

Targeting Thinking in the Classroom

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Module 1

Targeting Thinking in the Classroom

Description: Effective integration of technology cannot occur without important instructional components in place. Technology best supports and enhances learning when higher-order thinking skills are required. In this module, you discuss essential skills for your students' future, and review different models of thinking in order to apply key ideas to your own classroom. You also build upon your knowledge of what affects and supports deeper thinking in the classroom.

Activity 1: Introducing Yourself



During this time, you will have the opportunity to introduce yourself and meet all of the course participants. On the lines below, you may want to list the key points you want to share about yourself, such as the grade level and subject you teach.

Key points to share:

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Activity 2: Introducing the Thinking Tools

Step 1: Previewing the Intel Education Web Site

Browse the Intel Education Web site to preview its resources that you can use in this course and beyond.



Intel Education Web Site

www.intel.com/education

The Intel Education Web site provides resources, tools, and strategies that support effective practices in technology integration. It is a free resource for educators developed by an extended team with expertise in education, technology, and innovation.

The free teaching tools that are used in this course are available on the Intel Education Web site, along with technical instructions and best practices for using these tools. Additional K-12 teaching resources reside on the Web site, most notably Designing Effective Projects (www.intel.com/education/designprojects), which includes a collection of exemplary Unit Plans that effectively integrate technology, strategies for developing your own exemplary technology-supported learning, and resources to support higher-order thinking skills.

Also of interest is Technology Literacy (www.intel.com/education/tools/technologyliteracy), a three-year curriculum for middle students that embeds technology literacy skill development in core content courses. Aligned to address the NET-S standards, Technology Literacy projects that cumulatively provide students with opportunities to become fully technologically literate and provide opportunities for authentic research, writing, and communication.

Using the Intel® Education Help Guide

Use the Help Guide to introduce yourself to the Thinking Tools.



Throughout this course, you will be looking to other resources to help you find answers to your questions. Often, you can search online or ask a peer when you are looking for help. When you are looking for technical help on how to use the thinking tools, the *Assessing Projects* application, Microsoft Office applications, and other Web or productivity resources, you can use the Intel Education *Help Guide*. In this digital resource, you find step-by-step directions for how to complete technical skills. You can use the *Help Guide* on the Web or on your Curriculum Resource CD to quickly learn how to do certain tasks on the computer as they are needed. Preview this valuable resource that is available to you while you are enrolled in this course and in the future.

Refer to the following skills in the Help Guide for this section:

- Help Guide 1: Finding Technology Skills
- Help Guide 2: Viewing Skills While You Work



Intel Education Help Guide

www.intel.com/education/tools

Note the variety of tools available on the Intel Education Web site. Select **Help Guide** from the list of tools. (See Help Guide Skills 1 and 2.)

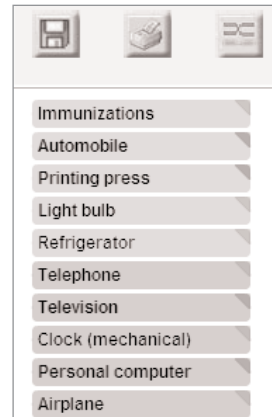
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Step 2: Previewing the Thinking Tools

To prepare for this course and begin thinking about how you might integrate the thinking tools into your classroom, use this time to become familiar with how these tools work and their intended purpose. Use the *Help Guide* as necessary to help you explore these tools.

Preview the tools used in this course:

Visual Ranking is an online tool for prioritizing and ordering items in a list. Using *Visual Ranking*, students identify and refine criteria as they assign order or ranking to a list. They must explain their reasoning and can compare their work with each other in a visual diagram. This tool supports activities where students need to debate differences, reach consensus, and organize ideas.



1. Open: www.intel.com/education/visualranking
2. Review the home page. Note the sections of *Visual Ranking*. Each thinking tool is set up with the same categories:
 - *Overview and Benefits* — Features of the tool
 - *Try the Tool* — A practice project that you can manipulate as well as a full tutorial
 - *Project Examples* — Project ideas and unit plans
 - *Instructional Strategies* — Best practices for using the tool with students
 - *Workspace* — Password-protected space to set up projects for your students
3. Click **Project Examples**, and then **Project Ideas**.
4. With a partner, view and discuss the use of *Visual Ranking* within the project idea, **Impact of Inventions**.
5. Click the **Back** button and then click **Try the Tool**.
6. Read the description of the demo and then click **Demo**. (See Teaching Tools, Visual Ranking Tool Skill 1.1.1.)
7. Rank the list of inventions and mouse over the triangles to view comments. (See Teaching Tools, Visual Ranking Tool Skills 1.15 and 1.17.)
8. Compare your list with another team's and view team comments by mousing over the triangles. (See Teaching Tools, Visual Ranking Tool Skill 1.20.)

Refer to the following skills in the Help Guide for this section:

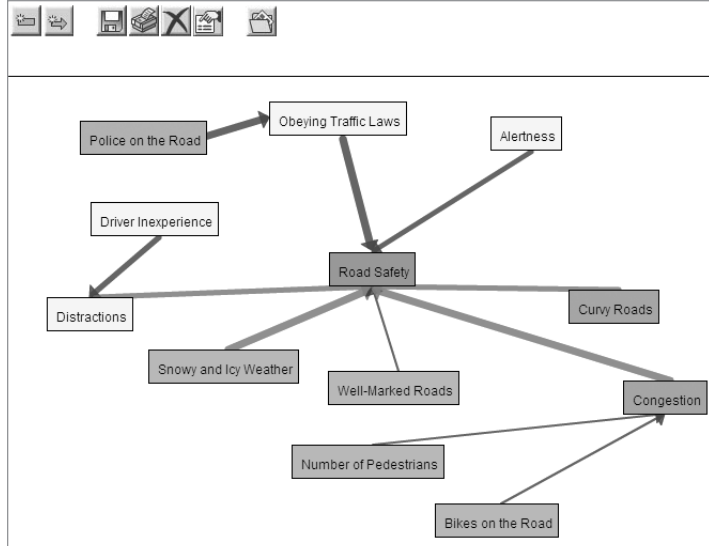
- Visual Ranking Tool Skill 1.1.1: Viewing a Visual Ranking demonstration
- Visual Ranking Tool Skill 1.15: Ranking items in a list
- Visual Ranking Tool Skill 1.17: Viewing a comment attached to an item
- Visual Ranking Tool Skill 1.20: Comparing lists

Review the scenario that focuses students' use of the *Visual Ranking Tool*. View a sample ranked list and its comments. View other teams' rankings and compare them with the current ranking. Note the use of different perspectives as student groups rank the list of possible community projects from the viewpoint of various community members.

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The *Seeing Reason Tool* is an online tool for mapping cause-and-effect relationships. Students create visual representations of the factors and relationships in a cause-and-effect investigation. These maps make thinking visible and promote collaboration as students refine their understanding.



1. Open: www.intel.com/education/seeingreason
2. View the overview page.
3. Click **Project Examples**, and then **Unit Plans**.
4. View and discuss the use of *Seeing Reason* within the unit plan, **Road Safety**.
5. Click the **Back** button and then click **Try the Tool**.
6. Read the description of the demo and then click **Demo**.
7. Practice reading the map and double-click existing factors and the relationship arrows to read their descriptions. (See Teaching Tools, *Seeing Reason Tool Skills 2.21 and 2.17*.)
8. Experiment with the map by adding factors and relationships. (See Teaching Tools, *Seeing Reason Tool Skill 2.15 and 2.20*.)

Review the unit summary that discusses the students' role as they analyze the complex factors that influence road safety. View the two *Seeing Reason* maps within the unit. Practice reading the maps by mousing over and reading the descriptions of the red and blue relationship lines. Double-click the factor boxes to view the explanations of the factors.

