

The logo for 'ARTFUL THINKING' features the word 'ARTFUL' in a light green, sans-serif font above the word 'THINKING' in a dark red, sans-serif font. The letter 'A' in 'ARTFUL' is enclosed in a yellow circle, and the letter 'T' in 'THINKING' is enclosed in a purple square.

*Stronger thinking and learning through
the power of art.*

Final Report submitted to

Traverse City Area Public Schools

by the

President and Fellows of Harvard College

on behalf of

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OVERVIEW

HOW THIS REPORT IS ORGANIZED

This report presents the philosophies, developed materials and research findings of the Artful Thinking project at TCAPS. This overview chapter explains how the report is organized and provides a brief history of the Artful Thinking project and the relationship between Project Zero and TCAPS.

Chapter 2, **The Artful Thinking Approach**, describes the theoretical background of thinking dispositions, presents a rationale for using art in the curriculum and provides an in-depth description of the Artful Thinking program. This chapter also explains the Artful Thinking palette – the central metaphor for the program – and thinking routines, which are at the core of the Artful Thinking program.

Chapter 3, **Instructional Components**, provides one-page write-ups of the thinking routines developed for the Artful Thinking program. They are organized by the six dispositions: Reasoning, Perspective Taking, Questioning & Investigating, Observing & Describing, Comparing & Connecting, and Finding Complexity.

Chapter 4, **Teacher Resource Materials**, contains a protocol developed for teachers to use in their bi-weekly study groups to help them look at student thinking and become better at spotting opportunities for thinking. The Think Track discussed in this section is a tool designed to help teachers reflect on their routine use. The tool was also used by the research team to track the frequency and trajectory of routine use at Long Lake School. A case study of these teachers' pattern of use is included in this chapter.

The final section of Chapter 4, Institutional Structure and Support, includes ideas for structuring the program and suggestions for sustaining and growing Artful Thinking in a school.

Chapter 5, **Assessment**, describes the Artful Thinking stance on assessment and contains a six-continua tool for helping teachers assess student thinking. This chapter also describes revision of the district's CAAP test to make this assessment more thinking-centered.

Finally, Chapter 6, **Research**, describes research carried out in addition to the development components described in the previous chapters. The first sections of Chapter VI discuss the results of Concepts of Art data from teachers and students. This instrument, which used a routine called *I used to think, now I think*, was administered to participating teachers and to students in grades 5, 6 and 9 who were involved in the program for between six months and two years.

The last section of Chapter 6 discusses Student Concept Map data. This was a written activity administered to 4th, 5th and 6th grade students at the beginning and end of the 2004-2005 school year, and then again in March of 2006. The same test was also administered at the same times to a commensurate control group of students.

Appendix A includes tools developed for the program. These tools are discussed in various sections throughout the report. **Appendix B** includes materials developed during the project to support routine use in writing and in the foreign language curriculum.

INTRODUCTION

In October of 2003, Traverse City Area Public Schools (TCAPS), in Traverse City, Michigan, received an Arts in Education Model Development and Dissemination grant from the U.S. Department of Education to develop a program called “Building Connections.” One of the key stated goals of the program is:

Integrating the arts into the core elementary school curriculum as a means for improving reading, writing, and general academic achievement.

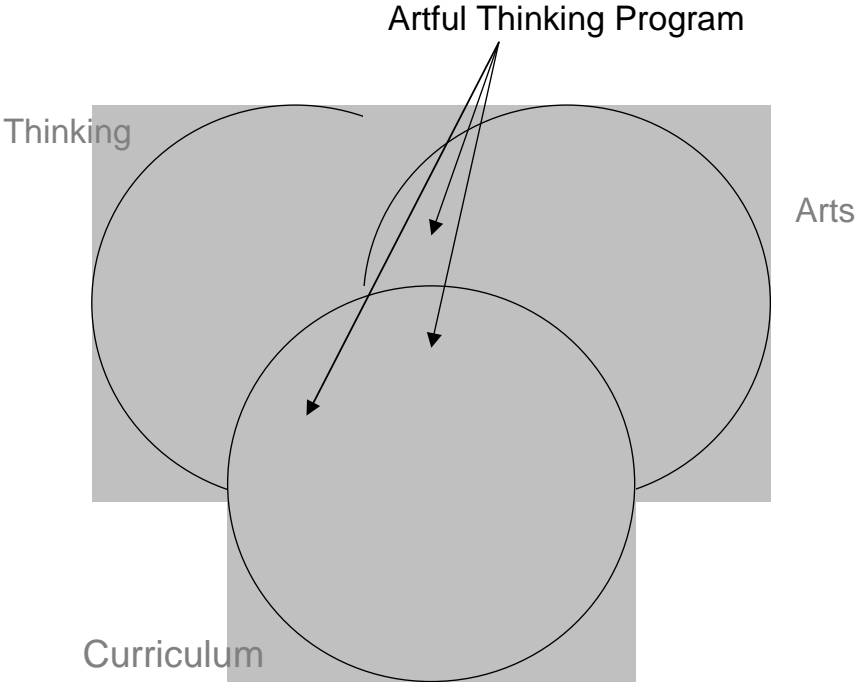
Toward this goal, TCAPS invited Project Zero at the Harvard Graduate School of Education to develop an arts-infused curriculum in which the arts are used as entry points for students to develop deeper thinking and learning skills. Accordingly, Project Zero proposed to develop *The Artful Thinking Program* – a program to be used in the regular classroom that helps deepen student learning by teaching high-level thinking dispositions in and through the arts.

Artful Thinking is one component of a larger TCAPS grant from the U.S. Department of Education to develop a model approach for integrating art into regular classroom instruction. The purpose of the Artful Thinking Program is to help teachers regularly use works of visual art and music in their curriculum in ways that strengthen student thinking and learning.

The Artful Thinking program is designed to be used by the regular classroom teacher, not necessarily arts specialists. It currently targets grades K-9 and will eventually be used in all grades. The program focuses on experiencing and appreciating art, rather than making art. (Other components of the overarching DOE grant focus on art-making.) There are two broad goals of the program: (1) To help teachers create rich connections between works of art and curricular topics; and (2) to help teachers use art as a force for developing students’ thinking dispositions.

Project Zero was awarded a subcontract from TCAPS for a 2 year and 4 month period (September, 2004 – December, 2006) to develop the program, renewable yearly, pending continued TCAPS funding from the DOE. Year One of the Artful Thinking project was September, 2004 – August, 2005. Year Two covered a 10 month period, September 2005 – June 2006. The final period of the project was July, 2006 – October, 2006.

The goal of the Artful Thinking program is to help students develop thinking dispositions that support thoughtful learning—in the arts, and across school subjects.



THE ARTFUL THINKING APPROACH

Works of art are good things to think about. This simple premise underlies Artful Thinking, a program that helps teachers regularly use works of art in their curriculum in ways that strengthen student thinking and learning. Used by classroom teachers across all grade levels, as well as art specialists, the program focuses on looking at and interpreting art, rather than making art. Its goals are twofold: To help teachers create rich connections between works of art and topics they are teaching; and to use the power of art as a force for developing students' thinking dispositions.

THINKING DISPOSITIONS

Most educators believe that it's important to teach students to think. Traditionally, efforts to teach thinking have been ability-centric: They foreground the teaching of thinking skills – reasoning skills, problem solving skills and the like – with the assumption that developing the requisite skills is all that's needed to insure the desired behavior. Thinking skills are certainly important. But if we want students to use their skills frequently, if we want them to transfer their skills to diverse and novel contexts, if we want them to feel committed to certain patterns of intellectual behavior in certain circumstances (for example, to feel committed to exploring works of art from multiple perspectives, say, or committed to taking the time to form thoughtful interpretations about works of art), then simply teaching thinking skills may not be enough. As an alternative, the Artful Thinking program takes a dispositional approach to teaching thinking. In a moment we describe how Artful Thinking takes a dispositional approach. But first a few words about the idea of dispositions and its presence in the psychological and educational research.

The general idea of dispositions is that people behave in a more or less informed and appropriate way guided not only by knowledge and skills but by predilections or tendencies. For instance, everyday language includes many words that mark tendencies in intellectual, social, and moral conduct. We speak of people as more or less open-minded, reasonable, thoughtful, skeptical, curious, friendly, responsible, generous, honest, and so on. Such attributions address what people are inclined to do within the range of their knowledge and capabilities. Closed-minded people could ponder different perspectives if they chose. People who lack curiosity could identify more puzzles and ask more questions. People who jump to conclusions or settle for first impressions could take the time to be more thoughtful.

A number of psychologists have included attention to dispositions in their analyses of thinking and intelligence. For example, dispositions play a central role in Baron's (1985) model of rationality. Baron distinguishes between dispositions and cognitive capacities. Capacity factors like short-term memory determine what in principle a person can do. Dispositional factors, in contrast, determine what a person does do within capacity limits. Perkins (1995) in an analysis of psychometric versus other conceptions of intelligence discussed how positive dispositions are needed to overcome broad negative dispositional tendencies in thinking that veer toward hasty, narrow, indiscriminating, and disorganized thinking.

THINKING DISPOSITIONS

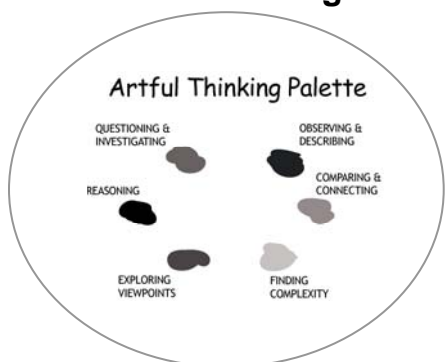
Various programs of research have documented the presence of thinking dispositions and their influence on intellectual performance. For example, Cacioppo and Petty (1982) introduced the dispositional trait need for cognition. This refers to people's readiness to invest in cognitively demanding activities and enjoyment in such activities. Need for cognition has proven to be a stable individual trait largely independent of psychometric intelligence and showing significant positive correlations with school performance, thoughtful examination of arguments, and related matters (Cacioppo, Petty, Feinstein, & Jarvis, 1996).

Langer (1989), in a program of research extending over many years, has documented a very general disposition toward 'mindlessness' – the shallow processing of ideas and information in everyday circumstances that can lead to maladaptive albeit superficially efficient responses. Some people are systematically more mindful, and sometimes remarkably simple manipulations can boost mindfulness well beyond their obvious scope. For instance, giving elderly people plants to care for has been shown to improve their attitudes and patterns of activity in a number of ways, even to the point of extending somewhat their life spans.

Several researchers have developed ways to distinguish cognitive skills from thinking dispositions as predictors of intellectual performance (Stanovich & West, 1997; Perkins, Tishman, Richhart, Doni, and Andrade, 2000; Facione, 1995), and several philosophers and psychologist have argued for the importance of a dispositional conception of rationality or intelligence (Baron 1985; Ryle 1949; Dewey, 1933; Dai & Sternberg 2004).

Arts educators and art education programs have also recently embraced the notion of dispositions. For example, Studio Habits of Mind (Hetland, L., Winner, E., Veenema, S., & Sheridan, K., in press). takes a dispositional approach to the analysis and design of studio arts instruction. Art Works for School takes a dispositional approach to teaching thinking in and through visual art and theater (Grotzer, Howick, Tishman and Wise, 2002). Lambert (2006) argues for the importance of thinking dispositions as an outcome of arts education.

The Artful Thinking Palette



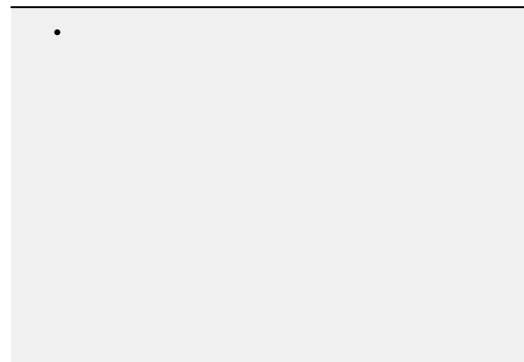
There are many thinking dispositions worth cultivating – curiosity, open-mindedness, reasonableness, to name just a few. Artful Thinking focuses on a set of six thinking dispositions that have special power for exploring works of art and other complex topics in the curriculum. They are: *questioning & investigating, observing & describing, reasoning, exploring viewpoints, comparing & connecting, and*

THINKING DISPOSITIONS

finding complexity. These dispositions have been chosen for two reasons. The first is that each of the six represent forms of thinking that are powerful in terms of exploring and appreciating works of art. The second is that each of the six represent forms of thinking that are powerful in terms of building understanding in other disciplines.

Each of these dispositions has specific intellectual behaviors associated with it. Reasoning involves constructing arguments and seeking evidence; exploring viewpoints involves looking at things from different points of view; finding complexity involves uncovering multiple dimensions and layers; comparing and connecting involves exploring juxtapositions and seeking connections; questioning & investigating involves posing questions and finding avenues of inquiry; observing and describing involves close looking and re-presenting. As a set, the six dispositions are synergistic: Observing naturally leads to reasoning, which connects to questioning, which in turn links to connection-making, and so on. Artful Thinking uses the image of an artist's palette to express this synergy. A full-page version of the Artful Thinking palette can be found in Appendix A.

Thinking dispositions and thinking routines



Dispositions are formed when people routinely engage in specific patterns of behavior. Accordingly, in the Artful Thinking program, thinking dispositions are developed through the use of *thinking routines* – short, easy-to-learn procedures that help students enact thinking-dispositional behavior in and across the six areas of the palette. For example, these three discussion questions – *What do you see? What do you think about that? What does it make*

you wonder? – comprise a thinking routine that connects to two dispositions on the palette – observing & describing, and questioning & investigating. Other thinking routines encourage exploring multiple viewpoints, forming careful interpretations, finding complexity, and so on. Thinking routines are designed to be used flexibly and frequently. Students can use them solo or in small or large group settings, they can be used across subject matters, and they can be used with a wide range of topics and works of art. Above all, they are designed to deepen students' thinking about the topic at hand, whether it is a painting, an historical event, or a mathematical operation. Please see Chapter 3: Instructional Components for more on Thinking Routines.

CLAIM / SUPPORT / QUESTION

A Reasoning Routine

- Make a claim about the artwork or topic.
- Identify support for your claim.
- Ask a question related to your claim.

Artful Thinking and making thinking visible



Too often, students are exposed only to the final, finished products of thought – the finished novel or painting, the established scientific theory, the official historical account. They rarely see the patterns of thinking that lead to these finished products, yet it is precisely these habits of mind that students need to develop. A key part of *Artful Thinking* involves making students' thinking visible by documenting

their unfolding thought processes as they use thinking routines. Making thinking visible in the classroom provides students with vivid models of what the process of good thinking looks like and shows them how their participation matters.



THINKING AND ART

Thinking dispositions, thinking routines, and making thinking visible are emphasized in all Visible Thinking initiatives at Project Zero. Though all Visible Thinking initiatives are art-friendly, Artful Thinking is distinctive in that it was developed to explicitly bring out the connection between art and thinking. There are two reasons for this. The first has to do with how works of art make us think, and the second has to do with what they make us think about.



Sofonisba Anguissola, *Three Sisters Playing Chess* (c. 1535-1625)

naturally invites them. An Artful Thinking student once said, “If a picture is worth a thousand words, then a painting must be worth two thousand.” She’s telling us that works of art are packed with meaning. And she’s right: Works of art are metaphorical, often multi-layered and ambiguous, often full of detail. They express artists’ intentions and their un-intentions and they condense many meanings and purposes. Moreover, works of art are made with the purpose of engaging our attention. Artists generally want us to look and ponder and explore. So one deep connection between looking at art and learning to think is this: By both design and default, art naturally invites deep and extended thought.



Jacob Lawrence, *Forward*, 1967

In terms of how art makes us think, consider the kinds of things we have in mind when we talk about teaching thinking. We want students to learn to ask thoughtful questions, to construct careful explanations, to explore new viewpoints, to see the complexity and dimensionality of the topics they study, to find puzzles worth pursuing, and so on. These forms of thinking come naturally when looking at art, because art



Jeff Koons, *Three Balls Total Equilibrium*, 1985

Of course works of art are more than simply a powerful vehicle for teaching thinking; they are also important things to think about. The second reason to connect looking at art and learning to think has to do with the

meanings of artworks themselves and the multiple ways they connect to the curriculum. Works of art provoke rich, multilayered meaning-making in ways unlike other disciplines. They raise questions, evoke connection-making, and in many ways transform the shape of inquiry. For example, Jacob Lawrence's painting of Harriet Tubman and the underground railway (above), raises questions and evokes the complexities of being "led" to freedom in ways that a straightforward timeline of events never could. In doing so, it has the power to transform students' historical inquiry into a personal and contemporary one.

There are many ways to connect art to the curriculum, from targeted connections between the content of artworks and specific topic or themes, to more open-ended approaches that leave loose the directions in which a work of art will lead. Artful Thinking is in favor of any and all curricular connections, so long as students are invited to think directly and deeply about an artwork itself. Art gets shortchanged when it is used superficially merely as illustrative aid to a set of facts, such as when a painting is used simply to illustrate the costumes of a particular era or the geography of a particular region. Artful Thinking avoids this shortfall because thinking routines – the mainstay practice of Artful thinking – are designed to engage students in thinking deeply about the artwork or topic at hand. They allow for the "superficial read," which after all is part but not all of an artwork's meaning, but they also push students to unpack the depth and complexity of works of art by inviting them to ask creative questions, make diverse observations, explore multiple viewpoints, and seek personal connections.



I NSTRUCTIONAL **C**OMPONENTS

Thinking routines are the core instructional components of the Artful Thinking program. Routines are short, easy-to-learn mini-strategies that extend and deepen students' thinking and become part of the fabric of everyday classroom life. They are used flexibly and repeatedly—with art, and with a wide variety of topics in the curriculum.

THINKING ROUTINES

Routines exist in all classrooms; they are the patterns by which we operate and go about the job of learning and working together in a classroom environment. A routine can be thought of as any procedure, process or pattern of action that is used repeatedly to manage and facilitate the accomplishment of specific goals or tasks. Classrooms have routines that serve to manage student behavior and interactions, to organize the work of learning, and to establish rules of communication and discourse. Classrooms also have routines that structure the way students go about the process of learning. These learning routines can be simple structures, such as reading from a text and answering the questions at the end of the chapter, or they may be designed to promote students' thinking, such as asking students what they know, what they want to know, and what they have learned as part of a unit of study.

Artful Thinking makes extensive use of learning routines that are thinking rich. These routines are simple structures, for example a set of questions or a short sequence of steps that can be used across various grade levels and content. What makes them routines, versus merely strategies, is that they get used over and over again in the classroom so that they become part of the fabric of a classroom's culture. The routines become the ways in which students go about the process of learning.

Thinking routines form the core of the Artful Thinking program. What makes these routines work to promote the development of a student's thinking and the classroom culture are that each routine:

- Is goal oriented in that it targets specific types of thinking
- Gets used over and over again in the classroom
- Consists of only a few steps
- Is easy to learn and teach
- Is easy to support when students are engaged in the routine
- Can be used across a variety of contexts
- Can be used by the group or by the individual

Routines are really just patterns of action that can be integrated and used in a variety of contexts. You might even use more than one routine in teaching a single lesson. Thus, you shouldn't think about the routines as taking time away from anything else you are doing, they should actually enhance what you are trying to do in the classroom.

Focus on Integration with Existing Content

Because of their simple nature, the routines do not need to be taught but can simply be used as a means of investigating and working with existing subject matter. Nonetheless, when teachers first introduce a routine he or she may choose to do so with one of the suggested topics or a topic that may not be a regular part of students' study. For example, the *What makes you say that?* routine might be introduced with an engaging picture or photograph, though later a teacher might want to use it with a poem, artifact, or scientific experiment. With all of the routines, teachers will need to think about what topics are most appropriate for their introduction and continued use. It is necessary for the teacher to bring appropriate content to the routine.

THINKING ROUTINES

Thinking routines on the following pages are grouped by the disposition they help develop:

Reasoning-centered routines:

- “What makes you say that?”
- Claim / Support / Question
- Think Pair Share

Perspective Taking-centered routines:

- Perceive / Know / Care About
- Circle of Viewpoints

Questioning & Investigating-centered routines:

- I See / I Think / I Wonder
- Think / Puzzle / Explore
- Creative Questions

Observing & Describing-centered routines:

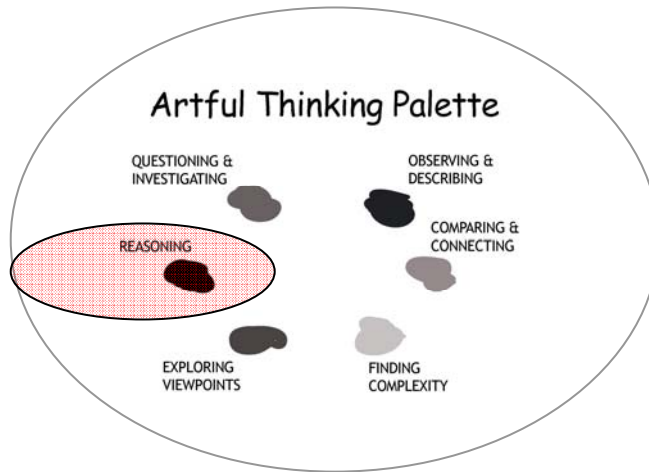
- Elaboration Game
- Beginning / Middle / End
- Listening: Ten Times Two
- Looking: Ten Times Two
- Colors, Shapes, Lines

Comparing & Connecting-centered routines:

- Headlines
- Connect / Extend / Challenge
- Creative Comparisons
- I Used to Think, Now I Think

Complexity-centered routines

- Parts / Purposes / Complexities
- Complexity Scale



REASONING-CENTERED ROUTINES

The reasoning disposition emphasizes forming well-reasoned interpretations and ideas. Routines in this area focus on using evidence, capturing essential meanings, and telling well-reasoned stories that explain why things are the way they are.

Central questions:
 What do you think is going on?
 What are your reasons?

"WHAT MAKES YOU SAY THAT?"

