fitness plan

Project Description

Since 1980, the rate of obesity in adults has doubled in the U.S. The number of overweight children and teens has doubled in the past two decades. Obesity can lead to serious health problems. Should we care about being physically fit? Why should you have a personal fitness plan? Create a presentation answering these questions, plus submit a personal fitness plan to improve your overall fitness and health.

Possible Question or Prompts

Visual Ranking Prompt: List the most persuasive arguments for encouraging someone to become physically fit, from the most to least persuasive.

Seeing Reason Question: What factors impact your physical fitness?

Showing Evidence Prompt: Should we be selling unhealthy foods at school?

Science: Earth Science

Learning Objectives

- Research ways to prepare for a hurricane
- Understand the causes and effects of hurricanes
- Inform others how to stay safe in a hurricane

Project Description

Hurricanes are nature's greatest storms. History tells us that lack of education and preparedness for hurricanes often spells disaster. Hurricane preparedness can be used to save lives at work, home, while on the road, or on the water. Your job as a meteorologist is to inform the public about all the issues surrounding hurricanes so that if they ever find themselves in a hurricane situation, they will know what to do.

Possible Question or Prompts

Visual Ranking Prompt: What are the most important ways to prepare for a hurricane? Rank the list from most important to least important.

Seeing Reason Question: What are the causes and effects of a hurricane?

Learning Objectives

- Understand the relationship between humans and the environment
- Identify and weigh the damaging factors affecting seashore environments
- Persuade the public to change current practices and preserve sea life

Project Description

People, through their actions, often cause damage to seashore environments. You have been appointed to an Environmental Protection Team to teach people about ways they can protect and preserve the environments of the beach, the shallows, and the coral reef. You will create a presentation to educate and encourage the public to change their dangerous actions.

Possible Question or Prompts

Visual Ranking Prompt: What damages seashore environments—from the most damaging to least damaging?

Seeing Reason Question: What are the causes and effects of damage to the seashore environments?

Learning Objectives

- Rate the impact of various recycling efforts
- Analyze the costs and benefits of recycling
- Identify pollution in the community and make a plan to lessen its impact

Project Description

Many places around the world are littered and polluted. Nearly everything we do leaves behind some sort of solid waste. This can affect the water we drink, the air we breathe, and the food we eat. As your city's new Environmental Management Director, you are responsible for a new program that encourages citizens and businesses to recycle and reduce waste. Create and present a plan for action to help lessen the pollution problem in your community.

Possible Question or Prompts

Visual Ranking Prompt: Rank the recycling efforts that have the most impact on the environment.

Seeing Reason Question: What impact can recycling have on a community?

Showing Evidence Prompt: Is recycling worth it?

Learning Objectives

- Apply understanding of the elements and interconnections of the earth's biomes in a persuasive argument
- Present correlations between rainforest destruction and negative world impact

Project Description

The earth is composed of a variety of biomes. Together these biomes create a delicate balance of give and take for the survival of this living planet. The rainforest biome has been impacted by human needs and wants. Working within a team of specialists, your task is to educate and persuade others to help save the rainforests. Within your presentation, submit solutions to the destruction of the rainforest.

Possible Question or Prompts

Visual Ranking Prompt: Rank the factors that contribute to rainforest devastation with those with the greatest impact listed first.

Seeing Reason Question: How does the destruction of the rainforest impact the world?

Showing Evidence Prompt: What is the right balance of conservation for the world's rainforests, considering the economic, political, and environmental concerns?

Science: Life Science



Learning Objectives

- Know and understand the characteristics and habitats of bats
- Compare factual information with people’s misconceptions and emotional responses
- Use developmentally appropriate strategies to express original ideas

Project Description

Many people are afraid of bats because they have wrong information. You are a member of the “Friends of the Bats” club. The first thing you will need to do is try to understand why people are afraid of bats. Secondly, you will help others learn what bats are really like.

Possible Question or Prompts

Visual Ranking Prompt: What are the greatest benefits for having bats around? Rank them from most to least important.

Seeing Reason Question: What increases people’s fear of bats?

Showing Evidence Prompt: Should we be afraid of bats?

Science: Physical Science

Learning Objectives

- Identify the obstacles associated with prolonged space travel and the effects of zero gravity on living things
- Propose ways to extend space travel

Project Description

Medical risks, both physical and psychological, are a significant concern for those people who are interested in traveling beyond Earth’s orbit. Travel for short durations is not as big a concern as long duration missions, such as extended time in space stations or possible long distance trips to other planets. Is extended space travel realistic for human beings? What conditions would be necessary in order for humans to safely spend time in space? These are questions that need to be answered before the development of future long-term space travel. Your mission is to present a presentation along with recommendations on whether—and how—humans will be able to adapt to space travel.

Possible Question or Prompts

Visual Ranking Prompt: What are the biggest obstacles to prolonged space missions? Rank the list with the greatest obstacle first.

Seeing Reason Question: What are the effects of zero gravity on the human body?

Showing Evidence Prompt: Should we continue to explore space?

Sample K-3 Unit Plan: Birds, Birds, Birds!

Unit Overview
Unit Summary
As a year-long study, kindergarten students will become ornithologists who will study bird trends over time. They will focus on classification, counting, patterns, animal behaviors, and weather on a daily basis as they record data either in a database or spreadsheet. At the end of every season, the students will study the data to see which birds came to eat at the birdfeeder most often, how many birds came, and determine how weather might have affected visitation. Periodically, the students will develop improvement plans for the area around the birdfeeder to increase the possibility of more visiting birds. Throughout the project, the students will be doing arts and crafts, songs, theme days, life cycle study—all about birds—to enrich the unit. Students will present their findings at the end of the year through the creation of a brochure and collaborative story.
Subject Area
Science, Mathematics, Language Arts
Grade Level
K-2
Approximate Time Needed
This is a year long project-based unit covering all of the seasons.
Unit Foundation
Habits of Learning Taxonomy
Knowledge, Gathering Data Through All Senses, Application, Learning Continuously, Acquisition and Integration of Knowledge, Questioning and Posing Problems, Listening to Others
Targeted Content Standards and Benchmarks
<p>Kansas K-4 Environmental Education Standards</p> <p>1.3 Describe the climate of their region. Example: Construct a simple weather station, or utilize existing equipment, to gather data for identifying trends and patterns, e.g., record daily weather, graph and compare weather characteristics.</p> <p>2 Learners demonstrate an understanding of the relationships and interactions between organisms and the environment.</p> <p>2.1.2 Classify or group plants and animals according to structures and basic needs (food, water, shelter, space, air, and sunlight). Example: Classify birds by foot type (e.g., webbed, clawed, taloned, etc.).</p>

Unit Foundation (Continued)

Targeted Content Standards and Benchmarks

- 4.1 Learners demonstrate scientific questioning skills.
 - 4.1.1 The students will express a simple question in a way that can be investigated.
- 4.2 Learners demonstrate scientific inquiry skills.
 - 4.2.4 Gather and record data related to an investigation using appropriate data displays.
 - 4.2.5 Form conclusions based on the data collected.
 - 4.2.6 Demonstrate a willingness to modify opinions based on evidence.
- 1.1 All students will be involved in activities that develop skills necessary to conduct scientific inquiries. These activities will involve asking a simple question, completing an investigation, answering the question, and presenting the results to others.
 - 1.1.1 The students will identify characteristics of objects.
 - 1.1.2 The students will classify and arrange groups of objects by a variety of characteristics.
 - 1.1.3 The students will use appropriate materials and tools to collect information.
 - 1.1.4 The students will ask and answer questions about objects, organisms, and events in their environment.
 - 1.1.5 The students will describe an observation orally or pictorially.
- 3 LIFE SCIENCE: As a result of the activities for grades K-2, all students will begin to develop an understanding of biological concepts.
 - 3.1.3 The students will observe living things in various environments.
- 4.3 All students will describe changes in weather. Weather includes snow, rain, sleet, wind, and violent storms.
 - 4.3.1 The students will observe changes in the weather from day to day.
 - 4.3.2 The students will record weather changes daily.
- 5.1 All students will use technology to learn about the world around them. Students will use software and other technological resources to discover the world around them.
 - 5.1.2 The students will experience science through technology.

Kansas K-2 Math Standards

- 1.2 The student demonstrates an understanding of whole numbers with a special emphasis on place value in a variety of situations.
- 4.1 The student applies the concepts of probability using concrete objects in a variety of situations.
 - 4.1.A1 The student conducts an experiment or simulation with a simple event and records the results in a graph using concrete objects or frequency tables (tally marks).
- 4.2 The student collects, records, and explains numerical (whole numbers) and non-numerical data sets including the use of concrete objects in a variety of situations.
 - 4.2.A1 The student communicates the results of data collection from graphs using concrete objects and frequency tables.
 - 4.2.K1 The student records numerical (quantitative) and non-numerical (qualitative) data including concrete objects, graphs, and tables.
 - 4.2.K2 The student collects data related to familiar everyday experiences by counting and tallying (2.4.K1a,g) (\$).
 - 4.2.K3 The student determines the mode (most) after sorting by one attribute (2.4.K1a, g) (\$), e.g., color, shape, or size.

