Activities

MODULE 8

Considering the Seeing Reason Tool for Your Unit

Description: In this module, you try out your ideas by creating a practice *Seeing Reason* causal map. You also discuss and practice effective questioning techniques, provide and receive feedback on your ideas, and use tips on implementation and assessment to revise your Unit Plan.

Activity 1: Trying Out Your Seeing Reason Idea

Creating a practice causal map enables you to test your concepts and disclose different interpretations of the research question and avenues of thought. You can then use your findings to revise your project, questions, and requirements, as needed. Note that your practice causal map should *not* be shown to your students as an example for them to follow. Rather, students should make their own discoveries. You can also use your practice causal map to determine whether the use of the *Seeing Reason Tool i*s the best fit for your unit. You may decide, after trying out your ideas, that another thinking tool can support your unit's objectives in a more direct way.

Follow the steps below to create a practice causal map. Use the Intel® Education *Help Guide* if you need assistance in completing any technology skills identified in the steps. You can use the same directions with your students when you are ready to have them create their own causal maps.

When creating your practice causal map, ensure the following:

- The causal map directly answers a research question that investigates cause-and-effect relationships, and also supports and provides the basis for answering the in-depth project questions.

- The factors listed on the causal map can be measured, observed, or verified.

- The factors are clearly described, and the relationships between the factors are causal, valid, and defensible.

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Step 1: Logging On as a Student

1. Open *Seeing Reason* from your Favorites. (**www.intel.com/education/seeingreason**)

2. Click **Student Log-In**.

3. Type your **Teacher ID**, **Team ID**, and **Password** (which you may have written on Overview page vii), and then click **Sign In**.

   Note: All of the teams in your class will use the same teacher ID, so you can write it on the board or on assignment sheets. You will need to meet with each team to let them know their team ID and password.

4. Open your project. (See Teaching Tools, Seeing Reason Tool Skill 2.3.)

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

- Seeing Reason Tool Skill 2.3: Opening a Seeing Reason project in the Student Workspace

- Seeing Reason Tool Skill 2.15: Adding a factor

- Seeing Reason Tool Skill 2.16: Adding or changing the color of an existing factor

- Seeing Reason Tool Skill 2.23: Saving a project

Step 2: Using the Seeing Reason Tool

The following instructions may seem redundant since you worked with *Seeing Reason* in previous modules; however, the instructions are provided here to model how you might instruct your students. Review the instructions and then create a sample map for your project that includes the level of detail that you might expect from your students. Direct your students to use the *Help Guide* as needed to complete any of the technological steps below.

1. Preview the checklist on page 8.07 and keep in mind its criteria for a well-developed project and map as you test your project ideas.

2. After you log on and select your project, a blank map opens.

3. Create a new factor. Name and describe the factor. (See Teaching Tools, Seeing Reason Tool Skill 2.15.)

4. Consider whether colors will have meaning for your factors, and then choose the color you want the factor to be. (See Teaching Tools, Seeing Reason Tool Skill 2.16.)

5. Continue adding new factors until you are ready to create relationships.

6. Be sure to save your work at frequent intervals and before you exit out of the map. (See Teaching Tools, Seeing Reason Tool Skill 2.23.)

7. Delete any factors you decide are not relevant or appropriate. (See Teaching Tools, Seeing Reason Tool Skill 2.19.)

8. Add relationships between factors. Be sure to provide an adequate explanation of the relationships between factors—similar to what you might expect from your students. (See Teaching Tools, Seeing Reason Tool Skill 2.20.)

    Note: The description area in both the *Edit Factor Information* and *Edit Relation Information* dialog boxes can be used to clarify meaning, justify or quantify factors or relations, cite sources, and so forth.

9. Edit factors if relationships are difficult to define. (See Teaching Tools, Seeing Reason Tool Skill 2.18.)

10. Enter comments below the map that can be directed to the teacher or team members. All comments are saved sequentially, with the most recent on top. (See Teaching Tools, Seeing Reason Tool Skill 2.28.)

11. Preview or print your work. (See Teaching Tools, Seeing Reason Tool Skill 2.30.)

12. Save important stages of the map into your portfolio. The portfolio can be used to save milestone maps that students want the teacher to view. The teacher can always look at all of the saved maps; however, the portfolio can include maps that show significant changes. (See Teaching Tools, Seeing Reason Tool Skill 2.24.)