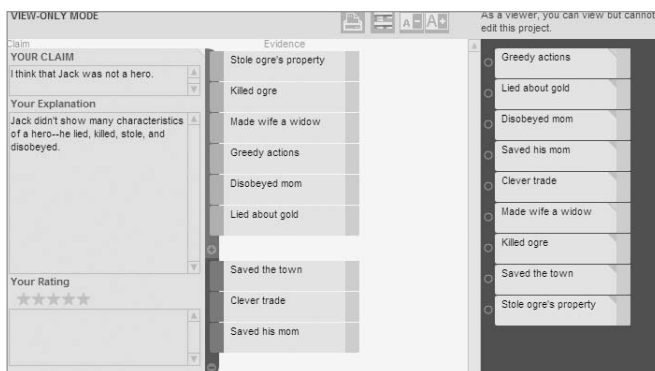


Refer to the following skills in the Help Guide for this section:

- Seeing Reason Tool Skill 2.15: Adding a factor
- Seeing Reason Tool Skill 2.17: Viewing a description of a factor
- Seeing Reason Tool Skill 2.20: Adding a relationship
- Seeing Reason Tool Skill 2.21: Viewing a description of a relationship

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The **Showing Evidence Tool** is an online tool for constructing an argument or hypothesis and supporting it with evidence. Students learn how to prove their case, weigh the quality and strength of their evidence with the use of a visual framework.



1. Open: www.intel.com/education/showingevidence
2. Review the overview page.
3. Click **Try the Tool**.
4. Read the description of the demos and then click **Elementary Demo** to view a sample case using the simplified version of the tool.
5. Review the claim and existing evidence.
6. Experiment with the case by creating new evidence and attaching evidence to the claim. (See Teaching Tools, Showing Evidence Tool Skills 3.21 and 3.25.)
7. Click the **Back** button to return to the main **Try the Tool** page.
8. Click **Secondary Demo** to view another sample case using the full version of the tool.
9. Experiment with the case by rating the quality and support of the evidence, creating new evidence, and attaching evidence to the claim. (See Teaching Tools, Showing Evidence Tool Skills 3.22 and 3.24.)
10. Click the **Back** button.
11. Click **Project Examples**, and then **Unit Plans**.
12. View and discuss the completed simplified *Showing Evidence* project within the Unit Plan, **Jack and the Beanstock**.
13. Click the **Back** button and then click the unit, **Mysterious Malady**, to view and discuss a completed project with the full version of the tool.



Note: Research behind the online thinking tools is available in the Thinking Tools folder on the Curriculum Resource CD.

Both the Elementary Demo and Secondary Demo are unfinished projects that provide you with the opportunity to practice adding evidence, comments, ratings (in the Secondary Demo), and attaching evidence to the claim.

Refer to the following skills in the Help Guide for this section:

- Showing Evidence Tool Skill 3.21: Creating evidence
- Showing Evidence Tool Skill 3.22: Rating the quality of evidence
- Showing Evidence Tool Skill 3.24: Rating the strength of evidence for a claim
- Showing Evidence Tool Skill 3.25: Linking evidence to a claim

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Activity 3: Applying Models of Thinking

As society changes, the skills that students need to be successful in life also change. Basic literacy skills of reading, writing, and mathematics are no longer sufficient. Our students need to master those basic skills as well as read critically, write persuasively, think and reason logically, and solve complex problems. A successful 21st century student must also be adept at managing information—finding, evaluating, and applying new content understanding with great flexibility.

Below you will find a summary of one such list of essential 21st century skills (Partnership for 21st Century Skills, 2007). Consider which skills are actively taught or supported in your own classroom.

- **Core Subjects and 21st Century Themes** include English, reading, or language arts; world languages; arts; mathematics; economics; science; geography; history; government and civics, as well as global awareness; financial, economic, business and entrepreneurial literacy; civic literacy; and health literacy
- **Learning and Innovation Skills**
 - Creativity and Innovation Skills focuses on originality and inventiveness in work; developing, implementing and communicating new ideas to others; being open to new perspectives; acting on creative ideas
 - Critical Thinking and Problem Solving Skills requires exercising sound reasoning in understanding, making complex choices and decisions, understanding the interconnections among systems, identifying and asking significant questions that clarify various points of view and lead to better solutions, framing, analyzing and synthesizing information to solve problems and answer questions
 - Communication and Collaboration Skills includes articulating thoughts and ideas clearly and effectively through speaking and writing, demonstrating ability to work effectively with diverse teams, exercising flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal, assuming shared responsibility for collaborative work
- **Information, Media and Technology Skills**
 - Information Literacy requires accessing information efficiently and effectively, evaluating information critically and competently, using information accurately and creatively for the issue or problem at hand, possessing a fundamental understanding of the ethical/legal issues surrounding the access and use of information
 - Media Literacy requires an understanding of how media messages are constructed, for what purposes and using which tools, characteristics and conventions; examining how individuals interpret messages differently, how values and points of view are included or excluded, and how media can influence

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- beliefs and behaviors; a fundamental understanding of the ethical/legal issues surrounding the access and use of information
- ICT Literacy includes using digital technology, communication tools and/or networks appropriately to access, manage, integrate, evaluate, and create information in order to function in a knowledge economy; using technology as a tool to research, organize, evaluate and communicate information, and the possession of a fundamental understanding of the ethical/legal issues surrounding the access and use of information
 - **Life and Career Skills**
 - Flexibility & Adaptability includes adapting to varied roles and responsibilities, and working effectively in a climate of ambiguity and changing priorities
 - Initiative & Self-Direction includes monitoring one's own understanding and learning needs; going beyond basic mastery of skills and/or curriculum to gain expertise; demonstrating initiative to advance skill levels towards a professional level; defining, prioritizing and completing tasks without direct oversight; utilizing time efficiently and managing workload; demonstrating commitment to learning as a lifelong process
 - Social & Cross-Cultural Skills requires working appropriately and productively with others, leveraging the collective intelligence of groups when appropriate, and bridging cultural differences and using differing perspectives to increase innovation and the quality of work
 - Productivity & Accountability requires setting and meeting high standards and goals for delivering quality work on time and demonstrating diligence and a positive work ethic
 - Leadership & Responsibility includes using interpersonal and problem-solving skills to influence and guide others toward a goal, leveraging strengths of others to accomplish a common goal, demonstrating integrity and ethical behavior, and acting responsibly with the interests of the larger community in mind

Thinking beyond the level of knowledge acquisition is considered complex thinking—that which requires effort and produces outcomes that may differ from one student to another. These outcomes are not predictable because the process of higher-order thinking is not mechanical. Central to higher-order thinking is the ability to work through new challenges with understanding and empathy and rise to meet those challenges.

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In the review of current research on higher-order thinking, the conclusion is clear. Instruction that builds upon and encourages the use of higher-order thinking skills yields greater levels of student learning. Gains on learning and intelligence measures have been tied to instruction that use a variety of specific techniques (Cotton, 1991), including:

- CREATIVE AND CRITICAL THINKING SKILLS, such as decision making, problem solving, fluency, observation, exploration, classification, and generating hypotheses (Crump, Schlichter, and Palk 1988; Herrnstein, et al. 1986; Horton and Ryba 1986; Kagan 1988; Matthews 1989; MCREL 1985; Ristow 1988; Robinson 1987; Tenenbaum 1986).
- METACOGNITION, including awareness, self-monitoring, and self-regulating (Bransford, et al. 1986; Freseman 1990; Haller, Child, and Walberg 1988; Pearson 1982; Pogrow 1988; Robinson 1987; Wong 1985).

Many models exist to help educators and researchers identify and categorize thinking skills. Benjamin Bloom's Taxonomy of Thinking Skills is perhaps the most familiar to educators. Others have revisited thinking skills since Bloom in an attempt to broaden the taxonomy to show complex processes like decision making or problem solving—areas that are not specifically addressed within Bloom's framework.

In order to build a framework for organizing thinking skills that will best suit your students' learning needs and to focus on classroom practices that promote deeper thinking, we will review three models of thinking: Bloom's Revised Taxonomy (Anderson and Krathwohl, 2001), Marzano's Dimensions of Learning, and Costa and Kallick's 16 Habits of Mind. You will use these models to help build your own "Habits of Learning Taxonomy" for your classroom.