Student Objectives/Learning Outcomes		
<p>Students will be able to:</p> <ul style="list-style-type: none"> ▪ Count and record the number of birds in a tally sheet and on a graph ▪ Classify birds based on color, size, and diet ▪ Gather data for identifying trends and patterns over time ▪ Record daily weather and predict the number of birds that might visit based on the weather ▪ Communicate the results of data to others ▪ Develop an improvement plan for the bird feeders to increase the number of visiting birds 		
Curriculum-Framing Questions		
Essential Question	What can nature tell us?	
Unit Questions	How do the seasons and weather affect birds? How can we improve our feeder so more birds will visit?	
Content Questions	How many birds visited us today? What are the names of the birds? Do all birds eat the same food? How can we measure the amount of food the birds eat? How could we sort the birds that come to visit us? How could we graph the number of birds that come to visit us?	
Assessment Plan		
Assessment Timeline		
Before project work begins	Students work on projects and complete tasks	After project work is completed
<ul style="list-style-type: none"> ▪ <i>Visual Ranking Tool</i> activity to assess prior knowledge ▪ Verbal discussions ▪ Discussion of pictures 	<ul style="list-style-type: none"> ▪ Bird graph ▪ Color tally sheet ▪ Seasonal Recording spreadsheet ▪ Analysis of environmental factors using <i>Seeing Reason</i> ▪ Improvement plan brainstorming and ranking ▪ Evaluation of data using <i>Showing Evidence</i> ▪ Verbal discussions ▪ Discussion of pictures and stories 	<ul style="list-style-type: none"> ▪ Class story and drawings ▪ Checklist for self-assessment ▪ Rubric to assess brochure ▪ Presentation to parents and community

Appendix C: A Project Approach to Learning

Assessment Plan
Assessment Summary
<p>At the beginning of the unit, students will use the <i>Visual Ranking Tool</i> to assess students' prior knowledge of the types of birds in our community. Periodically, students will be assessed on the accuracy and completion of data on the Bird Graph Document and on the Color Tally Sheet. They will be assessed on their ability to count and record data, analyze the data, and their completion of art components. Throughout the unit, students will be assessed through their verbal discussions and analysis of bird classifications and actions. The students' improvement plans and rankings will be assessed for their understanding of bird activity and requirements. Students will be assessed on the accuracy and understanding of bird behavior and the effects of the seasons when creating a collaborative story and drawing. Students will have teacher assistance to self-assess their brochures using a checklist. Student brochures will be assessed with a rubric.</p>
Visual Ranking Elements—Project 1
Visual Ranking Project Name (For the <i>Visual Ranking</i> workspace)
Feathered Friends Around Us
Project Description (For the <i>Visual Ranking</i> workspace)
<p>Work together to learn about birds that are common in our community all year. What birds do you think will come to the bird feeder most often? Using the <i>Visual Ranking Tool</i>, rank the birds you think will come to the feeder—from most to least.</p>
Prompt (For the <i>Visual Ranking</i> workspace)
<p>What type of bird do you think we are going to see the most at the bird feeder and why? Rank the list from the most to least number.</p>
Sorting List (For the <i>Visual Ranking</i> workspace)
Black, Birds, Blue Jays, Cardinals, Crows, Finch, Meadowlark, Sparrows
Visual Ranking Elements—Project 2
Visual Ranking Project Name (For the <i>Visual Ranking</i> workspace)
Making it Homey
Project Description (For the <i>Visual Ranking</i> workspace)
<p>What should we do to attract more birds to our feeder? How can we make this area a nice place for the birds to hang out? Using the <i>Visual Ranking Tool</i>, rank the improvements you think we should make from most important to least important. Explain why you think that improvement will encourage more birds to come to the area around our feeder.</p>
Prompt (For the <i>Visual Ranking</i> workspace)
<p>Rank the improvements you think we should make to encourage more birds to come to our feeder. Rank the list from the most important to least important. Explain why you think it would help or not help.</p>

Sorting List (For the <i>Visual Ranking</i> workspace)
another feeder, bird bath, bird house, bushes, different food, ground feeder, higher feeder
Seeing Reason Elements
Seeing Reason Project Name (For the <i>Seeing Reason</i> workspace)
In the Bird House
Project Description (For the <i>Seeing Reason</i> workspace)
A person who studies birds is called an ornithologist. This year, you will be an ornithologist! All year, you will study bird trends over time by watching them. You will focus on counting, classifying, and watching bird behaviors so you can gather and record the information. You will also record the weather on a daily basis to see how the weather might change the birds' actions. Use the <i>Seeing Reason Tool</i> to think about what might make birds stay away from the feeder and what might encourage them to come to the feeder.
Research Question (For the <i>Seeing Reason</i> workspace)
What affects whether birds will come to the feeder?
Practice Map (For your future quick reference)
<pre> graph TD A[People at the window] --> B[Birds at the feeder] C[Lack of natural food] --> B D[Bad weather] --> B E[Food in the feeder] --> B F[Other birds] --> B G[Noise] --> B </pre>

Appendix C: A Project Approach to Learning

Showing Evidence Elements (Complete this section if this tool will be used in the unit)	
Showing Evidence Project Name (For the <i>Showing Evidence</i> workspace)	
Here Little Birdie!	
Project Description (For the <i>Showing Evidence</i> workspace)	
At the end of each season, you will study your logs to see which birds came to eat most often, the times the birds came to eat (morning or afternoon), how many birds came to eat, and how the weather changed their habits. Use the <i>Showing Evidence Tool</i> to help you learn whether the number of birds that come to our feeder was affected by the season.	
Prompt (For the <i>Showing Evidence</i> workspace)	
Does the season affect how many birds come to eat at our feeder?	
Practice Case (For your future quick reference)	
Unit Details	
Prerequisite Skills	
None	
Instructional Procedures	
Introduction	
At the beginning of the year, introduce the year-long Essential Question, What can nature tell us? Use pictures and recorded sounds to assess students' prior knowledge of the natural world around them. Talk about how they will be learning about birds all year and they will become bird experts, which are called ornithologists. Introduce the unit questions that they will be working on all year: How do the seasons and weather affect birds? and How can we improve our feeder so more birds will visit? Post all three in the classroom. Brainstorm what kinds of things birds need to survive and make a list of what they as a class can do to help. Introduce how they will use a bird feeder to record information about the birds in their community.	

Unit Details

Instructional Procedures

Using Thinking Tools to Set the Stage for Learning

Ask the students what kinds of birds they have seen in their yard, at the school, and around the community. Make a list to populate the *Visual Ranking Tool*. Have students work in pairs to discuss what birds they have seen, how often they see them, and whether they think the birds might come to their bird feeder. Have them rank the birds from what they think will be the greatest number to visit the feeder to the least. Use this information to assess students' prior knowledge of the birds in your community.

Go outside to survey possible locations for the bird feeder. Brainstorm what might affect whether or not a bird will come to the feeder. Have students use the brainstormed ideas as they make an initial *Seeing Reason* map that shows what might make birds stay away from the feeder and what might encourage them to come to the feeder. Be sure to have them save their maps into their portfolio. Read bird stories to them, have them look at age-appropriate bird books, and show videos to help them better understand bird behavior and habitat. Have students use that new information to update their *Seeing Reason* maps again (and save in their portfolio folder). From this new knowledge, have students plan the location and supplies they will need for the bird feeder.

Daily Calendar of Bird Activities

As the students do their daily calendar lesson, have them complete bird graphing activities. Students will look outside to count how many birds are at the feeder. They will record the data on the Bird Graph document and on the Color Tally Sheet. On the Bird Graph document, have the students shade in the boxes of the number of birds they see at the feeders both in the morning and afternoon. On the Color Tally Sheet, have the students mark a tally for the color of birds they see. For example, if they see a Cardinal at the feeder, they would put a tally next to red. If they see a bird with many colors, they will put a tally under each color they see. Using the Measurement Worksheet, have students track the amount of food added to the feeder on a daily and weekly basis. It will also allow them to track how many days it took for the birds to eat the feed.

At the end of the week, help the students calculate the totals. File the sheets away in a folder based on each season. For example, all of the sheets for the weeks of August through September 21 would be in a summer folder. All of the sheets from September 22 through December 21 would be in a fall folder. All of the sheets from December 22 through March 21 would be in a winter folder. All of the sheets from March 22 through the end of the school year would be in a spring folder.

At the end of the first week of recording bird data, introduce the *Showing Evidence* case. Working in teams of three, have students decide whether they think the seasons will affect how many birds come to their feeder. Have them use their prediction to create a claim. Include some pre-populated evidence that is appropriate for the current season. Have students create new evidence based on their other research.

Instructional Procedures (Continued)

Analyzing the Data Each Season

At the end of each season, pull out the data logs and have the students make some conclusions based on the data. Create four sheets within a spreadsheet program—one for each season. Have the students use the Seasonal Recording Spreadsheet to record all the data by season.

Have the student teams evaluate their spreadsheet for evidence as to whether the numbers help to support their *Showing Evidence* claim or not. Have students create new evidence based on their data and other research and connect them to the claim. Some evidence will need to stay in the evidence bin (i.e., not be attached to the claim) until more data is recorded for the other seasons.

Improvement Plan

Near the end of the first season, remind students of one of the unit questions: How can we improve our feeder so more birds will visit? Discuss what they have done so far to improve the feeder area. Have students update their *Seeing Reason* map and determine whether they think they need to make any changes to help encourage birds to visit their feeder. Encourage them consider the weather associated with the upcoming season.

At the end of the third season, help students brainstorm some possible improvements, such as adding a bird bath, bushes, another feeder, ground feeder, different food, bird house. Have students use the *Visual Ranking Tool* to rank the improvements they would like to add to their bird feeder environment to increase the number of birds. Have a member of a local bird club also rank the list. Be sure students compare their lists and discuss the differences. Plan a bird habitat improvement day so students can implement the improvement plan. Be sure to take pictures!

Bringing It All Together

During the last season, assign the student teams a new team log-in so they can revisit their first *Visual Ranking* list of birds. Using the data from all year, have student teams rank the list again according to which birds frequented the bird feeder most. Instruct them to compare their new ranking with the ranking they did at the beginning of the year. Have students discuss the differences and what they have learned.

At the end of the last season, provide time for students to add their remaining evidence, connect it to the claim, and then make a conclusion as to whether or not their claim can be supported—in other words, has their claim been found to be true? Help students to reflect on all they have learned about birds this year. Revisit one of the unit questions in preparation of the creation of a class story about the adventures of a bird: How do the seasons and weather affect birds? Write the story together as a class and have each student draw a picture to illustrate one part of the story.

Communication with Community

Provide a self-assessment checklist and rubric to help students create a collaborative brochure to share their findings, improvement plans, and pictures with the community and parents. Wrap up with a discussion about what nature has been able to tell us this year.