    Note: You will have additional time to work on your sample map later in this module.

13. Before closing the window to exit out of the map, save your work. (See Teaching Tools, Seeing Reason Tool Skill 2.23.)

> Refer to the following skills in the Help Guide for this section:
>
> - Seeing Reason Tool Skill 2.18: Editing a factor
> - Seeing Reason Tool Skill 2.19: Deleting a factor
> - Seeing Reason Tool Skill 2.20: Adding a relationship
> - Seeing Reason Tool Skill 2.23: Saving a project
> - Seeing Reason Tool Skill 2.24: Saving a map to your portfolio
> - Seeing Reason Tool Skill 2.26: Copying, saving, or printing a map as an image
> - Seeing Reason Tool Skill 2.28: Commenting on a project
> - Seeing Reason Tool Skill 2.30: Viewing and printing a team's most recent map

Step 3: Saving a Map Image

You can insert a map image into other files, such as word processing documents (for your Unit Plan), presentations, or publications.

1. Copy a map image that can be inserted into any document or presentation or save a map to use at a later time. (See Teaching Tools, Seeing Reason Tool Skill 2.26.)

2. Paste the map into a presentation or document (such as your Unit Plan). (See Teaching Tools, Seeing Reason Tool Skill 2.26.)

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Activity 2: Sharing Causal Maps and Practicing Effective Questioning

In this activity, you role-play teacher-student interactions using inquiry-based questions while sharing your practice causal map. In addition, you receive valuable feedback on your map's effectiveness.

Step 1: Taking a Deeper Look at Maps

The *Seeing Reason* mapping tool supports investigation that occurs in cycles:
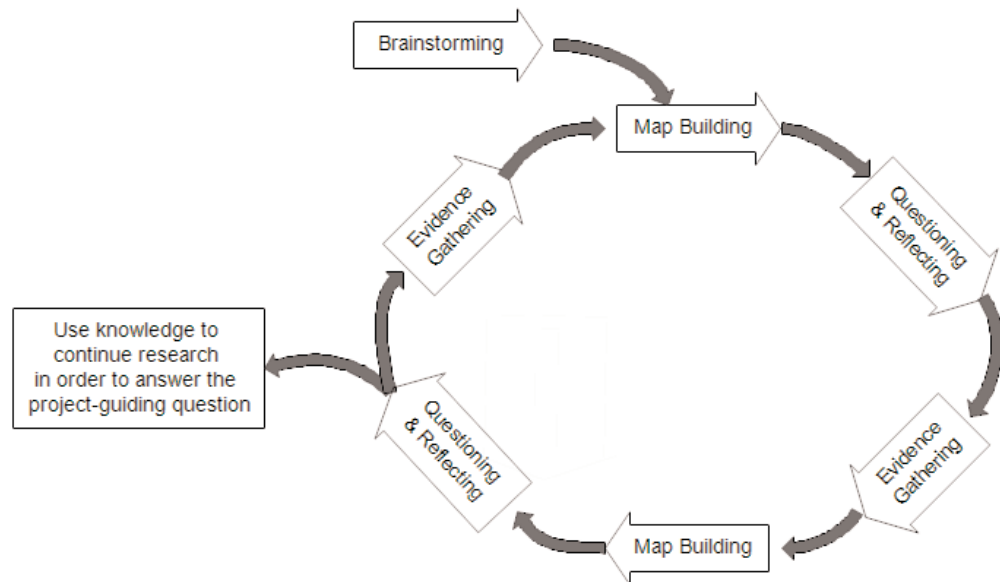
After building an initial map that taps students' prior knowledge of a topic, students experiment or research to gather more data and evidence, and then revise and adjust their maps. Part of the teacher's task involves cycles of listening, questioning, and refocusing student work. The *Seeing Reason Tool* is best used for reasoning based on measurable or observable evidence. A teacher's main job during map-building sessions is to lead students to evaluate their own thinking—each time refocusing students' attention on the relationships among factors or weighing the evidence used to define relationships.

As a group, discuss some sample maps and the kinds of conversations you might have with the student teams that developed them.

Note any questioning techniques you learned during this activity.

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Your facilitator will show some sample student maps for you to discuss. Various grade levels are represented in the sample maps. Although your facilitator may have additional ideas for questions and discussions, you should come up with as many ideas as you can for the types of conversations you would have with the student teams.

