

Educational Leadership

February 2008 | Volume 65 | Number 5

Teaching Students to Think Pages 57-61

Making Thinking Visible

When learners speak, write, or draw their ideas, they deepen their cognition. Project Zero's Visible Thinking approach shows how.

Ron Ritchhart and David Perkins

What are your thoughts about arthropods?

Chances are you don't have too many thoughts about this particular phylum of invertebrates. But students in Naomi Arrow's 5th grade class at Bialik College in Melbourne, Australia, came up with many initial observations when Naomi introduced a unit on the creatures, everything from "I think they're creepy" to "They are hairy and have many legs."¹ Beyond first impressions, the students generated questions on aspects of arthropods that they were puzzled about: "How do they walk upside down?" "How does the spider produce its web?" And (in an intriguing somersault of perspective taking), "Is there stuff that they stamp on, like we stamp on them?"

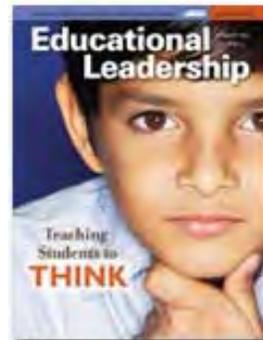
Naomi's students were applying a *thinking routine* called think-puzzle-explore, which has students share what they think about a topic, identify questions they puzzle about, and target directions to explore. Thinking routines help learners ponder topics that might not seem to invite intricate thinking at first glance, such as arthropods. Such routines jump-start thinking and make it visible.

Thinking routines are one element of an initiative called Visible Thinking that we, our colleagues at Project Zero, and collaborators in various schools have developed. In our research, we have explored the practicality of using thinking routines and documentation as classroom learning tools, developed a framework for pursuing cultural transformation in classrooms and schools, and devised tools for integrating the arts. This work has spanned elementary through university settings, included both public and independent schools, and involved schools in the United States, the Netherlands, Sweden, Belgium, and Australia.²

What Is Visible Thinking?

Six key principles anchor Visible Thinking and characterize our approach in schools.

- *Learning is a consequence of thinking.* Students' understanding of content, and even their memory for content, increases when they think through—and with—the concepts and information they are studying. Thinking through issues is not a solo endeavor,



February 2008

however. Team members often share and build on one another's knowledge. Notational systems, specialized vocabulary, and various technological and other tools also free up memory for more complex tasks.

- *Good thinking is not only a matter of skills, but also a matter of dispositions.* Open-mindedness, curiosity, attention to evidence, skepticism, and imaginativeness all make for good thinking (Perkins & Ritchhart, 2004; Perkins, Tishman, Ritchhart, Donis, & Andrade, 2000). Such characteristics concern not so much a person's abilities as how the person invests those abilities. Children and adults often greatly underutilize their thinking capabilities. Accordingly, besides nurturing relevant skills, education needs to promote open-mindedness over closed-mindedness, curiosity over indifference, and so on. Several studies support this dispositional view of thinking.
- *The development of thinking is a social endeavor.* In classrooms, as in the world, there is a constant interplay between the group and the individual. We learn from those around us and our engagement with them. The sociocultural character of classrooms and schools should ensure that thoughtful learning is pervasive, not sporadic.
- *Fostering thinking requires making thinking visible.* Thinking happens mostly in our heads, invisible to others and even to ourselves. Effective thinkers make their thinking visible, meaning they externalize their thoughts through speaking, writing, drawing, or some other method. They can then direct and improve those thoughts. Visible Thinking also emphasizes documenting thinking for later reflection.
- *Classroom culture sets the tone for learning and shapes what is learned.* We have identified eight forces that shape classroom culture: (1) classroom routines and structures for learning, (2) language and conversational patterns, (3) implicit and explicit expectations, (4) time allocation, (5) modeling by teachers and others, (6) the physical environment, (7) relationships and patterns of interaction, and (8) the creation of opportunities. Depending on their form, these forces can support or undermine the rhythm of thoughtful learning (Ritchhart, 2002, 2007).
- *Schools must be cultures of thinking for teachers.* Professional learning communities—in which rich discussions of teaching, learning, and thinking become a fundamental part of teachers' experiences—provide the foundation for nurturing thinking and learning in the classroom. Administrators need to value, create, and preserve time for teachers to discuss teaching and learning, grounded in observation of student work.