Accommodations for Differentiated Instruction	
Resource Student	Present instructions in a variety of ways Provide assistance with counting and recording of data
Nonnative English Speaker	Use cooperative learning strategies to be immersed in the English language Provide resources in their target language
Gifted Student	Provide opportunities to conduct research on the birds that come to visit and suggest improvements specifically for them
Materials and Resources Required for Unit	
Printed Materials	<p><i>The Audubon Backyard Birdwatcher: Birdfeeders and Bird Gardens</i> ISBN: 1571451862</p> <p><i>Birds, Nests, & Eggs (Take-Along Guide)</i> by Mel Boring ISBN: 155971624X</p> <p><i>The Burgess Bird Book for Children (Dover Science Books)</i> by Thornton W. Burgess ISBN: 0486428400</p> <p><i>Have You Seen Birds?</i> by Joanne Oppenheim, Joanne F. Oppenheim ISBN: 0590270303</p> <p><i>The Baby Beebee Bird</i> by Diane Redfield Massie, Steven Kellogg ISBN: 0060280832</p> <p><i>A Bird or 2: A Story About Henri Matisse</i> by Bijou Le Tord ISBN: 0802851843</p>
Supplies	Bird Feeder, Birdseed, Measuring Cups
Technology - Hardware	Computers for research and creation of brochures Digital Camera for taking pictures of birds and students Printer for brochures, graphs, and logs

Appendix C: A Project Approach to Learning

Materials and Resources Required for Unit (Continued)	
Technology - Software	<p>Spreadsheet program for entering data</p> <p>Word processing program for stories and brochures</p> <p>Image processing for digital pictures of birds</p> <p>Multimedia presentation software for parent meetings and open house</p>
Internet Resources	<p>PBS Nature: Puzzles and Fun www.pbs.org/wnet/nature/fun/jigsaw_exbirds_flash.html Bird jigsaw puzzle</p> <p>E Nature: Bird Audio www.enature.com/birding/audio.asp Bird song audio sound files</p> <p>Bird Video Clips http://asiabird.com/birds_video_clips.htm Bird video files</p> <p>Cloud Forest Alive www.cloudforestalive.org/tour/hcam Hummingbird Live Cam</p> <p>Colorado State University: The Warren and Genevieve Garst Photographic Collection http://lib.colostate.edu/wildlife/birds.html Bird image gallery</p> <p>Enchanted Learning: All About Birds www.enchantedlearning.com/subjects/birds Information about birds; appropriate for lower elementary grades</p> <p>National Wildlife Federation Fun & Games: Bonnie & Chester Matching Game www.nwf.org/kidzone/kzPage.cfm?siteId=2&departmentId=150 Backyard buddies matching game</p> <p>National Wildlife Federation Ranger Rick www.nwf.org/kidzone/kzPage.cfm?siteId=3&departmentId=77 Bird brains online game</p> <p>Interactive Venn Diagram www.readwritethink.org/materials/venn Online interactive Venn diagram</p>
Outside Participation	<p>Guest visit by a local bird expert; ranking participation by local bird club member or other community member</p>
Other Resources	<p>Field trip to the local nature center</p>
Credits	
<p>Renee Ewert and Dyane Smokorowski, participating in the Intel® Teach Program, developed the idea for this unit plan. A team of teachers expanded the plan into the example you see here.</p>	

Appendix D Assessment Resources

Sample Assessment Plan: Fraction Quest

Unit Overview
Unit Summary
Students are assigned to a profession that uses fractions on the job. They research, summarize, draw conclusions, and present their findings to the class answering questions such as, <i>Does accuracy really matter that much?</i> and <i>How are fractions used on the job and are they needed to get the job done right?</i> Students learn to add, subtract, multiply, and divide fractions to help answer the Unit Question, <i>How can understanding fractions make your life easier?</i> As a culminating activity, students reflect on the importance of knowing fractions in the assigned profession and in their own lives both now and in the future.
Subject Area
Math
Grade Level
3-5
Higher-Order Thinking Skills
Problem Solving, Making Inferences, Generalizing
Key Learnings
Fractions, Problem Solving, Research Techniques
Unit Foundation
Targeted Content Standards and Benchmarks
<p>California Mathematics Standards for Grade 5</p> <ul style="list-style-type: none"> 2.0 Students perform calculations and solve problems involving addition, subtraction, and simple multiplication and division of fractions: 2.3 Solve simple problems, including ones arising in concrete situations, involving the addition and subtraction of fractions and mixed numbers (like and unlike denominators of 20 or less), and express answers in the simplest form. <p>California Mathematics Standards for Grade 5 (Continued)</p> <ul style="list-style-type: none"> 2.4 Understand the concept of multiplication and division of fractions. 2.5 Compute and perform simple multiplication and division of fractions and apply these procedures to solving problems.

Appendix D: Assessment Resources

Targeted Content Standards and Benchmarks (Continued)		
<p>National Educational Technology Standards</p> <ul style="list-style-type: none"> Students use productivity tools to collaborate in constructing technology-enhanced models, prepare publications, and produce other creative works. Students use telecommunications to collaborate, publish, and interact with peers, experts, and other audiences. Students use technology to locate, evaluate, and collect information from a variety of sources 		
Curriculum-Framing Questions		
Essential Question	Does accuracy really matter that much?	
Unit Questions	How are fractions used on the job? How can understanding fractions make your life easier?	
Content Questions	What is a fraction? How do you add, subtract, multiply, and divide fractions? What is a numerator? What is a denominator?	
Assessment Plan		
Assessment Timeline		
Before project work begins	Students work on projects and complete tasks	After project work is completed
<ul style="list-style-type: none"> Journal Collaboration Checklist Poster Checklist 	<ul style="list-style-type: none"> Project Rubric Presentation Checklist Research Checklist Conferences Questioning 	<ul style="list-style-type: none"> Presentation Checklist Project Rubric Chart Reflection
Assessment Summary		
<p>Students answer prompts in their math journals related to the Unit Questions and the fraction activities. Students use the checklist to self-assess their poster and monitor their collaboration skills as they work together on the poster. Students use a project rubric to help guide them through the entire project. Students use a checklist and storyboard to help them through the researching, drafting, and writing phases of the presentation. The teacher uses the checklist to assess content integration and the overall effectiveness of the presentation. Teachers schedule individual conferences to assess the students' mathematical understanding, critical thinking, collaboration, and the research process. Students use the storyboard to plan and monitor work on the presentation. Teachers use the journal, checklists, storyboard, conference notes, and reflections to assess conceptual understanding using the project rubric as a guide. Teachers use questioning strategies to monitor student progress, probe for understanding, and engage students in higher-order thinking. Teachers also return to Curriculum-Framing Questions throughout the project to analyze student understanding. Students reflect on their learning by relating how knowing fractions helps them now and in the future. Teachers review final reflections to assess student growth in understanding.</p>		

Sample Assessment Plan: Storm Watch

Unit Overview
Unit Plan Title
Storm Watch
Unit Summary
This unit helps students understand the many factors that determine what the weather is like in a particular location, such as the angle of the sun's light rays, the tilt of the Earth's axis, and the proximity to water, winds, and elevation. Students conduct many scientific investigations to understand the complexities of weather systems. Throughout the unit, students are asked to ponder the Essential and Unit Questions, <i>How do people respond to change?</i> and, <i>How does weather affect our lives?</i> In a final presentation, students take on the role of weather forecasters and report on weather conditions in a city they would like to visit. They demonstrate their understanding about the factors contributing to weather that people throughout the world experience each day.
Subject Area
Science, Math, Language Arts
Grade Level
4-6
Higher-Order Thinking Skills
Cause and Effect, Analysis
Key Learnings
Measurement, Weather Changes, Patterns, Public Speaking
Unit Foundation
Targeted Content Standards and Benchmarks
<p>Colorado English Standards for Grade 5-8</p> <ul style="list-style-type: none"> write and speak for a variety of purposes such as conveying technical information, explaining concepts and procedures, and persuading; organize written and oral presentations using strategies such as lists, outlining, cause/effect relationships, comparison/contrast, problem/solution, and narration; select relevant material for speaking purposes;

Targeted Content Standards and Benchmarks (Continued)

- paraphrase, summarize, organize, and synthesize information;
- give credit for others' ideas, images, or information; and
- use information to produce a quality product.

Colorado Science Inquiry for Grade 5–8

- ask questions and state hypotheses that lead to scientific investigations;
- make predictions based on prior experiences and understandings;
- use appropriate tools, technologies, and metric measurement units to gather and organize data;
- summarize data and communicate results of investigations in a variety of ways, including written reports, graphs, charts, data tables, and oral presentations; and
- work as a group to solve a problem.

Colorado Standards - Earth's systems and the dynamics of the solar system and the universe for Grade 5–8

- describe the atmosphere;
- observe changes in weather conditions;
- describe weather systems;
- explain how the sun affects atmospheric circulation; and
- investigate the occurrence of storms and explain their effects on human populations and the environment.

Colorado Mathematics Standards for Grade 5–8

- read, construct, compare, and contrast displays of data using appropriate techniques and technology; and
- gather data, formulate hypotheses, draw conclusions, and make convincing arguments based on data analysis.

National Educational Technology Standards

- Students use productivity tools to collaborate in constructing technology-enhanced models, prepare publications, and produce other creative works.
- Students use technology to locate, evaluate, and collect information from a variety of sources.

Curriculum-Framing Questions		
Essential Question	How do people respond to change?	
Unit Questions	How does weather affect our lives?	
Content Questions	What are the reasons for the seasons? What are weather systems? What causes change in our weather? How does air pressure affect our weather?	
Assessment Plan		
Assessment Timeline		
Before project work begins	Students work on projects and complete tasks	After project work is completed
<ul style="list-style-type: none"> ▪ T-Chart ▪ K-W-L Chart ▪ Science Journal 	<ul style="list-style-type: none"> ▪ Science Journal ▪ Conferences ▪ Line Graph Rubric ▪ Research Checklist ▪ Multimedia Rubric ▪ Peer Feedback ▪ <i>Visual Ranking</i> Comments ▪ Group Process Rubric ▪ Oral Presentation Rubric ▪ K-W-L Chart 	<ul style="list-style-type: none"> ▪ K-W-L Chart ▪ Science Journal ▪ Oral Presentation Rubric ▪ Reflections ▪ District Test
Assessment Summary		
<p>Students create a T-Chart to compare and contrast fact from fiction in a story. The teacher uses it as a pre-assessment to determine readiness for studying weather. Students return to these throughout the unit to add additional questions and new learnings. Students make observations and keep notes in their science journal as they investigate weather systems. The teacher reviews during conferences to provide feedback, clarify misunderstandings and provide additional lessons if necessary. Students use a rubric to help them complete a line graph with data from their investigations. Students use a checklist to guide them through the research process. Teachers ask students to bring the checklist to conferences to monitor progress and allow students to ask questions. Students use a rubric to ensure they've met the expectations as they research a weather system and present their findings. Peers use the rubric to provide feedback to the presenters. Students rank the steps to take in a severe weather system. The teacher probes student understanding and reasoning through questioning, reviewing comments, and providing feedback. Students complete a test at the end of the unit; the teacher uses the test results to assess student's science content knowledge.</p>		
Credits		
Jeanne Shirley participated in the Intel® Teach Program, which resulted in this idea for an assessment plan. It has been modified and shortened for use in this appendix. The full Assessment Plan can be found at: www.intel.com/education/assessingprojects		