Step 2: Using Effective Questioning Techniques

Successful causal mapping activities involve dialog between the teacher and the investigating team. The teacher should raise the bar on rigorous thinking by asking "how" and "why" questions, rather than procedural ones. Teachers need to test their students' logic and probe for justification.

Have an open discussion about your map with your partner, and focus on how questions can help develop your students' thinking processes.

1. In a small group or in pairs, talk through your practice causal maps.

2. Take turns role-playing student and teacher. In your role as a student, share and talk through the map you created. Use the space on the following page to note any suggested changes or new ideas for updating your map.

3. In your role as a teacher (while viewing your colleague's causal map), practice the cycle of listening, questioning, and helping to refocus your "student's" work. Peruse the following questions and use them as needed:

   ▪ How have you described this factor?

   ▪ Would you please read this relationship for me?

   ▪ Is this factor measurable? Observable?

   ▪ What other factors are related to this one?

   ▪ What is your evidence for the relationship you show between these factors?

   ▪ Why do you think this factor affects the other factor?

   ▪ How have you described your evidence for this relationship?

   ▪ How are these factors different?

   ▪ What do you mean by… ?

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- Is there another factor that contributes to …?

- Why is this important to understand?

- What is happening in this relationship?

- Can this happen in another way?

- What causes this to happen?

- Can you explain this evidence further? Can it be measured? How? Reproduced?

- If you think this is evidence for that, then what is this evidence for?

- Can you explain this relationship further? How does it increase this factor?

Note: Students should also learn how to use effective questioning techniques as they work through and discuss their maps with each other.

From the feedback you received, write down any new ideas for your practice causal map.

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Note any questioning techniques you learned during this activity.

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Step 3: Reflecting on Your Causal Map

With the other team or teacher from the previous step, discuss the overall concept of your project and practice map. Determine whether your project and map support the complexities of the concepts students will be studying in the unit. Additionally, consider whether your practice causal map supports and begins to provide answers for the overall unit. Use the Reflection Checklist below and the Project Rubric on pages 2.18–2.19 to help guide your discussion. Use the *Comments* section in the Reflection Checklist to note any needed revisions.

Note: This checklist is available in the *Thinking Tools, Seeing Reason Tool* folder on the Curriculum Resource CD.

Seeing Reason Project Reflection Checklist

Reflection Checklist	Comments
☐ The project description is focused and clear. The description provides background and/or context for how the *Seeing Reason Tool* fits in the unit.	
☐ The project description defines what students will be trying to solve, produce, respond to, test, recommend, or find out.	
☐ The research question is worded so that it requires the building of a cause-and-effect map of a complex system or issue.	
☐ The practice causal map contains factors of sufficient quantity and quality to adequately answer the research question.	
☐ A high level of interaction or complexity exists among the factors.	
☐ The factors listed on the causal map can be measured, observed, or verified.	
☐ The factors and relationships are clearly described, and the relationships between the factors are causal, valid, and defendable.	
☐ The map building and overall project require students to use higher-order thinking skills.	
☐ The use of the *Seeing Reason Tool* helps students meet the unit's learning objectives.	
☐ The overall project idea meets the highest ratings of the Project Rubric on pages 2.18–2.19.	

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Activity 3: Revising Your Project

Use any new ideas from your colleagues to revise your practice map. Use the Internet to research your evidence and then eliminate, validate, or add to your initial causal map ideas.

Step 1: Editing Your Project

If you need to edit the project, or want to practice editing a project, follow the directions below.

1. Open *Seeing Reason* from your Favorites. (**www.intel.com/education/seeingreason**)

2. Click **Teacher Workspace**.

3. Enter your **Login ID** and **Password**. (Your log on information may be listed on Overview page vii.)

4. Open the project that you want to edit. (See Teaching Tools, Seeing Reason Tool Skill 2.5.)

5. Change any of the project information. (See Teaching Tools, Seeing Reason Tool Skill 2.8.)

6. Add or edit team information. (See Teaching Tools, Seeing Reason Tool Skills 2.10 and 2.12.)

Step 2: Reviewing Student Work

Follow the steps below to practice reviewing a student causal map.

1. If you have logged out as a teacher, go to the *Seeing Reason Teacher Workspace* at **www.intel.com/education/seeingreason**. Click **Teacher Workspace** and log on.

2. Review your sample team's work. The team's most recent map is displayed by default. (See Teaching Tools, Seeing Reason Tool Skill 2.30.)