First Grade Thinkers at Work ...

To show these principles in action, let's look inside another classroom at Bialik College, a private preK–12 school in Melbourne, Australia. The school includes students with severe learning disabilities as well as gifted students. First grade teacher Roz Marks has been implementing visible thinking in her classroom for two years through our Cultures of Thinking project. She has found the think-puzzle-explore routine a good way to uncover students' thinking and plan her inquiry-based curriculum. When her class showed interest in the April 2006 Beaconsfield Mine collapse in Tasmania and the subsequent rescue of two miners, Roz

used this routine to help define students' inquiry.

Gathering her class, Roz asked, "What do you think you know about the Beaconsfield Mine?" To provide think time, she gave them paper to draw their ideas. Students were soon eager to share.

"I think Larry Knight [the sole fatality] was a good person," Yasmin offered. Roz recorded Yasmin's comment on chart paper and gently pushed her thinking by asking, "What makes you say that?" The 6-year-old paused before speculating, "Because maybe he offered to drive the truck and didn't mind that he wasn't protected."

Ivan added, "I think Larry Knight was scared when the rock was falling."

Roz probed, "What makes you say that?" Ivan pointed to his picture: "Because the rock was so big."

As the sharing continued, Roz followed each student's statement with "What makes you say that?" and documented responses to keep the collective thinking visible. Soon students justified their ideas without prompting. "I think one of the miners is ill," Jade offered, quickly adding, "because I heard it on the news."

Roz turned the class's attention to the mysteries of the mining disaster. "What are you puzzling over or wondering about the mine?" Hands shot up and questions flew. Some questions focused on causes of the tragedy: "How did the collapse happen?" "Why was the cage [part of the vehicle in which miners worked] so small?" "Why was Larry Knight not in the cage?" Others explored the rescue: "Why were the last three meters of rock the hardest?" Still others expressed personal puzzles: "Why wasn't I allowed to watch it on TV?"

After collecting students' "puzzles"—the questions students puzzled over—Roz discussed with the class how varied they were and asked, "How will we explore our puzzles?" Students suggested various media sources, such as newspaper and television. A few recognized the need for "the truth," not just information, and suggested visiting Tasmania or phoning the miners themselves. The class decided to keep looking at and listening to news reports. Roz and the students regularly brought articles to class, and students continued to form theories about the collapse and rescue on the basis of new evidence. Roz also made books about geology and mining available to students.

... And How Their Teacher Fostered Thinking

In this interaction, Roz fostered thinking and made it visible in multiple ways. Even before the discussion, Roz signaled interest in her students' ideas. Through observing students' conversations and play, she recognized the opportunity for rich learning related to the topic of the Beaconsfield Mine. In Roz's classroom, student thinking is noticed, respected, and encouraged, fostering a culture of pervasive learning.

Roz gave her students time to become aware of their ideas and questions, and then used the think-puzzle-explore routine to support their inquiry. Like the familiar KWL strategy—What do you **K**now? What do you **W**ant to know? What have you **L**earned? (Lyman, 1981)—think-puzzle-

explore taps students' prior knowledge, but with a key difference. By asking what students "think they know" rather than what they "know," the prompt uses conditional language that suggests possibilities and openness rather than absolutes (Langer & Piper, 1987; Ritchhart & Perkins, 2000). This encourages sharing of tentative ideas. All students can engage in a conversation focused on personal thoughts rather than definitive knowledge. As the conversation in Roz's class developed, students adopted conditional language in their responses ("I think Larry Knight was scared"). Such language communicates the message that learning begins with one's own ideas and truth is built over time.