Even if you are familiar with the thinking skills categorized by Bloom, Marzano, and Costa and Kallick, these activities are designed as a quick review in order to have a common vocabulary. You will be drawing from these models to create a list of thinking skills you want to target in your own classroom.



Note: A summary of another model of thinking skills, Wiggins and McTighe's Six Facets of Understanding, is provided in the *Thinking Skills* folder on the Curriculum Resource CD as an additional resource.

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Step 1: Applying Bloom’s Taxonomy of Thinking Skills

The following activity is designed to help you analyze—using Bloom’s Revised Taxonomy—the thinking processes that are involved in problem solving. Read the following scenario and predict the answer.

The Glass is Half Full Problem

Two glasses are each filled half-way with soda—one with cola, the other with lemon-lime. A small amount of the lemon-lime is removed from the glass and put into the cola glass. The glass is stirred thoroughly so that the lemon-lime is completely mixed into the cola. Then the same amount of the mixture is removed from the cola glass and put back into the glass with the lemon-lime.

Question:

After the soda has been exchanged, is there more cola in the lemon-lime glass or more lemon-lime in the cola glass?

Look over the problem and predict which of the following is most likely to be correct:

- More cola in the lemon-lime.
- More lemon-lime in the cola.
- The same in both glasses.



Join a group that has the same prediction as yours. An observer will be assigned to your group who will

- Observe the group solving the problem and record in the checklist on the next page what is observed about the strategies and processes your group uses as they work.
- Make check marks or brief comments when observing any of the behaviors listed in the chart.



Discuss your individual strategies for determining your answer and then, as a group, come to a final decision on the answer. If at any time during your group’s discussion you change your mind as to what you believe is the correct answer, you may change groups.

Three observers will be chosen by the facilitator at the beginning of this activity and one will be assigned to each group. (Observers should be familiar with Bloom’s Taxonomy.) While teachers are individually trying to determine the answer, observers will be watching for the types of methods participants use to come up with the solution.

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Participants should not view or use this list at the beginning of the activity so that it will not unduly influence the methods they use to solve the problem. Although finding the “right” answer is not actually the point of this activity (analyzing the higher-order thinking skills used in problem solving is), you can find a description of various methods of solving this problem and answers at: www.geocities.com/CapitolHill/lobby/7049/wine.htm

Demonstrated Thinking Skill	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>Remembering</p> <ul style="list-style-type: none"> Defines terms Lists elements of the problem Other: _____
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>Understanding</p> <ul style="list-style-type: none"> Accesses prior knowledge Restates problem in different words Identifies all of the key elements of the problem Simplifies problem Other: _____
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>Applying Uses math/equations to calculate</p> <ul style="list-style-type: none"> Contrasts possibilities with a simpler problem Demonstrates knowledge of math or science principles Tests ideas Other: _____
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>Analyzing Sketches or uses pictures to analyze the problem</p> <ul style="list-style-type: none"> Makes tables and diagrams Discusses options/considers multiple hypotheses Makes generalizations to other cases Other: _____
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>Evaluating</p> <ul style="list-style-type: none"> Assesses the validity of methods and answers Supports a conjecture with a logical or mathematical argument Tests and accepts or rejects a conjecture based on well-thought-out rationale Checks answer with second method Other: _____
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>Creating</p> <ul style="list-style-type: none"> Works backwards Builds models Proposes a completely new way to look at the problem Other: _____

Note: A table of Bloom’s Revised Taxonomy is on page 1.12 for reference.

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After discussing the problem in your small group, individually check those skills you think you and your colleagues used during the activity. Compare your list with your observer.

As a whole group, discuss the following questions:

- Which levels of Bloom’s Revised Taxonomy did you use? What could you have done differently to come up with your answer?
- By applying Bloom’s Revised Taxonomy in this way, how did it affect your reflection about your problem-solving process and the thinking skills employed?
- What was it like being observed? What was it like observing? What issues about assessment of thinking did your experiences generate?
- What kind of information could you get from a checklist like this one? How might teachers and students use this information?

Consider how Bloom’s Revised Taxonomy can be used in project planning and the assessment of students’ thinking skills. The table on the next page helps to define the categories of Bloom’s Revised Taxonomy and the actions that often surround and encompass the use of these skills—by both teacher and student. You will reflect back on this list as you build your own “Habits of Learning Taxonomy” in the next activity.

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Bloom's Revised Taxonomy of Thinking Skills

Level	Definition	What a Teacher Does	What a Student Does	Cues
Remembering	Identifying and recalling information	tells, shows, directs, questions	accesses prior knowledge, describes, lists, names, recognizes, remembers	cite, define, describe, enumerate, find, identify, list, label, locate, match, memorize, name, recall, recite, recognize, record, recount, repeat, report, retrieve, specify, state, tabulate
Understanding	Explaining ideas or concepts; stating a problem in one's own words	compares, contrasts, demonstrates	demonstrates, explains, interprets, paraphrases, summarizes	clarify, confirm, defend, discuss, distinguish, duplicate, exemplify, explain, express, extend, illustrate, infer, interpret, locate, paraphrase, predict, relate, report, reproduce, restate, retell, review, rewrite, select, translate, understand
Applying	Using concepts in new situations	observes, facilitates, critiques	solves problems, demonstrates knowledge, implements, executes	apply, calculate, carry out, compute, demonstrate, dramatize, employ, estimate, execute, exhibit, experiment, illustrate, implement, make, model, modify, operate, perform, practice, simulate, sketch, solve, use
Analyzing	Breaking information into parts to explore understandings and relationships	guides, probes, serves as a resource	compares, deconstructs, discusses, dissects, organizes, uncovers	analyze, appraise, categorize, compare, connect, contrast, deconstruct, determine, diagram, discriminate, examine, generalize, hypothesize, imagine, organize, outline, probe, question, test
Evaluating	Judging value based on criteria; justifying a decision/course of action	clarifies, accepts, guides, harmonizes	checks, critiques, disputes, experiments, judges	appraise, argue, assess, check, conclude, convince, criticize, critique, deduce, defend, evaluate, hypothesize, judge, rank, rate, recommend, revise, scrutinize, support, value, weigh
Creating	Generating new ideas, products, or ways of viewing things	extends, evaluates, facilitates, reflects	designs, constructs, plans, produces, invents	actualize, combine, compose, concoct, construct, contrive, create, design, develop, devise, formulate, generate, incorporate, integrate, invent, make, modify, originate, plan, produce, propose, rearrange, transform

This table is based on the Bloom's Revised Taxonomy by Anderson and Krathwohl (2001).

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At a Glance: Bloom’s Revised Taxonomy

Bloom’s Revised Taxonomy is distinguished by the way it categorizes thinking skills from the simplest learning behavior to the most complex. He and his team created a hierarchical system of thinking skills where the higher thinking levels include all of the cognitive skills from the lower levels. Anderson and Krathwohl revised the taxonomy categories into verb forms and created a two dimensional table: The Knowledge Dimension (or the kind of knowledge to be learned, identified above) and The Cognitive Process Dimension (or the process used to learn: factual, conceptual, procedural, and meta-cognitive).

Step 2: Applying Marzano’s Dimensions of Learning

Dimensions of Learning is an instructional framework developed by Robert J. Marzano (1988, 1992). This model is based on the idea that all successful learning is based upon five dimensions of thinking. Marzano’s Dimensions 1 and 5 recognize the importance of social and emotional factors in learning. Dimension 2 focuses on knowledge, which is the basis or foundation that Dimensions 3 and 4 build upon.

Each of these dimensions of thinking occupies an equal place in successful learning. “The five dimensions do not exist in ‘isolation’ from each other and they do not show a progressive linear pattern of accomplishment. They do describe different cognitive processes, each valuable in its own right and each worthy of teacher attention during a unit of study” (Marzano, 1992).