Sample Assessment Plan: Great Thinkers

Unit Overview
Unit Summary
<p>This unit exposes students to great minds who have made a significant impact on the world. Students take on the role of a Great Thinker and through research they analyze how these “Great Thinkers” changed the world. After synthesizing their research information, students create “I AM” poems as well as diary entries from the perspective of their Great Thinker. As a culminating activity, students become their Great Thinker, presenting the life and accomplishments of a Great Thinker to the class. In a final reflection, students answer the Essential and Unit Questions, What does it take to change our world? and Which people have positively impacted our world?</p>
Subject Area
Social Studies, Language Arts
Grade Level
6-8
Higher-Order Thinking Skills
Analysis, Synthesis
Key Learnings
Researching, Expository Writing, Public Speaking
Unit Foundation
Targeted Content Standards and Benchmarks
<p>Washington State Standards Reading</p> <ul style="list-style-type: none"> ▪ The student understands the meaning of what is read. <p>Writing</p> <ul style="list-style-type: none"> ▪ The student writes in a variety of forms for different audiences and purposes. ▪ The student understands and uses the steps of the writing process. <p>Communication</p> <ul style="list-style-type: none"> ▪ The student communicates ideas clearly and effectively. <p>Social Studies</p> <ul style="list-style-type: none"> ▪ Understand and use inquiry and information skills required by citizens in a democratic society ▪ Understand and apply critical thinking and problem solving skills to make informed and reasoned decisions

Curriculum-Framing Questions		
Essential Question	What does it take to change our world?	
Unit Questions	Which people have positively impacted our world?	
Content Questions	How did these “Great Thinkers” change the world? Who did their work impact? What obstacles did they overcome to change the world?	
Assessment Plan		
Assessment Timeline		
Before project work begins	Students work on projects and complete tasks	After project work is completed
<ul style="list-style-type: none"> ▪ Journal ▪ Questioning 	<ul style="list-style-type: none"> ▪ Research Quiz ▪ Journal ▪ Questioning ▪ K-W-L Chart ▪ Anecdotal Notes ▪ Poem Scoring Guide ▪ Peer Feedback ▪ Diary Scoring Guide ▪ Oral Content Scoring Guide ▪ Oral Presentation Scoring Guide 	<ul style="list-style-type: none"> ▪ K-W-L Chart ▪ Questioning ▪ Oral Content Scoring Guide ▪ Oral Presentation Scoring Guide ▪ Reflection
Assessment Summary		
<p>Students develop classroom and individual Know-Wonder-Learn Charts about Great Thinkers. The teacher uses the K-W-L initially to gauge readiness and interest in the topic and then during the unit to promote metacognitive skills as students revisit the charts and reflect on their learning. Students use journals to write down research notes and to answer reflective questions. The teacher reviews journals during conferences to provide feedback, clarify misunderstandings, and provide additional lessons if necessary. The teacher reviews journals at the end of the unit to assess analysis and synthesis skills. Students are given a short answer research quiz to check on their progress. Notes from observations and interactions with individuals and groups and from the conferences provide documentation for final assessment. Students use the poem scoring guide to monitor the quality of their work and to provide peer feedback during the writing, editing, and revising of the “I AM” poems. The teacher uses it to assess the final poems. Students write and deliver a speech as their Great Thinker, using the Speech Content Scoring Guide to help prepare for the content of the speech as well as to clarify questions during the practice sessions. Students reflect upon what they have learned in the unit, returning to the Essential and Unit Questions, “What does it take to change our world?”, and “Which people have positively impacted our world?” Students cite evidence from their research and their peers’ presentations. The teacher uses these reflections to assess students’ growth throughout the unit.</p>		
Credits		
<p>Joel Lang participated in the Intel® Teach Program, which resulted in this idea for an assessment plan. It has been modified and shortened for use in this appendix. The full Assessment Plan can be found at: www.intel.com/education/assessingprojects</p>		

Sample Assessment Plan: World War I

Unit Overview
Unit Plan Title
World War I: The War to End All Wars?
Unit Summary
<p>High school history students begin a journey to discover the answer to the Unit Question: <i>Could this “war to end all wars” have been prevented?</i> by investigating the causes of World War I. They create a newspaper that answers the questions about the causes of WWI. The students then use the <i>Visual Ranking Tool</i> to rank which of the causes was the most influential in the start of the war and defend their position. After a class discussion on the causes of the War, students complete a map of Europe prior to the outbreak of the War using a paint program to label countries and color code them according to which side they were on. Students use information from primary sources written by WWI soldiers. Then they participate in a simulated trench warfare activity. Based on this experience, they write journal entries or letters to a family member as if they were soldiers in the trenches. Students then examine the objectives and tools of propaganda and do research on WWI propaganda from several different countries to study the impact that propaganda had on the home front. Students conclude this unit by creating a multimedia presentation analyzing how propaganda was used in different countries. Students use rubrics and checklists to plan and monitor their work. As a concluding activity, students compare the propaganda of World War I to the present day and discuss how propaganda has an influence on their lives today. To culminate this unit, students complete an essay test about World War I.</p>
Subject Area
U.S. History
Grade Level
11
Higher-Order Thinking Skills
Cause-and-Effect, Decision-Making, Analysis
Key Learnings
Main Causes of World War I, Trench Warfare, US Entry into WWI, Propaganda, Treaty of Versailles

Unit Foundation		
Targeted Content Standards and Benchmarks		
<p>Kansas History Benchmark 1</p> <p>The student uses a working knowledge and understanding of individuals, groups, ideas, developments, and turning points in the era of the emergence of the modern United States (1890 - 1930).</p> <ol style="list-style-type: none"> 1. Analyzes the reasons for and impact of the United States' entrance into World War I. 2. Analyzes how the home front was influenced by United States involvement in World War. 		
Curriculum-Framing Questions		
Essential Question	Why is there conflict?	
Unit Questions	Could the "war to end all wars" have been prevented? Is propaganda necessary?	
Content Questions	What are the four M.A.I.N causes of World War I? What is propaganda?	
Assessment Plan		
Assessment Timeline		
Before project work begins	Students work on projects and complete tasks	After project work is completed
<ul style="list-style-type: none"> ▪ Brainstorming ▪ Discussion ▪ Journals ▪ World Map 	<ul style="list-style-type: none"> ▪ Newspaper Checklist and Rubric ▪ Map ▪ Anecdotal Observations ▪ Collaboration Self- and Peer-Assessment Checklist and Rubric ▪ Collaboration Reflection ▪ Revised Map ▪ Journal ▪ Decision-Making Checklist ▪ WWI Journal and Letters Rubric ▪ Discussion ▪ Propaganda Presentation Checklist and Rubric ▪ Propaganda Presentation Peer Feedback ▪ Informal Interviews 	<ul style="list-style-type: none"> ▪ Project Rubrics ▪ Final Essay Test and Rubric ▪ Final Reflections

Appendix D: Assessment Resources

Assessment Summary

Students write in their journals throughout the unit to explore various WWI topics. The information from these journal entries is used to provide individual and group feedback as students work on their projects. Students color-code maps of the world identifying which countries participated in WWI and which side they were on. Students use a checklist to monitor their progress while conducting research and creating their newspapers and use a rubric to make sure their work is high quality. The rubrics are also used to assess the final product. After creating the WWI newsletter with their groups, students use their Collaboration Self-Assessment Checklist to reflect on how well they worked with others. Students use a rubric to organize their thoughts on the final essay question and to plan what they are going to write. It is also used to assess the final essay. In this end-of-unit reflection, students assess their own learning during the unit and set goals for future learning experiences. The teacher and students use this information to track learning throughout the year.

Credits

Johanna Van Ness created the idea for this assessment plan. It has been modified and shortened for use in this appendix. The full Assessment Plan can be found at:
www.intel.com/education/assessingprojects

Appendix E Visual Ranking Tool Resources

Sample Project Idea: River City Water

Unit Overview	
Unit Plan Title	River City Water
Unit Summary	In this environmental science unit, students participate in a variety of activities to help them understand how human actions affect the quality of nearby rivers. Students conduct in-depth research about specific environmental factors and learn how to measure water quality indicators. The <i>Visual Ranking Tool</i> helps students compare factors relating to water quality and narrow their focus for research projects.
Subject Area	Environmental Science
Grade Level	9-12
Approximate Time Needed	2 weeks (extended if field work is included)
Unit Foundation	
Higher-Order Thinking Skills	Problem Solving, Evaluation, Cause and Effect, Decision-Making
Key Learnings	Water Quality, Interaction of Systems, Social Justice
Student Objectives/Learning Outcomes	<ul style="list-style-type: none"> ▪ Understand how ground water, river water, well water, tap water, and city water interact as a system ▪ Understand how human actions affect the quality of nearby rivers

Appendix E: Visual Ranking Tool Resources

Curriculum-Framing Questions	
Essential Question	How do we affect our natural environment?
Unit Questions	What are the challenges of protecting a river ecosystem? How can a community develop in ways that use its water resources wisely?
Content Questions	How do you measure water quality? How do different water sources (ground, well, river, tap) interact as a system?
Visual Ranking Elements	
Visual Ranking Project Name (For the <i>Visual Ranking</i> workspace)	
River City Water	
Project Description (For the <i>Visual Ranking</i> workspace)	
Based on the newspaper articles you've read and the experiments you've conducted, use <i>Visual Ranking</i> to arrange the industries in order of what development is the least harmful to the river and surrounding area and at the same time is the most beneficial to the community. Use the comment feature for each item to explain your reasoning on why you ranked the item where you did. Later in this project, your team will be assigned a role in a city council hearing that is evaluating proposed development projects. You will use the information from your ranking along with additional research to create a presentation to the city council.	
Prompt (For the <i>Visual Ranking</i> workspace)	
Which industries do you believe have the least negative effect on the river environment while at the same time providing the most benefits to the community?	
Sorting List (For the <i>Visual Ranking</i> workspace)	
<ul style="list-style-type: none"> Fish hatchery Office building Shopping center Housing development Recycling Center Hydroelectric plants Parks and recreation Farms Factories Waste treatment plants 	

Unit Details

Instructional Procedures

Description

Ask the Essential Question: How do we affect our environment? Give students two minutes for a quick write in which they list as many factors that come to their mind. Have students evaluate their list and choose the one factor they think is the most critical environmental concern facing our earth. Instruct students to write their chosen factor on a poster board strip and assign a place in the classroom in which all the factors can be visible. With the students' help, group factors by similarities. Select a few students to share their rationale; use this to emphasize the process of sharing thinking and being influenced by others' logic and information. Ask students, Do you think you have enough information in which to make a decision about the one factor that is the most critical facing our world today?