Roz used the power of language to shape thinking by weaving in the "What makes you say that?" prompt with its gentle invitation to provide evidence. Over time, students took on this expectation for reasoned thinking. Finally, the question, What are you puzzling over? is subtly different from the traditional, What do you want to find out? and guides students toward investigating rather than stockpiling facts.

Creating a Culture of Thinking for Teachers

At Bialik, teachers like Naomi and Roz discuss their efforts to create a culture of thinking in one of seven teacher study groups. These groups use action research, classroom observations, and reading and discussion to clarify how the eight cultural forces mentioned earlier in this article shape learning in classrooms.

The study groups regularly discuss student work through the Looking at Student Thinking protocol. Using documentation of students' thinking, this protocol guides teachers through closely observing student responses, speculating about students' thinking, raising questions, and exploring implications for teaching (information on this protocol is available at www.pz.harvard.edu/vt).

For example, Roz's group spent 90 minutes exploring and analyzing her class's conversation about the Beaconsfield Mine. Her colleagues noticed that student responses signaled great empathy and curiosity and marked emerging mathematical and scientific ideas about types of rock, weights, distances, and cause-and-effect relationships. They noted that students presented evidence for all their statements, sometimes without prompting, and showed rich awareness of informational resources.

As the discussion expanded, questions emerged about the power of starting with student interests, the role of the media in presenting information, and adults' role in censoring that information. Issues arose about what opportunities students should have to delve deeply into ideas, explore their own thinking, and pursue research. Teachers suggested that Roz might extend the exploration into geology, Australia's natural resources, and the process of mining—or connect it to a discussion of survival skills and how events affect communities. Roz not only could see her students' thinking more clearly, but also could better situate their learning within the school's collective efforts.

The Effects of Making Thinking Visible

We have seen positive changes in school culture and student learning in Bialik and other

schools implementing the Visible Thinking approach. Classroom activities become more learning oriented rather than work oriented (Marshall, 1988). Students who previously believed they lacked a voice or that their ideas weren't valued, including students with learning disabilities, participate more actively and confidently (Ritchhart, Palmer, Church, & Tishman, 2006); and students' awareness of thinking strategies dramatically increases at all grade levels (Ritchhart, Hadar, & Turner, 2008). Teachers at Bialik have told us that making thinking visible enables them to more accurately assess students' understanding.

Data from schools using the approach reflect improved student learning. High school students at Bialik reported that thinking routines helped them structure their thinking before they began writing essays for their state graduation exams, which boosted their confidence and increased the time they spent writing. At Long Lake Elementary in Traverse City, Michigan, where our colleagues have been implementing Visible Thinking ideas since 2004, student scores have significantly increased on state and district tests in reading, writing, and social studies. Efforts are underway to expand the program throughout the Traverse City district.

The long-standing goals of the Visible Thinking approach—deepening learning in the content areas and fostering thinking skills and dispositions—are vital in schools today. In our experience, this approach creates a chemistry that can be truly transformative for learners and teachers.

Thinking Routines: Tools for Making Thinking Visible

Project Zero researchers developed more than 30 thinking routines in collaboration with K–12 teachers. Below are a few popular routines used by teachers. See www.pz.harvard.edu/vt/ for more information, including actual classroom examples, on these routines and many others.

Headlines

This routine uses newspaper headlines to capture the essence of an event, idea, concept, or topic. It works especially well at the end of a class discussion in which students have explored a topic and gathered new information and opinions. Ask students,

- If you were to write a headline for this topic or issue right now that captured the most important aspect to remember, what would that headline be?
If you ask the first question at the beginning of the discussion, follow up with these questions:
- How would your headline change after today's discussion? How does it differ from what you would have said yesterday?

Connect-Extend-Challenge

This routine helps students make connections. Ask students these three questions:

- How are the ideas and information presented connected to what you know and have studied?
- What new ideas extended or pushed your thinking in new directions?
- What is still challenging or confusing for you? What questions, wonderings, or puzzles do you have?