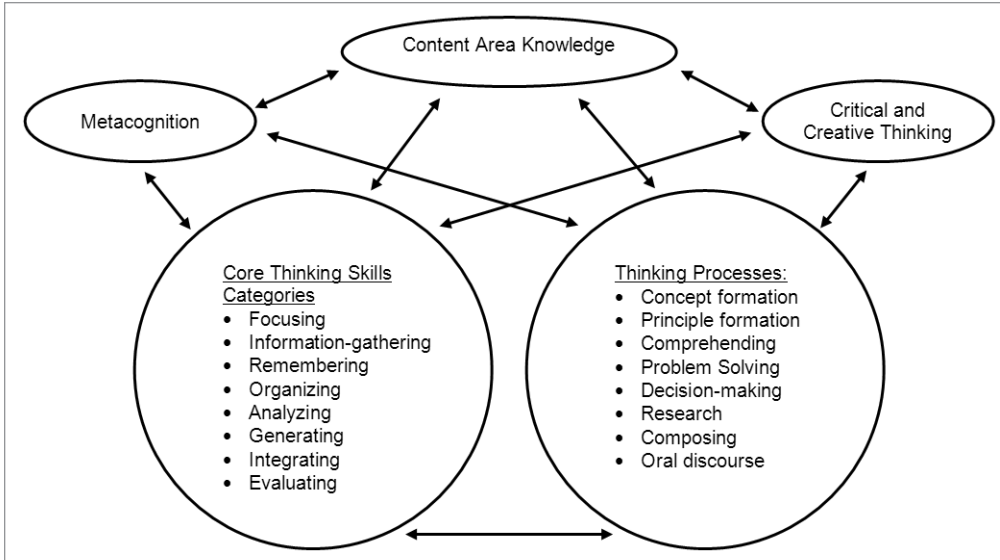
Review the Dimensions of Learning and consider which elements emerge as being important in your own classroom.

	Title	Example
Dimension 1	Positive Attitudes and Perceptions About Learning	<ul style="list-style-type: none"> ▪ Classroom Climate ▪ Feeling accepted by teacher and peers ▪ Perceiving order
Dimension 2	Acquisition and Integration of Knowledge	<ul style="list-style-type: none"> ▪ Students must be guided in relating new knowledge to what they know, organizing it, and making it part of long-term memory ▪ Two types of knowledge: <ul style="list-style-type: none"> ▪ Declarative Knowledge ▪ Facts, concepts, generalizations, and principles ▪ Procedural Knowledge ▪ Skills, procedures, and processes

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	Title	Example
Dimension 3	Extension and Refinement of Knowledge	<ul style="list-style-type: none"> ▪ Learners must develop in-depth understanding and apply and refine that knowledge ▪ Common reasoning processes are: <ul style="list-style-type: none"> ▪ Comparing — How are these things alike? ▪ Classifying — How can these be organized? ▪ Inductive Reasoning — Based on these facts, what is your conclusion? ▪ Deductive Reasoning — Based on this rule, what conclusions can you draw that must be true? ▪ Analyzing Errors — How is this information misleading? ▪ Constructing Support — What is an argument that would support this claim? ▪ Abstracting — To what other situations can this apply? ▪ Analyzing Perspectives — What is the reasoning behind this perspective?
Dimension 4	Meaningful Use of Knowledge	<ul style="list-style-type: none"> ▪ Students learn best when they need knowledge to accomplish a goal that is meaningful to them <ul style="list-style-type: none"> ▪ Decision Making ▪ Investigation ▪ Experimental Inquiry ▪ Problem Solving ▪ Systems Analysis
Dimension 5	Productive Habits of Mind	<ul style="list-style-type: none"> ▪ Mental habits that students develop that will enable them to learn on their own <ul style="list-style-type: none"> ▪ Critical Thinking ▪ Creative Thinking ▪ Self-Regulation—Metacognition

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This is one group’s model of a thinking skills framework they entitled “Dimensions of Thinking.” It was created by Public Schools of North Carolina and adapted from Marzano’s Dimensions of Learning (1988). Used with permission.

At a Glance: Marzano’s Dimensions of Learning

Marzano’s categories of how people think is different from Bloom’s in that the categories do not build upon each other in a hierarchical fashion. Each cognitive category is just as important as the others. The Dimensions of Learning represent elements that Marzano believes are all worthy of focus and inclusion within a unit of study.

Apply the Dimensions of Learning as you review a project on the Intel® Education Web site. Use the *Help Guide* if you need assistance in completing any technology skills identified below.



1. Open: www.intel.com/education/visualranking
2. Add this page to your Bookmarks, Favorites, or online bookmarking site. (See Web Technologies Skill 1.5 or 3.5.)
3. Click **Project Examples**, and then click **Project Ideas**.
4. Click **River City Water** and note the sections of the project and the live *Visual Ranking* project embedded in the project idea. (Use the *Help Guide’s* Visual Ranking skills, if needed.)

Note: A printed copy of this unit plan is also available in Appendix E.01.

Refer to the following skills in the Help Guide for this section:

- Web Technologies Skill 1.5: Mozilla Firefox, To bookmark a favorite page on the Web
- Web Technologies Skill 3.5: Internet Explorer, To bookmark a favorite page on the Web

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5. Read the project idea. Pick a few of the thinking skills below from Marzano’s Dimensions 3 and 4 that students would employ during this unit. Theorize and explain what students would be doing within that dimension during the unit. What might occur to promote thinking at each dimension, extrapolating from the description? How would that thinking process be carried out? The first one is completed as an example.

Note: Not all skills listed below may be evident in the unit plan, nor do they all need to be present.

- a. Comparing — “How are these things alike?”

Students group and compare critical environmental concerns.

Students compare their ranking list with other teams’ ranking.

- b. Inductive Reasoning — “Based on these facts, what is your conclusion?”

- c. Analyzing Errors — “How is this information misleading?”

- d. Constructing Support — “What is an argument that would support this claim?”

- e. Analyzing Perspectives — “What is the reasoning behind this perspective?”

- f. Experimental Inquiry — “What if...?” “How would you determine...?”

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g. Problem solving — “What solutions will you try?”

h. Systems Analysis — “What happens if a key part of this system...?”



6. Share your ideas of what you saw in this unit with a partner. Discuss how this new categorization of thinking skills and classroom learning provides a different way of looking at thinking skills. How is this analysis of thinking skills different than if you used Bloom’s Taxonomy?

Step 3: Applying Costa and Kallick’s 16 Habits of Mind

Excellence is an art won by training and habituation. We do not act rightly because we have virtue or excellence, but we rather have those because we have acted rightly. We are what we repeatedly do. Excellence, then, is not an act but a habit.

Aristotle

Art Costa and Bena Kallick have identified 16 Habits of Mind that are used by effective thinkers when confronted with a challenging problem. Art Costa says a habit of mind “is knowing how to behave when you don’t know the answer” (Costa & Kallick, 2000–2001). Employing a habit of mind requires many skills, attitudes, and learned behaviors. These behaviors are not performed in isolation, but in clusters. The 16 Habits of Mind is not a complete list, but a beginning point for discussion on how people display their intelligence. Read through each of the habits below and on the next page. Circle the top three habits of mind that you consider important for your own classroom, and then complete the survey on page 1.20 to begin thinking about how effective your students are in employing the Habits of Mind.