Interpretation with Justification Routine

There are two core questions for this routine. The first question asks for an interpretation. The second question asks for justification.

1. **What is going on?**
 2. **What do you see that makes you say that?**
-

WHAT KIND OF THINKING DOES THIS ROUTINE ENCOURAGE?

This routine helps students describe what they see or know and asks them to build explanations. It promotes evidential reasoning (evidence-based reasoning) and because it invites students to share their interpretations, it encourages students to understand alternatives and multiple perspectives.

WHEN AND WHERE CAN IT BE USED?

Because the basic questions in this routine are flexible, it is useful when looking at objects such as works of art or historical artifacts, but it can also be used to explore a poem, make scientific observations and hypothesis, or investigate more conceptual ideas (i.e., democracy). The routine can be adapted for use with almost any subject and may also be useful for gathering information on students' general concepts when introducing a new topic.

WHAT ARE SOME TIPS FOR STARTING AND USING THIS ROUTINE?

In most cases, the routine takes the shape of a whole class or group conversation around an object or topic, but can also be used in small groups or by individuals. When first introducing the routine, the teacher may scaffold students by continually asking the follow-up questions after a student gives an interpretation. Over time students may begin to automatically support their interpretations with evidence with out even being asked, and eventually students will begin to internalize the routine.

When using this routine in a group conversation it may be necessary to think of alternative forms of documentation that do not interfere with the flow of the discussion. One option is to record class discussions using video or audio. Listening and noting students' use of language of thinking can help you see their development. Students' words and language can serve as a form of documentation that helps create a rubric for what makes a good interpretation or for what constitutes good reasoning.

Another option is to make a chart or keep an ongoing list of explanations posted in the classroom. As interpretations develop, note changes and have further discussion about these new explanations. These lists can also invite further inquiry and searches for evidence. Other options for both group and individual work include students documenting their own interpretations through sketches, drawings, models and writing, all of which can be displayed and revisited in the classroom.

This routine was originally developed by Abigail Housen in collaboration with Philip Yenawine, for the Museum of Modern Art's Visual Thinking Curriculum (VTC).

CLAIM / SUPPORT / QUESTION

A Reasoning Routine

1. Make a *claim* about the artwork or topic



CLAIM:

An explanation or interpretation of some aspect of the artwork or topic.

2. Identify *support* for your claim



SUPPORT:

Things you see, feel, and know that support your claim.

3. Ask a *question* related to your claim



QUESTION;

What's left hanging? What isn't explained? What new reasons does your claim raise?

WHAT KIND OF THINKING DOES THIS ROUTINE ENCOURAGE?

This routine helps students develop thoughtful interpretations of an artwork or topic by encouraging them to reason with evidence.

WHEN AND WHERE CAN IT BE USED?

Use *Claim / Support / Question* with works of art and with topics in the curriculum that invite explanation or are open to interpretation.

WHAT ARE SOME TIPS FOR STARTING AND USING THIS ROUTINE?

Model the routine for the whole class, then work in small groups or individually. Take turns using the routine so that each member of the group makes a claim, identifies support and asks a question. Following each person's report, take a moment as a group to discuss the artwork or topic in relation to the claim before moving on to the next person. After everyone has had a turn, reflect on the activity. Ask students to discuss what new thoughts they have about the artwork or topic.

This routine is adapted from the Visible Thinking project, Harvard Project Zero.

THINK PAIR SHARE ROUTINE

A routine for active reasoning and explanation

Think Pair Share involves posing a question to students, asking them to take a few minutes of thinking time and then turning to a nearby student to share their thoughts.

WHAT KIND OF THINKING DOES THIS ROUTINE ENCOURAGE?

This routine encourages students to think about something, such as a problem, question or topic, and then articulate their thoughts. The Think Pair Share routine promotes understanding through active reasoning and explanation. Because students are listening to and sharing ideas, Think Pair Share encourages students to understand multiple perspectives.

WHEN AND WHERE CAN IT BE USED?

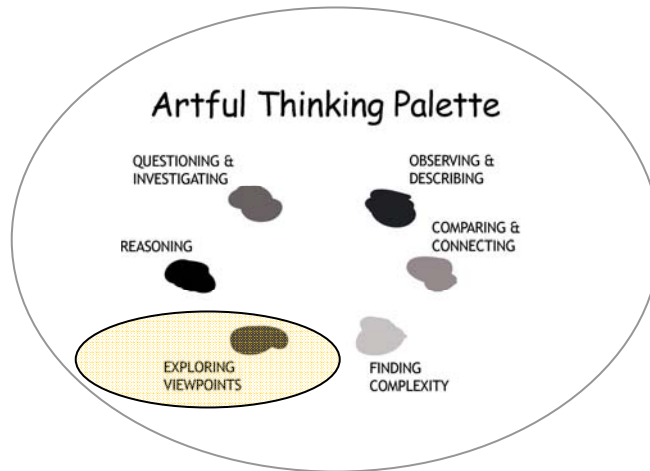
Think Pair Share can be applied at any given moment in the classroom. For example, when approaching a solution, solving a math problem, before a science experiment, or after reading a passage or chapter of a book you may ask students to take a moment to think about a particular question or issue and then turn to their neighbor and share their thoughts. Sharing can also be done in small groups. Some times you will want to have pairs or groups summarize their ideas for the whole class.

WHAT ARE SOME TIPS FOR STARTING AND USING THIS ROUTINE?

When first introducing the routine, teachers may want to scaffold students' paired conversations by reminding them to take turns, listen carefully and ask questions of one another. One way to ensure that students listen to each other is to tell students that you will be calling on individuals to explain their partners thinking, as opposed to telling their own thoughts.

Encourage students to make their thinking visible by asking them to write or draw their ideas before and/or after sharing. Journals can also be useful. Student pairs can report one another's thoughts to the class and a list of ideas can be created in the classroom.

This routine is adapted from Frank Lyman: Lyman, F. T. (1981). The Responsive Classroom Discussion: The Inclusion of All Students. In A. Anderson (Ed.), *Mainstreaming Digest* (pp. 109-113). College Park: University of Maryland Press.



PERSPECTIVE TAKING-CENTERED ROUTINES

The perspective taking disposition is about developing insight by seeing things through different lenses or points of view. Routines in this area emphasize perspective-taking, role playing, empathy, and looking through disciplinary lenses (e.g., thinking like a historian).

Central questions:
 What different ways could you look at it? How does it look from different points of view?

PERCEIVE/ KNOW/ CARE ABOUT

A Routine for Getting Inside Viewpoints

Three core questions guide students in the process of exploring a viewpoint:

1. What can the person or thing *perceive*?
2. What might the person or thing *know about or believe*?
3. What might the person or thing *care about*?

WHAT KIND OF THINKING DOES THIS ROUTINE ENCOURAGE?

This routine helps students to explore diverse perspectives and viewpoints as they try to imagine things, events, problems, or issues differently.

WHEN AND WHERE CAN IT BE USED?

Use the routine when you want students to open up their thinking and look at things differently. It can be used as an initial kind of problem solving brainstorm that opens up a topic, issue, or item. It can also be used to help make abstract concepts, pictures, or events come more to life for students.

Exploring different perspectives can lead to a richer understanding of what is being studied. For instance, imagining oneself as the numerator in a fraction of a math problem. In other settings, exploring different viewpoints can open up possibilities for further exploration. For example, following this routine a student might write a poem from the perspective of a soldier's sword left on the battlefield.

WHAT ARE SOME TIPS FOR STARTING AND USING THIS ROUTINE?

This routine asks students to step inside the role of a character or object—from a picture they are looking at, a story they have read, an element in a work of art, an historical event being discussed, and so on—and to imagine themselves inside that point of view. Students are asked to speak or write from that chosen point of view.

In getting started with the routine the teacher might invite students to look at an image and ask them to generate a list of the various perspectives or points of view embodied in that picture. Students then choose a particular point of view to embody or talk from, saying what they perceive, know about, and care about. Sometimes students might state their perspective before talking. Other times, they may not and then the class could guess which perspective they are speaking from.

In their speaking and writing, students may well go beyond these starter questions. Encourage them to take on the character of the thing they have chosen and talk about what they are experiencing. Students can improvise a brief spoken or written monologue, taking on this point of view, or students

can work in pairs with each student asking questions that help their partner stay in character and draw out his or her point of view.

HOW DOES IT MAKE THINKING VISIBLE, AND HOW CAN I DOCUMENT IT?

Students' responses can be written down so that various perspectives can be examined and contrasted. This might take the form of a grid in which the perspectives are listed at the top and the three questions down the left-hand side. Using the grid, a teacher might ask, whose position seems the most similar to each? Different? Most like your own?

This routine is adapted from The Art Works for Schools project, DeCordova Museum and Sculpture Park, Harvard Project Zero, Underground Railway Theater.

CIRCLE OF VIEWPOINTS ROUTINE

A routine for exploring diverse perspectives

Brainstorm a list of different perspectives and then use this script skeleton to explore each one:

1. I AM THINKING OF ...*the topic* ... FROM THE POINT OF VIEW OF ...*the viewpoint you've chosen*
2. I THINK...*describe the topic from your viewpoint. Be an actor--take on the character of your viewpoint*
3. A QUESTION I HAVE FROM THIS VIEWPOINT IS...*ask a question from this viewpoint*

WRAP UP: *What new ideas do you have about the topic that you didn't have before? What new questions do you have?*

WHAT KIND OF THINKING DOES THIS ROUTINE ENCOURAGE?

This routine helps students consider different and diverse perspectives involved in and around a topic. Understanding that people may think and feel differently about things is a key aspect of the Fairness Ideal.

WHEN AND WHERE CAN IT BE USED?

This routine can be used at the beginning of a unit of study to help students brainstorm new perspectives about a topic, and imagine different characters, themes and questions connected to it. It can be used after reading a book or chapter. Provocative topics and issues are encouraged and the routine also works especially well when students are having a hard time seeing other perspectives or when things seem black and white. The routine can be used to open discussions about dilemmas and other controversial issues.

WHAT ARE SOME TIPS FOR STARTING AND USING THIS ROUTINE?

After identifying a topic, ask students to brainstorm various viewpoints about this topic. This can be done solo, or as a class, but make sure to give the initial brainstorm enough time for students to really stretch and explore diverse ideas. If students need help thinking of different viewpoints, try using the following prompts:

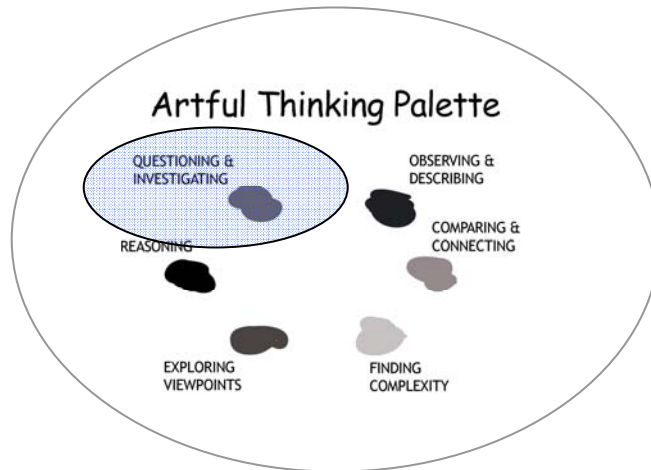
- How does it look from different points in space and different points in time?
- Who (and what) is affected by it?
- Who is involved?
- Who might care?

After the brainstorm, ask each student to choose one of these viewpoints. Give them time to prepare to speak about the topic from that perspective and to embody the viewpoint using the script skeleton to structure what he or she says.

Once students have prepared their “characters”, the class should be ready to go around the circle and act out their various perspectives. Taking turns, ask students to speak briefly about their chosen viewpoint using the script skeleton. Invite them to stand up and use gestures and movement if necessary. The discussion at this point might move fairly quickly, capitalizing on the immediacy of the experience as each student goes through the script and presents a perspective. The array of responses will hopefully be broad and distinct, as each student should strive to produce a unique viewpoint. If some students choose the same character, encourage them to perform differently. For example, if several students choose the viewpoint of an explorer, one may be trying to seek out wealth through trade, another explorer might be adventurous or want to become famous. Ask them to raise different questions in order to elaborate their viewpoints.

Viewpoints connect to the idea of physical perspective taking and you may notice that your students interpret this literally at first by naming and describing what their characters *see*. While it is fine to help students get started with concrete examples, try to move your students to consider *thoughts and feelings* of characters, rather than describing a scene or object. As students perform their viewpoint in the circle, their ideas can be recorded or written on the board so that a class list of perspectives is created. The last question of the routine asks students to think of a question they might have from their chosen viewpoint. Collect these questions or ask students to write them down and answer them as they think more about the topic as it is studied in class. Once everyone in the circle has spoken, the teacher can lead a discussion by asking: “What new ideas do you have about the topic that you didn’t have before?” and “What new questions do you have?”

This routine is adapted from The Art Works for Schools project, DeCordova Museum and Sculpture Park, Harvard Project Zero, Underground Railway Theater.



QUESTIONING & INVESTIGATING-CENTERED ROUTINES

The questioning & investigating disposition emphasizes asking questions as a way of stimulating curiosity and guiding inquiry. Routines in this area focus on asking good questions, becoming sensitive to puzzles and ambiguities, and finding and exploring problems.

Central questions:
 What do you wonder about?
 What would you like to find out?

I SEE / I THINK / I WONDER

A routine for exploring works of art and other interesting things

1. What do you see?
 2. What do you think about that?
 3. What does it make you wonder?
-

WHAT KIND OF THINKING DOES THIS ROUTINE ENCOURAGE?

This routine helps student make careful observations and thoughtful interpretations; to stimulate curiosity and set the stage for inquiry.

WHEN AND WHERE CAN IT BE USED?

Use this routine when you want students to think carefully about why something looks the way it does or is the way it is.

WHAT ARE SOME TIPS FOR STARTING AND USING THIS ROUTINE?

Ask students to make an observation about the artwork or topic and follow up with what they think might be going on or what they think this observation might be. Encourage students to back up their interpretation with reasons. Ask the students to think about what this makes them wonder about the artwork or topic.

The routine works best when a student responds by using the three stems together at the same time, i.e., “*I see...*, *I think...*, *I wonder ...*.” However, you may find that students begin by using one stem at a time, and that you need to scaffold each response with a follow up question for the next stem.

The routine works well in a group discussion but in some cases you may want to have students carry out the routine individually on paper or in their heads before sharing them out as a class. Student responses to the routine can be written down and recorded so that a class chart of observations, interpretations and wonderings are listed for all to see and return to during the course of study.

This routine is adapted from the Visible Thinking project, Harvard Project Zero.

THINK / PUZZLE / EXPLORE

A routine that sets the stage for deeper inquiry

1. What do you think you know about this artwork or topic?
2. What questions or puzzles do you have?
3. What does the artwork or topic make you want to explore ?

WHAT KIND OF THINKING DOES THIS ROUTINE ENCOURAGE?

This routine helps students connect to prior knowledge, to stimulate curiosity and to lay the groundwork for independent inquiry.

WHEN AND WHERE CAN IT BE USED?

Use *Think/Puzzle/Explore* when you are beginning a topic and when you want students to develop their own questions of investigation.

WHAT ARE SOME TIPS FOR STARTING AND USING THIS ROUTINE?

There are three questions in this routine. Begin by giving students a few quiet moments to consider the artwork or the topic at hand. Then, work as a whole class or in small groups and brainstorm ideas in all three areas. Make sure to give adequate time between each question for students to think up and articulate their ideas. In some cases, you may want to have students do the routine individually on paper or in their heads before sharing ideas as a class.

Keep a visible record of students' ideas. If you are working in a group, ask students to share some of their thoughts and collect a broad list of ideas about the artwork or topic on chart paper. Or students can write their individual responses on post-it notes and later add them to a class list of ideas.

Note that it is common for students to have misconceptions at this point—include them on the list so all ideas are available for consideration after further study. Students may at first list seemingly simplistic ideas and questions. Include these on the whole class list but push students to think about things that are truly puzzling or interesting to them.

This routine is adapted from the Visible Thinking project, Harvard Project Zero.

CREATIVE QUESTIONS

A routine for creating thought-provoking questions

1. Brainstorm a list of at least 12 questions about the artwork or topic. Use these question-starts to help you think of interesting questions.

Why...?

What are the reasons...?

What if...?

What is the purpose of...?

How would it be different if... ?

Suppose that...?

What if we knew...?

What would change if...?

2. Review your brainstormed list and star the questions that seem most interesting. Then, select one of the starred questions and discuss it for a few moments. (If you have the time, you can discuss more than one question.)
3. Reflect: What new ideas do you have about the artwork or topic that you didn't have before?

WHAT KIND OF THINKING DOES THIS ROUTINE ENCOURAGE?

Use Creative Questions to expand and deepen students' thinking, to encourage students' curiosity and increase their motivation to inquire.

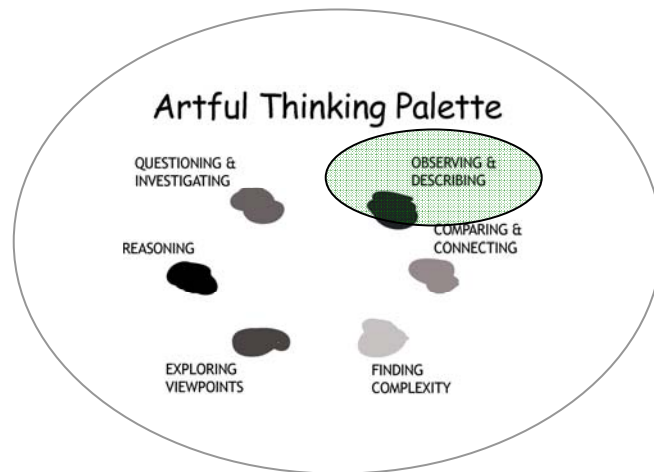
WHEN AND WHERE CAN IT BE USED?

Use Creative Questions when you want students to develop good questions and think deeply works about of art or topics in the curriculum.

WHAT ARE SOME TIPS FOR STARTING AND USING THIS ROUTINE?

Work as a whole class or in small groups. Or mix it up. For example, do step 1 as a whole class, do step 2 in pairs, and step 3 as a whole class again.

This routine is adapted from The Art Works for Schools project, DeCordova Museum and Sculpture Park, Harvard Project Zero, Underground Railway Theater.



OBSERVING & DESCRIBING-CENTERED ROUTINES

The observing & describing disposition is about noticing and communicating impressions (including emotional and sensory impressions). Routines in this area emphasize careful and extensive observation, self-awareness, and detailed description.

Central questions:
 What do you notice? What are the details?

ELABORATION GAME

A routine for careful observation and description

As a group, observe and describe several different sections of an artwork.

1. One person identifies a specific section of the artwork and describes what he or she sees. Another person elaborates on the first person's observations by adding more detail about the section. A third person elaborates further by adding yet more detail, and a fourth person adds yet more.

Observers: Only describe what you see. Hold off giving your ideas about the art until the last step of the routine.

2. After four people have described a section in detail, someone else identifies a new section of the artwork and the process starts over: Four more people take turns making increasingly detailed observations. Then the process starts over again, and so on, until everyone in the group has had a turn or all sections of the artwork have been described.
3. After the artwork has been fully described, as a group, discuss some of your ideas about it. For example, what do you think is going on? (and what did you observe that makes you say that?)

Helpful definitions:

Observe: Describe how something appears.

Elaborate: Expand on something in detail.

Interpret: Explain what something means.

WHAT KIND OF THINKING DOES THIS ROUTINE ENCOURAGE?

This routine encourages students to look carefully and deeply at details. It challenges them to develop verbal descriptions that are elaborate, nuanced, and imaginative. It also encourages them to distinguish between observations and interpretations by asking them to withhold their ideas about the artwork – their interpretations – until the end of the routine. This in turn strengthens students' ability to reason carefully because it gives them practice making sustained observations before jumping into judgment.

HOW SHOULD SECTIONS OF THE ARTWORK BE IDENTIFIED?

There are two ways to handle this. You, the teacher, can decide how to divide the artwork up into different spatial sections—quadrants, for example—and then simply tell students which sections to describe. Or, students can identify different sections themselves. Either way, Be flexible about what counts as a section. For example, a section can be a smaller area of detail within a larger section that has already been discussed.

WHEN AND WHERE CAN IT BE USED?

Use this routine with any kind of visual art that stays still in time, such as painting or sculpture. (There is an adapted version of this routine for use with music.) You can also use the routine with non-art objects, such as a microscope, an animal skeleton, or a plant. The routine works especially well with objects or works of art that have some degree of complexity.

The Elaboration Game is an especially good way to launch a writing activity because it helps students develop a detailed descriptive vocabulary.

WHAT ARE SOME TIPS FOR STARTING AND USING THIS ROUTINE?

This routine is pretty much self-starting. All you need to do is explain the rules of the game. Decide ahead of time whether you want to have each student speak in turn, or whether you want students to raise their hand and offer their observations at will. Don't worry if the routine feels a bit awkward the first time you try it. It is challenging to look at things deeply and it sometimes takes students a while to make new observations and find fresh ways to describe things. Give students lots of "think time" and they'll soon get the hang of it.

BEGINNING/ MIDDLE/ END

A routine for observing and imagining

Choose one of these questions:

- If this artwork is the **beginning** of a story, what might happen next?
- If it this artwork is the **middle** of a story, what might have happened before? What might be about to happen?
- If this artwork is the **end** of a story, what might the story be?

-- Use your imagination --

WHAT KIND OF THINKING DOES THIS ROUTINE ENCOURAGE?

This routine is a springboard for imaginative exploration. It uses the power of narrative to help students make observations and use their imagination to elaborate on and extend their ideas. Its emphasis on storytelling also encourages students to look for connections, patterns, and meanings.

WHEN AND WHERE CAN IT BE USED?

The routine works with any kind of visual artwork that stays still in time – such as painting or sculpture. (There is an adapted version of this routine for use with music.)

Use *Beginning, Middle, or End* when you want students to develop their writing or storytelling skills. You can use the questions in the routine in the open-ended way they are written. Or, if you are connecting the artwork to a topic in the curriculum, you can link the questions to the topic. For example, if you are studying population density, you can ask students to keep the topic in mind when they imagine their stories.