Show a short video clip from the movie, *A Civil Action* (John Travolta, 1998): a true case involving contamination of a river that may have resulted in eight local children being diagnosed with leukemia. Cue the video at the beginning and stop when the lawyer is surveying the river by the factory. Pose the Unit Question: What are the challenges of protecting a river's ecosystem from human activities? Give students some quiet time to reflect on this question; they will answer it at the end of the next activity. Prior to the unit, collect a portfolio of newspaper, magazine and Internet articles reporting about environmental issues concerning rivers. Make copies and hand out different articles to student groups for discussion. Tell students to highlight the factors in the articles that contribute to the environmental concern. Clarify the meaning of factor, cause, effect, and correlation. Have one student from each group share a brief synopsis of their article for the class. As students are sharing, write down the factors they have identified from their article so the list is visible for the whole class. Discuss the factors and then group those that are similar. Now that students have been exposed to some background information, pose the Unit Question again for a free write: What are the challenges of protecting a river's ecosystem from human activities? Assess students' responses based on how well they are able to synthesize information from the articles to construct a response.

Use the Visual Ranking Tool

Based on the newspaper articles and prior experiences, have students decide on ten industries that benefit from being located on or near a rivers to conduct their business (such as fish hatchery, hydroelectric plants, parks and recreation, farms, factories, and waste treatment plants). Working in small groups, students use *Visual Ranking* to arrange the factors in order of what development is the least harmful to the river and surrounding area and at the same time is the most beneficial to the community—based on their current understanding and initial assessment. Instruct students to use the comment feature for each item to explain their reasoning on why they ranked the item where they did. In a whole class activity, student teams analyze the correlation numbers between their group's list to those generated by classmates and view their reasoning through the comments.

Classroom Activities

Assign each team one of the industries and explain that they are to investigate the factors that have a positive or negative effect on a river by this development. Have students use the Internet to find cases that relate to river quality. Students should show how industry and development have impacted the quality of their river and highlight the challenges of protecting

Unit Details

Instructional Procedures

a river ecosystem from human activities. Present classroom activities to introduce students to procedures and equipment used to test water quality and soil properties. At a minimum, students should demonstrate an understanding of how ground water, river water, well water, tap water, and city water interact as a system through classroom activities, lab work, discussions, and/or hands-on field work. Give students time to share findings of their research with the rest of the class through a presentation. As an enrichment, have students learn how to measure water quality and put their understanding to use by conducting field studies at local watershed sites.

Revisit the Visual Ranking Tool

After the presentations, have groups re-evaluate their *Visual Ranking* lists on the order of development factors by logging in with a second team ID. Using the comment boxes, direct students to explain how their thinking has changed by analyzing the errors, misconceptions, or limited understanding found in the original ranking. Tell students to compare their new lists with their original lists through the comparison button of the *Visual Ranking Tool*; have them also compare with the other groups' new lists in order to analyze other perspectives. As an assessment exercise, have groups pair with another group in which they had a low correlation. Explain that the two groups that are paired are to try and achieve a higher correlation through discussion and presentation of their research, rationale, and persuasive arguments.

An extended activity is to have teams participate in a simulation. One team takes on the role of city council and conducts a hearing to evaluate proposed development projects. Other teams come before the council to present the viewpoints of special interest groups, such as project investors, recreational fishermen, or hydropower plant owners. The city council team evaluates each proposal according to which project has the least negative effect on the river and provides the most benefits to the community.

Students could also answer the question: How can communities develop in ways that use their water resources wisely? by exploring a more global perspective. Have them evaluate how the 1972 Federal Water Pollution Control Act (Clean Water Act), the creation of the Superfund (created by the EPA to clean up the worst sites) and the World Water Forum have improved our world's water quality. Direct students to the following Web sites for more information on global solutions that affect the smallest of communities; this information can be incorporated into their proposed development project:

World Bank

www.worldbank.org/depweb/english/modules/environm/water

Environmental Literacy Council

www.enviroliteracy.org/subcategory.php/43.html

World Water Assessment Program

www.unesco.org/water/wwap/case_studies/index.shtml

As a final journal assessment, pose the Essential Question again: *How do we affect our natural environment?* How has your thinking changed from your original quick write in the beginning?

Sample Unit Plan: Grow a Business

Unit Overview
Unit Plan Title
Grow a Business
Unit Summary
Fourth-grade students develop business skills by marketing flowers for Mother's Day. Students conduct market research, determine product potential, seek funding, and market and sell their product. They survey schoolmates to determine flower popularity and use their knowledge of market price and profitability to "grow a business" and reach their sales goal. The <i>Visual Ranking Tool</i> helps students to set priorities, debate differences, and make correlations in order to reach consensus about which flowers to sell.
Subject Area
Social Science, Mathematics, Language Arts
Grade Level
3-5
Approximate Time Needed
8-10 class periods, 1 hour each
Unit Foundation
Habits of Learning Taxonomy
Analyzing perspective
Problem solving
Creative thinking
Thinking and communicating with clarity and precision
Analysis—debate, compare, order

Unit Foundation (Continued)

Targeted Content Standards and Benchmarks

Social Science-Economics (National Standards - Grade 4)

NSS-EC.K-4.1 SCARCITY

Productive resources are limited. Therefore, people cannot have all the goods and services they want; as a result, they must choose some things and give up others.

- People who make goods and provide services are called producers. People whose wants are satisfied by using goods and services are called consumers.
- Entrepreneurs are people who organize other productive resources to make goods and services.

Standard 7: Markets –Price and Determination

Markets exist when buyers and sellers interact. This interaction determines market prices and thereby allocates scarce goods and services.

- A price is what people pay when they buy a good or service, and what they receive when they sell a good or service.
- A market exists whenever buyers and sellers exchange goods and services.

Standard 14: Profit and the Entrepreneur

Entrepreneurs are people who take the risks of organizing productive resources to make goods and services. Profit is an important incentive that leads entrepreneurs to accept the risks of business failure.

- Entrepreneurs are individuals who are willing to take risks, to develop new products, and start new businesses. They recognize opportunities, like working for themselves, and accept challenges.
- Entrepreneurs often are innovative. They attempt to solve problems by developing and marketing new or improved products.

National Council of Teachers of Mathematics: Grades 3-5

Data Analysis and Probability

Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer.

- Design investigations to address a question and consider how data-collection methods affect the nature of the data set;
- Collect data using observations, surveys, and experiments;
- Represent data using tables and graphs such as line plots, bar graphs, and line graphs;
- Recognize the differences in representing categorical and numerical data.

Develop and evaluate inferences and predictions that are based on data.

- Propose and justify conclusions and predictions that are based on data and design studies to further investigate the conclusions or predictions.

Understand and apply basic concepts of probability.

- Describe events as likely or unlikely and discuss the degree of likelihood using such words as certain, equally likely, and impossible;
- Predict the probability of outcomes of simple experiments and test the predictions;
- Understand that the measure of the likelihood of an event can be represented by a number from 0 to 1.

National Council of Teachers of English Communication Strategies

Students employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes.

Targeted Content Standards and Benchmarks (Continued)		
Evaluating Data — Students conduct research on issues and interests by generating ideas and questions, and by posing problems. They gather, evaluate, and synthesize data from a variety of sources (e.g., print and nonprint texts, artifacts, people) to communicate their discoveries in ways that suit their purpose and audience.		
Student Objectives/Learning Outcomes		
Students will:		
<ul style="list-style-type: none"> ▪ Gather data by conducting a school wide survey to determine product popularity and sales potential ▪ Summarize findings, draw conclusions, and rank items based on survey and research data ▪ Present findings in a proposal letter to the school parent group ▪ Use the <i>Visual Ranking Tool</i> to determine which flower students will sell 		
Curriculum-Framing Questions		
Essential Question	Why take the risk?	
Unit Questions	How do we grow a business? How do you convince others?	
Content Questions	What is the difference between a producer and a consumer? In what ways can surveys help us to make decisions? What is marketing? What is profit?	
Assessment Plan		
Assessment Timeline		
Before project work begins	Students work on projects and complete tasks	After project work is completed
<ul style="list-style-type: none"> ▪ Questioning 	<ul style="list-style-type: none"> ▪ Student Rubric ▪ Questioning ▪ Peer Review 	<ul style="list-style-type: none"> ▪ Summary of What We Learned ▪ Student Rubric ▪ Project Rubric ▪ What I Learned ▪ Questioning
Assessment Summary		
<p>A variety of questioning strategies help to tap students' prior knowledge, prompt student thinking about making informed business decisions, and guide teaching. Students use the student version of the project rubric to help them guide the creation of their business plan and their marketing research, and self-assess their work. The project rubric assesses student team effort, writing, and mathematical reasoning. Students participate in a peer review to give and receive feedback while writing their persuasive letters. The summary of <i>What We Learned</i> assesses what students learned about the class average in comparison to their own <i>Visual Ranking</i> list. The <i>What I Learned</i> assessment assesses what students learned from their school-wide survey results.</p>		

Appendix E: Visual Ranking Tool Resources

Visual Ranking Elements
Visual Ranking Project Name (For the <i>Visual Ranking</i> workspace)
Grow a Business
Project Description (For the <i>Visual Ranking</i> workspace)
Mother's Day is coming! Everyone has a hard time finding the perfect gift for his/her special mom. Our class needs to earn money for an upcoming field trip. Put the two together and what do you get? An opportunity! You will be involved in researching, planning, marketing, and selling flowers for Mother's Day. You, as a member of the class, are now a business partner and you have many important decisions to make so that your business is successful. Think carefully about all that is involved in this business venture so that we can make a profit. Let's grow a business!
Prompt (For the <i>Visual Ranking</i> workspace)
Which flower(s) should we sell for Mother's Day? Consider price, profit, and popularity as you rank them.
Sorting List (For the <i>Visual Ranking</i> workspace)
Carnations, Daffodils, Daisies, Irises, Lavender, Lilies, Mums, Orchids, Roses, Tulips
Unit Details
Prerequisite Skills
Addition and subtraction; basic word processing and desktop publishing skills; ability to enter data into a spreadsheet
Instructional Procedures
Setting the stage To set the stage for the project, inform students that Mother's Day is approaching and that this might be a great time to hold a class fund-raiser for an upcoming field trip (or other event/ equipment desired). Note: If you do not already have a specific item in mind, have students brainstorm their own list of classroom wants and needs and together decide what the goal item should be for the fund-raiser. (Although not a part of this particular project plan, deciding what to buy for the classroom by ranking options in order of class preference could be a way to introduce students to the <i>Visual Ranking Tool</i> .) Tell students that in order to raise the money, they will be taking on the role of young entrepreneurs and their task will be to start up and successfully run their own company. Post the following Unit and Essential Questions: <i>How do we grow a business?</i> and <i>Why take the risk?</i> Divide students into small discussion groups and have them brainstorm ideas on how to build and run a successful company. Assign one student to record responses. Bring the groups back together and have them share their answers with the entire class. Record and save these initial responses for later reflection and analysis.