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16 Habits of Mind	Description
1. Persisting	Ability to sustain a problem solving process over time
2. Managing Impulsivity	Ability to think before acting, intentionally forming a plan before beginning a task
3. Listening to Others—With Understanding and Empathy	Ability to listen to another person, to empathize with and to understand their point of view
4. Thinking Flexibly	Capacity to change one’s mind as additional data is received; ability to approach a problem from a new angle using a novel approach
5. Thinking About Our Thinking (Metacognition)	Ability to develop a plan of action, maintain that plan in mind over a period of time, and then reflect back on and evaluate the plan upon its completion. Aware of one’s actions and the effect of those actions on others and on the environment. Ability to explain one’s strategies of decision making.
6. Striving for Accuracy and Precision	Valuing of accuracy, precision, and craftsmanship
7. Questioning and Posing Problems	Knowing how to ask questions to fill in the gaps between what is known and unknown. Ability to recognize discrepancies and phenomena in one’s environment and probe into their causes.
8. Applying Past Knowledge to New Situations	Ability to abstract meaning from one experience, carry it forth, and apply it in a new and novel situation
9. Thinking and Communicating with Clarity and Precision	Striving to communicate accurately in both written and oral form taking care to use precise language, define terms, and use correct names, universal labels, and analogies
10. Gathering Data Through All Senses	Deriving information from the environment by observing or taking it in through the senses
11. Creating, Imagining, and Innovating	Trying to conceive problem solutions differently, examining alternative possibilities from many angles, using analogies, starting with a vision and working backward, taking risks, and pushing the boundaries of one’s perceived limits
12. Responding with Wonderment and Awe	Maintaining curiosity, enthusiasm, and passion about learning, inquiring, and mastering
13. Taking Responsible Risks	Accepting confusion, uncertainty, and the higher risks of failure as part of the normal process. Learning to view setbacks as interesting, challenging, and growth producing

Targeting Thinking in the Classroom

16 Habits of Mind	Description
14. Finding Humor	Using humor and laughter to liberate creativity and provoke such higher-level thinking skills as anticipation, finding novel relationships, visual imagery, and making analogies. Having a whimsical frame of mind, finding incongruity and perceiving absurdities, ironies, and satire
15. Thinking Interdependently	Heightened ability to think in concert with others. Ability to justify ideas and to test the feasibility of solution strategies on others. Willingness and openness to accept the feedback from a critical friend
16. Learning Continuously	Constantly searching for new and better ways, always striving for improvement, always growing, always learning, and always modifying and improving themselves

Summarized from: Costa & Kallick's "Describing 16 Habits of Mind."

At a Glance: Costa and Kallick's 16 Habits of Mind

Rather than trying to categorize all areas of thinking (like Bloom) or how knowledge is used within the context of a social and personal environment (like Marzano), Costa and Kallick define habits that are required to meet "challenging conditions"—ones that demand "strategic reasoning, insightfulness, perseverance, creativity, and craftsmanship to resolve a complex problem."

Targeting Thinking in the Classroom

Do Your Students Behave Intelligently?

As you complete this survey, think about the students in your classroom and how they approach difficult or new problems. Rate their behaviors that correspond to the 16 Habits of Mind.

- 1. In general, my students are persistent when dealing with a new problem. If they don't succeed on the first try, they keep trying until they do succeed.

Strongly Disagree Disagree Agree Strongly Agree

- 2. My students manage their impulses and think before they act. They formulate a plan before attempting a difficult task.

Strongly Disagree Disagree Agree Strongly Agree

- 3. My students listen to my and other students' ideas empathetically. They try to understand points of view that differ from their own.

Strongly Disagree Disagree Agree Strongly Agree

- 4. My students are open-minded, capable of changing their mind when new data is provided. They can easily change their approach to a problem if the first is not working.

Strongly Disagree Disagree Agree Strongly Agree

- 5. My students are aware of how they learn. They consciously reflect on what process works for them and what doesn't and adjust their plan accordingly. They are aware of how their actions affect others.

Strongly Disagree Disagree Agree Strongly Agree

- 6. My students proofread and check the quality of their work. They understand the importance of—as well as value—accuracy and precision.

Strongly Disagree Disagree Agree Strongly Agree

Targeting Thinking in the Classroom

7. My students are not afraid to ask questions or to probe deeper into an issue or problem.
-
- Strongly Disagree Disagree Agree Strongly Agree
8. My students apply what they have learned previously to solve new problems.
-
- Strongly Disagree Disagree Agree Strongly Agree
9. My students work hard to communicate accurately in writing and speaking.
-
- Strongly Disagree Disagree Agree Strongly Agree
10. My students observe their environment and use all their senses to gather information.
-
- Strongly Disagree Disagree Agree Strongly Agree
11. My students are creative when solving a new problem, trying to imagine different solutions. They are innovative visionaries.
-
- Strongly Disagree Disagree Agree Strongly Agree
12. My students allow themselves to see and respond to the beauty in the world. They maintain their sense of curiosity, enthusiasm, and passion about learning.
-
- Strongly Disagree Disagree Agree Strongly Agree
13. My students are willing to venture into the unknown and take responsible risks. They view setbacks as challenges that help them grow, rather than seeing them as failures.
-
- Strongly Disagree Disagree Agree Strongly Agree
14. My students use humor to creatively view situations and the odd or funny coincidences or relationships. They can see and appreciate the absurdities, ironies, and satire in life—as well as the whimsical side of themselves and others.
-
- Strongly Disagree Disagree Agree Strongly Agree

(continued)

Targeting Thinking in the Classroom

15. My students work really well together and are able to talk through and try out different solutions. They are open and receptive to the feedback from others.

Strongly Disagree Disagree Agree Strongly Agree

16. My students always work to improve themselves and endeavor to grow and learn from every experience. Learning is very important to them.

Strongly Disagree Disagree Agree Strongly Agree

Adapted from the Habits of Mind Survey by Steve Huffman, Sacred Hearts Academy, Hawaii (2004)

Review your survey results and compare them with the habits you identified as important for students in your classroom. Identify one or two habits that you are particularly interested in supporting in your classroom. Form a small group of like-minded colleagues to discuss that habit (or those habits) and its application in the classroom.



In your small group, use the following questions to help guide your discussion and, optionally, record your ideas in a wiki:

- When do you see that habit—or a glimmer of that habit—being employed right now by your students? What triggers or helps to encourage that habit?
- How can we structure our classrooms to help support that habit? What scaffolds, environment, or strategies can we employ to encourage the ongoing development of that habit?
- What changes could we make to our student projects or classwork to promote that habit?
- What conversations could you have with your students to discuss the Habits of Mind?

Activity 4: Creating Your Own “Habits of Learning Taxonomy”

When you think about what your students need to be successful, which skills and habits do you think are most important to support in your curriculum and classroom environment?

1. Consider all three models of categorizing/skills needed for students to learn most successfully. Which ideas from any of these models are you most interested in developing (or continuing to develop) in your classroom?
2. Develop your own “Habits of Learning Taxonomy” using a visual organizer that meets your needs. Use the table below, the Venn diagram on the next page, or an organizer of your own choosing to define and organize the thinking skills and/or habits you would like your students to develop in your classroom.