The routine is especially useful as a writing activity. To really deepen students' writing, you can use the *Ten Times Two* routine with the same artwork prior to using this routine as a way of helping students generate descriptive language to use in their stories.

WHAT ARE SOME TIPS FOR STARTING AND USING THIS ROUTINE?

Give your students quiet time to look *before* they begin writing or speaking.

If you like, take a few minutes to ask the class as a whole to name several things they see in the artwork, before they begin thinking individually about a story. If students are writing, they can talk over their ideas with a partner before they begin to write solo. They can also write in pairs.

If students are doing the routine verbally, they can tell stories individually, or work in pairs or small groups to imagine a story together. You can also imagine a story as a whole class by asking someone to begin a story and having others elaborate on it.

LISTENING: TEN TIMES TWO

A routine for observing and describing music

1. **Listen to a piece of music quietly. Let your ears wander and take in as much as possible.**
 2. **List 10 words or phrases about any aspect of what you hear.**
 3. **Repeat Steps 1 & 2: Listen again and try to list 10 more words or phrases to your list.**
-

WHAT KIND OF THINKING DOES THIS ROUTINE ENCOURAGE?

The routine helps students slow down and make careful observations about music. It asks students to think about words or phrases to describe the work and encourages students to push beyond first listen or basic description.

WHEN AND WHERE CAN IT BE USED?

The routine will work with any kind of music. Use *Ten Times Two* when you introduce a new piece of music to get students thinking carefully about it before having a discussion or using another routine. You can also use the *Ten Times Two* routine after an in depth discussion about a piece of music to both push forward and summarize some of the ideas and observations that were made during the conversation.

The routine is useful before a writing activity. It gets students thinking about descriptive language and helps students make observations about the music.

WHAT ARE SOME TIPS FOR STARTING AND USING THIS ROUTINE?

Give students time to listen to the music multiple times, with an effort on hearing something new each time. If possible, keep the music playing at a softer volume while students develop their lists.

Students can work as a whole class, in small groups or individually. Students should try to write their ideas down, or in a whole class discussion the teacher could write students' comments on the board. Make sure that the descriptive words and phrases generated are made visible for the whole group at some point in the discussion. Add to the list as necessary during any follow up conversations.

A natural follow up to *Ten Times Two* would be another routine that get students talking about their interpretations, for example the *What makes you say that?* routine or *Claim Support Question*.

LOOKING: TEN TIMES TWO

A routine for observing and describing

1. **Look at the image quietly for at least 30 seconds. Let your eyes wander.**
2. **List 10 words or phrases about any aspect of the picture.**
3. **Repeat Steps 1 & 2: Look at the image again and try to list 10 more words or phrases to your list.**

WHAT KIND OF THINKING DOES THIS ROUTINE ENCOURAGE?

The routine helps students slow down and make careful observations about an object, image or work of art. It asks students to think about words or phrases to describe the work and encourages students to push beyond first glance, or obvious description.

WHEN AND WHERE CAN IT BE USED?

The routine can be used with any kind of artwork, especially visual art. You can also use non-art images or objects.

Use *Ten Times Two* when you introduce a new artwork to engage students in careful looking before having a discussion about it or before using another routine. You can also use the *Ten Times Two* routine after an in depth discussion about an artwork to both push forward and summarize some of the ideas and observations that were made during the conversation.

The routine is useful before a writing activity. It gets students thinking about descriptive language and helps students make observations about the work of art.

WHAT ARE SOME TIPS FOR STARTING AND USING THIS ROUTINE?

Give your students time to look and tell students know that you will be the time-keeper. Quiet, uninterrupted thinking and looking time is essential to this routine.

Students can work as a class, in small groups or individually. You can also vary the way students work, for example, students might generate the first list of words solo, writing their ideas down on post-it notes so that they can be posted to a class list of observations. The second list in a group situation. Students should try to write their ideas down, or in a whole class discussion the teacher might write students' comments on the board. Make sure that the descriptive words and phrases generated are made visible for the whole group at some point in the discussion. Add to the list as necessary during any follow up conversations.

A natural follow up to the Ten Times Two would be another routine that encourages students to talk about their observations and interpretations, for example the *What makes you say that?* routine or *Claim Support Question*.

COLORS, SHAPES, LINES

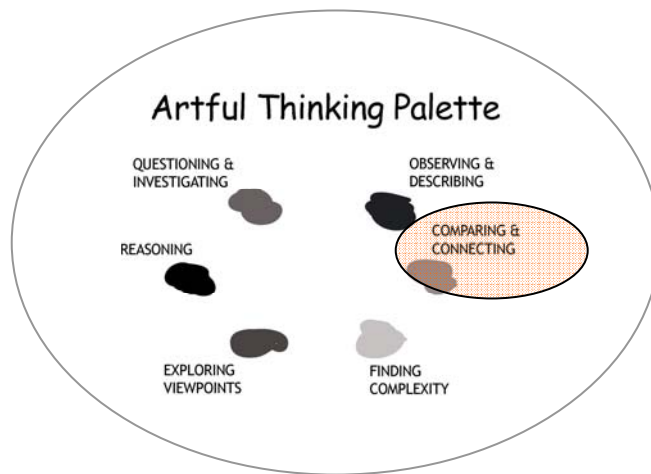
A Routine for Exploring the Formal Qualities of Art

1. Take a minute to look at the artwork. Let your eyes wander over it freely. What do you see? Take a few observations from students and then move on to the next step.
2. Observe and describe the colors, shapes, and lines in detail. Make 3 columns.

COLORS What colors do you see? Describe them.	SHAPES What kinds of shapes do you see? Describe them.	LINES What kinds of lines do you see? Describe them.

3. Choose a kind of color, shape, or line that you listed.* How does it contribute to the artwork overall? (How does it help the artwork “work?”) Consider:
 - How does it contribute to how the artwork feels?
 - How does it contribute to the mood of the artwork?
 - How does it contribute to how the artwork looks?
 - How does it contribute to the story the artwork tells?
 - How does it contribute to the ideas in the artwork?

* Do this with at least two elements. They can be chosen from any column.
4. What new ideas do you have about the artwork? What do you see now that you didn’t see before?



COMPARING & CONNECTING-CENTERED ROUTINES

The comparing & connecting disposition involves using the imagination to make insightful comparisons and connections. Thinking routines in this area focus on making comparisons and analogies, and exploring the power of verbal and visual metaphors.

Central Questions:
 What else is it like? How does it connect to other things you know about?

HEADLINES

A Routine for Capturing Essence

This routine draws on the idea of newspaper-type headlines as a vehicle for summing up and capture the essence of an event, idea, concept, topic, etc. The routine asks one core question:

1. **If you were to write a headline for this topic or issue right now that captured the most important aspect that should be remembered, what would that headline be?**

A second question involves probing how students' ideas of what is most important and central to the topic being explored have changed over time:

2. **How has your headline changed based on today's discussion? How does it differ from what you would have said yesterday?**

WHAT KIND OF THINKING DOES THIS ROUTINE ENCOURAGE?

This routine helps students capture the core or heart of the matter being studied or discussed. It also can involve them in summing things up and coming to some tentative conclusions.

WHEN AND WHERE CAN IT BE USED?

This routine works especially well at the end of a class discussion or session in which students have explored a topic and gathered a fair amount of new information or opinions about it.

WHAT ARE SOME TIPS FOR STARTING AND USING THIS ROUTINE?

The routine can be used quite effectively with think-pair-share. For example, at the end of a class the teachers can ask the class, "Think about all that we have been talking about today in class. If you were to write a headline for this topic or issue right now that captured the most important aspect that should be remembered, what would that headline be?" Next, the teacher tells students, "Share your headline with your neighbor." The teacher might close the class by asking, "Who heard a headline from someone else that they thought was particularly good at getting to the core of things?"

HOW DOES IT MAKE THINKING VISIBLE, AND HOW CAN I DOCUMENT IT?

Student responses to the routine can be written down and recorded so that a class list of headlines is created. These could be reviewed and updated from time to time as the class learns more about the topic. For instance, the list could be reviewed and the follow-up questions

This routine is adapted from the Visible Thinking project, Harvard Project Zero.

CONNECT / EXTEND/ CHALLENGE

A routine for connecting new ideas to prior knowledge

- CONNECT:** How are the ideas and information presented CONNECTED to what you already knew?
- EXTEND:** What new ideas did you get that EXTENDED or pushed your thinking in new directions?
- CHALLENGE:** What is still CHALLENGING or confusing for you to get your mind around? What questions, wonderings or puzzles do you now have?
-

WHAT KIND OF THINKING DOES THIS ROUTINE ENCOURAGE?

The routine helps students make connections between new ideas and prior knowledge. It also encourages them to take stock of ongoing questions, puzzles and difficulties as they reflect on what they are learning.

WHEN AND WHERE CAN IT BE USED?

The natural place to use the Connect-Extend-Challenge routine is after students have learned something new. It doesn't matter how *much* they have learned – it can be a lesson's worth, or a unit's worth. The routine is broadly applicable: Use it after students have explored a work of art, or anything else in the curriculum. Try it as a reflection during a lesson, after a longer project, or when completing a unit of study. Try using it after another routine!

WHAT ARE SOME TIPS FOR STARTING AND USING THIS ROUTINE?

This routine works well with the whole class, in small groups or individually. Keep a visible record of students' ideas. If you are working in a group, ask students to share some of their thoughts and collect a list of ideas in each of the three categories. Or have students write their individual responses on post-it notes and add them to a class chart. Keep students' visible thinking alive over time: Continually add new ideas to the lists and revisit the ideas and questions on the chart as students' understanding around a topic develops.

This routine is adapted from the Visible Thinking project, Harvard Project Zero.

<p style="text-align: center;">CONNECT</p> <p style="text-align: center;">How are the ideas and information presented CONNECTED to what you already knew?</p>	<p style="text-align: center;">EXTEND</p> <p style="text-align: center;">What new ideas did you get that EXTENDED or pushed your thinking in new directions?</p>	<p style="text-align: center;">CHALLENGE</p> <p style="text-align: center;">What is still CHALLENGING or confusing for you to get your mind around? What questions, wonderings or puzzles do you now have?</p>

CREATIVE COMPARISONS

A routine for creating metaphors

1. What do you see in the artwork? / What do you know about the topic?
2. Compare: Choose a category from the list below or identify your own category.
3. Imagine: If this topic/artwork was a kind of _____ (category), what would it be?
4. Explain three ways that it compares.

Good bet categories: Things that have a wide variety of parts or types.

For example:

- | | |
|--|--|
| <ul style="list-style-type: none">• Musical instruments• Plants• Toys• Cities• Parts of the body | <ul style="list-style-type: none">• Artworks of all kinds (for topics that aren't artworks)• Paintings (for any topic or artwork that isn't a painting)• Music (for any topic or artwork that isn't music) |
|--|--|

WHAT KIND OF THINKING DOES THIS ROUTINE ENCOURAGE?

The routine encourages metaphorical thinking – central to the work of any artist and to creative thinking in any discipline. Metaphors provoke our imaginations to create comparisons between dissimilar things, often leading to deeper and richer understanding of each.

WHEN AND WHERE CAN IT BE USED?

Creating metaphors help students understand unfamiliar subjects by linking it to what they already know. Use the routine when you want to help students make connections between disparate elements or ideas, or to stimulate new insights and solutions.

WHAT ARE SOME TIPS FOR STARTING AND USING THIS ROUTINE?

Begin by encouraging students to observe the artwork or brainstorm ideas about the topic at hand. Keep a visible record of students' ideas. When first using the routine, model a creative comparison for the class by then asking students to share a few ways the artwork or topic could compare to a plan/toy/city, etc. Remind students to use some of the brainstormed ideas or observations in the comparison. Alternatively, students can write their individual responses on post-it notes and add them to a class chart of metaphors. Keep students' visible thinking alive over time: Continually refine and add new thoughts to the lists of ideas and revisit the metaphors as students' understanding around a topic develops.

I USED TO THINK..., NOW I THINK

A routine for reflecting on how and why our thinking has changed

Remind students of the topic you want them to consider. It could be the ideal itself—fairness, truth, understanding, or creativity—or it could be the unit you are studying. Have students write a response using each of the sentence stems:

- **I used to think....**
- **Now, I think...**

WHAT KIND OF THINKING DOES THIS ROUTINE ENCOURAGE?

This routine helps students to reflect on their thinking about a topic or issue and explore how and why that thinking has changed. It can be useful in consolidating new learning as students identify their new understandings, opinions, and beliefs. By examining and explaining how and why their thinking has changed, students are developing their reasoning abilities and recognizing cause and effect relationships.

WHEN AND WHERE CAN IT BE USED?

This routine can be used whenever students' initial thoughts, opinions, or beliefs are likely to have changed as a result of instruction or experience. For instance, after reading new information, watching a film, listening to a speaker, experiencing something new, having a class discussion, at the end of a unit of study, and so on.

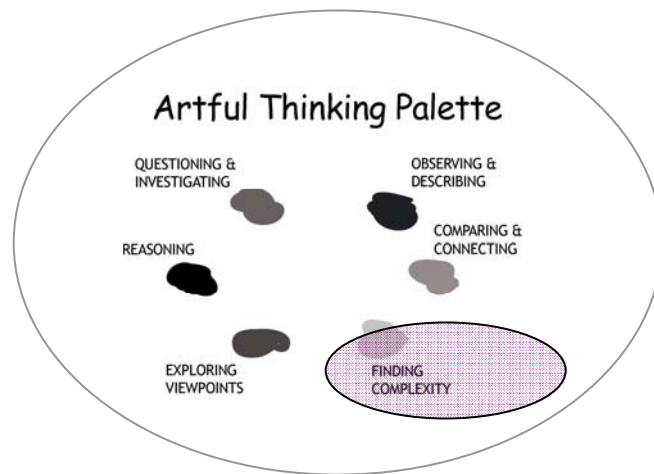
WHAT ARE SOME TIPS FOR STARTING AND USING THIS ROUTINE?

Explain to students that the purpose of this activity is to help them reflect on their thinking about the topic and to identify how their ideas have changed over time. For instance:

When we began this study of _____, you all had some initial ideas about it and what it was all about. In just a few sentences, I want to write what it is that you used to think about _____. Take a minute to think back and then write down your response to “I used to think...” Now, I want you to think about how your ideas about _____ have changed as a result of what we’ve been studying/doing/discussing. Again in just a few sentences write down what you now think about _____. Start your sentences with, “But now, I think...”

Have students share and explain their shifts in thinking. Initially it is good to do this as a whole group so that you can probe students' thinking and push them to explain. Once students become accustomed to explaining their thinking, students can share with one another in small groups or pairs.

This routine is adapted from the Visible Thinking project, Harvard Project Zero.



COMPLEXITY-CENTERED ROUTINES

The complexity disposition emphasizes seeing the dimensions, layers, and complexity in things. Thinking routines in this area focus on uncovering multiple dimensions, revealing layers, and exploring parts/purposes relationships.

Central questions: How is it complicated? What are its different layers and pieces?

PARTS / PURPOSES / COMPLEXITIES

A routine for seeing layers and dimensions of things

Choose a topic and ask:

- **What are its parts?** (What are its pieces, components?)
- **What are its purposes** (What is it for, what does it do?)
- **What are its complexities?** (How is it complicated in its parts, purposes, the relationship between the two, or other ways?)

Reflect: What insights or new questions do you have about the topic?

WHAT KIND OF THINKING DOES THIS ROUTINE ENCOURAGE?

This routine helps students build a more multi-dimensional mental model of a topic by identifying different dimensions of the topic and considering various ways in which the topic is complex.

WHEN AND WHERE CAN IT BE USED?

Use the *Parts-Purposes-Complexities* routine with objects (sea shells, microscope, buildings), topics (fractions, grammar, electricity, democracy), and works of art. It's important for an example of the topic to be readily accessible to students, either physically or mentally. If the object is physically visible, students don't need a lot of background knowledge. If it is a conceptual topic, like democracy, it's helpful for student to have background knowledge of a particular instance of it.

WHAT ARE SOME TIPS FOR STARTING AND USING THIS ROUTINE?

The routine can be used in any format – large group, small group, or solo. Whatever the format, make sure there's a way for students to make their thinking visible. (See the example of documentation in the Picture of Practice on the following page.) Encourage students to think creatively about different kinds of parts. For example, the colors or shapes in a painting are one kind of part; artist and audience are another kind of part. Use the concept of “purpose” loosely, so that it means how something works, what it's for, what it does, or the purposes it serves.

The “purposes” question can broadly apply to the topic as a whole (e.g., the purpose of a microscope is to make small things visible), or to parts of the topic (e.g., the purpose of an eyepiece on a microscope is to hold your eye steady and keep out extra light).

When using the routine with works of art, be especially flexible with the meaning of purpose, so that it means “how it works.” For example, if *bright colors* is a part of a work of art, a purpose might be: *the colors get your eyes excited and moving around the painting.*

PICTURE OF PRACTICE: PARTS / PURPOSES / COMPLEXITIES

FRACTIONS 4TH GRADE

PARTS <i>Some parts of fractions are...</i>	PURPOSES <i>The purposes of fractions are...</i>	COMPLEXITIES <i>Some things that are complex about fractions are...</i>
<ul style="list-style-type: none"> • The number above the line • The number below the line • The line? • Knowing math (it's a part of fractions, because you have to know math to do fractions.) • The never-ending amount of numbers between 1 and 0. • numerator, denominator • division line • whole numbers in mixed fractions • top number means how many, bottom number means the whole amount 	<ul style="list-style-type: none"> • Practicing for harder work • Being able to do math between numbers • They can be used to add up to an odd number • To divide an odd number by an even • To divide things in pieces • sharing something • making something equal • figuring out percentages • deciding how much chance something has (like 2 out of 5) • making something smaller (dividing it in half, quartering it) 	<ul style="list-style-type: none"> • Converting $1\frac{1}{2}$ to $\frac{3}{2}$, and going the other way. And switching. • There are a lot of parts. You need to find out how they work together. • Fractions are like a play. You need to know what to do, where you are going, and the role of each part. • Remembering the names of things. • Explaining how you do a problem • Half doesn't always equal half (like half of \$1000 isn't the same as half of \$1000000) • When something is given in decimals and something else is given in fractions and you have to decide what is bigger or smaller • Half of something can be a third of something else (like half of 10 and a third of 15 are the same things) but a third is supposed to be smaller than half • 3 is bigger than 1 and 6 is bigger than 2, but $\frac{3}{6}$ and $\frac{1}{2}$ are equivalent. How can that be? • Reducing fractions seems like I'm making them smaller, but they are supposed to be equal.

THE COMPLEXITY SCALE

A routine creating multi-dimensional mental models

1. Say some broad things you know about a topic –observations, facts, ideas. Think up different *kinds* of things.
2. Place each statement somewhere on the complexity scale
3. Explain why you want to place it there.*

Simple _____ **Complex**

4. Reflect: What new insights and questions do you have about the topic?

*Feel free to discuss and debate placement. You can even place a statement in more than one spot on the line (sometimes things are simple in one way, but complex in another).

WHAT KIND OF THINKING DOES THIS ROUTINE ENCOURAGE?

This routine helps students build a more multi-dimensional mental model of a topic by identifying different aspects of the topic and considering their complexity. The benefit of the routine consists mainly in the *reasoning* students do in order to choose and explain their ratings. Of less importance is assigning each idea to the “right” place on the complexity scale.

WHEN AND WHERE CAN IT BE USED?

Use the Complexity Scale when you have been studying a topic for a while and students know something about it. But don’t wait until the end of topic to use the routine. The Complexity Scale is a good way to surface students’ conceptions so you can get a sense of how they are understanding the topic in its entirety.

WHAT ARE SOME TIPS FOR STARTING AND USING THIS ROUTINE?

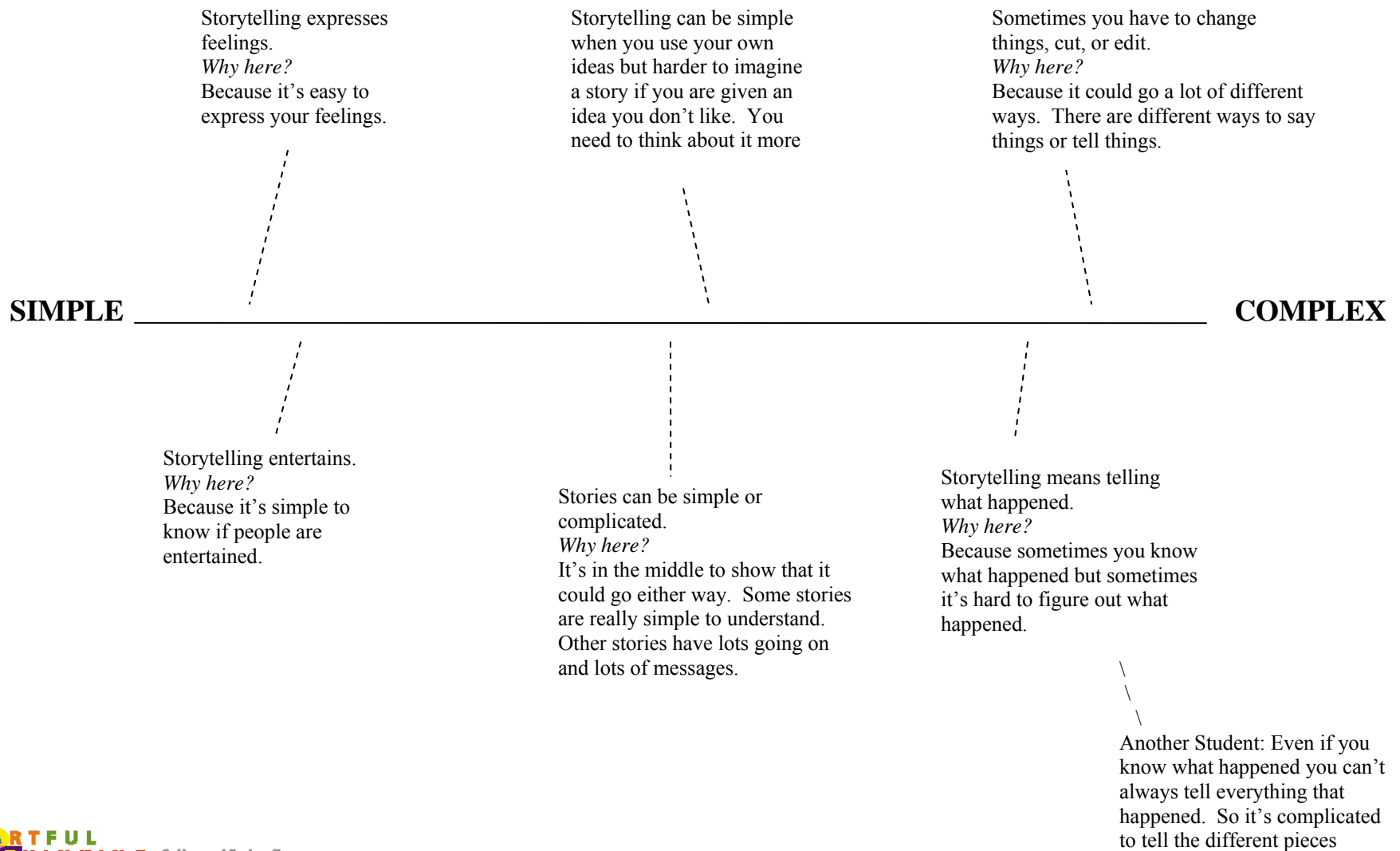
This routine works well in a large group, but you can also use it in small groups or even solo. Almost any fact, observation or an idea about a topic that students think of can be placed on the scale. So all students should be able to participate. The essence of the routine is in the thinking and discussion it generates, so make sure to encourage students to discuss their ideas about where to place items on the scale. If students seem to default to thinking of complex as only hard or difficult, encourage them to think of other things that are layered, intricate, or complicated.