Instructional Procedures

Next, tell students that in order to grow a business they must first have a product or service to sell. Ask students to come up with gift ideas for Mother's Day. Divide the class into small groups and have them generate a list of things that "mothers like" (i.e., perfume, flowers, jewelry). After a few minutes of discussion, have the groups revisit their list and delete items that would not work well for a class fund-raiser.

After they have finished, bring the groups together and discuss the activity as a class. Ask questions to prompt student thinking, such as:

- How did your list change?
- How did you decide which items would or would not be good fund-raisers?

Then have each group share the final list with the whole class. Discuss similarities and differences among the lists. Although another product could be chosen when this unit is implemented in the classroom, for the development of this unit, we will assume students have chosen to sell flowers.

Discuss Business Decisions

Discuss the concept of making informed business decisions and build a Web diagram to capture student thinking. Use questions such as these to stimulate discussion:

- How should group business decisions be made?
- How do you convince others?
- Does everyone have to agree?
- How do you know if you've made the right decision?
- What do producers need to know about consumers in order to make good business decisions?
- What else needs to be considered?

Discuss the challenge of making group decisions, especially ones that can affect an entire business. Remind students that poor decisions put companies out of business every day, and that you do not want that to happen to them and their fund-raiser.

Create a Market Survey

Introduce the terms: producer, consumer, marketing, and profit. Define each using simple language that students can understand. To dig deeper into unit content and help students understand the importance of marketing research, post the Content Question: In what ways can surveys help us to make business decisions? Elicit and record student responses to the question. Next, tell students that they will be conducting their own marketing research to help ensure business success. Pass out the student version of the project rubric and discuss the criteria the students will be assessed on during this unit of study. Allow for questions and make sure that students understand all aspects of the rubric. Provide students with a list of flower choices available from local vendors. Distribute flower samples and have your students take digital photos of them. Together, create a market survey to use to poll the entire school. Photos help students understand what they are voting on. Make sure to include a question or two asking whether students will support your fund-raiser and buy flowers from your business.

Instructional Procedures (Continued)

Conduct a poll

Divide students into teams of 3–4 members and assign each team to poll one grade level using the market survey form. Make a spreadsheet template with fields or separate pages for each grade level. Make fields for the flowers and the classes at each grade level. When they complete the survey, show students how to tally the results and enter data into a spreadsheet. Have them create at least one chart or graph from their one grade’s data, and share their interpretations with the class. Once students input their data, combine the data into a single spreadsheet to show schoolwide results. Use this opportunity to demonstrate how spreadsheets can be sorted in order to interpret data. Sort total number of student votes in descending order and then discuss the results.

Understanding Cost and Profit

Have students use the *Seeing Reason Tool* to identify factors that might contribute to the cost of flowers. Then, invite a local florist to visit to talk about the flowers that were on the top of the survey list and discuss “wholesale” vs. “retail” and what is involved in setting those prices. Instruct students to take notes during the visit and to ask any additional questions before returning to update their causal maps.

Rank Priorities

Build a project in the *Visual Ranking Teacher Workspace* and create and distribute a What We Know handout that includes the number of schoolwide votes received, sale price, and profit margin for each flower they will be ranking. Have students log in to their *Visual Ranking* team space. Point out the prompt: Which flower(s) should we sell for Mother’s Day?

Consider price, profit, and popularity as you rank them. Have each team categorize the items with these criteria in mind. Have them use the Comments feature of the tool to explain why they placed the flowers in that particular order. Make sure teams refer to the What We Know handout as they rank and defend their choices. As students sort their lists, listen to their discussions and ask questions to help teams negotiate, make choices, and express their thinking.

Compare and Discuss

Once teams have finished ranking and commenting, have them compare their lists and read each other’s comments about why they placed items in that order. Suggest that they identify the teams that ranked items most and least like they did. Have similar and dissimilar teams meet to discuss their rankings and rationale behind the order. Some teams may want to revise their ranking based on what they learn from discussions with other teams.

Once teams finish ranking and discussing, meet as a class to reflect on the process by answering some of these questions:

1. How did your group decide ranking order? Was everyone in agreement? If not, how did you resolve the conflict?
2. How did your list compare with that of other groups, and what did you learn from it?
3. Was your group able to convince others to consider changing their ranking order or were others able to convince you to change yours? Why? How?

Instructional Procedures (Continued)

4. When considering popularity, price, and profit, was one factor more important than the others in deciding your ranking order? If so, how might this same factor affect businesses if they, too, consider it the most important factor?

After comparing group lists and discussing learning outcomes, have students return to the *Visual Ranking Tool*. Give them a few minutes to adjust their ranking and comments as needed. Next, have each group compare its list with the "class average." Have them print a report of this comparison and attach it to a summary of what they learned. Their summary should communicate mathematical reasoning and what they learned from considering other teams' rankings. To assess each individual's ability to understand and interpret data representations, create a worksheet that contains a pie chart depicting the schoolwide survey results. (To make the data easier to read and interpret, include only the flower choices that students ranked.) The individual report should communicate mathematical reasoning and the student's explanation of their decision-making processes. Ask students to refer to the student version of the project rubric to help guide their writing. After students finish writing, gather together and discuss the pie chart and *Visual Ranking* class average. Revisit the Content Question: In what ways can surveys help us to make decisions? Help students draw conclusions and decide which flowers to sell.

Inform and Persuade Others

Once you have decided what products you will sell and have determined a sales goal, have students write a letter to the parent group asking for start-up money to help launch the fund-raiser. Begin the process by reminding students that before they can actually sell the flowers, they need to buy their inventory. Because they have no money to fund their business up front, they will need to borrow it. Let them know that the school parent group is willing to help, but they need to be convinced that your class fund-raiser is worthwhile and that there is very little risk involved in funding your business venture.

Post the Unit Question: How do we convince others? Ask students to come up with a list of ideas that should be mentioned in the letter. Main elements should include an explanation of your purpose, your funding needs, market research and analysis, sales goals, and expected profits.

Once you have a comprehensive list of what should be included in the letter, discuss how the letter should be organized and written. Discuss using persuasive language that will make it impossible for the parent group to refuse your request. Pass out a writing process rubric for the students to use as they write their letters and post the list of the main elements the class has decided to include. Give the students time to write, peer review, and then revise their letters into final draft form. Have the students share their completed letters in small groups. Ask the groups to combine the best pieces from the individual letters into one letter to send to the parent group. The individual letters can be assessed using the project rubric.

Advertise and Sell

In addition to persuading the parent group to help fund their business, students also need to persuade their schoolmates to buy their product. Have students create flyers to distribute and post around the school to market their product. In advance, decide as a class on language and content for the flyer. Have students use desktop publishing software to create a professional-looking flyer or provide them with paper, markers, paint, and crayons for a more home-made effect. Prior to Mother's Day, have students put up their posters and promote their fund-raiser during the morning or afternoon announcements. Assign a different set of students and parent volunteers

Appendix E: Visual Ranking Tool Resources

Instructional Procedures (Continued)	
<p>to be responsible for each day's selling. Allow time for students to practice giving correct change and tracking flowers sold. Finally, have students take turns staffing the flower booth and keeping track of money received. Make sure each day that the sales information is entered into a spreadsheet that will give the overall picture of profit/loss and types of flowers sold. Hold a celebration activity to reveal the results.</p> <p>Measure Success</p> <p>To wrap up the unit, revisit the Essential Question: <i>Why take the risk?</i> and the Unit Question: <i>How do you grow a business?</i> Together, review your original goals, business plan, research, funding efforts, marketing strategies and profit. Help students to draw their own conclusions about whether or not their efforts to grow a business paid off and were worth the risk.</p>	
Accommodations for Differentiated Instruction	
Resource Student	<p>Make classroom modifications as expressed in the student's IEP. Present instructions in a variety of ways.</p> <p>Include checkpoints and positive reinforcement throughout the unit and assigned projects.</p> <p>Select helpful class partners who can support his/her needs.</p> <p>Allow extra time to complete assignments.</p>
Nonnative English Speaker	<p>Enlist the help of bilingual students to help with translation and interpretation of concepts.</p> <p>Provide more templates and graphic organizers for students to fill in.</p> <p>Select class partners that are best suited to work with this student and address his/her language needs.</p>
Gifted Student	<p>Have them attend the next parent group meeting to deliver the class letter in person and present a short oral presentation to help persuade the group to consider your class proposal.</p> <p>Have them create a short commercial or jingle to promote your fundraiser and ask them to present it over the PA system during morning or afternoon announcements.</p> <p>Have them conduct research to locate local and/or Internet vendors who sell flowers. Have them create a spreadsheet listing possible items for your class to sell and comparing vendor prices.</p>

Materials and Resources Required for Unit	
Printed Materials	Flower catalogs and books
Technology - Hardware	<ul style="list-style-type: none"> ▪ Computer to access and utilize the <i>Visual Ranking Tool</i> in order to determine which flowers to sell, create marketing materials and parent letter, record and sort data, create graphs and charts ▪ Digital camera to take photos of the flowers that will be included on the market survey form ▪ Internet connection to conduct research and access the <i>Visual Ranking Tool</i> ▪ Printer to publish marketing materials, summaries of what they learned, and the parent letter
Technology - Software	<ul style="list-style-type: none"> ▪ Desktop publishing to create flyers ▪ Internet browser to conduct research ▪ Spreadsheet software to record, sort, visually represent, and analyze data
Internet Resources	<p>Floral Express www.floral-express.com</p> <p>Grower's Box www.growersbox.com/categories.php</p> <p>Online Wholesale Flowers www.onlinewholesaleflowers.com/Thumbnailcatalog.html</p>
Outside Participation	Guest visit by a local florist; ranking flowers by principal; parent volunteers to help pick up flowers to sell
Other Resources	Walking field trip to local florist

Appendix F Seeing Reason Tool Resources

Sample Unit Plan: Ecology Explorers

Unit Overview	
Unit Plan Title	
Ecology Explorers	
Unit Summary	Students study problems that arise as wildlife and human habitats increasingly overlap in our shrinking world. Taking the role of wildlife conservationists, students become experts on an endangered animal or plant that is at risk in their region. They study the organism's needs and understand interdependencies in the ecosystem in which it lives. Using the <i>Seeing Reason Tool</i> , students model their developing understanding of the intricacies of a balanced ecosystem, and then map the human factors that influence that balance. Through a Webquest research project, they learn how human activity affects an organism's survival and consider ways to lessen human impact on local populations. They prepare a presentation for an authentic audience in which they describe their species' habitat needs and offer practical and economically feasible solutions to ensure its continued existence.
Subject Area	
Science, Language Arts	
Grade Level	
6-8	
Approximate Time Needed	
Four weeks, 20 - 50 minute class periods	
Unit Foundation	
Habits of Learning Taxonomy	
Analysis—connect, compare, appraise	
Synthesis—propose, plan, formulate	
Evaluation—predict, assess, support, defend	
Problem solving	
Thinking flexibly	