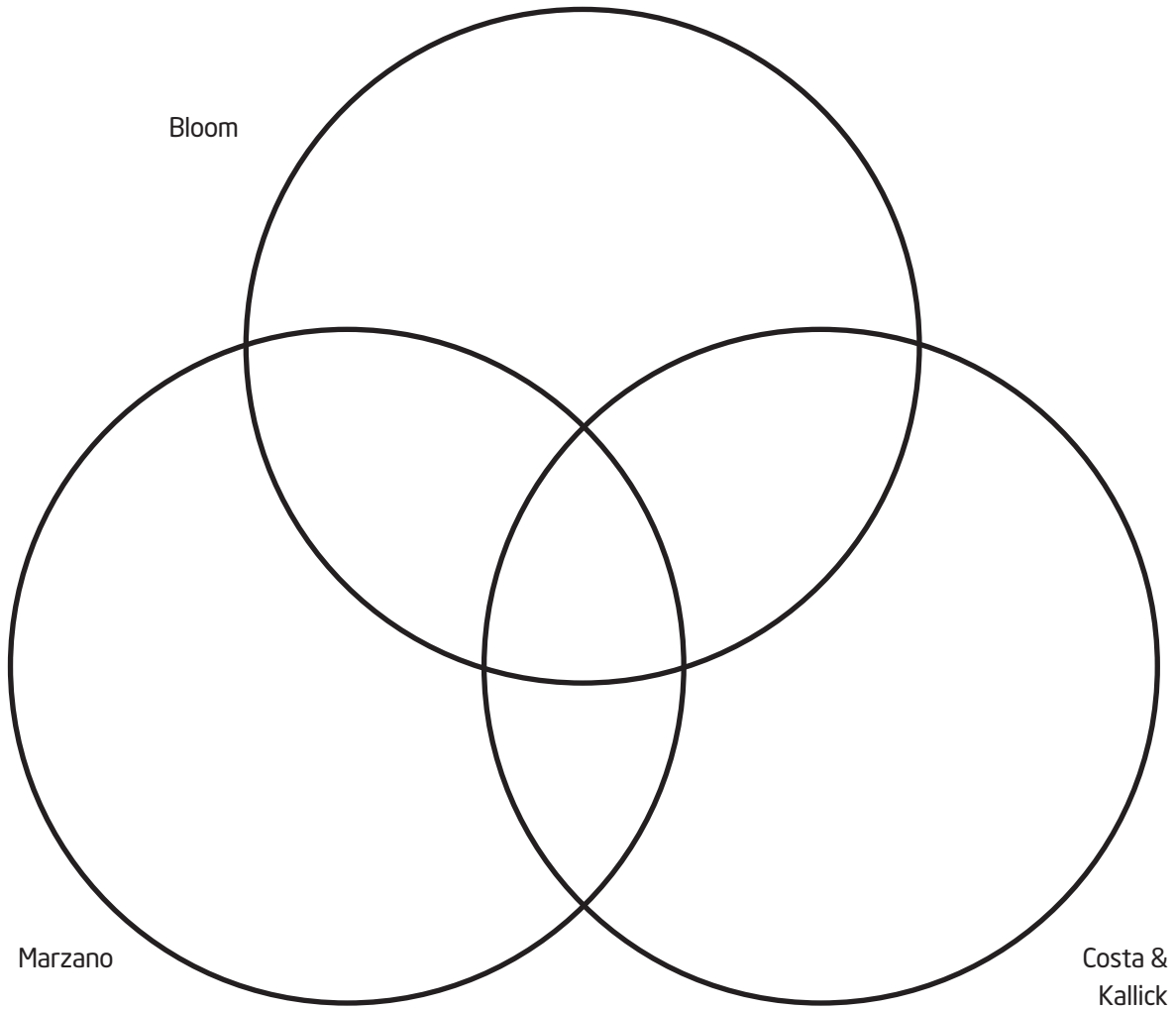
Note: A summary of Wiggins and McTighe’s Six Facets of Understanding is available in the Thinking Skills folder on the Curriculum Resource CD as an additional thinking model to consider, if desired. You may also want to review the thinking skill resources available at: www.intel.com/education/designprojects — Click **Thinking Skills**.

Visual Organizer Option 1: Table

Bloom’s Taxonomy	Marzano’s Dimensions of Learning	Costa & Kallick’s 16 Habits of Mind

Targeting Thinking in the Classroom

Visual Organizer Option 2: Venn Diagram



Visual Organizer Option 3: Create Your Own

Activity 5: Reviewing the Unit Plan Template

Throughout the following modules, you will:

- Build the foundation of your unit (by determining your targeted thinking skills, standards, priorities for project design, Curriculum-Framing Questions, and Assessment Plan)
- Try out the thinking tools to see how well they fit and support your unit's goals and objectives
- Finalize your plans for tool use, unit activities, and implementation

Modules 1 through 4 provide the opportunity to build a strong, pedagogically sound foundation for your unit. In Modules 5 through 10, you test out the ideas for using the thinking tools that may work in your unit. In Module 11, you finalize your Unit Plan, plan for assessment, assessment instrument(s), and then showcase your unit.

During this unit-building process, you choose the best tool or tools for the job. Throughout the modules, you will evaluate your ideas for using the tools in your unit—determining their suitability for your students' needs—and then choose the appropriate tools to integrate into your Unit Plan. At any time during these modules, or if you know from the outset that a specific tool will not work for your unit, you can try out an idea for another unit or project that may fit the purpose of the tool better.

In this activity, you view the Unit Plan Template in preparation for future activities. You also use this time to type your "Habits of Learning Taxonomy" into the Unit Plan Template as the first layer in the foundation of your unit. To get started, you need to create a location to save your unit materials. Use the Help Guide if you need assistance in completing any technology skills identified below.

It is important that you do not force a fit for the use of technology or to simply use the thinking tools for superfluous activities. Modules 5 through 10 will help you identify the best tools to use in your unit.



1. Create a folder on your desktop (or the location indicated by your instructor) and name the folder *[your name] Project Folder*. Save all files from this course in this folder. (See Operating Environment Skill 2.1.)



2. For easier access to the Curriculum Resource CD, create a shortcut to the "Start Here" file located at the top level of the CD. (See the CD Instructions on the Curriculum Resource CD.)



Note: The Curriculum Resource CD works best with Microsoft Internet Explorer 6.0* and later. However, if you are using Mozilla Firefox* or Netscape Navigator* as your Internet browser, create a shortcut to the "Thinking_w_Tech.htm" file within the Curriculum_Resource_CD folder instead.

3. Start the Curriculum Resource CD and navigate to the *Unit Development* folder on the CD. (See the CD Instructions on the Curriculum Resource CD.)

Refer to the following skills in the Help Guide for this section:

- Operating Environment Skill 2.1: To create a new folder on the desktop

Module 1

Targeting Thinking in the Classroom

4. View the following Unit Plan Template, briefly review the various sections, and note the descriptions in the fields that you are required to complete. The callouts explain in which module you complete different sections of the Unit Plan Template.
5. Save the Unit Plan Template into your Project Folder. (See Web Technologies, Mozilla Firefox Skill 2.1 or Web Technologies, Internet Explorer Skill 4.1.)
6. Open the Unit Plan Template from your Project Folder.
7. Consider refining your "Habits of Learning Taxonomy" to a manageable number of thinking skills, and then type them into the *Habits of Learning Taxonomy* section of your Unit Plan and save. You will continue to refer to these thinking skills as you build your unit throughout the following modules.



Refer to the following skills in the Help Guide for this section:

- Web Technologies, Mozilla Firefox 2.1: To download a document from a Web site
- Web Technologies, Internet Explorer 4.1: To download a document from a Web site

Module 1: Think of topic and possible project for unit.

Modules 6, 8, 10: Revise ideas for unit after trying out your ideas for incorporating the thinking tool(s).

Module 11: Summarize unit and the incorporation of one or more thinking tools

Unit Plan Template

Unit Author	
First and Last Name	
School District	
School Name	
School City, State	
Unit Overview	
Unit Plan Title	
<i>A descriptive or creative name for your unit</i>	
Unit Summary	
<i>A concise overview of your unit that includes the topics within your subject that are covered, a description of the main concepts learned, a brief explanation for how the activities help students answer the Curriculum-Framing Questions, and how the thinking tool(s) will be integrated into the unit to meet important learning goals.</i>	
Subject Area	
<i>The subject area you are specifically targeting for the unit (addressed in the standards, objectives, and instructional procedures)</i>	
Grade Level	
<i>The targeted grade level(s) for the unit</i>	
Approximate Time Needed	
<i>Example: 8 50-minute class periods, 6 weeks, 3 months, and so forth</i>	

(continued)