See-Think-Wonder

This routine helps stimulate curiosity and sets the stage for inquiry. Ask students to make observations about an object, image, or event, answering these three questions:

- What do you see?
- What do you think about that?
- What does it make you wonder?

Compass Points

This routine helps students explore various facets of a proposition or idea (such as a school dress code) before taking a stand on it. Ask students these four questions, recording their responses as the directions of a compass to provide a visual anchor.

- E = Excited. What excites you about this idea or proposition?
- W = Worrisome. What do you find worrisome about this idea?
- N = Need to Know. What else do you need to know or find out about it? What additional information would help you?
- S = Stance, Steps, or Suggestions for Moving Forward. What is your current stance on the idea or proposition? What steps might you take to increase your understanding of the issue?

Source: Activities are adapted from Project Zero's Visible Thinking Web site (www.pz.harvard.edu/vt) created by David Perkins, Ron Ritchhart, Patricia Palmer, and Shari Tishman. © 2007 by the president and fellows of Harvard College on behalf of Project Zero at the Harvard Graduate School of Education. Used with permission.

Endnotes

¹ For the purist, most arthropods have many legs, but only a few are hairy.

² For more information on Project Zero's practice and research, visit www.pz.harvard.edu/vt or www.pz.harvard.edu/tc.

References

- Langer, E., & Piper, A. (1987). The prevention of mindlessness. *Journal of Personality and Social Psychology*, *53*, 280–287.
- 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.
- Marshall, H. H. (1988). In pursuit of learning-oriented classrooms. *Teaching and Teacher Education*, *4*(2), 85–98.
- Perkins, D. N., & Ritchhart, R. (2004). When is good thinking? In D. Y. Dai & R. J. Sternberg (Eds.), *Motivation, emotion, and cognition: Integrative perspectives on intellectual functioning and development* (pp. 351–384). Mahwah, NJ: Erlbaum.
- Perkins, D. N., Tishman, S., Ritchhart, R., Donis, K., & Andrade, A. (2000). Intelligence in the wild: A dispositional view of intellectual traits. *Educational Psychology Review*, *12*(3), 269–293.
- Ritchhart, R. (2002). *Intellectual character: What it is, why it matters, and how to get it*. San Francisco: Jossey-Bass.
- Ritchhart, R. (2007). Cultivating a culture of thinking in museums. *Journal of Museum Education*, *32*(2), 137–154.
- Ritchhart, R., Hadar, L., & Turner, T. (2008, March). *Uncovering students' thinking about thinking using concept maps*. Paper to be presented at American Educational Research Association, New York.
- Ritchhart, R., Palmer, P., Church, M., & Tishman, S. (2006, April). *Thinking routines: Establishing patterns of thinking in the classroom*. Paper presented at American Educational Research Association, San Francisco.
- Ritchhart, R., & Perkins, D. N. (2000). Life in the mindful classroom: Nurturing the disposition of mindfulness. *Journal of Social Issues*, *56*(1), 27–47.

Author's note: Some of the ideas and research reported here were developed with support from Bialik College, Abe and Vera Doravitch, and the Stiftelsen Carpe Vitam. The views expressed by the authors are not necessarily those of the foundations.

Ron Ritchhart is Research Associate and Principal Investigator of the Cultures of Thinking Project at Project Zero, Harvard Graduate School of Education; 617-495-4898; ron@pz.harvard.edu. **David Perkins** is Senior Professor of Education at Harvard Graduate School of Education; David_Perkins@pz.harvard.edu.