You can record students’ ideas yourself, or students can place them on the scale themselves. (Sticky notes work great here because they can be moved around when students’ ideas about placement change). Conclude the activity by asking students what new insights and questions they have about the topic.

Once your students are familiar with the routine, you can use the basic idea of complexity-rating in the context of regular class discussions, as a way of probing an aspect of a topic that you think is worth examining. For instance, you can ask: *Where would you place this idea/fact/event on the complexity scale.*

THE COMPLEXITY SCALE: PICTURE OF PRACTICE

STORYTELLING 4TH GRADE



TEACHER RESOURCE MATERIALS

This section contains Study Group materials that support school-wide learning. The protocol for looking at student work and tools for reflection focus attention on thinking and help to support teachers in their ongoing efforts with Artful Thinking. These resources help teachers to look closely at students' thinking and to think about creating rich opportunities for thinking.

In addition, you will find tips and suggestions for forming and facilitating study groups.

TEACHER STUDY GROUPS

Artful Thinking is both a classroom and a school-wide endeavor. As you and your colleagues seek to make thinking more visible in your classrooms through the use of thinking routines and documenting students' thinking, you will find that there is much benefit in coming together to share and learn from one another. In such gatherings, it is often helpful to use a protocol—that is, a structure for conversation—to keep the group clearly focused.

The Study Group Protocol is a protocol for looking at student work with a focus on the thinking present in the work. Like most protocols for looking at student work, it is highly structured. For teachers not used to using protocols to guide conversation, this may appear to be a bit rigid and confining, not allowing for the natural flow of conversation they are used to having with colleagues. However, the structure ensures that the conversation stays focused on a particular goal—in this case thinking about the thinking present in students' work. Over time, teachers get used to the structure and it feels more natural and facilitating of conversation rather than inhibiting.

Looking for thinking in student work is new to many teachers. Teachers are often more accustomed to evaluating work, assessing it against established criteria, or focusing on the instruction of the lesson than looking for evidence of thinking. As a result, some teachers may initially feel like they don't have enough information about the goals of instruction, how instruction unfolded, or the criteria by which to evaluate the success of the work. While this information can be useful in providing context, it is important not to let it become the focus of discussion but to focus on the thinking that seems to be present in the work itself.

Trying to identify thinking can be challenging. It may be useful to have a copy of the palette to use as a sample of what kinds of things to look for in the work. For example, when sharing work from one of the routines, teachers might look for evidence that students are making connections, finding complexity, considering different perspectives, and so on. When teachers use the protocol at every study group, they find that not only does the protocol become more comfortable but they also become better at identifying thinking. This carries over into the classroom as teachers become better at spotting opportunities for thinking.

While any piece of student work can be looked at for evidence of understanding, it is often useful to use work associated with a thinking routine. This ensures that the goal and purpose of the work is to facilitate thinking and also provides an example of using the routines from which others can build. The work might be that of an individual student, a group of students, or the documentation from an entire class discussion. As a part of the protocol, teachers will talk about where the instruction might go next. This will further reinforce the use of routines.

Looking at Student Thinking

1. Greetings and housekeeping matters. (3 minutes)
2. Briefly review Puzzles and Insights from last week (3 minutes)
3. Sharing Documentation. Work in pairs. Each person shares a piece of documentation of students' thinking. Talk about it using the See/Think/Wonder routine. (20 minutes total, 10 minutes for each teacher to share work)

What do you see in the work?

Describe the work. Withhold judgment for the time being. What do you notice?

What do you *think* about that?

Speculate about students' ideas: What kinds of thinking do you see?
What's going on?

What does it make you *wonder* about students' thinking?

Ask questions about the students' thinking.

Reflect

What are implications for future teaching?

4. Identify Puzzles and Insights. Each person identifies two headlines from their paired discussion: One key insight, and one key question or puzzle. Write these ideas on post-it notes that can be shared with the group in the next step. (5 minutes)

Make the groups the ideas visible in step 4. Save the documentation and use it in the following study group.

4. Insight and Puzzles discussion Come together as a whole group. Make the groups' thinking visible by sticking the Puzzles and Insights post-it notes on the board. As people put their ideas on the board, they should read other people's post-its and try to group their Puzzles and Insights with ideas that are connected to their own. Review the categories and pick one or two of them for a longer discussion. (20 minutes)
5. Creating opportunities for Thinking Brainstorm opportunities to use an idea or thinking routine that was discussed today. Choose one and plan a time to use it in the near future. (5 minutes)
6. Reflect on the study group and protocol How was this process? What was positive, what could be improved? Are there any questions about the protocol? (5 minutes)
7. Closing. Thank one another for support and plan to meet next time.

THINK TRACK

Artful Thinking and the Use of Thinking Routines: A Case Study of Think Track Data

Since 2004, Long Lake Elementary School in Traverse City, Michigan has been involved in the Artful Thinking project developed in collaboration with the Traverse City Area Public Schools (TCAPS) through a Department of Education Arts Education Model Dissemination grant. TCAPS is a large rural school district with almost 11,000 students, many are considered “at-risk.” On any given day, you can walk into Long Lake, a typical school in the district demographically, and observe teachers and students engaged with a thinking routine. As you look around the classrooms and hallways, you could see visible evidence of student thinking – lists of questions and “wonderings”, charts with sticky notes reflecting students’ ideas, and diagrams of class discussions. Students in some rooms might be gathered around a work of art establishing and exploring different points of view about it.

For the past year and a half, all twenty teachers at Long Lake Elementary School have been involved with Artful Thinking. The project was faced with the challenge of creating an arts integration program for a school where most of the teachers were classroom teachers who had little or no background or interest in the arts. By using thinking routines to explore works of art, we have found that teachers are able to think more deeply about art. Developing understanding about works of art also helps teachers and students make connections to other topics. We have also seen that thinking routines not only help teachers and students to think about art and other subjects in new ways, but also encourage them to think more deeply about thinking. Important epistemic messages – such as learning starts with one’s own ideas, learning involves getting personally involved, learning can be a group process and a group outcome, and questions are outcomes and engines, among others – are conveyed through the use of thinking routines when looking at art or using routines in other subject areas.

In this case study, we examine Long Lake teachers’ uses of thinking routines. Teachers reported routine use at their bi-weekly study group meetings by filling out a “think-track” sheet, approximating how many and which routines they used in the classroom. Individual teachers were interviewed mid-year. In March all teachers responded to a survey about routine use and benefits. Drawing on this survey, as well as interview and observational data, we describe the frequency and trajectory of routine use and consider what attracts teachers to specific routines. We also explore what Long Lake teachers describe as the student and instructional benefits of using routines.

Frequency and Trajectory of Routine Use

In the first semester of the 2005-06 school year, the second year of the program, all teachers consistently reported using 1-3 routines a week, although some did report using more than three. By March 2006, more than half of the teachers

THINK TRACK

reported using 4-6 or more routines per week. The increased frequency of routine use over this year shows that teachers have become comfortable using routines on a regular basis. But this was not always the case. During the first year of the program, teachers were gradually introduced to new routines at different times. They would often try out routines once to gain familiarity with them before returning to a few routines that would then be used repeatedly. This exercise initially came across as a classroom activity in itself rather than using a routine instrumentally to achieve specific thinking goals. During this time, apparently, teachers were just getting familiar with the concept of routines. But, of course, the uptake of certain routines was quick and we'll take a look at the most popular ones in the next section.

Another indication that teachers became more confident with routines over the course of the project is their experimenting with the structure of the routines. As certain routines became more familiar, teachers took parts of the routine and used them independently of each other, or just used the needed steps; teachers started to layer routines on top of routines and blend them together. Other routines were tweaked or adapted to fit the needs of the teacher or a particular lesson. For example, the Headlines routine was modified because some teachers felt the need to take students beyond merely summarizing events to providing an explanation and justification for that headline. Thus, the Headlines routine became the Headline News routine in which students were asked, "What's the story behind the headline?" Teachers also became more creative with ways to document the thinking generated from routines, often involving students in this process. These experiments indicate that the teachers are becoming more comfortable with the routines, but also that they are more aware of the types of thinking that the routines can elicit.

Which routines are used most?

Of the sixteen routines introduced to the Long Lake teachers as of March 2006, we found that the three most commonly used routines are What Makes You Say That? (WMYST),¹ See-Think-Wonder, and Headlines. While the data indicate that many teachers use a wide variety of routines, all teachers have used these three routines most frequently and most teachers have used See-Think-Wonder and What Makes You Say That? consistently over the past year. They report that these routines target specific kinds of thinking that they are interested in developing in their students.

In our surveys, 16 out of 20 teachers reported See-Think-Wonder as one of their most commonly used routines. An analysis of the "think-track" data collected over the years also supports this. About half of the teachers report that WMYST was among their most frequently used routines and again this is confirmed by the "think track" data. Slightly less than half of the teachers reported Headlines among their most frequently used routines. Interestingly, teachers report that their use of the What Makes You Say That? routine is almost impossible to quantify, as that core prompt has become an integral part of almost

¹ A routine adapted for teaching thinking from a strategy for examining works of art developed by Philip Yenawine and Abigail Housen (Housen, 1996; Housen, Yenawine, & Arenas, 1991)

every routine. Teachers find themselves continually asking students to support their thinking with evidence and report this in both survey and “think-track” data.

Student and Instructional Benefits

These three routines share the common structural characteristics of all routines: they are simple, explicit and easy to learn. They are useful across a variety of subjects and grade levels. As we have seen, they are flexible and dynamic. But how do teachers view them as vehicles for promoting and revealing thinking?

In discussing their use of these three routines, teachers talk about the benefits for their students and for their own instruction. These benefits reflect many of the epistemic moves and messages. An analysis of the thinking moves across all the routines developed through the Visible Thinking work can be classified into the following broad types of cognitive behaviors. Taken together, these epistemic moves characterize a process-oriented conception of thinking that emphasizes critical thinking, creative elaboration, and reflection:

- Generate lots of ideas.
- Give evidence and explanations.
- Look for comparisons and connections.
- Construct reason-based syntheses, summaries, and conclusions.
- Construct evidence-based interpretations and explanations
- Make discernments and evaluations
- Identify parts, components, dimensions
- Ask questions
- Identify and explore multiple perspectives
- Create metaphors
- Reflect on and consolidate learning

Key thinking moves in the What Makes You Say That? routine include giving evidence and explanations, generating ideas, and, peripherally, identifying and exploring multiple perspectives. These epistemic moves are essential in so many different areas of study in school and in life, which may make the routine appealing to so many teachers and students.

A fourth-grade teacher reports that the What Makes You Say That? routine “extends students’ thinking and gives them the space to support their ideas with evidence. The fact that I’m so curious and intrigued with their thinking is part of the ‘hidden curriculum’ in our room

that says to students that their ideas and evidence are important. In general, What Makes You Say That? gives me a glimpse of what students understand and why it's much easier to do a quick assessment of whether that student 'has it' or if and what I need to re-teach." Another teacher adds, "I learn things they know or notice that I would not otherwise know, it leads to a discussion. I often use their evidence as a launch into another question."

These teachers point out that the instructional benefit of the What Makes You Say That? routine is diagnostic, revealing students' conceptions or misconceptions and ideas and indicating future instructional direction. It also uncovers students' interests, encourages them to make connections and helps to launch new ideas. In addition to the structural characteristics of this routine, its messages that learning starts with one's own ideas and that students need to get personally involved with learning seem to be leading reasons for the popularity of this routine.

Some of the epistemic moves most strongly connected to the See-Think-Wonder routine include generating ideas and questions, and making discernments and evaluations., among others. A first grade teacher says that "See-Think-Wonder allows us to share ideas and deal with misconceptions and 'wonder' increases our curiosity! Students feel like we are here to build their understanding." Another teacher reports, "I find out what students are interested in and can hear how their vocabulary is developing. It gives me a picture of their understanding."

The epistemic messages this routine sends are similar to the What Makes You Say That? routine: learning starts with learner's own ideas, it involves challenging and revising one's ideas, questions are engines and outcomes. The routine encourages students to get personally involved by asking them to make observations and connections and to share thoughts and wonderings. The See-Think-Wonder routine leaves students with "wonders", or questions, rather than answers, which is a powerful shift in understanding for some students.

The main epistemic move associated with the third most commonly used routine, Headlines, asks students to reflect on and consolidate learning. Additionally, the Headlines News routine asks students to construct a reason-based synthesis. Both versions of this routine send the strong message that learning involves uncovering complexity. When teachers talk about the Headlines routines, they often mention the essence-capturing function of the routine and how it helps provide insight into their students' understanding of a topic. "Headline News encourages students to see the 'big idea,'" reports one teacher. "It allows them to put their knowledge in their own words."

A third grade teacher also uses the routine to get a better sense of her students' understandings and to consider the shape of future lessons: "I think it's a great vehicle for closing a group of experiments for the end of the day or the end of that time that you are working, because I think it also puts that information of headlines in the kids' heads so they are thinking about it even though they are going home or whatever. ... It gives good direction as to where to go, because it really kind of outlines the direction of the next day's lesson. You might have misconceptions that come up and disagreement, so you have lots to work with the next day."

Reflections on routine use at Long Lake School

Routines are an important part of the school culture at Long Lake, shaping the daily activities of teachers and students. Teachers have integrated routine use into the everyday fabric of their classrooms across many subject areas with a wide variety of routines being used. Teachers consistently use a smaller subset of these routines across all grade levels. What Makes You Say That?, See-Think-Wonder and Headlines are three successfully adopted routines at Long Lake. The epistemic messages of these routines suggest that the Long Lake community is striving for an inquiry-oriented and active approach to learning. These teachers want their learners to be self-motivated, engaged and encouraged to reflect on their own thinking. Teachers report that thinking routines are contributing to deeper thinking and understanding in their classrooms, benefiting both the students and their own instruction:

The routines provide easy access to kids' thinking. They promote substantive conversation. They let me choose the kind of thinking I want others to do. They provide thinking rich activities. In most cases, I get a better idea of how students are applying knowledge in their own thinking and assignments/projects. In some cases studying kids' responses reveals their misconceptions or superficial knowledge and point me back toward more concept development before pressing ahead.

The Think Track tool can be found in Appendix A

INSTITUTIONAL STRUCTURE AND SUPPORTS

What is needed to sustain and grow Artful Thinking at a school? What kinds of structures and supports help to create a culture of thinking? At one level, all that is needed is dedication and commitment. An enthusiastic individual or pair of teachers can be very successful in creating change in their classrooms using these ideas on their own. For schools thinking about adopting Artful Thinking as an instructional approach as well as promoting a school-wide movement toward a culture of thinking, it will be important to consider putting in place the supports and structures that ensure success. Below are some key needs for such an approach:

Facilitation of the teacher groups and general process.

Facilitation is essential for leadership, coordination, introducing new teachers to the program, and supporting the work. The facilitator need not be an expert in Artful Thinking, only a dedicated individual interested in the work and in promoting the development of a culture of thinking at the school among colleagues. The facilitator's role is to introduce and discuss the routines as well as set up regular core group meetings.

While we suggest an Artful Thinking Coordinator have a commitment of 50% time to support and grow the program, in some situations this might not be possible. In those situations, it will still be important to have a volunteer facilitator, or pair of facilitators, to coordinate the group and schedule group meetings.

Teacher time to meet in the study groups and exchange ideas.

New instructional ideas benefit from regular action, discussion, and reflection to help them take hold and become established. For this reason, it is important to create a schedule that allows for study groups to meet together consistently.

Two hours every week for new groups is ideal. This allows for momentum to be built and interest to be sustained. Groups might meet every week for 8-12 weeks and then begin to meet once every two weeks. Two hours ensures that there is time to discuss a piece of student work brought from a member of the group as well as to share what is happening in classrooms and to discuss routines.

Teacher planning time for teachers new to the process.

While the Artful Thinking routines and processes of documentation are designed for easy integration with the curriculum, teachers new to this work will find it does take some planning to think about how to use the routines most effectively. Ideally, this planning would occur jointly with other teachers. As a rule of thumb, administrators might think of terms of one hour per week of additional planning time for teachers new to the process.

Ongoing professional development

Devoting a day or two every term for exploration, planning, and discussion of Artful Thinking helps to maintain focus and to grow the ideas and practices of

teachers. An outside expert, the facilitator, or a group of teachers at the school could facilitate these days. The time can be balanced between sharing classroom practices with learning new routines and planning for future instruction.



A S S E S S M E N T

How can we design everyday classroom practices so that they reveal and cultivate student thinking and learning?

STANCE ON ASSESSMENT

1. The goal of Artful Thinking is thinking-centered learning, which can only be revealed through thinking-centered assessments.

Artful Thinking (AT) encourages students to actively think with and through available information in order to develop thoughtful understanding of content. A key ingredient of thoughtful understanding is the active presence of *thought*. Assessments that don't invite active engagement with content aren't appropriate assessments of the effects of the Artful Thinking program.

2. Artful Thinking emphasizes “high-end cognition” in the sense that it help students develop thinking skills and dispositions that enable them to actively engage with challenging ideas and develop layered understandings of complex topics. Students' capacity to engage in high-end cognition can only be assessed by activities that invite them to do so. Assessments that foreground low-end cognition, such as knowledge recall and demonstrations of basic literacies, are not appropriate assessments of AT. The effectiveness of the program can't be gauged by changes in these outcomes.

3. Beware of hanging one's hat on collateral outcomes.

It's possible that students who are involved in AT *may* show gains on assessments that invite low-end cognition, but the effects are collateral: they aren't true measures of AT. High-stakes standardized tests often foreground low-end cognition.

4. Only rich practice will yield rich outcomes.

AT is not an “add-on” program: its goals are large and transformational. It aims to transform the way teachers teach and the way students learn, so that teaching and learning become more thinking-centered—across the school day and across the curriculum. This happens through: (a) the regular use of thinking routines in all school subjects, (b) frequent thoughtful explorations of visual art, (c) extensive documentation of student work in ways that reveal and extend student thinking, and (d) regular teacher study groups that examine student work and explore issues of thinking-centered instruction. Isolated or “add-on” AT practices are unlikely to make a lasting, visible change in student learning.

5. Artful Thinking routines, when combined with thoughtful documentation, embody assessment.

The purpose of assessment is to provide information about student performance that reveals competencies and indicates directions for growth and improvement. The purpose of thinking routines is to reveal, scaffold, and extend student thinking. When documented, they provide teachers with useful information about student learning, including their understandings and misconceptions, strengths and weaknesses. This information informs teacher feedback and the direction of instruction. This loop – from making student thinking visible through thinking-centered activities to shaping instruction so that it further enhance student performance -- *is* assessment in the most authentic sense. When practiced fully, AT makes thinking visible in a way that continually shapes student learning and informs responsive pedagogy.

An Artful Thinking stand on high-stakes testing.

- AT can only truly be assessed by assessments that engage students in the kind of learner-driven, thinking-centered inquiry that the program emphasizes. Most high-stakes testing doesn't do this, although tests can be redesigned to align more closely with AT goals.
- It is inappropriate to judge AT's efficacy through its collateral effects on tests that aren't designed to assess the kinds of thinking AT develops. If a school or district is committed to AT and also committed to wide-scale testing, tests will likely need to be redesigned.
- To a large extent, rich AT practice embodies assessment. To that extent that the goal of assessment is to reveal and improve student thinking, teachers should use the activities intrinsic to the program as sources of information about student thinking.
- AT engages students in high-end cognition; many high-stakes standardized tests call for low-end cognition.
- Tests often drive instruction. But they can also impoverish instruction. Many teachers and schools adopt AT/VT because they *don't* think high-stakes, standardized tests are worth teaching to. Rather, they value the kind of thinking-centered learning and rich pedagogy reflected in AT/VT. So choosing the values behind the AT/VT approach can often be a kind of stand against high-stakes testing.

THE CONTINUA

The areas of thinking on the Artful Thinking Palette and their related thinking routines represent *performances of understanding*: They are forms of thinking that help students build deep understanding of content. Good assessments of subject-matter understanding are also good assessments of thinking, as long as the assessments are performances of understanding that genuinely invite thinking.

Assessing thinking needn't always be an "add on" to assessing understanding, so long as the tests or measures we use to assess students' understanding of content invite students to go beyond the facts to think *with* the content.