Targeting Thinking in the Classroom

Unit Foundation		
Habits of Learning Taxonomy		
<i>A list of higher-order thinking skills and/or habits that are targeted for your classroom</i>		
Targeted Content Standards and Benchmarks		
<i>Paste your standards here. After refining and reducing the list of standards for this specific unit, the resulting standards in this section should include prioritized, targeted standards that your students are expected to meet (not just lightly address) and which you will assess by the end of this unit.</i>		
Student Objectives/Learning Outcomes		
<i>A prioritized list of content objectives that students will master by the end of unit</i>		
Curriculum-Framing Questions		
Essential Question	<i>A broad, overarching question that can bridge several units/subject areas</i>	
Unit Questions	<i>Guiding, open-ended, unit-specific question(s) that help build understanding of the Essential Question</i>	
Content Questions	<i>Fact-oriented, closed questions that are required in order to begin answering the larger questions of the unit. Often these questions are content area or definitional questions that directly support the unit's targeted standards.</i>	
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"> Enter assessments that help determine a student's background, skills, attitude, and misconceptions 	<ul style="list-style-type: none"> Enter assessments that gauge student needs, monitor progress, check for understanding, and encourage metacognition, self-direction, and collaboration 	<ul style="list-style-type: none"> Enter assessments that assess students' understanding and skills, encourage metacognition, and gauge student needs for future instruction
Assessment Summary		
<i>Describe the assessments that you and your students use to gauge needs, set goals, monitor progress, provide feedback, assess thinking and processes, and reflect on learning throughout the learning cycle. These might include graphic organizers, journal prompts, anecdotal notes, checklists, conferences, questioning, and rubrics. Also describe the artifacts of student learning that you assess, such as products, presentations, written documents, or performances and the assessments you use. Describe in the Instructional Procedures section who uses the assessments, how they are used, and where they occur.</i>		

Module 1: Create your own "Habits of Learning Taxonomy"

Module 3: Develop Curriculum-Framing Questions for unit

Module 4: Draft Assessment Timeline

Modules 6, 8, 10: Revise Assessment Plan after trying out your ideas for incorporating the thinking tool(s).

Module 11: Write Assessment Summary and create an assessment for student project

(continued)

Module 1

Targeting Thinking in the Classroom

Modules 5 & 6: Try out a Visual Ranking project

Visual Ranking Elements (Complete this section if this tool will be used in the unit)

Visual Ranking Project Name (For the *Visual Ranking* workspace)

A descriptive title for your Visual Ranking project. This name could specifically reference the purpose or use of the Visual Ranking Tool in your unit. This title will appear in the Student Workspace as well as above your students' Visual Ranking lists.

Project Description (For the *Visual Ranking* workspace)

A focused, short paragraph that describes the project to your students and explains how they will use the Visual Ranking Tool to help them answer the questions of the unit. It explains why this is a project or problem that is worthy of study as well as defines what your students will try to solve, produce, respond to, test, recommend, or find out.

Prompt (For the *Visual Ranking* workspace)

Instructions on what criteria students should consider as they rank the list. Word the prompt so that students know that they should sort all items and not just pick out the best. This question or statement will appear on the top of the students' list to rank.

Sorting List (For the *Visual Ranking* workspace)

Items to rank. Maximum of 16 short-length items or 12 long-length items. Optimal number to sort is 7–12 items. Ensure there is no unintentional bias in the order of your list; you may want to alphabetize it.

Practice Ranking (For your future quick reference)

Teacher ID:

Password:

Practice Team ID 1:

Password:

Practice Team ID 2:

Password:

Modules 7 & 8: Try out a Seeing Reason project

Seeing Reason Elements (Complete this section if this tool will be used in the unit)

Seeing Reason Project Name (For the *Seeing Reason* workspace)

A descriptive title for your project. This name could specifically reference the purpose or use of the Seeing Reason Tool in your unit. This title will appear in the Student Workspace as well as above your students' Seeing Reason maps.

Project Description (For the *Seeing Reason* workspace)

A focused, short paragraph that describes the project to your students and explains how they will use the Seeing Reason Tool to help them answer the questions of the unit. It explains why this is a project or problem that is worthy of study as well as defines what your students will try to solve, produce, respond to, test, recommend, or find out.

Research Question (For the *Seeing Reason* workspace)

The direct question that students will respond to in their maps, which requires the building of a cause-and-effect map of a complex system or issue

(continued)

Targeting Thinking in the Classroom

Seeing Reason Elements (continued)	
Practice Map (For your future quick reference)	
Practice Team ID:	Password:
<i>Copy an image of the practice map here. (See Teaching Tools, Seeing Reason Tool Skill 2.26.)</i>	
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)	
<i>A descriptive title for your project. This name could specifically reference the purpose or use of the Showing Evidence Tool in your unit. This title will appear in the Student Workspace as well as above your students' Showing Evidence cases.</i>	
Project Description (For the <i>Showing Evidence</i> workspace)	
<i>A focused, short paragraph that describes the project to your students and explains how they will use the Showing Evidence Tool to help them answer the questions of the unit. It explains why this is a project or problem that is worthy of study as well as defines what your students will try to solve, produce, respond to, test, recommend, or find out.</i>	
Prompt (For the <i>Showing Evidence</i> workspace)	
<i>The direct question that students will respond to in their argument case, which requires the investigation and gathering of evidence to validate a claim</i>	
Practice Case (For your future quick reference)	
Practice Team ID:	Password:
Reviewing Team ID:	Password:
Claims	
<i>If you are pre-populating the claims for your students, enter those claims here.</i>	
Evidence	
<i>If you are pre-populating the evidence bins for your students, describe the evidence you will use and/or the source for those evidence items here.</i>	
Unit Details	
Prerequisite Skills	
<i>Conceptual knowledge and technical skills that students must have to begin this unit</i>	
Instructional Procedures	
<i>A clear picture of the instructional cycle—a description of the scope and sequence of student activities and an explanation for how students are involved in planning their own learning. Learning activities can be described in phases or activity-by-activity. Describe methods of assessment as they occur and note how the Curriculum-Framing Questions will be used and answered throughout the unit.</i>	

Modules 9 & 10: Try out a Showing Evidence project

Module 2: Identify a project approach for unit
Modules 6, 8, 10: Revise Instructional Procedures after trying out your ideas for incorporating the thinking tool(s)
Module 11: Finalize Instructional Procedures for unit

Module 1

Targeting Thinking in the Classroom

Module 11: Create accommodations to support all learners

Module 11: Identify resources for project

Unit Details (continued)	
Accommodations for Differentiated Instruction	
Resource Student	<i>Describe accommodations and support for students, such as extra time for study, adjusted learning objectives, modified assignments, grouping, assignment calendars, adaptive technologies, and support from specialists. Also describe modifications in how students express their learning (for example, oral interview instead of a written test).</i>
Nonnative English Speaker	<i>Describe language support, such as English Language Learner (ELL) instruction and tutoring from more able bilingual students or community volunteers. Describe adaptive materials, such as first-language texts, graphic organizers, illustrated texts, dual-language dictionaries, and translation tools. Describe modifications in how students express their learning, such as first language rather than English or an oral interview instead of a written test.</i>
Gifted Student	<i>Describe the various ways students may explore curriculum content, including independent study, and various options through which students can demonstrate or exhibit what they have learned, such as more challenging tasks, extensions that require in-depth coverage, extended investigation in related topics of the learner's choice, and open-ended tasks or projects.</i>
Materials and Resources Required for Unit	
Printed Materials	<i>Textbooks, curriculum guides, story books, lab manuals, reference materials, and so forth</i>
Supplies	<i>Essential items that have to be ordered or gathered to implement your unit and are specific to the course of study. Do not include everyday items that are common to all classrooms.</i>
Technology - Hardware	<i>Technology devices needed to carry out the plan. These may include: cameras, computer(s), DVD player, handheld devices, printer, projection system, scanner, television, VCR, video camera, video conferencing equipment, and so forth</i>
Technology - Software	<i>Software programs and applications needed to carry out the plan. These may include: database/spreadsheet, desktop publishing, Web page development, word processing software, multimedia, specific software programs, email, Internet browser, and so forth</i>
Internet Resources	<i>Web addresses (URLs) that support the implementation of your unit or Web sites that students will use as a starting point for gathering information and evidence</i>
Other Resources	<i>Field trips, experiments, guest speakers, mentors, other students/classrooms, community members, parents, and so forth</i>