    Caution: In this review mode, the maps you view are fully functional. Any changes you make will be reflected in the students' map.

3. In the *Comments* section below the map, enter your comments to the team. (See Teaching Tools, Seeing Reason Tool Skill 2.28.)

    Note: All comments are saved sequentially, with the most recent one at the top.

4. View how the team's thoughts have evolved through the project by viewing or printing maps from all work sessions. You can also view students' descriptions of the

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

- Seeing Reason Tool Skill 2.5: Opening an existing project

- Seeing Reason Tool Skill 2.8: Editing a project

- Seeing Reason Tool Skill 2.10: Add a new student team

- Seeing Reason Tool Skill 2.12: Viewing or editing team information

- Seeing Reason Tool Skill 2.28: Commenting on a project

- Seeing Reason Tool Skill 2.30: Viewing and printing a team's most recent map

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factors and the relationships as well as delete maps. (See Teaching Tools, Seeing Reason Tool Skills 2.31 and 2.35.)

Note: If you have a pop-up blocker, you need to turn it off for this feature to work. Another way to override your pop-up blocker is to hold down the **Ctrl** key as you click the link to view the maps. **Macintosh* users:** You may be able to override a pop-up blocker by holding down the Command key as you click the link.

<div style="float:right; border:1px solid #ccc; padding:8px;">
Refer to the following skills in the Help Guide for this section:

- Seeing Reason Tool Skill 2.31: Viewing and printing selected maps

- Seeing Reason Tool Skill 2.35: Deleting selected maps
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a. **Most recent map** displays the most recent map and the descriptions of the factors and relationships.

b. **Select maps to view or print** shows small images of saved maps that you can select to view or print. You may only want to view or print maps showing significant changes.
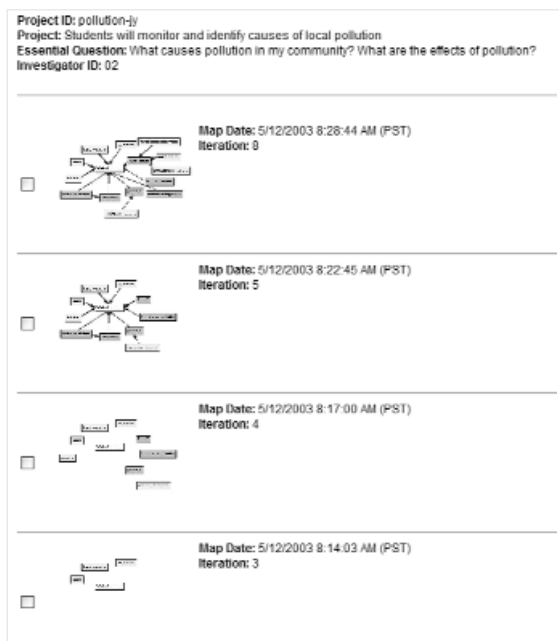
c. **All maps for this team** shows all the maps and the descriptions of the relationships.

d. **Maps in Portfolio** takes you to the maps the students have saved into their portfolio.

Step 3: Revising Your Causal Map

Use any new ideas from your colleagues to revise your practice map. Use the Internet to research your evidence in order to eliminate, validate, or add to your initial causal map ideas.

Activity 4: Revisiting Your Unit Plan

In this activity, you discuss ways to implement and manage projects that use the *Seeing Reason Tool* and continue working on your Unit Plan.

Step 1: Understanding Best Classroom Practices

Learn the tool by using it. The no-frills simplicity of the maps is intentional. Students spend little time on learning to use the tool and quickly turn their attention to the complexities of the problems they are exploring. Teachers find that a short 5- to 10-minute demonstration of creating factors and defining relationships followed by hands-on time building sample maps is sufficient preparation for first-time users. Students' natural trial-and-error tendencies will give them further confidence with the tool's features.

Use the tool in groups—pairs is ideal. On the road to "making thinking visible," the tool makes thinking discussible. Because map building naturally elicits debate and discussion about what is going on in students' minds, the maps are, most importantly, for groups. Teachers find that pairs of students work best, with regular rotations between one at the keyboard and one keeping track of the entries.