The 6 Continua are tools that help identify qualities of thinking. These qualities are represented on the continua. The continua can be used by teachers to examine students' thinking. They can also be used by students themselves to examine and guide their own thinking.

OBVIOUS	BEYOND THE GIVEN
FUZZY	CLEAR & FOCUSED
SIMPLISTIC	ELABORATED
ONE-DIMENSIONAL	MULTI-DIMENSIONAL
RESTRICTED	GENERATIVE
TANGENTIAL	ESSENCE-CAPTURING

ASSESSING THINKING: SIX CONTINUA

OBVIOUS

BEYOND THE GIVEN

1

2

3

4

States the obvious, just scratches the surface, doesn't stretch to go beyond the given information or surface story.

Continuum one

Probes beneath the surface, reaches beyond the obvious, stretches for new applications, questions, connections.

FUZZY

CLEAR & FOCUSED

1

2

3

4

Thinking moves aren't clear (questions slide into statements, reasons slide into claims, observations slide into interpretations). Sprawling: rambling, unfocused, disorganized. Loses sight of main ideas or goals.

Continuum two

Thinking moves are clearly differentiated, thinking has a clear structure. Goals and purposes are clear and appropriately met. Anchored to main ideas, conceptually well-organized.

SIMPLISTIC

ELABORATED

1

2

3

4

Under-described, no detail or nuance. Overly broad, overly simplified, overly generalized.

Continuum three

Rich in detail, evocative, imaginative, nuanced, descriptive

ONE-DIMENSIONAL

MULTI-DIMENSIONAL

1

2

3

4

Only touches on one layer or dimension of a topic, work of art, or idea. Doesn't see complexity, layers, or other viewpoints.

Continuum four

Touches on several layers or dimensions (e.g., facts, big ideas or themes, deep structure, puzzles, perspectives). Recognizes complexity, recognizes that there are different levels, layers, or perspectives.

RESTRICTED

GENERATIVE

1

2

3

4

Closure-oriented. Doesn't seem to want to explore big ideas or ask hard questions. Often shows bias, resistance to thinking

Continuum five

Expands or extends thinking in new directions. Broadens understanding, opens up new lines of inquiry. Often reflects curiosity and openness.

TANGENTIAL

ESSENCE-CAPTURING

1

2

3

4

Doesn't capture or recognize important themes, characteristics or elements. Strays from the topic. Hovers over unimportant details or ideas.

Continuum six

Insightful, captures the heart of things. Identifies key themes, characteristics or elements. Sees deep structure. Shows an appreciation for the relative importance of things.

CAAP ASSESSMENT REDESIGN

The goal of the CAAP redesign work was to make the CAAPs a better indicator of the quality of student thinking, and more aligned with the thinking-centered goals of the Artful thinking program. The PZ research team has been an advisor to the TCAPS teachers and administrators who have been working to revise and improve the current CAAP tests. Pilot work centered on the grade 5 Social Studies CAAP for the Revolutionary War unit.

Several versions of the CAAP were pilot tested. The final version on the following page uses the MEAP Released Item format of providing a sequence of tasks that start with an image, text passage, or data chart. Thinking-centered tasks were designed to extend this format, which is complementary to Artful Thinking approaches.

The revised template for creating CAAPS starts with an image/text/data chart and uses thinking-centered tasks such as observation, reasoning, perspective identifying and perspective taking. While the types of thinking targeted by these activities correspond to the dispositions developed by the Artful Thinking program, it is not necessary to be in the program for the CAAP to be implemented.

CAAP template:

Observation Activity

1. Look at this image/text/data chart. Make ten observations.

Reasoning

2. Make a claim about what is going on this image/text/data chart.
 - Support your claim
 - What questions do you have?

Perspective Identifying

3. What different types of people might react to this image/text/data chart? Why?

Perspective Taking

4. Choose a perspective you identified above. Describe the experience from your point of view. What did you perceive (feel, taste, hear, smell, see)? What did you know about?

Model Item for 5th Grade Revolutionary War CAAP Test



The Boston Massacre, an engraving by Paul Revere (p. 108 of *HistoryAlive: America's Past*)

Observation Activity

1. Look at this painting. Make ten observations.

Reasoning

2. Make a claim about what is going on this picture.
 - Support your claim
 - What questions do you have?

Perspective Identifying

5. What different types of people might react to this image in 1775? Why?

Perspective Taking

6. Choose a perspective you identified above. Describe the experience from your point of view. What did you perceive (feel, taste, hear, smell, see)? What did you know about?

Michigan Standards addressed:

Stand I: Historical Perspective
Standard 3
Later Elementary Benchmarks 1 and 2:

Benchmark 1: Use primary sources to reconstruct past events.

Benchmark 2: Interpret conflicting accounts of events in both Michigan and United States history and analyze the viewpoints of the authors.

Assessing Thinking: Six Continua

Observation Activity:
This item aligns with continua 1, 4, 5

Reasoning Activity:
This item aligns with continua 2, 5, 6

Perspective Taking:
This item aligns with continua 4, 5, 6

Seven Standards for Assessment

- #1 Organization of Information
- #2 Consideration of Alternatives
- #5 Elaborated Written Communication



RESEARCH

Concepts of Art: Student and Teacher
"Used to Think" Data

Student Concept Map Data

CONCEPTS OF ART: I USED TO THINK, NOW I THINK

A qualitative examination of students' and teachers' changing perceptions of art.

Overview. During the course of the development of the Artful Thinking Program, we began to see a shift in teachers' ideas about art as they more familiar with discussions of art in the classroom. For example, it seemed to us that teachers were becoming less concerned about choosing "good" art to use in the classroom and more interested in the quality of student discussion. We also noticed that teachers were growing increasingly comfortable with using a variety of types of art images in their classroom – classical, contemporary, mixed and unusual media, art with provocative content—whereas in the early days of the program the teachers seemed most interested in using art that was well-known and relatively traditional.

These apparent changes invited deeper examination, and we decided to take a closer look. Our goals were twofold: From a research perspective, we wanted to document teachers' and students' conceptual change related to the Artful Thinking program. From a program perspective, we were mindful of Artful Thinking's commitment to making thinking visible and we wanted to provide teachers and students with an opportunity to reflect on, and make visible to themselves, their own evolving ideas.

Instrument and Procedure. To accomplish the foregoing goals, we used a thinking routine called *Used to think, now I think* to collect perceptions from both students and teachers. The routine can be used with virtually any topic around which sustained thought has occurred, and it works exactly as its label suggests: It asks people to reflect on what they *used* to think about a topic, and what they *now* thinks. Several, but not all, of the teachers and students had used this routine once before. The routine requires no prior training.

We used the routine with two topics as follows, with slightly different wording for teachers and students.

Teacher task:

I used to think...now I think about art (topic 1)

I used to think...now I think about connecting art and the curriculum (topic 2)

Student task:

I used to think...now I think about art (topic 1)

I used to think...now I think about how art connects to things we study in school (topic 2)

The routine was used with 26 teachers, 18 5th graders, 42 6th graders, and 25 9th graders. The length of time teachers and students had been involved in the program ranged from 2 years to 6 months. Teachers used the routine in a workshop setting, and were given about 15 minutes to write down their ideas.

The following week, teachers administered the routine in a classroom setting, giving students about 15 minutes to write down their ideas. In the classroom, several teachers conducted class discussions following the routine so that students could share their ideas aloud. Those discussions are not captured in the following analysis.

A word about the structure of the task. It is important to note that the *Used to think...now I think* task was designed as a thinking routine. Like all thinking routines, it does more than simply uncover users' prior ideas about a topic, it also encourages people to construct ideas in the moment. The particular purpose of this routine is to promote reflection and discernment by setting up a dichotomy around which people can organize their ideas. The "I used to think; now I think" dichotomy encourages people to identify change where they might not have identified it before, usually encouraging people to identify change in the direction of positive growth, since the routine is typically used in a learning setting. Consequently, the routine isn't suitable as an objective measure for counting the number of people who have experienced conceptual change, since its structure virtually insures that people will report the occurrence of change. Rather, the routine is a powerful tool for documenting how people construct and characterize their own perceived sense of conceptual change. It is the qualities of this perceived change that we aim to capture in our analysis of the data.

First we report the results for students, then the results for teachers.

STUDENT RESULTS: Used to think...Now I think

Interestingly, although students followed the task structure and wrote ideas in the two areas designated by the two topics of the task – art, and connecting art to school subjects –their ideas did not divide neatly into these two categories. Students mainly seemed interested in talking about their thoughts about art in general, which they did across both tasks, and we coded their ideas wherever we found them. When students did say something specifically about the connection between art and school subjects, they seemed to take the connection as a given, reporting their ideas in more or less a yes/no fashion: For example, now they "look at pictures in math class" but they didn't used to. Since our purpose in using the routine was not to simply record *that* participants' ideas had changed, but rather to characterize the particular qualities of change, we only coded students' ideas related to topic 1 – art in general.

Students' ideas fell into six broad categories: three categories for their "used to think" ideas, and three categories for their "now I think" ideas. The categories are:

USED TO THINK

- 1. Art is not engaging** (i.e., not an object of inquiry or sustained thought)
- 2. Art is just one thing** ("just" painting, "just" pictorial, "just" one meaning)
- 3. Art is remote, not accessible.**

NOW I THINK

- 4. Art invites inquiry** (because it has complexity, narrative, depth).
- 5. Art is in many places and times and has many forms**
- 6. Art is beautiful, fun.**

Although the 6 categories apply to all three grades – 5th, 6th and 9th – the story unfolds somewhat differently across the grades. In what follows, we report the results category by category, comparing the grades as we go along.

Category 1: Art is not engaging (Art has no special or deep meaning, art is not worth thinking about).

- *I thought when you looked at a painting or a sculpture what you saw was the whole picture and nothing was the center of interest or thought provoking (5th grade)*
- *I used to think there wasn't a lot to say about art. (5th grade)*
- *I used to think that art had no point or meaning. (6th grade)*
- *I used to think art wasn't exciting and I didn't think that it stood out to people's eyes. (6th grade)*
- *They were just pictures, had no hidden meaning, no hidden secrets, nothing more than paint. (9th grade)*
- *Music and pictures, I never looked deeper into it, to see the message (9th grade)*
- *I used to not pay attention to detail and the mood of the artwork or music. I would look at the artwork superficially, only paying attention to what was right in front of my face such as the color. I never delved deeper into what the artist was trying to get across. (9th grade)*

As the foregoing quotes suggest, many students report that they simply didn't perceive art as something that invited deep or sustained thought. Art simply didn't seem to be on their radar screens as a worthy object of inquiry. 50 % of the 5th graders and 45% of the 6th graders report ideas in this category. Interestingly, this number increases strikingly in 9th grade, where 72% of the students report that they used to find art uninteresting or unengaging.

Category 2: Art is “just one thing” – just one medium (usually painting), just one meaning or interpretation, just realistic, just illustrative.

- *I used to think art was just drawing pictures and coloring them in. (5th grade)*
- *I used to think art is only supposed to make one message (5th grade)*
- *I thought art was pictures of people and animals and things. (6th grade)*
- *I used to think it was just like a photo, but someone painted it with more detail. (6th grade)*
- *I used to think that pictures were just to show what things looked like (9th grade)*
- *I used to just look at a picture and look at it as a picture. (9th grade)*

The thought expressed most often by 5th graders (83%) is that art is monolithic in nature: They report having perceived it as just one kind of thing, such as “just” painting, or “just a picture,” or as having just one meaning. This number decreases dramatically in 6th grade to 38%, and decreases slightly again in 9th grade to 24%.

Category 3: Art is remote, not accessible, art is only for experts or people who are good at it.

- *I used to think that art was just for people who were good at it. (5th grade)*

- *Art was only from a long time ago (5th grade)*
- *The artists had to be the best of the best (6th grade)*

A relatively small percentage of students report seeing art as inaccessible, remote, or for experts only. Perhaps in keeping with their relatively sparse conception of art, 5th graders' responses fall into this category most often (33%), while the number is quite low in 6th grade (12%) and lower still in 9th grade (8%).

It is worth noting that, despite the structure of the *used to think...now I think* task, which scaffolds a negative-to-positive response, a small number of students (find percentage) – but only in 9th grade – report having positive views of art in the “used to think” portion of the task. For example, ...quote here... We did not code these responses and report them as percentages because the task structure renders them artificial. It is quite possible that many students had positive feelings about art (if they were aware of having any feelings about art at all) but the structure of the task tends to suppress expression of this view. Still, it is worth noting that, despite the task structure, by 9th grade the power of art has a strong enough positive influence on a small number of students to make a mark in their initial responses.

How do students' ideas about art change? Again, we report students' ideas in each category, noting how the pattern changes across grades.

Category 4: Art is engaging: It has meaning, narrative, complexity

- *[Now I think] Art can have many questions in it (5th grade)*
- *[Now I think] Art can tell a story, or set a mood, or even let you figure out what it's telling you! (5th grade)*
- *[Now I think] Art is very complex and there are a lot of observations you can make and there are a lot of view points in art (5th grade)*
- *Now I try to look at small details and things that don't and do stand out (6th grade)*
- *Now I think art has lots of meanings (6th grade)*
- *Now in class when we look at art ...we think more specifically and really discover what this artwork makes us feel and want to know and learn. (9th grade)*
- *[Now I think] that every picture or song has a message, a hidden meaning, that exists within the pictures. You just have to take the time to find it...It's not just a picture it's a symbol for something more. (9th grade)*

Across the grades, the most frequent thought expressed by students in the *...now I think* part of the task is that art *is* engaging and has deep meaning. They now perceive art as provoking questions, telling stories, having hidden messages and layers of details. Though this reported conceptual shift is robust at each grade level, students' perception that art is engaging and meaningful seems to increase over the years: 61% of the 5th graders express this thought; 79% of the 6th graders, and 84% of the 9th graders.

Category 5: Art can occur many forms, places and times

- *Art is old and new. (5th grade)*
- *Art is more than painting. It could be cooking. (5th grade)*
- *Art can be from any time, even the future. (5th grade)*

- *You can use more than just paint to do art. (5th grade)*
- *Now I know there is more than one artist (6th grade)*

The foregoing quotes are drawn mainly from 5th graders, 61% of whom expressed that they now think art is more than “just” painting and that it can take many forms, be done by many different people, be found in many different places and be made at different times. The percentage of 6th graders who express this idea drops considerably, to 14%, and only one 9th grader makes a comment in this area. This pattern recalls the earlier pattern in the *used to think* category of “art is just one thing,” in which 83% of the 5th graders expressed the idea that they used to think art was “just” paintings, whereas only 38% of the 6th graders did, and only 24% of the 9th graders.

Category 6: Art is beautiful / Art is fun

- *Art paintings are pretty (5th grade)*
- *Art is a really fun thing to do and learn about. (5th grade)*
- *It just has to be fun to you (6th grade)*
- *Now I love art, music, videos, everything. It is important, it gives us information but it can also really be fun. (9th grade)*

The ideas in this category come mainly from 5th graders, 28% of whom expressed the idea that art was pleasurable in some way. Just 10% of 6th graders explicitly voiced this thought, and almost no 9th graders.

Discussion: Looking across the grades, an interesting story seems to unfold. When students report what they “used to think” about art, the youngest children seem to report having the most limited view, with 83% thinking that art was “just one thing.” Less than half of the 5th graders felt this way (38%), and only about a quarter (24%) of the 9th graders felt this way. When students reported what they *now* think, it is only the 5th graders who seem to have a strong sense of a shift in this area, with 61% of them reporting a perceived change, while the number of 6th and 9th students who report shifts in this area is negligible. It seems that one of the strong effects of the Artful Thinking program on 6th graders is that it crystallizes their perceptions of art as a distinct and nuanced realm of human activity. Art, to 5th graders, used to be “just one thing.” This “one thing” has now taken on dimensionality: *now they think* art can have multiple forms, be made at many times and in many places by many different kinds of people, and that works of art can have many interpretations.

Another sizable shift for 5th graders occurs around their sense of art as engaging and worth thinking deeply about. Half the 5th graders report that they used to think art wasn’t engaging, and 61% report that now they do find art engaging. This shift is robust for all the grades, but interestingly, it is by far the most salient shift for 6th and 9th graders, while its saliency for 6th graders is similar to the saliency of their shift toward seeing art as having dimensionality.

For 6th and 9th graders, the program has the strongest effect on their sense of whether art is engaging. 79% of 6th graders and 84% of 9th graders report a shift in this perception, commenting that now they see art as having “deep meaning”, “hidden messages”, “lots of details”, “stories to tell” and “lots of thought behind it”. While more than half the students in

all grades report this shift, the shift for 9th graders is most dramatic, with 72% reporting that they used to think art wasn't engaging and 82% reporting that now they do. As one 9th graders puts it: *Now we think more specifically and really discover what this piece of artwork makes us feel an want to know and learn.*

To summarize the student results of the *used to think...now I think* findings for students, students in all three grades – 5th, 6th, and 9th – report salient shifts in their perceptions about art. For 5th graders, two perceived shifts stand out similarly strongly: One is a shift towards a sense of as a distinct and nuanced realm of human activity, and another is a shift toward a sense of artworks as objects worthy of prolonged inquiry. For 6th and 9th graders, the shift toward perceiving art as a worthy object of inquiry is the shift stands out more strongly than any other, and its saliency seems to increase with grade level: The shift toward seeing art as something worth thinking deeply about seems to be noticeably stronger in 6th grade than in 5th, and stronger again in 9th grade.

TEACHER DATA: I used to think...now I think

We turn now to the teacher side of the story and ask: What kinds of shifts are teachers experiencing in their ideas about art? Recall that the shifts in students' thinking occurred mainly around topic 1 -- art in general. This was not the case with teachers. Teachers' ideas clearly fell into the two areas parsed by the task: ideas about art in general (topic 1), and ideas about art in connection to the curriculum (topic 2). In fact, teachers expressed more ideas about topic 2 than they did about topic 1. This may be because one of the explicit goals of the program was to help teachers connect art to the curriculum and many teacher-workshop hours were devoted to this goal. Whatever the reason, it is clearly the topic most on teachers' minds, so we report the results in the corresponding order: first we report teachers ideas related to art and the curriculum; then we report their ideas about art in general. Unlike the student data, there is not a cross-grade story to tell within each category, so rather than report the results category by category, as we did in the forgoing section, we report the results of all categories together, for each of the two tasks.

TEACHER RESULTS: Used to think...now I think about art and the curriculum

In this area, teachers reported ideas in the following 5 categories:

USED TO THINK about art and the curriculum

- 1. Art is unconnected to the curriculum**
- 2. Art is just for art class**
- 3. Art is motivational or instrumental**

NOW I THINK about art and the curriculum

- 4. Art connects meaningfully to the curriculum**
- 5. Art helps students think and learn**

Many teachers seemed to begin the program with the perception that art was an “add-on,” – something separate from or relatively unconnected to the curriculum. In their own words:

- *I used to think art didn't connect to the curriculum – only in the art arenas such as “art history/art appreciation.”*
- *I used to think art was for the art class.*
- *I used to think pictures and visual aids were a fun addition to a lesson or unit. Too much time could be wasted discussing a work of art.*

Several teachers (37%) stated explicitly that they thought art had no or little direct connection to their curriculum. Several more (27%) stated explicitly that art was something that happened just in the art class – “a class kids took once a week.” About a quarter of the teachers (24%) reported that they used to view art in the classroom mainly as a motivational activity to get students interested in a topic, or as something “just for fun.”

How do teachers' views shift? Again, teachers' own words:

- *Now I think there is so much more if you take the time to study the details...using various routines. All learners become more engaged and connected, making the artwork much more meaningful.*
- *Now I think connecting art to the curriculum has so much depth and value for students in their way of thinking, not only in schools, but also for use in the “real world.” The kids take more of an active role in class and they enjoy it.*
- *Now I think that the arts provide many opportunities for students to think and can really connect**

The largest shift for teachers seems to occur in the area of curricular connections. Almost two thirds of the teachers (62%) explicitly mention that they now think art *does* connect meaningfully and centrally to the curriculum. Many teachers (56%) also explicitly report that they now believe that exploring works of art with students helps students learn to think and deepens their understanding of subjects in the curriculum. Several teachers (18%) also explicitly mention that art fosters student engagement, and that students find art interesting.

TEACHER RESULTS: Used to think...now I think about art in general

As we mentioned earlier, teachers reported more ideas related to the connection between art and the curriculum than about art in general. Nonetheless, there are some distinct ideas and shifts in this area as well. Teachers' ideas fall into the following 5 categories:

USED TO THINK about art in general

- 1. Art has just one meaning**
- 2. Art is for experts**
- 3. Art is recreational, contemplative**

NOW I THINK about art in general

- 4. Art has more than one interpretation or meaning**
- 6. Art teaches us about ourselves.**

In teachers' own words:

- *I used to think art had one specific meaning.*
- *I used to think art was meant to have the same meaning the artist wants others to know.*
- *I used to think art was for recreation, or contemplation/ meditation, trying to figure out what the artist was trying to say with his/her work.*
- *I used to think that interpretation was already known by "experts."*
- *I used to think that art was not meaningful time—that I could not make sense of it.*

About a quarter (24%) of the teachers reported thinking that works of art had just one meaning or interpretation, often the one intended by the artist.. Several teachers seemed to feel that some sort of expertise was needed to appreciate or interpret art (16%), and several explicitly mentioned feeling that art was inaccessible or uninteresting to them (16%). A few teachers talked about art as recreational or contemplative (8%)

Teachers' participation in the program seems to provoke a shift in some of these ideas. They report:

- *Now I think about how complex meaning can be drawn in many ways from a piece.*
- *Now I think that art can...give all students [of] all abilities the power/voice of interpretation.*
- *Now I think art can teach us more about ourselves.*

About a quarter of teachers (24%) report a shift from thinking that works of art only had a single "right" interpretation to thinking that works of art can have many different interpretations, generated by many different people, including students. A modest number of teachers (18%) explicitly report that they have come to feel that art is personally meaningful to their own lives.