Activity 6: Supporting Thinking

To prepare for the unit planning process that occurs throughout this course, it will be useful to identify and analyze what affects the way we think. Over the next few modules, you will explore this topic from different perspectives: a 21st century world citizen, a teacher, and a student in your classroom. During this activity, consider this topic from the perspective of a productive and successful 21st century world citizen. Refer to your own “Habits of Learning Taxonomy” on the previous pages and the 21st century skills beginning on page 1.06 as you consider what impacts thinking in the 21st century. Use the *Seeing Reason Tool* to explore answers to the question,

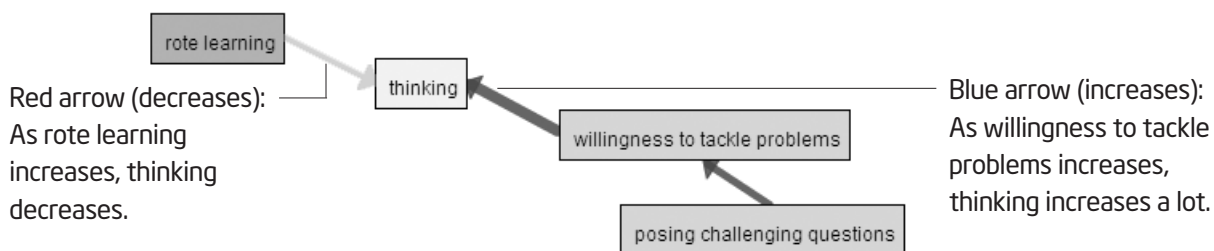
What makes you really think?

Step 1: Understanding the Seeing Reason Tool

During this and future activities, we will be using the *Seeing Reason Tool* to explore what affects our ability and interest in thinking deeply. The following provides a quick review of the tool space.

Factors involved in cause-and-effect relationships are represented by a square box. The relationships between the factors are represented by arrows of a specific thickness and color:

- Thicker arrows show a stronger relationship.
- Thinner arrows show a weaker one.
- Blue arrows indicate positive relationships (as X increases, Y increases).
- Red arrows indicate negative relationships (as X increases, Y decreases).



By moving your mouse over a relationship arrow, the description of that relationship will appear at the top of the map. By double-clicking an arrow or a factor, you can view the full relationship description that explains or provides evidence for the causality of the relationship.

Module 1

Targeting Thinking in the Classroom

Although you will be working in teams for this activity, you will be assigned your own team ID and password so that you can use the same log-in information for the other thinking tool projects in future modules.



When you are working in a team, simply decide among your team members which log-in to use. You

may find a sticky note on your computer with the log-in information. Since you have already experienced *Seeing Reason* before, the Help Guide steps are provided in case you need some additional assistance.



Refer to the following skills in the Help Guide for this section:

- Seeing Reason Tool Skill 2.15: Adding a factor
- Seeing Reason Tool Skill 2.20: Adding a relationship
- Seeing Reason Tool Skill 2.22: Saving a project
- Seeing Reason Tool Skill 2.23: Saving a map to a portfolio



Be sure to save your map into your portfolio at the end of this activity.



Don't forget to view other teams' maps.



Step 2: Exploring Thinking with the Seeing Reason Tool

Use the *Help Guide* if you need assistance in completing any technology skills identified below.

1. With a partner, go to: www.intel.com/education/seeingreason
2. Add this page to your Favorites or online bookmarking site.
3. Click **Student Log-In**.
4. Your facilitator will give your team the teacher ID, team ID, and password. Write them on Overview page vi as you will need these later in the course.
5. The student homepage will open. Under *Project Name*, click on the project **Thinking**.
6. Working with a partner, add factors and relationships to your map that answer the question, *What makes you really think?* from the perspective of a 21st century world citizen. Use the *Help Guide* if you need assistance in:

- a. Creating factors from the viewpoint of a 21st century world citizen. Provide concrete examples in the factors' description area. (See Teaching Tools, Seeing Reason Tool Skill 2.15.)

Note: For this activity, assign the same color to all the factors to designate that these factors are from the 21st century point of view. Be sure to include those factors that negatively affect thinking.

- b. Adding relationships between the factors. (See Teaching Tools, Seeing Reason Tool Skill 2.20.)

Note: The first factor must always "increase" in order to be able to visually interpret the map. You may need to re-word a factor so that the "sentence structure" and meaning of the map is correct.

- c. Saving your project periodically. (See Teaching Tools, Seeing Reason Tool Skill 2.22.)
- d. Saving your project to your portfolio. (See Teaching Tools, Seeing Reason Tool Skill 2.23.)

Note: You will revisit your map in later activities to add more factors and relationships. The Portfolio button allows a team to save important stages of their map so each stage of the learning process can be reviewed by the teacher.

7. Walk around to view and discuss other teams' maps. Double-click factors and relationship arrows to see the details in order to better understand the thinking of each team.

Step 3: Reflecting on Map-Building



After the mapping activity, discuss with the group the following questions:

- Did you and your partner immediately agree on what to map? Did you talk about your ideas and compromise? Or did you add ideas from both of you to the map?
- What did you talk about as you created your map?
- Did viewing other teams' maps give you other ideas?
- In what ways do you think the *Seeing Reason Tool* would be beneficial to students who are studying a system or issue that involves cause and effect?

Targeting Thinking in the Classroom

Extension Activity: Thinking in the Classroom

The following resources are available to you for self-study or as an optional extension within your course.

Step 1: Taking a Look into Two Classrooms

The intent of this activity is to see how thinking skills are embedded into instruction. Two sets of vignettes—one on mathematics and one on nutrition—are available on the Curriculum Resource CD. The classrooms described include a wide range and variety of levels of thinking skills as well as different contexts for students' learning. Read both sets of vignettes and then choose one to reflect upon. Both sets reflect different teachers teaching the same topic.



1. Start the Curriculum Resource CD and open the *Extensions* folder.
2. Open "Module 1 Taking a Look into Two Classrooms."
3. Read both vignettes and choose one to reflect upon. Think about the differences between the two classrooms.
4. Which set of vignettes did you choose to reflect upon?
 Mathematics Nutrition
5. What kinds of thinking skills did students demonstrate in each classroom?

Classroom 1: _____

Classroom 2: _____

6. Which teacher's classroom do you think was more successful at fostering, supporting, and encouraging students' higher-order thinking skills?

Targeting Thinking in the Classroom

7. Considering the classroom that you felt was more successful, reflect upon the following questions:

What did the teacher do? _____

What did the students do? _____

8. In which classroom do you think students were more engaged? Why?

Step 2: Reflecting on Your Own Classroom

In the previous step, you had the opportunity to take a peak into a few classrooms and consider the thinking skills that were supported in each. Now reflect on your own teaching. Think about a specific lesson/unit you recently taught or one you will be teaching in the future. Consider the classroom environment, your methods of modeling and coaching, and your students' active engagement in the learning process as you answer the questions on the reflection survey.



1. Start the Curriculum Resource CD and open the *Extensions* folder.
2. Open "Module 1 Reflecting on Your Own Classroom."
3. Answer the questions in the survey to reflect on your own teaching.

Targeting Thinking in the Classroom

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Targeting Thinking in the Classroom

Summary

Review the central ideas in this module and the plans or materials you created to help improve student learning.

Use this summary to review this module's main points and check for understanding.

Module 1 Key Points:

- The essential skills needed to be successful in the future go beyond basic literacy. Students must also be able to read critically, write persuasively, think and reason logically, solve complex problems, and other such skills, such as those defined by the Partnership for 21st Century Skills.
- Research is clear that instruction that builds upon and encourages higher-order thinking skills results in greater levels of student learning.

Accomplishments:

- Created a personalized list of higher-order thinking skills to target in instruction using three models for defining and categorizing thinking—Bloom's Revised Taxonomy, Marzano's Dimensions of Learning, and Costa and Kallick's 16 Habits of Mind
- Identified positive and negative influences that can affect thinking—from the viewpoint of a 21st century world citizen

In the following modules, we build upon these concepts as we discuss ways we can support and encourage higher-order thinking skills in the classroom.