Teachers also offer one important ground rule—both members of the team must "own" the factors and relationships defined in the map. That is, each team member must be able to support the presence of a factor or relationship with evidence or reasoning. On occasion, students will disagree about adding factors, reporting that a partner "won't let me add my factors!" Encourage teams to first find factors that they can agree on, and then to look for and discuss evidence for the factors they disagree on.

Early elementary classrooms present a different challenge. The most effective way to use the *Seeing Reason Tool* is in a whole class activity where the teacher facilitates the building of the map.

Not all work and discussion occurs at the computer. The mapping tool supports investigation that occurs in cycles of evidence gathering, map building, and reflecting. After building an initial map that taps students' prior knowledge, students experiment or research to gather more data and evidence, and then return to revise and adjust their maps. Teachers report that journal reflections are essential to focus and refine work. Student pairs can end a map-revision session (developing new factors and relationships) by printing the revised map and leaving the computer to discuss and write a conclusion or summary for the day's work on a problem. Students also need time away from the computer to plan and carry out the next cycle of data gathering.

Guide students in distilling essential information in their maps. As investigations proceed and maps evolve, many students begin to collapse and categorize factors on their own. Other students need prompting to consider extraneous factors and possibly conflicting relationships (for example, arrows going both ways). Some students maintain

a boneyard of unused factors off to the side of their maps. You should discuss these irrelevant factors and confusing relationships with the map builders, encouraging them to distill the essential information to evidence-based relationships among factors.

Recognize when maps are done. Naturally, the complexity of student maps varies widely—some students reach a finishing point quickly on their own while others are never done, as if the goal is quantity of factors and a messy spiderweb of relationships. You will find that the lingering map builders begin to recycle old ideas—for example, adding "new" factors that are new in name only (adding boulders or pebbles when rocks is already a factor). Remind students that simple maps can get the job done.

Use Multiple Methods of Assessment throughout the Project

The *Seeing Reason Tool* provides multiple opportunities to monitor student progress and learning during project work, as well as assess final products and performances. An effective unit will include assessment that provides explicit expectations and methods for students to demonstrate their learning, promote student self-management, and allow for teacher monitoring of progress.

The *Seeing Reason Tool* allows you to monitor your students' initial understanding and to see their progress in interpretation and integration of information. You can use a series of saved maps and students' writing to see how understanding changes over time. Assessment tools should evaluate how a map contributes to the understanding of the problem or system, rather than simply the number of factors and relationships in a map.

Ideas for incorporating multiple methods of assessment when using the *Seeing Reason Tool* include the following:

- Have students review their maps and write about the development of their understanding of the problem or system. Remind students to focus on the problem or system, not simply on the maps.

- Assess the quality of explanation regarding how students' thoughts have changed as they revised their maps. Ask for explanations for the addition or removal of factors or for changes to the relationships among factors.

- Have students negotiate with their partner while they build their maps. Ask them to assess how closely they agreed with each other as they created factors and relation-ships, and decided which ones were valid.

- Pose a thought-provoking scenario that adds a major influence related to the system or problem, and ask students to predict what the scenario would do to other factors on their maps.

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- Have students describe in their own words some aspect of the system that the map represents. Ask them to pick the most critical factors that influence the system or problem and explain why those factors are so critical, using information shown in the relationships defined on the map.

- Ask students to apply what they learned from their maps in another context.

Overall Project Assessment Ideas for All Online Thinking Tools

- Assess students using multiple forms:

  - Multiple assessors—students themselves, peers, teacher, mentors

  - Multiple units of assessment—individual students, groups, whole class

  - Multiple formats—written work (formal assignments and informal journal entries), observations (of group activities and individual work), presentations, informal discussions and questions, project designs, final media product

- Require students to complete journals, learning logs, essays, or other written reflection activities

- Set up a role-play, experiment, scenario, or other hands-on activity to assess skills and knowledge

- Use debates, interviews, or oral presentations to uncover the depth of students' understanding and comprehension

- Have students create a final project, such as a presentation or publication, that analyzes, evaluates, and proposes new action based on the use of the online thinking tools and the students' corresponding research

Some of the information above is modified from:

Rubric to Assess a PBL (Project-Based Learning) and Rubric
www.idecorp.com/assessrubric.pdf

Project Based Learning with Multimedia
http://pblmm.k12.ca.us/PBLGuide/AssessPBL.html (link no longer active)

Step 2: Revising Your Unit Plan

Considering the information in the previous step and what you have learned through the creation of your practice map, revise your ideas for your unit. Step back from just the use of the *Seeing Reason Tool* and sketch out the larger picture of the overall unit. If you are not going to use *Seeing Reason* in your unit, continue working on other parts of your Unit Plan that need completion.