Discussion: In terms of teachers' ideas about art and the curriculum, the biggest conceptual shift is away from the idea that art is unconnected to the central goals of the curriculum and towards a view that art can provide powerful opportunities for learning. Teachers seem less inclined, now, to think of art as a frill, or a motivational activity, and more inclined to view it as an important classroom activity in its own right. In terms of teachers' ideas about art in general, the largest shift seems to be away from a view that works of art have only one interpretation—typically represented as the artist's intention or the view of an expert--and towards a view of art as affording multiple valid interpretations from multiple perspectives, including interpretations constructed by teachers themselves and their students. It is interesting to consider this shift alongside the similar shift in students' thinking, in which students moved from perceiving art as monolithic in nature – just painting, just "one message" – to perceiving art as involving many forms and having many meanings. In their shared recognition of the multiple possible meanings of works of art, teachers and students seem to be traveling on a path together.

STUDENT CONCEPT MAPS

Overview. The foregoing study, “Used to think...Now I think,” explores students’ and teachers’ changing perceptions of art. In keeping with our interest in exploring conceptual change, we also decided to look closely at the ideas students hold about the nature of good thinking in general. Our goals were threefold: (1) to explore the general characteristics of students’ concepts of good thinking, (2) to explore whether, and how, students concepts of thinking change as a result of the AT program, and (3) to create an experience for students that allowed them to reflect on, and make visible to themselves, their own ideas about thinking. To achieve these goals, we developed a concept map instrument (See Appendix A).

We stress that the Concept Map instrument was not created to measure the overall effects of the AT program. Its purpose was to provide a window into the kinds of ideas students hold about thinking, and how these ideas might change as a result of exposure to the AT program. What the instrument does not measure is the ways in which the ideas students hold about thinking affect their intellectual behavior. For example, suppose a student holds the belief that good thinking involves looking at things from different points of view (a belief that might be reported in his or her concept map). Knowing that the student holds this belief suggests that the student is aware of this type of thinking and seems to value it. One might even go so far as to surmise that the student has the conceptual apparatus to recognize and engage in this type of thinking. What we can’t know, based on what the student has told us, is whether the student has the *ability* to engage in this type of thinking. To know that, we’d need to ask the student to demonstrate the taking of different points of view in relation to a particular problem or topic (such as the revised CAAP assessment is designed to do), for instance by presenting a situation and asking the student to write about it from several points of view.

So why look at students’ concepts of thinking, if they don’t tell us anything about students’ ability? Two reasons. First of all, research suggests that there is good reason to believe that students’ concepts about intelligence and thinking *do* affect their intellectual performance. For example, the earlier section on thinking dispositions mentions research by Dweck and others that shows that the different beliefs students hold about the nature of thinking and learning are correlated with different outcomes on measures of thinking (Dweck, 2000; Cacioppo, Petty, Feinstein and Jarvis, 1996). So having a better understanding of the ideas students associate with good thinking can give us a better idea of the kinds of thinking strategies they may have in their repertoire. Having the idea of something in repertoire doesn’t guarantee that it will be used, of course. But it is a *prerequisite* for use – a necessary but not sufficient condition.

The second reason to examine students’ concepts of thinking is the connection to the idea of thinking dispositions, on which the Artful Thinking program is based. Recall that idea of thinking dispositions identifies three components that need to be in place in order to successfully teach good thinking: ability, inclination, and

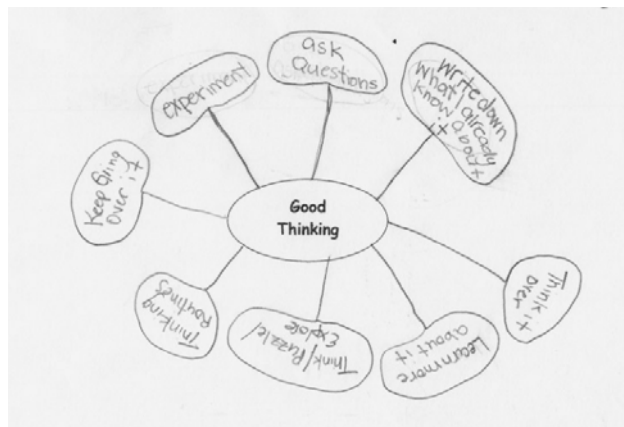
sensitivity (see the foregoing section on thinking dispositions.) We have argued elsewhere that teaching ability alone is not sufficient to insure good thinking, since all it does is help students engage in “performance on demand” (Perkins, et al., 2000). The concept map data may not tell us about students’ thinking abilities, but they do give us information about students’ *sensitivities* regarding thinking. This is because the concept maps straightforwardly ask students to write about the intellectual behaviors they believe are called for, in situations that ask them to think. What a student notices as “being called for” is a self-report of an intellectual sensitivity, because the student is effectively saying, “I look for [i.e. I am sensitive to] these kinds of thinking occasions.”

As with the “ability” component of the dispositional triad, having a sensitivity doesn’t guarantee that one will enact it. For example, one might be generally sensitive to the importance of looking at things from multiple points of view, but, in a particular situation, possess neither the inclination nor the ability to do so. Like ability, sensitivity is a necessary but not sufficient condition for good thinking. But unlike ability, the presence of sensitivity is rarely measured. This is the value of the concept map tool – to provide a window on the sensitivities students hold about thinking in general, and whether these sensitivities change as a result of the intervention.

Subjects. This study made use of the quasi-experimental design structure put in place by the external program evaluators (Learning Points), and allowed us to compare the experimental group – Long Lake elementary school – to a control group of students already established by Learning Points as commensurate, Glen Loomis elementary school. Data from grades 4, 5 and 6 at both schools was analyzed.

Instrument and procedure. Students were asked to make a concept map (sometimes called a mind map) that showed their ideas about what kind of thinking they did when they were trying to understand something. The activity was administered by the onsite program coordinator, who was also a TCAPS teacher. See appendix A for the Concept Map instrument and the classroom protocol for its administration.

Figure 1. Example of student concept map



The activity was administered to three grades – 4th, 5th, and 6th, and administered three times:

- t1 = September of 2004, the first year of the program
- t2 = May of 2005
- t3 = March 2006

Total number of maps: 359
Control group maps grade 4-6: 145
Experimental group maps grade 4-6: 214

Data collected over two years:

		2004-2005 School Year		2005-2006 School Year
		2 tests:		1 test:
		t1 September 2004	t2 May 2005	t3 March 2006
Group 1 (grade 4,4,5)	4 th grade (Glenn Loomis, Long Lake)	GL = 11 LL = 20	GL = 18 LL = 24	
	5 th grade (Glenn Loomis, Long Lake)			Subjects in 5 th grade for t3 GL = 24 LL = 21
Group 2 (grade 5,5,6)	5 th grade (Glenn Loomis, Long Lake)	GL = 17 LL = 35	GL = 16 LL = 40	
	6 th grade (Glenn Loomis, Long Lake)			Subjects in 6 th grade for t3 GL = 31 LL = 24
Group 3 (grade 6,6)	6 th grade (Glenn Loomis, Long Lake)	Yes GL = 14 LL = 27	Yes GL = 14 LL = 23	
	No 7 th grade at Glenn Loomis or Long Lake			All subjects in 7 th grade at a new middle school for t3, data not collected

The activity was administered to three grades – 4th, 5th, and 6th. It was not possible to track the 6th grade students when they left elementary school and went to middle school for 7th grade. Therefore, we have three groups, only two of which have completed the activity 3 times. The youngest group is Group 1: grade 4,4,5. This group did the first concept map in September of their 4th grade year, the second concept map in May of their 4th grade year, and the third concept map in March of their 5th grade year. Group 2: grade 5,5,6 followed the same pattern – they did the concept map activity in the beginning and end of 5th grade and the beginning of 6th. The third group is Group 3: grade 6,6. This group did the activity twice: once at the beginning of 6th grade and again at the end. As we mentioned, these students were not tracked once they entered middle school and therefore there is no t3 data for this group.

Coding

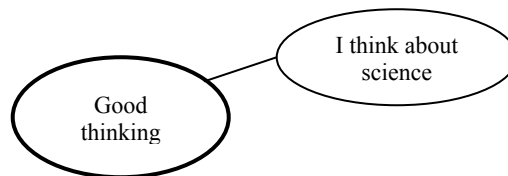
The coding process was lengthy and involved several iterations of coding categories. Students' responses can seem ambiguous, and we wanted to be sure not to wrongly interpret their words. At least two independent raters both coded a third of the data to insure reliability. For the results that follow, inter-rater reliability was 83%.

Results

The data were coded into 9 categories. The first 8 categories are descriptive of both groups of students' concepts of thinking – control and experimental. They do not capture changes in students' thinking as a result of the program. Rather, they describe broad categories of thinking into which students' ideas cluster. Category 9 *does* capture some important changes in students' thinking, and we discuss these findings in detail, devoting an entire section to them. But first we present the findings in categories 1-8, urging that they not be dismissed as unimportant. They are important because they tell us something about the “building blocks” of students' concepts of thinking – the chunks, or categories, out of which their specific ideas are comprised. As we report results for each category, we construct an evolving hypothetical concept map as we go along, to illustrate what the data actually looked like and to give a sense – albeit hypothetical – of a representative concept map.

Category 1: Objects of thought

The concept map activity asks student for their ideas about thinking. Not surprisingly, many of students' ideas have to do with *what* they think about. Many ideas fall into this category. E.g., “*I think about what I am going to do when I get home.*” “*I think about my dreams.*” “*I like animals*” “*shopping*” “*movies*” “*books*”. Not unexpectedly, this is the highest-scoring category, capturing roughly a third of students' responses. Though it is of interest to consider the kinds of topics students have in mind when they think about thinking, an analysis of these data isn't directly relevant to the main purpose of this study, which is to characterize to the kinds of ideas students have about the process of thinking. So we don't report the results here. We do report, however, that there are no statistically significant differences between the control and experimental groups across time in this category, suggesting that the intervention doesn't seem to affect the rate at which students generate ideas about objects of thought

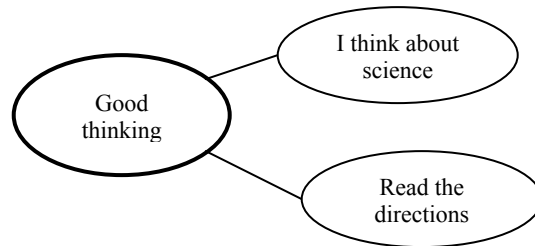


Concept map with 1 node – an object of thought.

Categories 2-9: Kinds of thinking

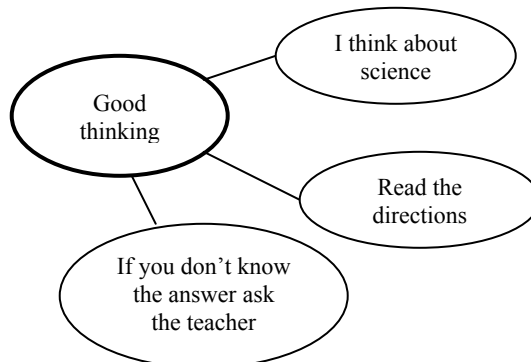
Beyond having ideas about objects of thought, students have plenty of ideas about kinds of thinking that are important. In what follows, we describe each coding category, giving examples of students' ideas as we go along.

Category 2: Basic strategies. Most students had at least one idea in this category. Basic strategies are procedural ideas about thinking that don't touch on the areas of the Artful Thinking palette, and that typically don't demonstrate high-level or critical thinking. They have to do with basic comprehension or basic, subject-specific procedures. Student ideas in this area include: "*read the directions.*" "*add the numbers together.*" "*read it over,*" "*read it slowly,*" "*guess the answer.*"



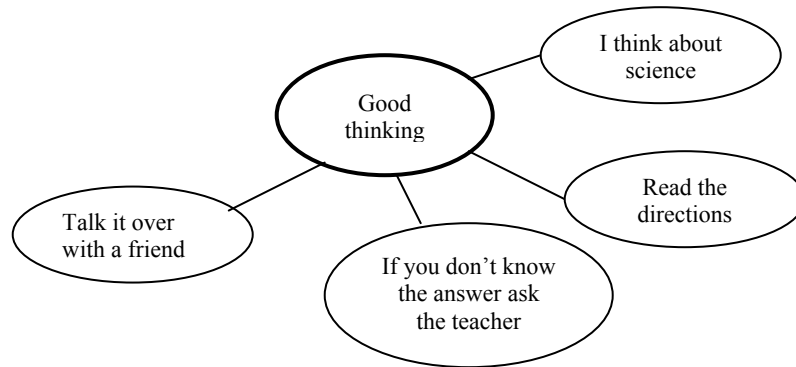
Concept map with Object of Thought and Basic Strategies.

Category 3: Authority seeking. Several students had ideas that related to asking an authority for information. For example, example, students said things like: "*See a teacher.*" "*get help*" "*Ask the teacher for help*" "*listen to what the teacher says.*"



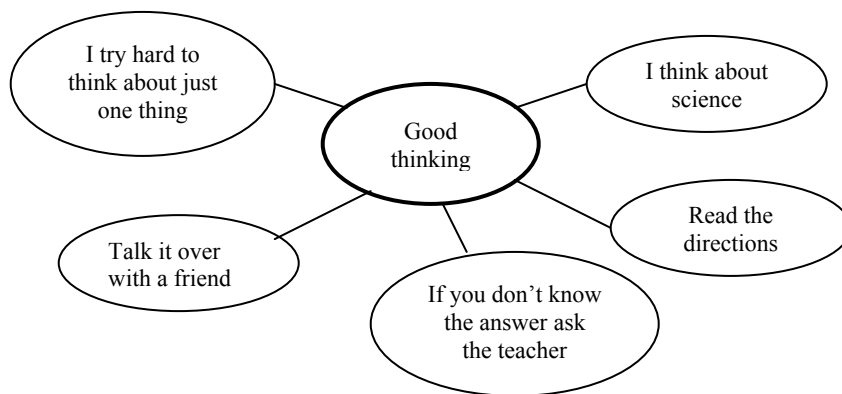
Concept map with Object of Thought, Basic Strategies and Authority seeking.

Category 4: Social co-thinking. In addition to looking for authority for assistance, students have some ideas about seeking assistance from their peers. For example, students said things like: “Working in a group” “I work with a partner.” “Ask someone else other than a teacher.” “Ask a friend to help you.”



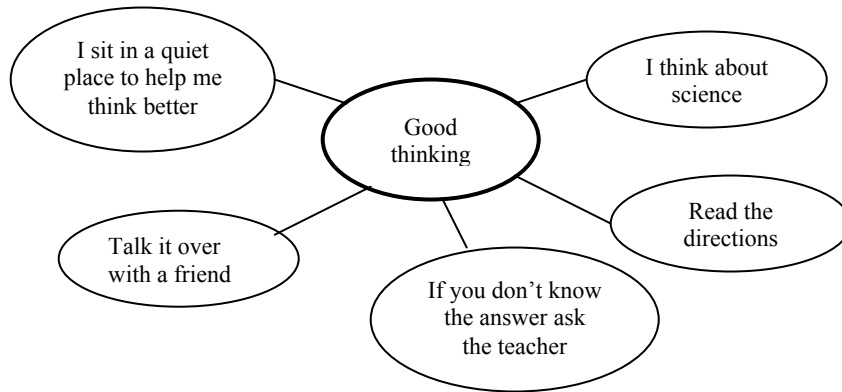
Concept map with Object of Thought, Basic Strategies, Authority seeking and Social co-thinking.

Category 5: Self management-attitude. Many students have ideas about how to manage their attitude or effort in thinking situations. This category captures ideas that explicitly indicate managing one’s focus or effort, or intentionally making an effort to do one’s best. Ideas in this category include: *I think to myself I can do it. I try to think hard on the subject. Concentrate on just one thing. Focus on the question.*



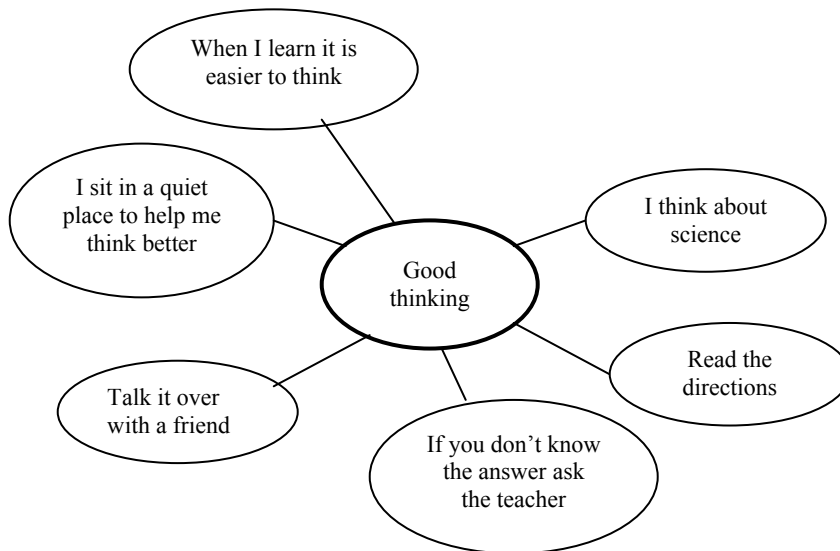
Concept map with Object of Thought, Basic Strategies, Authority seeking, Social Co-thinking and Self-management

Category 6: self-management – body. Students also have some ideas about how to manage their bodies and their environment in order to do good thinking. They mention ideas like: *Go to a quiet room to think better. Chew gum. Eat a good snack. Relax. Stay calm.*



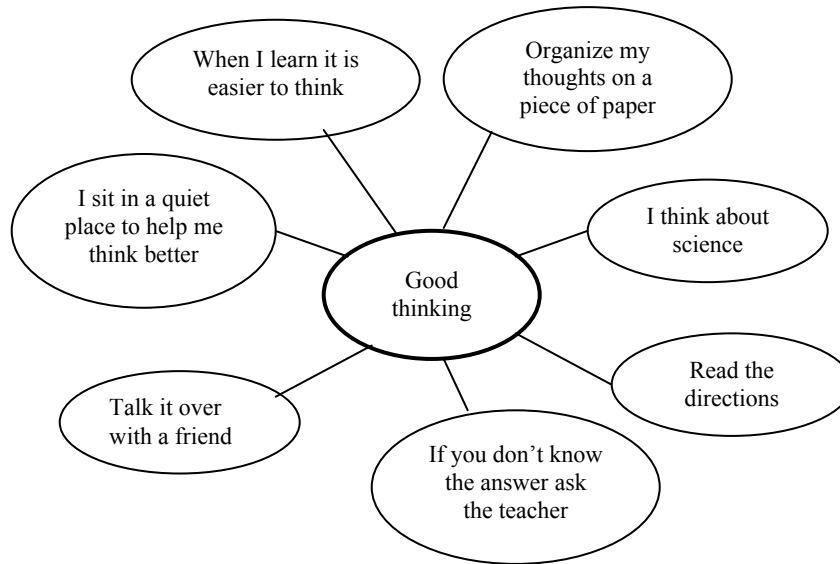
Concept map with Object of Thought, Basic Strategies, Authority seeking, Social Co-thinking and Self-management – body.

Category 7: Metacognition. In addition to managing their effort and their physical context, students sometimes respond to the task with comments that show that they have explicit thoughts about the nature of thinking itself. For example, they say things like: *I can do different kinds of thinking in different subjects. Thinking is hard and sometimes it is easy. Thinking makes you learn.*



Concept map with Object of Thought, Basic Strategies, Authority seeking, Social Co-thinking, Self-management – body and Metacognition.

Category 8: Distributed cognition. Students frequently mentioned ideas that had to do with writing things down or otherwise “distributing” the effort of thinking onto paper. Their ideas include things like: *Jot things down. Sometimes I write it on paper. Write what’s on your mind. Make a list. Make a web.*



Concept map with Object of Thought, Basic Strategies, Authority seeking, Social Co-thinking, Self-management – body, Metacognition and Distributed cognition.

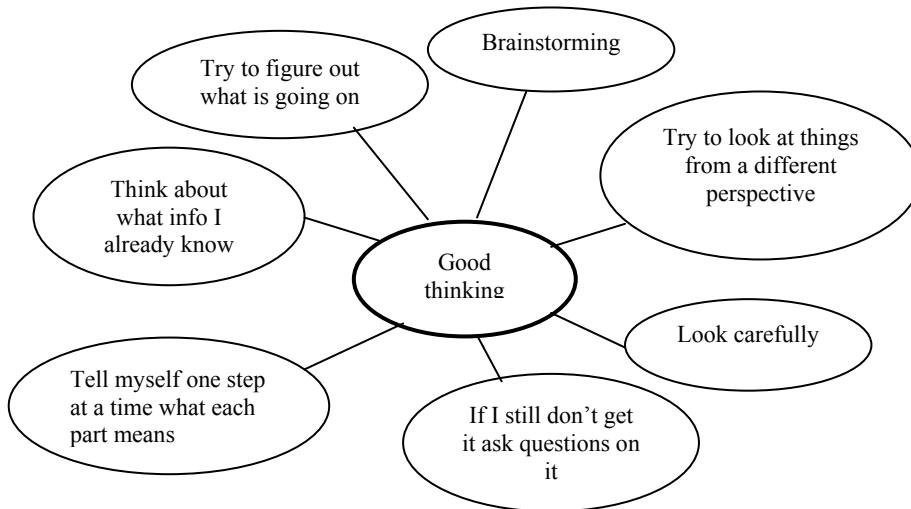
1. Category 9: Total palette

The total palette category captures and combines all the ideas students have about thinking that seem conceptually connected to the thinking dispositions on the Artful Thinking palette. It is the one coding category in which we see significant differences between the control and experimental group. We had hoped to be able to look at each palette area separately, to see whether there was more growth in some areas more than others (for example, do students mention more ideas in the area of questioning and investigating than in the area of observing & describing?), and whether there were correlations between areas of change (for example, do students' ideas about reasoning increase at the same rate as their ideas about finding complexity). Unfortunately, the numbers of student responses within each palette area are so small that statistical tests are uninformative about changes at this level.