[Contact Us](#) | [Copyright Information](#) | [Privacy Policy](#) | [Terms of Use](#)

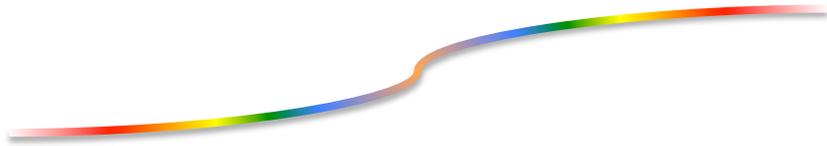
© 2007 Association for Supervision and Curriculum Development

Thinking Routines Matrix

From *Making Thinking Visible* by Ritchhart, Morrison & Church (2011)

Routine	Key Thinking Moves	Notes
<i>Routines for INTRODUCING & EXPLORING IDEAS</i>		
See-Think-Wonder	Description, Interpretation & Wondering	Good with ambiguous or complex visual stimuli
Zoom In	Description, Inference, & Interpretation	Variation of STW involving using only portions of an image
Think-Puzzle-Explore	Activating prior knowledge, wondering, planning	Good at the beginning of a unit to direct personal or group inquiry and uncover current understandings as well as misconceptions
Chalk Talk	Uncovers prior knowledge and ideas, questioning	Open-ended discussion on paper. Ensures all voices are heard, gives thinking time.
321 Bridge	Activates prior knowledge, questioning, distilling, & connection making through metaphors	Works well when students have prior knowledge but instruction will move it in a new direction. Can be done over extended time like the course of a unit.
Compass Points	Decision making and planning, uncovers personal reactions	Solicits the group's ideas and reactions to a proposal, plan or possible decision.
Explanation Game	Observing details and building explanations	Variations of STW that focuses on identifying parts and explaining them in order to build up an understanding of the whole from its parts and their purposes
<i>Routines for SYNTHESIZING & ORGANIZING IDEAS</i>		
Headlines	Summarizing, Capturing the heart	Quick summaries of the big ideas or what stands out
CSI: Color, Symbol, Image	Capturing the heart through metaphors	Non-verbal routine that forces visual connections
Generate-Sort-Connect-Elaborate: Concept Maps	Uncovering and organizing prior knowledge to identify connections	Highlights the thinking steps of making an effective concept map that both organizes and reveals one's thinking
Connect-Extend-Challenge	Connection making, identify new ideas, raising questions	Key synthesis moves for dealing with new information in whatever form it might be presented: books, lecture, movie, etc.
The 4 C's	Connection making, identifying key concept, raising questions, and considering implications	A text-based routine that helps identifies key points of complex text for discussion. Demands a rich text or book.
Micro Lab	A protocol for focused discussion	Can be combined with other routines and used to prompt reflection and discussion
I used to think	Reflection and metacognition	Used to help learners reflect on how their thinking has shifted and changed over time.
<i>Routines for DIGGING DEEPER INTO IDEAS</i>		
What makes you say that?	Reasoning with evidence	A question that teachers can weave into discussion to push students to give evidence for their assertions.
Circle Viewpoints	Perspective taking	Identification of perspectives around an issue or problem.
Step Inside	Perspective taking	Stepping into a position and talking or writing from that perspective to gain a deeper understanding of it.
Red Light, Yellow Light	Monitoring, identification of bias, raising questions	Used to identify possible errors in reasoning, over reaching by authors, or areas that need to be questioned.
Claim Support Question	Identifying generalizations and theories, reasoning with evidence, counter arguments	Can be used with text or as a basic structure for mathematical and scientific thinking.
Tug of War	Perspective taking, reasoning, identifying complexities	Identifying and building both sides of an argument or tension/dilemma
Word-Phrase-Sentence	Summarizing and distilling	Text-based protocol aimed at eliciting what a reader found important or worthwhile. Used with discussion to look at themes and implications.