1. Open your Unit Plan.

2. Revise the **Seeing Reason Title, Project Description**, and **Research Question**, if needed.

3. Consider whether additional standards or learning objectives need to be targeted in your unit. Revise the **Standards** or **Learning Objectives**, if necessary.

4. Review your **Curriculum-Framing Questions** and revise if necessary.

5. Consider the ideas on the previous two pages about ongoing assessment. In the **Assessment Summary** section of the Student Assessment Plan, add your ideas for how you plan to assess the learning during the unit. Revise the **Timeline** section, if needed.

6. In the **Procedures** section, draft the activities that will occur in the classroom that lead up to, include, and follow the use of the thinking tools and assessments.

7. Revise the **Unit Summary** by briefly describing your ideas for the overall unit. Include your general concept of the whole unit, not just the activity that will use the *Seeing Reason Tool*. Explain the main task, scenario, or challenge you will use to engage your students.

8. Copy an image of the practice map into the **Practice Map** section. (See Teaching Tools, Seeing Reason Tool Skill 2.26.)

9. Save your Unit Plan.

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Activity 5: Sharing Your Results

If you are using a wiki, create an entry to reflect on and share your experience with the *Seeing Reason Tool.* Review and provide feedback to one or two colleagues you have not reviewed before. If you are not using a wiki, share in small groups.

1. Go to the wiki site for this course and log on.

   Note: The URL and logon information may be written down on Overview page vi or in your Login Information document.

2. Use the following questions to help you reflect on your use of *Seeing Reason.*

   - Did you try out an idea for your main unit or for a different project idea?

   - Considering your test results, do you think you will keep this tool in your Unit Plan?

   - How do you see the use of the *Seeing Reason Tool* fitting in with the objectives and standards you are trying to target as well as your overall plan for your unit? How will the use of this tool help students meet the requirements?

   - How do you see the *Seeing Reason Tool* enhancing your students' higher-order thinking skills as well as collaboration and communication in your classroom?

   - What questions do you still have about this project's design, implementation, or assessment?

3. Save your wiki page.

4. Review one or two other wiki entries by colleagues you have not reviewed before.

5. Provide suggestions and feedback on your colleagues' ideas, concerns, or questions.

Extension Activity: Finalizing Your Seeing Reason Project

The following activities and resources are available to you as a self-study course enhancement or an optional extension in your course.

If you anticipate that your *Seeing Reason* project will be implemented in your unit because it is a good fit for the unit's objectives, complete any unfinished elements of your *Seeing Reason* project. Include appropriate references, comments, and analysis in your practice map that you would expect your students to include in their *Seeing Reason* projects. Make any necessary edits to the project, if necessary.

1. Go to: **www.intel.com/education/seeingreason**

2. Click **Teacher Workspace** or **Student Log-In** depending on whether you want to edit the project parameters or your sample student project.

3. Enter the login information, which may be written down on Overview page vii or in your Login Information document.

4. Make any necessary additions or changes.

References

Assessing student work with project-based learning. (1997–2001). *The multimedia project: Project-based learning with multimedia*. Retrieved from San Mateo County Office of Education Web site: http://pblmm.k12.ca.us/PBLGuide/AssessPBL.html

Rubric to assess a PBL and rubric. (n.d.). Retrieved from Innovative Designs for Education Web site: www.idecorp.com/assessrubric.pdf

Note: For additional resources on computer-based mapping, view resources in the *Thinking Tools, Seeing Reason* folder on the Curriculum Resource CD.

Module 8 Summary

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

Module 8 Key Points:

- The use of the *Seeing Reason Tool* supports mathematical reasoning and understanding across the curriculum through the use of logic, critical thinking, precise language, and the visual representation of direct and inverse relationships.

- The *Seeing Reason Tool* supports investigation that occurs in cycles of evidence gathering, map building, and reflecting.

Accomplishments:

- Integrated the use of the *Seeing Reason Tool* into a unit or project idea

- Completed a practice causal map

- Used a wiki to document the evolution of unit ideas and use of *Seeing Reason*

- Revised the project and overall unit based on feedback and reflection

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In Module 11, you determine which thinking tools you will use in your unit to meet the learning objectives for your students.

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