Appendix F: Seeing Reason Tool Resources

Unit Foundation (Continued)	
Targeted Content Standards and Benchmarks	
<p>Benchmarks for Science Literacy - Benchmark 5 Level 6–8 and 9–12</p> <ul style="list-style-type: none"> ▪ Two types of organisms may interact with one another in several ways: They may be in a producer/consumer, predator/prey, or parasite/host relationship. Or one organism may scavenge or decompose another. Relationships may be competitive or mutually beneficial. Some species have become so adapted to each other that neither could survive without the other. ▪ Ecosystems can be reasonably stable over hundreds or thousands of years. As any population of organisms grows, it is held in check by one or more environmental factors: depletion of food or nesting sites, increased loss to increased numbers of predators, or parasites. If a disaster such as flood or fire occurs, the damaged ecosystem is likely to recover in stages that eventually result in a system similar to the original one. ▪ Like many complex systems, ecosystems tend to have cyclic fluctuations around a state of rough equilibrium. In the long run, however, ecosystems always change when climate changes or when one or more new species appear as a result of migration or local evolution. ▪ Human beings are part of the earth’s ecosystems. Human activities can, deliberately or inadvertently, alter the equilibrium in ecosystems. Kyrene School District Standards ▪ A2.100.63 — Generalize about changes that may take place in organisms and populations of organisms within an ecosystem. ▪ 2.100.64 — Describe the relationship between humans and the environment. 	
Student Objectives/Learning Outcomes	
<p>Students will:</p> <ul style="list-style-type: none"> ▪ Understand the importance of balanced systems ▪ Distinguish between a food chain and a food web ▪ Identify some interactions/relationships between organisms in an ecosystem ▪ Explain limiting factors and their relationship to population density ▪ Describe how succession can be caused by human actions ▪ Identify current environmental issues and possible solutions 	
Curriculum-Framing Questions	
Essential Question	How can we all get along?
Unit Questions	How can people and animals coexist? What influences the biological success of a species?
Content Questions	What are limiting factors? What are the organisms within an ecosystem and how are they dependent upon each other? What makes a species endangered?

Assessment Plan		
Assessment Timeline		
Before project work begins	Students work on projects and complete tasks	After project work is completed
<ul style="list-style-type: none"> ▪ Analogy/manipulatives ▪ Questioning ▪ Webquest 	<ul style="list-style-type: none"> ▪ Questioning ▪ Science journal ▪ <i>Seeing Reason</i> map detail ▪ Scoring guide ▪ Research paper outline ▪ Self- and peer-review 	<ul style="list-style-type: none"> ▪ Science journal ▪ Questioning ▪ Webquest ▪ Scoring guide ▪ Research paper outline
Assessment Summary		
<p>Have students use manipulatives (balancing nail activity) to help them understand the concept of interdependence. Through the questioning and discussion, assess and build upon their prior knowledge. Use the Oh Deer! activity and discussion to assess their understanding of limiting factors. Use the Webquest to help guide their learning, keep them on track, and find resources for their research. Assess the quality of their science journal entries and <i>Seeing Reason</i> maps (causal relationship explanations, sources, overall understanding of the ecological system) to monitor progress and understanding of content. Use questioning throughout the unit to help students develop their higher-order thinking skills and process content. Have students use the scoring guide to help them self- and peer-assess work prior to their report and presentation's completion. Use this same scoring guide and the details in the Webquest and research paper outline to assess and grade the final project.</p>		
Seeing Reason Elements		
Seeing Reason Project Name (For the <i>Seeing Reason</i> workspace)		
Ecology Explorers: Overlapping Habitats		
Project Description (For the <i>Seeing Reason</i> workspace)		
<p>In preparation for your study of endangered species during the Webquest, research the relationships between humans and animals in general and identify what happens when their habitats overlap.</p>		

Appendix F: Seeing Reason Tool Resources

Seeing Reason Elements—Project 1 (Continued)
Research Question (For the <i>Seeing Reason</i> workspace)
What happens when human and animal habitats overlap?
Practice Map (For your future quick reference)
Seeing Reason Elements —Project 2
Seeing Reason Project Name (For the <i>Seeing Reason</i> workspace)
Ecology Explorers: Species Success
Project Description (For the <i>Seeing Reason</i> workspace)
<p>In our growing world, wildlife and human habitats are bound to overlap. Human-wildlife interactions, which occur in both rural and urban areas, can upset the survival of a species, as well as have impact on the humans of the area. As a wildlife conservationist, you must be aware of the outcomes of human/wildlife interactions. Your responsibility is to identify an animal or plant that is at risk in your region. Your position requires you to know everything about that species including the human interactions that occur, and how this human activity affects the organism's survival. Prepare a presentation for the conservation board that includes practical and economically feasible solutions to ensure your species continued existence.</p>

Seeing Reason Elements—Project 2 (Continued)	
Research Question (For the <i>Seeing Reason</i> workspace)	
How does human activity affect your organism’s survival either directly or indirectly?	
Practice Map (For your future quick reference)	
<pre> graph TD logging --> road_building logging --> forest_development logging --> catastrophic_wildfire road_building --> designated_habitat road_building --> riparian_habitats forest_development --> designated_habitat forest_development --> riparian_habitats forest_development --> catastrophic_wildfire recreational_activities --> forest_development livestock_grazing --> catastrophic_wildfire designated_habitat --> great_horned_owl designated_habitat --> mexican_spotted_owl riparian_habitats --> great_horned_owl riparian_habitats --> mexican_spotted_owl catastrophic_wildfire --> great_horned_owl catastrophic_wildfire --> mexican_spotted_owl </pre>	
Unit Details	
Prerequisite Skills	
Reading for information, basic research writing and presentation skills, basic knowledge on interdependencies of life	
Instructional Procedures	
<p>Prior to Instruction</p> <p>In advance of instruction, prepare the materials for the introductory “balanced systems” investigation. In individual plastic bags (one set for every four students), include:</p> <ul style="list-style-type: none"> ▪ 13 8-penny nails with flat heads (not finishing nails) ▪ 1 block of wood, approximately 10 cm by 4 cm, with one of the above nails embedded in the center <p>Provide science journals for each student to reflect on and respond to activities and questions throughout the unit.</p>	

Unit Details

Instructional Procedures

Review the Ecology Webquest. Make sure associated Web sites are active, and replace inactive sites if necessary. An alternative Webquest could be designed so that students research animals only from their local region, rather than worldwide—especially if you want the students to get involved in any community or regional action plans.

Consider how you could incorporate an authentic audience for your students' presentations. Contact local or state government officials, governing boards, wildlife specialists, community members, parent organizations, local clubs or organizations, etc. to set up a date and time when students can present their findings. If this is not possible, identify their audience as the (simulated) National Wildlife Conservation Board.

Setting the stage

Pose the Essential Question, *How can we all get along?* Prompt students to think about this question related to the world of science. Allow students time to write their thoughts in their science journals. Have students share their examples and thoughts in pairs. Turn the discussion back to the whole group and have individuals share what they've discussed. Chart student responses and save this chart to refer to throughout the unit. If some responses touch on ecosystems or other related topics, make sure to point out that this will be investigated further in the unit.

Begin the unit with an activity that focuses on the concept of balanced systems. Provide student teams with prepared sets of blocks and nails, and challenge them to create a "balanced" system by arranging the 12 loose nails so they all balance on the head of the one stationary nail that is embedded in the wood block. None of the loose nails can touch the wood or the ground. Allow plenty of time for exploration, and assure students that there is at least one solution, if not more.

After students complete the challenge, lead a discussion about the ways the nail-balancing activity serves as a model for concepts that govern all systems, natural and manufactured. Reinforce the idea that parts of one system also interact with parts of other systems. Encourage thinking with questions such as:

- What are the parts of this system?
- How does this system of nails balance? What forces and conditions influence this system?
- How do members of this system depend on other members?
- How many nails can be removed before the system fails and becomes unbalanced? What other actions could upset the balance?

In the natural world, overlapping systems all work together to achieve a balanced ecosystem. Chemical, biological, and physical conditions all influence systems. Discuss examples, and ask:

- What are some natural ecosystems? What features do they share?
- What parts of an ecosystem might the nails represent?
- What are some interactions and relationships between organisms in an ecosystem?
- How do natural ecosystems become unbalanced?

Unit Details

Instructional Procedures

Discuss the interdependence of life, and review food chains and food webs. You may want to have students draw food webs from different biomes (for example, desert food web, temperate forest food web) in their journals, and have them identify producers; primary, secondary, and tertiary consumers; and decomposers. Discuss symbiosis and symbiotic relationships: parasitism, mutualism, and commensalism.

Explore limiting factors

Discuss the fundamental necessities of living things: food, water, shelter, and space in a suitable arrangement. Discuss how limiting factors (the availability of these necessities) influence animal and plant populations. Discuss how additional limiting factors, such as competition for resources, predation, and disease, also influence populations. To have students experience how changes in limiting factors change animal and plant populations, play *Oh Deer!* This simulation exercise is described at Teachers.net Gazette, and available in print in the Arizona Game and Fish publication *Project Wild*. Afterward, discuss how limiting factors in play during the game affect food webs. Give student pairs the population data collected during the game. Have them enter it into a spreadsheet and then build animal population graphs. Ask students to explain why the fluctuations in population occur, using data from the game. View limiting factors team sample. Once students have a good grasp of the concept of population fluctuations, pose the Content Question, *What makes a species endangered?* Have students discuss their ideas in small groups and then share their ideas with the whole group. Have students write about their ideas in their science journals and consider some initial answers to the Unit Question, *What influences the biological success of a species?*

Discuss Plant Ecology

In *Oh Deer!* and the activities relating to limiting factors, students focused on animals. Take time now to address plant ecology and the concept of succession, from initial colonizers to climax communities. Mention succession cycles due to short- and long-term natural events (fire, climatic change), but focus on how human actions influence succession.

Study human-wildlife interaction

To explore and answer the Unit Question, *How can people and animals coexist?*, assign students to teams of four. Introduce the Ecology Webquest. Explain each section of the Webquest and their roles as wildlife conservationists. Hand out the scoring guide for students to self-monitor their progress as they move through the project.

Discuss how human and wildlife habitats overlap and how interactions in both rural and urban areas can influence wildlife as well as humans. Discuss human-wildlife interactions in your community, such as wild animals encroaching on populated areas or the effect of roads and fencing on animal migration patterns.