ARTFUL THINKING PALETTE



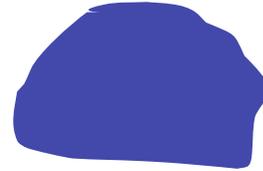
REASONING

WHAT MAKES YOU SAY THAT?
CLAIM / SUPPORT / QUESTION



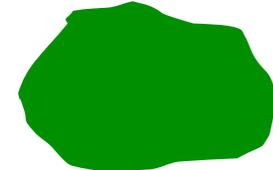
QUESTIONING & INVESTIGATING

THINK / PUZZLE / EXPLORE
CREATIVE QUESTIONS
SEE / THINK / WONDER



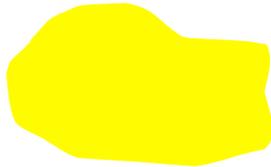
OBSERVING & DESCRIBING

BEGINNING / MIDDLE / END
LOOKING: TEN TIMES TWO
LISTENING: TEN TIMES TWO
COLORS / SHAPES / LINES
THE ELABORATION GAME



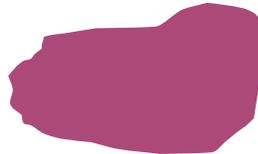
EXPLORING VIEWPOINTS

STEP INSIDE
CIRCLE OF VIEWPOINTS



FINDING COMPLEXITY

PARTS / PURPOSES / COMPLEXITIES
COMPLEXITY SCALE



COMPARING & CONNECTING

I USED TO THINK...NOW I THINK
CONNECT / EXTEND / CHALLENGE
CREATIVE COMPARISONS
HEADLINES



Study Group protocol

1. Greetings and housekeeping matters. (3 minutes)
2. Briefly review Puzzles and Insights from last week (3minutes)
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' thinking: What kinds of thinking do you see?
What's going on?

What does it make you wonder about students' thinking?

Ask questions about the work.

Reflect

What are implications for future teaching?

4. Headlines. Each person identifies two headlines from their paired discussion: One key insight, and one key question or puzzle. Write these ideas on paper or post it notes that can be posted on the board.
(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. Each person shares their puzzle and insight with the group. Make the groups' thinking visible – you may choose to write the headlines on chart paper, or stick their post-it notes on the board. Try to categorize the puzzles and insights and pick one or two of them for 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 stud 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.

BEGINNING / MIDDLE / END



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?

WHAT KIND OF THINKING DOES THIS ROUTINE ENCOURAGE? This routine uses the power of narrative to help students make observations and encourages them to 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 art that stays still in time – such as painting or sculpture. 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.

LOOKING: TEN TIMES TWO



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 add 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, detailed observations by encouraging them to push beyond first impressions and obvious features.

WHEN AND WHERE CAN IT BE USED? The routine can be used with any kind of visual art. You can also use non-art images or objects. The routine can be used on its own, or to deepen the observation step of another routine. It is especially useful before a writing activity because it helps students develop descriptive language.

PARTS / PURPOSES / COMPLEXITIES



Choose an artwork, object or 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?)

WHAT KIND OF THINKING DOES THIS ROUTINE ENCOURAGE?

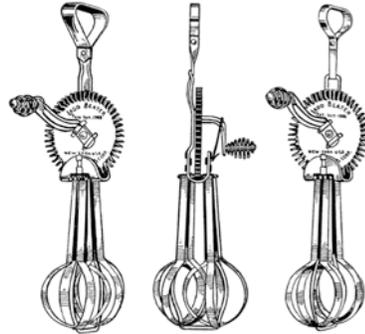
This routine helps students build a multi-dimensional mental model of a topic by identifying different aspects of the topic and considering various ways in which the topic is complex.

WHEN AND WHERE CAN IT BE USED?

Use it with many different things – 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.

PARTS, PURPOSES, COMPLEXITIES

LOOKING CLOSELY



Choose an object or system and ask:

What are its **parts**?

What are its various pieces or components?

What are its **purposes**?

What are the purposes for each of these parts?

What are its **complexities**?

How is it complicated in its parts and purposes, the relationship between the two, or in other ways?



Parts, Purposes, and Complexities

What Kind of Thinking Does This Routine Encourage?