In what follows, we start by providing some examples of students' responses in the "total palette" category. Although the numbers in the total palette category combine students' ideas across the palette, we give examples in each palette area, in order to communicate the flavor of students' ideas overall. Then, we discuss two research questions addressed by the findings in this category and describe the findings relative to each question.

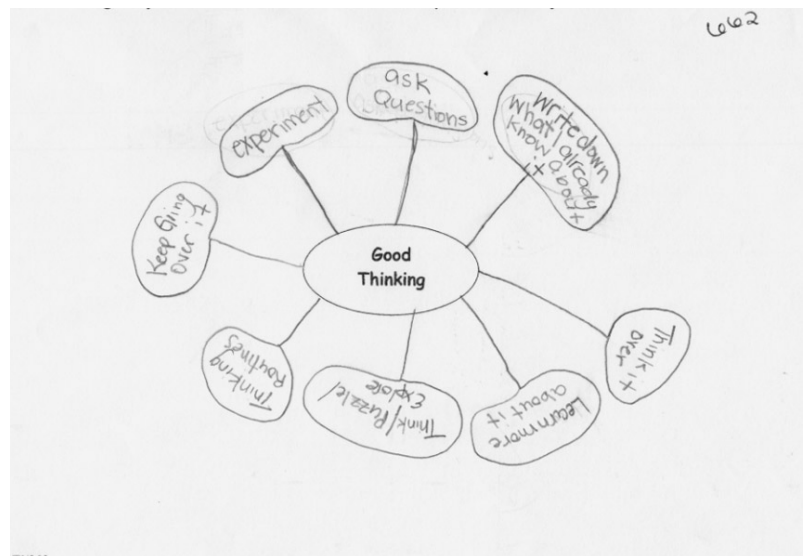
Student responses. The ideas that comprise this category are drawn from students' ideas in each palette area, plus ideas that we have labeled "multi-palette." A multi-palette response is an idea that seems to touch on more than one palette area.

- Observing & describing: *Make observations; use words to describe.*
- Reasoning: *I see if my answer is reasonable; see if I can find a way to prove it*
- Questioning & investigating: *Ask questions; [ask] what you wonder.*
- Comparing & Connecting: *Think of something similar; compare something; think about past experiences.*
- Exploring viewpoints: *I look at it in different ways; Always think of a different way of putting it. I think how it felt then.*
- Exploring complexity: *Break the sentence down; break into sections; Take little ideas and make it into a bigger one*
- Multi-palette: *Explain your thinking, try different ways to figure out the question, Think about brainstorming to explore different answers*

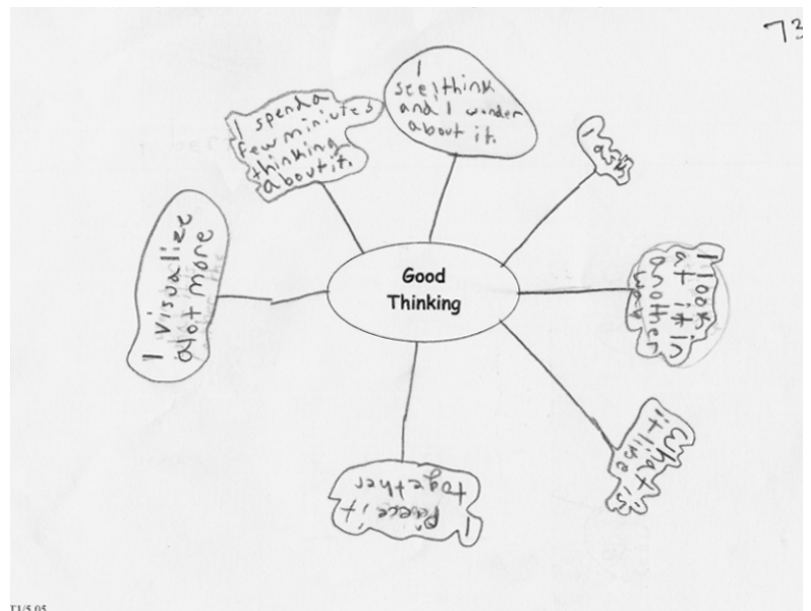


Concept map with representation of all palette areas.

5th grade student map from Long Lake School



6th grade student map from Long Lake School



Two research questions about the Student Concept Map Data.

There are two key questions the findings in the total palette area address. The first question has to do with whether children's ideas about thinking connect to the Artful Thinking palette, independent of the intervention. The second question has to do with whether the intervention has had any effect on students' ideas about thinking related to the palette. We discuss the findings in the order of the questions.

Question #1: How do children's ideas about thinking connect to the Artful Thinking palette, independent of the intervention?

A basic tenet of the Artful Thinking program is that the 6 thinking dispositions on the palette reflect ideas that are already present, albeit tacitly, in students' existing concepts of thinking. This constitutes one of the perceived strengths of the Artful Thinking program -- that it builds on, and expands, some of the everyday ideas about thinking that students already possess. The same principle underlies the thinking routines. The basic idea of thinking routines is that they are accessible to children because they connect to ideas about thinking that children already have. So one question to ask of the findings in the total palette area is whether they provide any evidence in support of this basic premise of accessibility.

How should one look for this evidence? If the basic premise of the program is accurate -- if students *do* hold ideas about thinking that connect to the dispositions on the palette, regardless of whether they have received the intervention -- then we should expect to see evidence of these ideas *in the control group's concept maps at t1, t2, and t3*. Further, because the control group was tracked over time (4th through 6th), we should also be able to see whether there are natural developmental patterns in their palette-related ideas as they get older.

In relation to the foregoing research question, the finding of note is that the control group does have ideas in the total palette category at every grade level, although the number of ideas that fourth graders have is quite small (see figure 2). This tells us that the thinking dispositions on the palette have a small but distinct presence in students' naturalistic ideas about thinking. Further, there seems to be a natural trajectory of growth in these ideas. We know this because, although the control group did not receive the intervention, their ideas in the "total palette" area increase significantly¹ over time ($p < .05$).

¹ The alpha level of .05 was used for all statistical tests reported in this document. When a score is reported as significant, it means that it is significant at less than the .05 level. Statistical significance is a way of determining the level of confidence one should place in the observed difference between the scores of different groups. When differences are reported as "statistically significant," it means we have a high degree of confidence that the observed difference is a true difference and not an illusory or random one based on measurement error or chance.

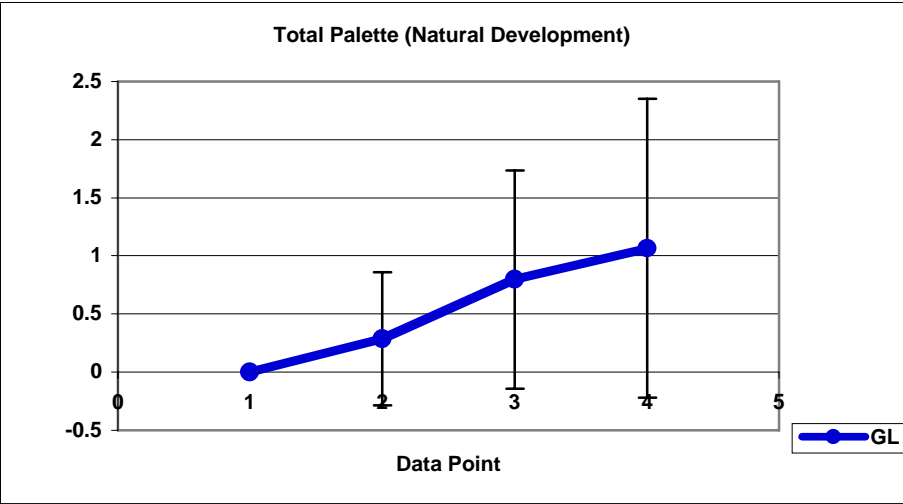


Figure 2: Developmental trajectory based on Control group data

To make sense of the chart, recall that 4th, 5th and 6th graders did the concept maps activity at the beginning and end of the school year. There is no significant difference between the scores at the end of one grade and the beginning of the subsequent grade (e.g. the end-of-year 4th graders score about the same as the beginning-of-the-year 5th graders). This gives us 4 data points across which to chart a natural trajectory of growth:

- point 1 = beginning of 4th grade;
- point 2 = end of 4th/beginning of 5th
- point 3 = end of 5th/beginning of 6th
- point 4 = the end of 6th grade.

What the chart tells us is that students seem to naturally acquire more palette-related ideas about thinking as they get older. 5th graders have significantly more ideas than 4th graders, and the number of ideas rises again in 6th grade, although the difference between 5th grade and 6th grade (points 3 and 4) is not statistically significant. ($p < .05$) (Recall that we don't have t3 data for 6th grade, so we can't know whether this gradual rise continues.)

Question #2: has the intervention has had any effect on students' ideas about thinking related to the palette?

We now turn to the effects of the intervention itself: How does the intervention affect the number of ideas students' have in the total palette area? The finding of note here is that the intervention seems to cause students to have considerably more ideas in this area than the control group does, with the sharpest rise in the number of their ideas between t1 and t2. Below are three charts, corresponding to the three experimental groups, Group 1: grade 4,4,5; Group 2: grade 5,5,6; and Group 3: grade 6,6. The charts mark the rate of increase in each group's ideas. They are overlaid onto the chart of the control group's development (figure 2 above) to illustrate how the rate of development of the experimental group compares to the natural trajectory of development of the control group.

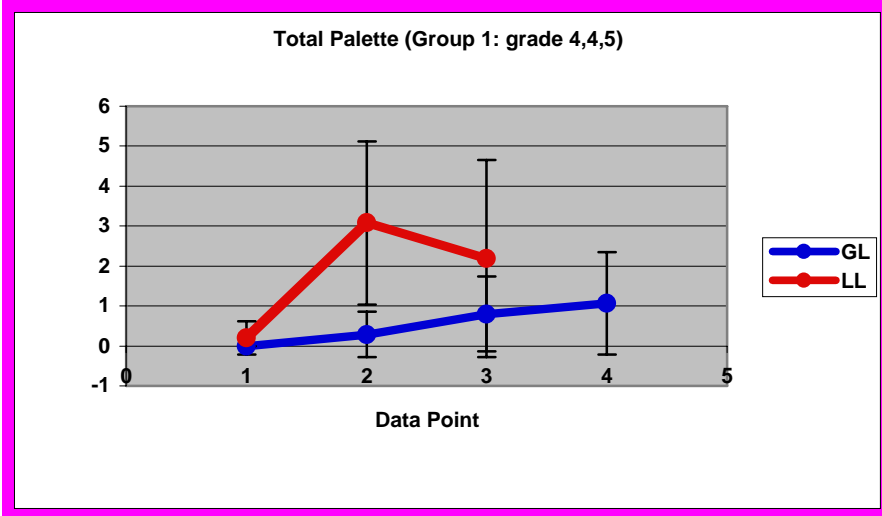


figure 3

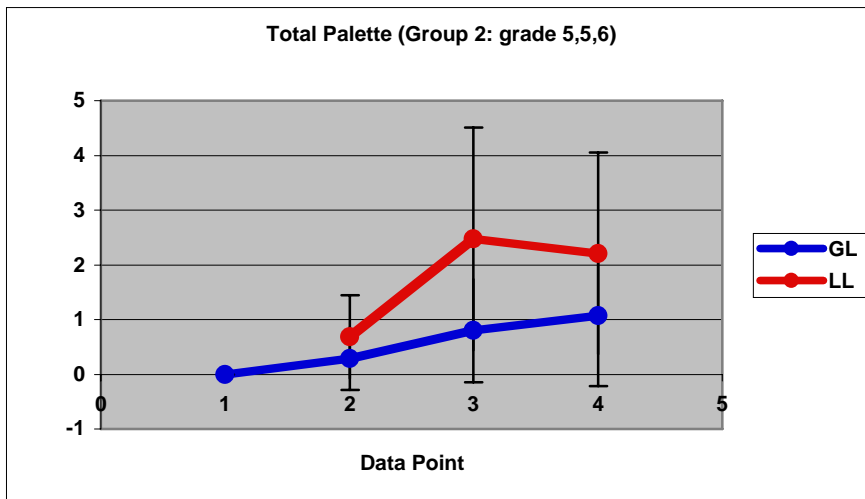


figure 4

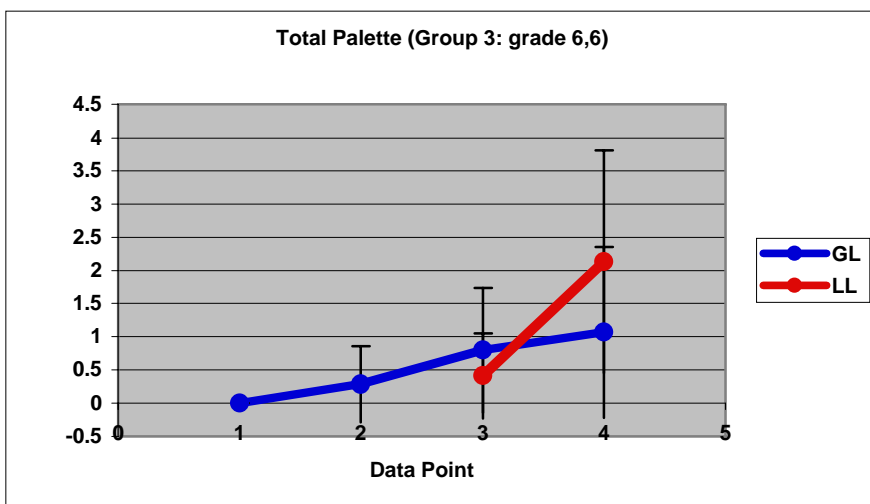


figure 5

The charts (figure 3,4,5) tell us three things. First of all, we see that at t1, all grades in the intervention group score similarly to their counterparts in the control group. There are no statistically significant differences in the t1 scores of the control and experimental groups at each grade. So it is reasonable to assume that the intervention group would have followed the same course of natural development taken by the control group if they had not received the intervention.

Secondly, the charts show that across all the grades, the largest effect of the intervention on students' palette-related ideas seems to occur in the first year. Across all grades in the experimental group, there is a statistically significant increase, at each grade level, from their t1 scores to their t2 scores. After year one, the increase levels off, and may even decrease slightly, although none of the decreases across the grades from t2 to t3 are statistically significant.

Thirdly, the charts show us that the experimental group's initial increase is to a level that is considerably higher than that reached naturally by sixth graders in the control group, and that this increase is sustained, even taking into consideration the slight decrease from t2 to t3. In other words, the program seems to cause an early and sharp acceleration in students' rate of conceptual development in the total palette area, relative to the natural trajectory of growth in this area for students without the intervention. Notably, the growth is most dramatic for 4th graders, the youngest students in the study.

Summary and Discussion

The categories into which students' ideas about thinking cluster provide an interesting picture of their concepts of thinking. Regardless of whether they received the intervention, students most often report their *objects of thought* – the things they think it is important to think about. But they also report being sensitive to occasions in which several different *kinds* of thinking are called for. For example, students report that they notice occasions when it is important to think in ways that focus on basic comprehension and simple procedures, mentioning occasions when it is important to “read the directions,” “read slowly,” and “add the numbers.” Students also are sensitive to the need to seek assistance when they are trying to think well, for instance by asking authority figures such as teachers for help, as well as asking their peers. Students are by no means entirely reliant on the guidance of outsiders, however, and they have several ideas about how to manage their own thinking. These ideas are of two kinds – ideas about how to manage their own attitudes, mainly by telling themselves to focus or concentrate, and ideas about how to manage their bodies and physical environments, for example by using the right pencil, finding a quiet spot, eating a good breakfast. Students also understand the value of “downloading” some of the effort of thinking onto paper, by “jotting things down,” taking notes, and “making a web.”

The foregoing kinds of ideas appear with about the same frequency on the concept maps of both the control and experimental groups, suggesting that the AT program doesn't seem to have any significant effects on students' ideas in these areas and the program fits comfortably with students' existing ideas about thinking overall.

The story changes somewhat when we look at the ideas students have about thinking that relate to the Artful Thinking palette specifically. The first thing to note is that both groups have some ideas in this area. For example, both groups mention the importance of asking

questions (questioning & investigating dispositions), making careful observations (observing & describing disposition), breaking things into parts to make a bigger whole (finding complexity disposition), and so on. But while students in both groups hold ideas in these areas, we see the number of ideas the experimental group hold increase quite dramatically in the early stages of the program. Recall that the experimental group has been using thinking routines in the classroom – routines that were designed to embody the thinking dispositions on the palette. So a straightforward explanation of the experimental group’s increased rate of palette-related ideas is that students are internalizing palette-related ideas and strategies through their use of thinking routines and incorporating them into their concepts of thinking at a faster rate than their control group counterparts. In other words, when AT students talk about what good thinking is, they are more likely to mention things that have to do with the 6 palette areas – reasoning, observing & describing, questioning & investigating, exploring viewpoints, comparing & connecting and exploring complexity. Moreover, this marked increase in their sensitivity to these areas occurs early on in the program, when it spikes up to a level above that of 6th graders who haven’t been involved in the program, and maintains that level over time. The spike is most precipitous for 4th graders, though it is significant at all grades. This suggests that there may be a developmental window of opportunity around 4th grade, when students are especially susceptible to changing the way they think about thinking.

A question that naturally arises is whether these patterns of findings are different for different subgroups of students. We mention this because during the course of the two-year program, many teachers reported that academically challenged and special needs students seemed to derive an particularly strong benefit from the program. These anecdotal reports bring to mind an earlier related study we conducted (Tishman, MacGillivray, & Palmer, 1999). The study focused on the Visual Thinking Curriculum, which foregrounds the use of a reasoning thinking routine (the “what makes you say that” routine) to talk about art. In that study, we found that low-achieving students experienced greater gains in their reasoning abilities than high achieving students, although students of all ability-levels experienced significant gains. Given this backdrop – TCAPS teachers’ anecdotal reports and the MoMA study – it makes sense to look at the concept map findings for special needs students in particular, to see whether there are any distinct patterns. To do this, we need to be able to look at a sufficient number of maps from a group of students at each data point (t1,t2, t3) or a sufficient number of matched sets of the special needs subgroup (a matched set is comprised of a set of concept maps at t1, t2, and t3 from the same student). Unfortunately, because the class make-up varies as students change grades, we did not have a large enough sample of maps from special needs students overall, and there are only two fully matched sets of data for individual special needs students, making it impossible for us discern any particular trends.

In summary, to understand the pattern of findings around the concept maps, it is important to remember that the concept maps do not measure students’ thinking abilities directly. Rather, they give us information about the kinds of ideas that populate students’ *concepts* of thinking and how these ideas change as a result of the intervention. Why do students’ concept of thinking matter? Because they relate to ability in two ways: First of all, as we mentioned earlier, research suggests that students’ concepts of thinking – especially their ideas about what counts as good thinking -- are often causally related to their intellectual performances (Dweck 2000, Stanovich and West, 1997, Langer, 1989). While TCAPS students in both the experimental and control groups have ideas related to the palette, the experimental group’s ideas are far more populous. This may indicate that students in the experimental group are

more likely to engage in these forms of thinking.

The second way that the findings reported here relate to students' overall thinking ability is in the "sensitivity" dimension of thinking dispositions. Project Zero researchers and others have argued that good thinking is dispositional in nature, pointing out that it is not enough simply to have the requisite thinking skills, one also needs more – for instance, the inclination to engage in good thinking and the sensitivity to occasions to do so (Perkins, Jay, & Tishman, 1993). The concept map data relate to the sensitivity dimension of dispositional development because they tell us about the kinds of thinking occasions students report being sensitive to. For example, most students—control and experimental – report being sensitive to situations that invite basic comprehension, to situations that invite the input of an expert, to situations that invite some form of self-management, and so on. What is distinctive about the concept maps of the experimental group is that they indicate increased sensitivity to occasions of palette-related thinking. In other words, students who have been involved in the Artful Thinking program "see" their thinking landscape as having more invitations to think along the lines of the Artful Thinking palette than do their counterparts in the control group – they see more invitations to make careful observations, more invitations to explore points of view, more invitations to explore complexity, more invitations to reason carefully. If one of the goals of the Artful Thinking program is to cultivate students' sensitivity to occasions to think, then this is a very good sign.

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APPENDIX A

The Artful Thinking Palette

Think Track Tool

Student Concept Map Instrument

Artful Thinking Palette

Reasoning



Questioning & Investigating



Observing & Describing



Exploring Viewpoints



Finding Complexity



Comparing & Connecting



THINK TRACK

Teacher name _____ School/ Grade level: _____ Date: _____

Thinking Dispositions: Reflect on the past week. Which of the following thinking dispositions do you think your classroom instruction helped students develop? (Check as many as apply. Give a **double check** to dispositions that were *strongly* emphasized this week.)

Reasoning _____		Questioning & Investigating _____	
Exploring Viewpoints _____			Observing & Describing _____
	Finding Complexity _____		Comparing & Connecting _____

Frequency of Thinking Routines: Think about the past week in your classroom. How many routines did you try? Include any partial use and/or combined use of Artful Thinking routines as well as use of other thinking routines you've invented or know about.

- ___ 0 routines
- ___ 1-3 routines
- ___ 4-6 routines
- ___ 7-10 routines
- ___ More than 10 routines

Use of Thinking Routines: Circle the routines you tried this week. Include any partial routines and/or combined use of routines.

- | | |
|----------------------------------|-------------------------------------|
| ___ What makes you say that? | ___ Beginning / Middle / End |
| ___ Claim / Support / Question | ___ Listening: Ten Times Two |
| ___ Think Pair Share | ___ Looking: Ten Times Two |
| ___ Perceive / Know / Care About | ___ Colors, Shapes, Lines |
| ___ Circle of Viewpoints | ___ Headlines |
| ___ I See / I Think / I Wonder | ___ Connect / Extend / Challenge |
| ___ Think / Puzzle / Explore | ___ Creative Comparisons |
| ___ Creative Questions | ___ Used to Think, Now I Think |
| ___ Elaboration Game | ___ Parts / Purposes / Complexities |
| | ___ Complexity Scale |

Integrating Art: Did you use any art in your classroom this week? Yes no
If yes, what did you do? Check as many as apply.