Have students use *Seeing Reason* to help them understand what happens when human and animal habitats overlap. Before they start mapping, follow these steps to introduce *Seeing Reason* to your class.

Unit Details

Instructional Procedures

Have each group of four split into two teams. Have student teams log in to the *Seeing Reason* project, Ecology Explorers: Overlapping Habitats and map their response to the question, *What happens when human and animal habitats overlap?* Have students use the Webquest links to conduct research on this topic and provide evidence for their causal relationships. As students build their maps, circulate around the room. Look at maps, listen to conversations, and ask students to describe their map. Help students think through their map by asking questions such as:

- What other factors relate to this one?
- What is your evidence for the relationship you show between these factors?

Ask questions that prompt deeper thinking about the intricacies of the topic, such as:

- Why are animal homes so important? How do animals that live in the forest depend on trees?
- How is an animal's success affected by its direct or indirect interactions with humans?
- What do you think might be the long-term effects of these encounters on animal behaviors and social structures?

When maps are complete, show several maps from the teacher workspace using a projector. Ask teams to describe their maps and the thinking behind them. After discussion, ask students to refine their maps based on what they learned from their peers.

Have students write about their findings in their science journals and consider some initial answers to the Unit Question, *How can people and animals coexist?*

Review Research and Presentation Guidelines

Return to the Webquest and review the required tasks. Discuss the research and presentation assignment with the class, and teach necessary research skills, such as taking notes and citing references. Review the research paper outline and scoring guide to clarify expectations. You may need to help students locate specific statistics and other "buried" content in lengthy reports and understand how to read charts and tables. Encourage students to include interviews with people they may have contacted for information or opinions, such as ranchers, logging or mining company spokespeople, government officials, environmental groups, and people representing state wildlife organizations. Identify the audience for which each team is writing and/or presenting.

Create Causal Maps and Research Papers

Have students use the research paper outline and Webquest to guide them in conducting their research and planning the individual reports for their species. Ensure students engage in the writing processes of drafting, revision, peer review, and publishing. Students need to make sure their research applies to and can help them answer the Essential, Unit, and Content Questions.

As students are conducting research, have them share what they have learned regarding their endangered species within their group of four. Have them compare and identify similar situations that are affecting the various species they are reporting on. In groups of two, have student teams go to their *Seeing Reason* account and log on. They are to choose one of the two species they have researched—or they can choose both if they feel their species have similar issues—to

Unit Details

Instructional Procedures

construct a series of maps within the Ecological Explorers: Species Success project. Maps should address the question, *What influences the biological success of your species?*

As students create their maps, take the opportunity to gauge understanding and guide learning. Look at maps, listen to conversations, and ask students to describe their maps. Ask questions that prompt deeper thinking about the intricacies of the topic, such as:

- Can you compare the ways in which humans and animals have adapted to life in this habitat?
- In what ways might the presence of humans in this habitat affect animal behaviors?

Have students work with each other during the mapping, research, and revision process. Arrange a “gallery walk,” where during several rotations, one partner in each team stays at the computer to explain the team’s map, while others rotate from computer to computer to view and ask questions about different teams’ maps. Allow time for students to reconsider and fine-tune their maps after this activity. Instruct students to use the information from their research and the creation of their map in the development of their research report and presentation on their group’s species. Remind students to keep their targeted audience in mind as they research and write their report. Have students use the Webquest instructions, research paper outline, and the scoring guide to self- and peer-assess. Provide students a second revision phase after these assessments.

Create Presentations

When reports are finished, have student teams begin developing their oral presentations and supporting multimedia. Remind students that the different presentation formats may include Web page, multimedia presentation, poster, video, a play, or other approved visual format. Remind them they have the role of conservationists, and that the purpose of their presentation is to inform the wildlife conservation board (or other assigned audience) about the group’s species and give viable, research-based solutions that will ensure the continued existence of all their species. Approve an outline of the presentation before students develop multimedia elements. Remind students to abide by copyright rules when using pictures or video in their presentations. Require peer-review prior to the oral presentation.

Present Proposals

As students complete their presentations, finalize arrangements for an event where they present their proposals to the (simulated) National Wildlife Conservation Board or their authentic audience. You may want to ask civic leaders, wildlife specialists, and community members to represent this “board.” Give students sufficient time to practice their presentations in small groups before they present to the larger audience. Assess student reports and presentations using the scoring guide and the details in the Webquest and research paper outline.

Appendix F: Seeing Reason Tool Resources

Unit Details	
Instructional Procedures	
<p>Wrap It Up</p> <p>Revisit the Essential Question, <i>How can we all get along?</i> Refer back to the chart created at the beginning of the unit and review student ideas. Create a new chart with student responses and discuss how ideas have changed or stayed the same based on what they've learned in the unit. Post the Essential and Unit Questions and allow students to choose one or more of the questions to reflect upon. This question can be used as a portfolio piece or as part of unit reflection in their science journals.</p>	
Accommodations for Differentiated Instruction	
Resource Student	<ul style="list-style-type: none"> Narrow students' research focus by assigning specific topics to investigate. Some animal topics have more information available at a more basic level than others. Provide a report template with fill-in-the-blank topic sentences. Make heterogeneous groups so a variety of learning styles and abilities are represented in each group.
Nonnative English Speaker	<ul style="list-style-type: none"> Provide texts from language of origin. Encourage students to research their animals using native language sources. Enlist the help of students who speak the same language and have greater proficiency in English.
Gifted Student	<ul style="list-style-type: none"> Require more in-depth research and analysis on all aspects of their project. Add an interview with an expert to the research requirements.
Materials and Resources Required for Unit	
Printed Materials	<ul style="list-style-type: none"> Reference books: field guides, natural history texts, encyclopedias <i>Project Wild: K-12 Curriculum & Activity Guide</i> (2002). Council for Environmental Education. Houston: TX.
Supplies	<ul style="list-style-type: none"> 13 8-penny nails with flat heads (not finishing nails) 1 block of wood approximately 10 cm by 4 cm (or a big chunk of clay could substitute for the wood)

Materials and Resources Required for Unit (Continued)	
Technology - Hardware	<ul style="list-style-type: none"> ▪ Computers for Internet research and creation of word processing document and multimedia products to support the oral presentation ▪ Presentation equipment (projector and screen) for the oral presentations ▪ Digital camera (optional) to take pictures of local habitat, animals, interviewees, and students' presentations ▪ Video camera (optional) for interviews and student multimedia support (video clips) for their multimedia support of their oral presentation
Technology - Software	<ul style="list-style-type: none"> ▪ Word processor for written reports, handouts for presentations, and other multimedia supporting documents ▪ Multimedia presentation software for oral presentations ▪ Multimedia atlas (optional) for research and image resources ▪ Electronic encyclopedias (optional) for research and image resources
Internet Resources	<ul style="list-style-type: none"> ▪ United States Environmental Protection Agency Student Center www.epa.gov/students Environmental concepts, activities, and tips for students in grades 5-8 ▪ United States Fish and Wildlife Service Endangered Species Program http://endangered.fws.gov Information on plants and animals on the threatened and endangered species lists <p>The following are Internet resources for the teacher:</p> <ul style="list-style-type: none"> ▪ Ecology: Interdependence of Life www.rickhershberger.com/bioactivesite/ecology/ecology.pdf Explanations of ecology concepts ▪ Teacher.net Gazette http://teachers.net/gazette/MAY02/stanimirovic2.html Offers description of <i>Oh Deer!</i> simulation

Appendix G

Index

16 Habits of Mind	1.18
21st Century Skills	1.06
Assessing Projects	
Introduction	11.05
Use	11.10
Assessment	
Assessment Plan examples	Appendix D
Assessment Timeline	4.20
Strategies for Gauging Student Needs	4.03
Strategies for Encouraging Self-Direction and Collaboration	4.05
Strategies for Monitoring Progress	4.06
Strategies for Checking Understanding and Encouraging Metacognition	4.07
Strategies for Demonstrating Understanding and Skill	4.09
“Big Ideas”	3.12
Bloom’s Revised Taxonomy	1.12
Content Questions	3.08
Costa and Kallick’s 16 Habits of Mind	1.17
Course Evaluation	11.27
Curriculum-Framing Questions	3.08
Examples	Appendix B
Process for Writing Questions	3.20
Essential Questions	3.08
“Habits of Learning Taxonomy”	1.23
Learning Objectives	2.07
Marzano’s Dimensions of Learning	1.13
Module Checklist	Overview v
Online Thinking Tools	
Benefits of	5.02
Web site	1.02
Open Questions	3.04
Overarching Concepts	3.12
Project Assessment Vignettes	4.11
Project Rubric	2.18, 11.25
Project wizard	2.13
Projects	
Characteristics	2.09
Ideas	Appendix C
Priorities	2.20
Steps for Project Planning	2.02
Reflection Checklists	
<i>Seeing Reason Tool</i>	8.07
<i>Showing Evidence Tool</i>	10.07
<i>Visual Ranking Tool</i>	6.19
Unit	11.15

Registering, Intel® Education Web Site	2.12
Rubrics	
Definition and use	11.03
Developing	11.07
Evaluation of Claim Rubric	9.17
Project Rubric	2.18, 11.25
Quality of Evidence Rubric	9.12
Strength of Evidence Rubric	9.14
Understanding rubrics	11.09
Seeing Reason Tool	
Benefits	7.13
Best practices	7.31, 8.10
Cause and effect, Understanding	7.07
Questioning techniques	8.05
Reflection checklist	8.07
Sample project ideas and research questions	7.22, Appendix C.03, F.01
Uses of <i>Seeing Reason</i> as classified by Costa and Kallick's 16 Habits of Mind	7.14
Showcase	
Methods for showcase	11.20
Showcase feedback form	11.24
Showing Evidence Tool	
Argumentation	9.02
Benefits	9.20
Best practices	9.23, 9.41, 10.09
Reflection checklist	10.07
Rubric	9.11
Sample project descriptions and prompts	9.29, Appendix C.03
Toulmin, Stephen	9.02, CD
Uses of Showing Evidence classified by Marzano's Dimensions of Learning	9.20
Spearman Correlation Coefficient	6.13, CD
Standards	2.04
Thinking Skill Vignettes	1.34
Toulmin, Stephen	9.02, CD
Unit Plan	
Reflection Checklist	11.15
Template	1.26
Topics and Ideas	2.13, 2.14, Appendix C.01
Unit Questions	3.08
Visual Ranking Tool	
Benefits	5.07
Best practices	6.21
Correlation	6.13, CD
Reflection checklist	6.19
Sample project descriptions and prompts	6.03; Appendix C, E
Student benefits	5.07
Uses of <i>Visual Ranking</i> Classified by Bloom's Taxonomy	5.08