This thinking routine helps students slow down and make careful, detailed observations by encouraging them to look beyond the obvious features of an object or system. This thinking routine helps stimulate curiosity, raises questions, and surfaces areas for further inquiry.

When and How Can This Routine Be Used?

This thinking routine can be used to explore any object or system. This routine can be used on its own, or in combination with another routine. Here are some ideas and considerations for putting this thinking routine into practice:

- The routine provides an opportunity to make students' thinking visible through creating lists, maps, and drawings of the parts, purposes, complexities of various objects and systems. You may introduce the three elements of this routine all at once, or you may want to introduce the three elements of the routine one at a time.
- If an object students are working with is present and/or physically visible, students might not need a lot of background knowledge. However, if students are working with a system—like democracy—it may be helpful for students to have background knowledge or to give them an opportunity to reflect on their experiences interacting with that particular system.
- To take this routine to the next level, after students have considered the parts, purposes, and complexities of an object as it is, you may consider having students take apart the objects they are working with—and then continue to identify the parts, purposes, and complexities they notice using different colored markers.
- You may consider swapping out the word “complexities” for more accessible terms, such as *puzzles* or *questions*.



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?

Purpose: 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.

Application: 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!

Launch: 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.

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?*

Purpose: 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.

Application: 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.

Launch: 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?”

CLAIM / SUPPORT / QUESTION

A reasoning routine

- | | | |
|--|---|---|
| 1. Make a claim about the topic | → | Claim: An explanation or interpretation of some aspect of the 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? |

Purpose: What kind of thinking does this routine encourage?

The routine helps students develop thoughtful interpretations by encouraging them to reason with evidence. Students learn to identify truth claims and explore strategies for uncovering truth.

Application: When and where can I use it?

Use *Claim Support Question* with topics in the curriculum that invite explanation or are open to interpretation.

Launch: What are some tips for starting and using this routine?

The routine can work well for individuals, in small groups and for whole group discussions. Begin by modeling the routine: Identify a claim and explore support and questions in a whole group discussion. On the board make one column for SUPPORT and one column for QUESTIONS. Ask the class for evidence that either supports a claim, or questions the claim and write it in the appropriate column. Take turns using the routine so that each student makes a claim, identifies support and asks a question.

Following each person's report, take a moment as a group to discuss the topic in relation to the claim before moving on to the next person. Be patient as students take a few moments to think. You may need to probe further by asking: What are some other questions you might want to ask about this statement? or Can you think of reasons why this may be true? Encourage friendly disagreement – once a student comes up with an alternative perspective about a claim, encourage other students to follow. The questions can challenge the plausibility of the claim, and often lead to a deeper understanding of the reasoning process. Let students know it is fine to disagree with one another's reasons and encourage them to come up with creative suggestions for support and questioning.

After everyone has had a turn, reflect on the activity. What new thoughts do students have about the topic?

QUESTION STARTS

A routine for creating thought-provoking questions

1. Brainstorm a list of at least 12 questions about the topic, concept or object. 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 the brainstormed list and star the questions that seem most interesting. Then, select one or more of the starred questions to discuss for a few moments.
3. Reflect: What new ideas do you have about the topic, concept or object that you didn't have before?

Purpose: What kind of thinking does this routine encourage?

This routine provides students with the opportunity to practice developing good questions that provoke thinking and inquiry into a topic. It also helps students brainstorm lots of different *kinds* of questions about a topic. The purpose of asking deep and interesting questions is to get at the complexity and depth of a topic. The purpose of brainstorming varied questions about a topic is to get at the breadth, and multi-dimensionality of a topic.

Application: When and where can it be used?

Use Question Starts to expand and deepen students' thinking, to encourage students' curiosity and increase their motivation to inquire. This routine can be used when you are introducing a new topic to help students get a sense of the breadth of a topic. It can be used when you're in the middle of studying a topic as a way of enlivening students' curiosity. And it can be used when you are near the end of studying a topic, as a way of showing students how the knowledge they have gained about the topic helps them to ask ever more interesting questions. This routine can also be used continuously throughout a topic, to help the class keep a visible, evolving list of questions about the topic that can be added to at anytime.