- Discussed an art image/object with a thinking routine you've used before
- Discussed an art image/object with a new routine
- Discussed an art image/object without using a thinking routine
- Created art using a thinking routine at some point in the creative process
- Created art without using a thinking routine
- Connected an art image/object to a topic in the curriculum
- Connected an art making experience to a topic in the curriculum
- Other. Please describe:

Optional: Tell us more about how using art in any of the above ways affected your students' thinking or understanding.

Name _____ School _____ Grade _____

When you are doing your best thinking, in order to understand something, what different kinds of thinking do you do? Make a web or mind map that shows your ideas.



Concept Map Distribution Protocol

- 1) ***Today I have an activity to ask you to do. This activity is a way for teachers to know a little bit more about your thinking. Have any of you ever made a mind map, or a web before?***

(you can take an answer here from a student...)

A web has an idea in center, and lines coming out from it for other ideas that connect to it.

Today we want to find out your ideas about what kind of thinking you do when you are trying to understand something—You can use your imagination, there are no right or wrong answers.

- 2) ***What kinds of things do you study in school?***
 - a. Students may answer “Social studies, math, science”, etc.
- 3) ***What are some topics within these areas that you study?***
 - a. Students may answer, “the civil war, long division, weather”, etc.
- 4) ***I'd like you to spend a few minutes, quietly, thinking about a question I have for you and then I'd like you do make your own mind map or web about it.*** Display the question below (on chart paper).

“When you are doing your best thinking, in order to understand something, what different kinds of thinking do you do?”

- 5) Distribute the maps to students. ***Make sure to fill out your paper with:***
 - a. first and last name,
 - b. date,
 - c. teacher and grade
 - d. school
- 6) Read the concept map aloud with them and ***tell them that you would like them to do their own web or mind map.***
- 7) Do not talk about it anymore as a group. ***Ask students to work on their own. They can raise their hand if they have a question*** and you can answer basic questions, however do not assist students in the task. ***Tell them to do their best and put down as many ideas as they can.***
- 8) Collect the maps when most of the class seems finished.

Fill out “Concept Map Probe Record Sheet

APPENDIX B

From Thinking Routines To Writing Goals

Connecting Thinking To Writing Goals

FROM THINKING ROUTINES TO WRITING GOALS

This document gives ideas for how specific thinking routines can support writing activities. Routines are organized by thinking dispositions on the Artful Thinking palette.

QUESTIONING AND INVESTIGATING-CENTERED ROUTINES

See / Think / Wonder

This routine stimulates curiosity and helps students make observations.

- It may be helpful to use this routine when you are **introducing a research project** or exploring expository writing. Have students open up the idea space around a relatively unknown topic by asking them to work individually or in small groups using the routine. Remind students to make their thinking visible for later reference or sharing activities.
 - STW can also help students **organize their thinking when editing** writing for content. Students can work in pairs to edit one another's writing and make suggestions for improvement by following the STW format. (e.g. "I *see* you have a sentence here on stegosaurus. I *think* it starts a new idea. I *wonder* if you should begin a new paragraph.")
 - This routine can be combined with the Perceive/Know/Care About routine to help students imagine a setting or character and **develop a description for narrative writing tasks**. If creating a setting description for a story, for instance, students can take on the persona of the character interacting with the setting, and describe it through the emotional/social lens of the character.
-

Think / Puzzle / Explore

This routine helps stimulate students' curiosity and lay the groundwork for independent inquiry.

- TPE can be used as an **introduction to research and expository writing**. If the topic is somewhat familiar to students, this may be a way for them to move beyond their initial understanding. Have students use the routine in small groups or individually, remembering to make their thinking visible for later reference or sharing.
-

Creative Questions

This routine deepens students' thinking, encourages curiosity through deep inquiry.

- When organizing expository or research-report writing, CQ can help students create generative, meaningful questions that should be answered in the body of their report. Consider having students create a list of questions about a topic and choose five or six questions that are most interesting or relevant. Students can use these **questions and answers as the organizing structure** for their writing activity.
- CQ can also be used to help students **develop interview questions** for newspaper or research report writing. Like the above example, students should generate a list of questions, then narrow their list to the most relevant or interesting topics.

REASONING-CENTERED ROUTINES

Claim/Support/Question

This routine helps students develop thoughtful interpretations by encouraging them to reason with evidence.

- This can be used to **structure persuasive writing** by helping students to support ideas with evidence. Challenge students to think of multiple supports for their claim as a way to develop their argument and persuasive writing.

“What makes you say that?”

Because this routine invites students to share their interpretations, it encourages them to understand alternatives and multiple perspectives.

- The routine could be used in writing to develop supporting ideas with evidence or **elaborating on the main idea**. As students are writing paragraphs, they can use WMYST to develop their main idea sentence using evidence from the text. Challenge students to come up with several reasons or pieces of evidence.
- For essay writing, WMYST can be used to **link ideas back to central theme**. Each paragraph in an essay should develop a WMYST statement in support of the topic sentence or main idea. Students can monitor their topic focus by asking themselves if each paragraph adds to the central theme of their paper.
- WMYST also works well as an **organizer for editing content**. Students can share papers and ask this question when support for an idea is not clear or the writer’s flow is unclear.

EXPLORING VIEWPOINTS-CENTERED ROUTINES

Perceive/Know/Care About

This routine helps students to explore diverse perspectives and viewpoints as they try to imagine things, events, problems, or issues differently.

- If students are familiar with dialogue, this routine can help students write **character-perspective dialogue** for their characters. Considering having students complete an initial draft of their story, including basic plot with character and setting descriptions. Then, have partners share stories. In scenes where two or more characters are present, the student pair can take on the roles of each character and create an oral dialogue together. This activity can also be used to help students create personified objects.
- The routine can be used in persuasive writing to help them explore multiple perspectives. Support them in **identifying other stakeholder/points of view**. Older students can use their knowledge of multiple perspectives to add information or qualifiers to their argument.

OBSERVING AND DESCRIBING-CENTERED ROUTINES

Looking Ten Times Two

This routine asks students to think about words or phrases to describe something and encourages them to push their observations beyond first glance, or obvious description.

- It can be used to encourage students to notice details to support **narrative description of setting or character**. This is helpful for adding color and detail to writing.
- LTTT can also be modified to help students **explore figurative language descriptors**. Try having students do the routine normally the first time through, then use the second looking to find items that can be described metaphorically. (e.g. “The windows on the house remind me of mini jail cells.” Or, “The bright red of the lady’s dress is the color of a fire engine.”)

Elaboration Game

This routine encourages students to look carefully and deeply at details and then build on those details.

- The EG routine can be used to help students learn to **give more information to their writing**. In expository writing, have students create three elaborative sentences to explain their main idea. In narrative description, encourage at least three sentences that elaborate on the setting or character.
 - The observation and interpretation aspects of EG can help students **create strong persuasive writing**. Remind students that the best persuasive pieces have a combination of observations (facts) and interpretations (opinions). Students can practice creating persuasive pieces by following the elaboration part of the routine with interpretive-arguments supported by observed-facts.
-

Beginning/Middle/End

This routine uses the power of narrative to help students make observations and use their imagination to elaborate on and extend their ideas.

- This routine is a natural support for organizing the **plot of a narrative text**. Consider having students explore several possible plot scenarios by creating several optional beginning or end scenes.
 - BME can also be used to discuss the **organization of expository text**. Remind students of the purposes for each section of an essay or paragraph and how each section works to support the others.
 - When **creating newspaper stories**, BME can be used to illustrate the old newspaper adage, “Tell us what you’re going to say; say it; tell us what you’ve said.”
-

CONNECTING THINKING ROUTINES TO WRITING GOALS

General Prewriting (thinking and organizing ideas before writing)

Useful Routines:

See/Think/Wonder

Think/Puzzle/Explore

To get students thinking about their writing topic and any puzzles it raises, consider using a routine that invites inquiry and investigation. *See/Think/Wonder* and *Think/Puzzle/Explore* stimulate curiosity and can be used for any prewriting activity. Encourage students to brainstorm about their topic before writing, putting their ideas to paper and referring back to their prewriting activity as they work.

Narrative Writing (telling a story or recreating an experience)

Useful Routines:

Beginning/Middle/End

Support students as they begin to create narrative text by having them engage in the *Beginning/Middle/End* activity. For older students who are familiar with story mapping, you can expand this routine to include the notion of a climax scene. Encourage students to make their thinking visible by writing down the ideas developed from their thinking.

Looking Ten Times Two

The Elaboration Game

Before students begin writing, help them visualize key parts of the narrative, including characters and setting. Use *Looking Ten Times Two* and the *Elaboration Game* to help students identify more details and figurative language to liven up their writing. Both routines can be completed in pairs, with each student sharing his or her vision of the scene and getting additional ideas from a friend.

Perceive/Know/Care About

If students are familiar with dialogue, the *Perceive/Know/Care About* routine can help students think of reasonable dialogue for their characters by imagining differing viewpoints. Considering having students complete an initial draft of their story, including basic plot with character and setting descriptions. Then, have partners share stories. In scenes where two or more characters are present, the student pair can take on the roles of each character and create an oral dialogue together. This activity can also be used to help students create personified objects.

Expository Writing (explaining an insight, informing the reader, expressing emotion)

Useful Routines:

See/Think/Wonder

Think/Puzzle/Explore

To get students thinking about their topic, encourage them to engage in a general prewriting activity using See/Think/Wonder or Think/Puzzle/Explore. Typically, See/Think/Wonder works best if students know very little about the subject, while Think/Puzzle/Explore is most helpful when students have a bit of background.

Beginning/Middle/End

Remind students of the structure of reports, essays, and paragraphs by highlighting the Beginning/Middle/End routine. Each of these writing tasks includes an introduction, body, and conclusion. Have students explain the significance of each part of an expository piece. Encourage them to “tell what they’re going to tell; tell it; and then tell us what they’ve said.”

Creative Questions

If students are writing reports, they can explore the topic more deeply using the Creative Questions routine to ask a series of questions about their topic. After generating the list, students can focus their writing by choosing several questions to explore. Answers to their chosen questions can form the topic sentence of their body paragraphs.

What Makes You Say That?

The Elaboration Game

Help students to support their ideas with evidence by engaging in the What Makes You Say That? routine. This routine supports reasoning as students expand upon their main ideas. The Elaboration Game can also be used to expand upon a topic sentence. Encourage students to elaborate on their main idea with three or more sentences. How else could the idea be expressed?

Headlines

After a first draft, students can refine their topic sentences by using the Headlines routine. Try having the students cover up their topic sentences and try to come up with a new headline for each paragraph. For some grades, this can be better done in pairs. Have each person cover up their main idea sentence and ask their partner to create a headline for the paragraph. The Headlines routine can also be used at the end to create a title that matches the content of the writing.

Persuasive Writing (making an argument, presenting evidence)

Useful Routines:

Think/Puzzle/Explore

Help students open up the topic to exploration by having them engage in the Think/Puzzle/Explore routine. Encourage students to identify what they think and explore the ramifications of that perspective, identifying misconceptions. Remind students to make their thinking visible.

Perceive/Know/Care About

After students have better considered their perspective, help them explore multiple perspectives by using the Perceive/Know/Care About routine. Support them in identifying other stakeholder/points of view.

Claim/Support/Question

The Claim/Support/Question routine can also be used support reasoning and evidence in persuasive writing. Have students make a claim about their topic, then think of as many supports as possible to give voice to their claim. Questions posed should be considered in the development of their writing and, for older students, acknowledged as limitations to the claim.

Communicative Writing (letter-writing, interviews, newspapers)

Useful Routines:

Headlines

This routine has obvious connections to writing newspapers headlines, and also can be used to encourage students to look for big themes and organize writing by topic.

Creative Questions

Use this routine as a question-answer technique for interviews or putting together a newspaper article.

Perceive/Know/Care About

Students can use Perceive/Know/Care About to write from a perspective other than their own or about current events. In letter-writing, they can explore what other people think or care about.

Editing Writing (re-writing and revision)

Useful Routines:

See/Think/Wonder

What Makes You Say That?

Several routines can be modified to provide organizers for authentic editing. See/Think/Wonder can be used as an organizer for editing content. (“I see you have a sentence here

on stegosaurus. I think it starts a new idea. I wonder if you should begin a new paragraph.”) What Makes You Say That? also can be used to edit. Have students read together for content and ask this question whenever the flow or logic of the writing is unclear.

A. CONNECTING THINKING ROUTINES TO WRITING GOALS

See/Think/Wonder

- Introduction to research and expository writing
- Organizer for editing content. (“I see you have a sentence here on stegosaurus. I think it starts a new idea. I wonder if you should begin a new paragraph.”)
- Using description/setting a scene

Think/Puzzle/Explore

- Introduction to research and expository writing
- Exploring misconceptions

Looking Ten Times Two

- Noticing details to support narrative description of setting or character
- Use of adjectives and other “describing” words; or the use of descriptors

Creative Questions

- Question-answer technique for organizing writing (especially expository writing)
- Writing interviews

Claim/Support/Question

- Persuasive writing
- Supporting ideas with evidence; elaborating on the main idea
- Raising new ideas/inquiries through writing

“What makes you say that?”

- Supporting ideas with evidence; elaborating on the main idea
- Organizer for editing content
- Linking ideas back to central theme

Perceive/Know/Care About

- Writing beyond first person - multiple perspectives in persuasive writing

- Character description and analysis (in response to action X, character 1 would do this, and character 2 would do this)
- Writing dialogue

Elaboration Game

- Giving more information to support main idea
- Providing more detail in narrative writing
- Using fact and opinion to support persuasive writing (observation versus interpretation)
- Clarifying or editing written work (How else/better could you say this?)

Headlines

- Main idea in paragraph
- Theme in essay, between texts
- Summarizing text

Beginning/Middle/End

- Organizer for narrative text
- Organizer for expository text (introduction, body, conclusion)
- Say what you're going to say; say it; tell us what you've said

IDEAS FOR USING ROUTINES IN FOREIGN LANGUAGE CLASS

Using routines in Language class has an intrinsic added bonus—in addition to getting kids “thinking” in Spanish (or what ever language is being learned), the routines emphasize natural language use. Routines help students learn to express their ideas in the new language. They can help students build new vocabulary and repeated use of routines allows students to practice language skills in many different modalities, all in the service of developing better understanding through thinking. Routines can also help strengthen speaking and reading skills and visible thinking reinforces the written word.

****Images and Artworks are particularly helpful in Language classes****

Consider choosing artworks that relate to some aspect of your Spanish studies, for example look at works from Spanish artists like Goya, Picasso, El Greco, Dali, Juan Gris, Miro, Juan de Arellano, Velasquez and Spanish architect Antonio Gaudí. It is possible to connect these artists to the political, social and cultural climate of their time. Other artists to explore might include Mexican muralist Diego Rivera, and surrealist painter Frida Kahlo, Latino performance artist Guillermo Gómez Peña, Colombian painter Fernando Botero, Puerto Rican artist Myrna Baez and Cuban artists Coco Fusco and Felix Gonzalez-Torres. Or look at Pre-Columbian artifacts, Guatemalan textiles or Andalucian ceramics. Similarly, consider the many different types of music you can listen to and connect to your studies in Spanish class.

Some websites to find art and images:

South American art and culture: http://www.zeroland.co.nz/latin_america.html

Spanish art and Culture: http://www.zeroland.co.nz/art_spain.html

Great museum and site in NY, El Museo Del Barrio: <http://www.elmuseo.org/>

Quick and Basic info on Spanish Culture: <http://www.donquijote.org/culture/spain/>

Free music: <http://www.free-music.com/download-free-spanish-music.html>

B. Routines from the observing and describing disposition

These routines should be particularly powerful and easy to use in Language classes. You can decide whether you want your students to attempt the routines in Spanish or English. It may be easiest to start in English until students “get it” and then try parts in Spanish as students’ language develops. You may want to think of follow up activities- either written or oral or a combination of both - that allow students to use and deepen their observations.

- Try *Looking: 10 x 2* to describe a painting and build on current vocabulary. Students can write down their observations in Spanish, or they can describe in English and then look up the word(s) in Spanish afterward. Either way helps to build vocabulary and understanding. Decide how you will then use these observations, for example: ask students to write a paragraph or descriptive sentences using these words; create lists of adjectives, nouns/verbs or synonyms/antonyms in Spanish based on the generated words; ask students to tell a story about the image that starts with one of the observations (in Spanish and/or English); launch into one of the other routines from here—CSQ, WMS or PKC might work well.

- Try *Listening: 10 x 2* the same way. Perhaps listen to different kinds of Spanish music (choose music with or without words, either can work.) This can help introduce new vocabulary words and expressions as well as familiarize students with different aspects of Spanish culture. Also helps kids get better at listening!

C. Reasoning Routines

Getting to students to support their interpretations with evidence is important in any language. These routines also work well with images and artworks, or you can ask students to try the routines with text.

Again, you can decide whether you want your students to attempt the routine in Spanish or English or some combination of both languages. To help students get started consider posting the core phrases or questions for these routine in Spanish and English on your classroom wall. Follow up activities for these routines vary but the possibilities are endless.

- *Claim Support Question (CSQ)*— This routine asks students to try to make a claim about the work or text, support with evidence and then ask a question about it. This doesn't necessarily need to be conversational—students can write their answers in notebooks or on post-it notes and look up words/partner with a friend to flesh out ideas. To facilitate the routine give students the Spanish words for Claim/Support/Question and the stems (“A claim I have about this _____ is...”, I think this because _____.... I wonder_____, or What happens if, or How does....” Etc.)

Perhaps review some of the language associated with claims and question words ahead of time. Brainstorm a list and make it visible in the classroom, too.

*****VT is very helpful and powerful in the Language classroom!***

- *What Makes You Say That? (WMS)* Use this routine to look at an image, object, short text or poem. During the discussion try to write the students' ideas about interpretations on chart paper under Observations. Write their supporting ideas under the heading Evidence. Remind students to back up their ideas with something they see in the image or in the text. Decide whether to write the ideas in Spanish or English. You can follow up by asking students to elaborate on the ideas presented or provide counter evidence for some of the observations (in English, Spanish or both.) Individual worksheets that help students structure ideas in this same way can also be created. This method may allow students extra time to think/write/look up words if necessary.

When learning the WMS routine beginning students can read about Spanish topics in English and move along to more simple text in Spanish as they progress. Alternatively, students can first translate texts from Spanish to English and then try the routine.

D. Exploring viewpoints routine

Many of the same Spanish-English combo methods can be used with the perspective taking routine. This routine may be particularly powerful for helping students explore dialogue.

- When using the *Perceive Know Care about* routine students can act out the perspectives of characters (or objects) in an image or story. They can also write down these ideas and create a dialogue. Keep the “stems” posted on the wall of the classroom in both Spanish and English to help students get started:
 - What can the person or thing *perceive*?
 - What might the person or thing *know about or believe*?
 - What might the person or thing *care about*?

E. Questioning and Investigating routine

These routines are helpful for opening up topics and raising questions for further discussion and consideration. If your students are doing research projects in Spanish or about Spanish-related topics, these routines can help students focus on a particular aspect to explore. They also help uncover strengths and misconceptions that your students might have and let you know where their true interests lie.

- The *Think Puzzle Explore* is very flexible. You can use this routine to focus on a specific aspect of Spanish culture, history or even mechanics of language [such as idioms: What do you think you know about idioms? What puzzles you about them? What would you like to explore idioms or how could we explore that (puzzle)?] Or you can try the routine with an artwork, image, object, concept or text.

When doing the routine with a whole class create a chart that reads: “What do you think you know about _____? What puzzles you about _____? What does it make you want to explore?” Write students ideas under each heading. It is also possible to have students write their ideas individually on post-it notes to add to the class chart. Group and categorize these ideas as necessary. Decide what language is appropriate for each step.

It is often helpful to leave these lists up in the classroom so that when you address something on it — i.e., you come across a fact that reveals a misconception on the list or a puzzle is partially answered — students can refer to the list, adding ideas, noting that they have found out more information or in some way answered or added to one of their previous questions. It is also possible to ask students to create individual TPE charts in their notebooks.

Or for new students, try the routine in English about the subject of Spanish in general—you may be surprised at what you find out!

- *See Think Wonder* can be used in ways similar to TPE routine. Try it with a story, poem, image or object. Again, make thinking visible in English and/or Spanish. Students can follow up with a written or verbal exploration of the “wonder”, or pair students to discuss their observations and ideas. It is possible to create a class chart of these ideas. When reflecting, try to capture themes and insights by categorizing students’ responses, a process that can happen in either language.
- *Creative Questions* can help students develop and ask interesting questions in Spanish. Consider launching this routine in English with an interesting artwork and make students’ question visible. Then work with students to translate some of the question-starter stems

associated with the routine and translate the questions generated from the artwork discussion. (Note: you may have generated a list of Spanish question words from one of the other routines.) Students may have some of their own ideas and question stems to add to the list as well. As a follow up activity, ask students to talk with a partner about one of the questions or write a brief paragraph exploring one of the questions.

F. Other Ideas

- *Word Phrase Sentence* is an important one for reading text in ESL and language classes. The routine asks students to identify key words, phrases and sentences in the text. You may want to identify different things for you students to look for, for example, ask students to look for words/phrase/sentence that indicate how a particular character is feeling, or that tell about the setting of the story. You may find it convenient to give each student a zeroxed version of the text to highlight and mark. Then, as a group, create a chart of these words/phrases/sentences. Stand back and discuss what you see (again, choose the language that will work best with your class). This process can be broken down into simple steps or you can just do one part at a time.
- The *Think Pair Share* routine is helpful throughout many aspects of language class. It can be used in combination with any of the routines, or use it on its own when you want students to think about an idea and share it with a peer.
- One last idea: Translate the Artful Thinking Palette and accompanying questions into Spanish (or a combo of Spanish and English). Use it to reflect on the kind of thinking that is happening after you have a discussion or after you try a routine. To get started with new students, talk about the kind of thinking that is happening in English first. Consider adding some of their ideas to the palette in Spanish.