Launch: What are some tips for starting and using the routine?

Before using Question Starts, you might want to ask students what *they* think makes a good question. Then, when you show the Question Starts, explain that this routine is a tool for asking good questions. Start the routine by providing a topic— Stockholm, a compass, the Equator, good sportsmanship. Ask them to use the Question Starts to generate a list of questions about the topic. Initially, it's best to work together as an entire group. Once students get the hang of the routine, you can have them work in small groups, or even solo. 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.

After students finish generating questions, you can use the questions they created in a variety of ways: pick one of the questions to investigate further, have a discussion about some of the questions, give students information to read about the topic, ask them to investigate it in other ways, or do nothing further as simply creating the list of questions is worthwhile since it gives students a sense of the breadth of a topic and sparks curiosity about it.

Students' questions can be written down and recorded so that they are listed for all to see. If students are working solo, they can keep their list of questions in a journal, or you can create a "collage" out of students' individual lists and display it on the classroom wall.

SEE / THINK / WONDER

A routine for exploring works of art and other interesting things

- What do you see?
- What do you think about that?
- What does it make you wonder?

Purpose: What kind of thinking does this routine encourage?

This routine encourages students to make careful observations and thoughtful interpretations. It helps stimulate curiosity and sets the stage for inquiry.

Application: 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. Use the routine at the beginning of a new unit to motivate student interest or try it with an object that connects to a topic during the unit of study. Consider using the routine with an interesting object near the end of a unit to encourage students to further apply their new knowledge and ideas.

Launch: What are some tips for starting and using this routine?

Ask students to make an observation about an object – it could be an artwork, image, artifact 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 students to think about what this makes them wonder about the object 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 ask students to try the routine individually on paper or in their heads before sharing 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.

STEP INSIDE: PERCEIVE, KNOW ABOUT, CARE ABOUT

A routine for getting inside viewpoints

Three core questions guide students in this routine:

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*?

Purpose: What kind of thinking does this routine encourage?

This routine helps students to explore different perspectives and viewpoints as they try to imagine things, events, problems, or issues differently. In some cases this can lead to a more creative understanding of what is being studied. For instance, imagining oneself as the numerator in a fraction. In other settings, exploring different viewpoints can open up possibilities for further creative exploration. For example, following this activity a student might write a poem from the perspective of a soldier's sword left on the battlefield.

Application: When and where can it be used?

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 then speak or write from that chosen point of view. This routine works well 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.

Launch: What are some tips for starting and using the routine?

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.

This routine is adapted from Debra Wise, *Art Works for Schools: A Curriculum for Teaching Thinking In and Through the Arts* (2002) DeCordova Museum and Sculpture Park, the President and Fellows of Harvard College and the Underground Railway Theater.

THINK / PUZZLE / EXPLORE

A routine that sets the stage for deeper inquiry

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

Purpose: What kind of thinking does this routine encourage?

This routine activates prior knowledge, generates ideas and curiosity and sets the stage for deeper inquiry.

Application: When and where can it be used?

This routine works especially well when introducing a new topic, concept or theme in the classroom. It helps students take stock of what they already know and then pushes students to identify puzzling questions or areas of interest to pursue. Teachers can get a good sense of where students are on a conceptual level and, by returning to the routine over the course of study, they can identify development and progress. The third question is useful in helping students lay the ground work for independent inquiry.

Launch: What are some tips for starting and using this routine?

With the introduction of new topic—for example, earth, leaves, fractions, Buddhism—the class can engage in the routine together to create a group list of ideas. Between each phase of the routine, that is with each question, adequate time needs to be given for individuals to think and identify their ideas. You may even want to have students write down their individual ideas before sharing them out as a class. In some cases, you may want to have students carry out the routine individually on paper or in their heads before working on a new area.

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 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.