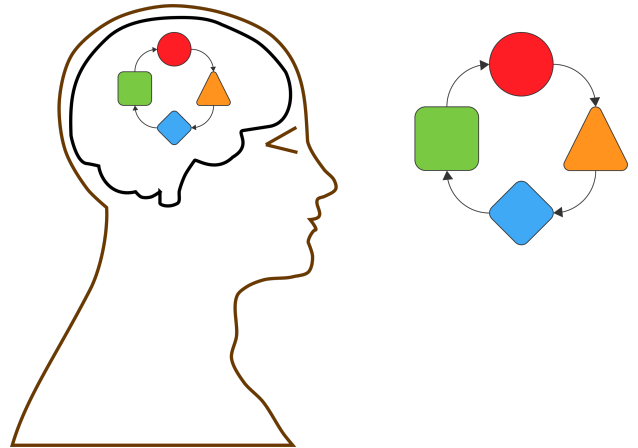


Thinking Routines

Making thinking visible:

- uncovers what learners are thinking, including misconceptions they might be holding, and allows us and them a window into what they are understanding and not understanding.
- reduces the cognitive load - when we can take ideas and manipulate them out of our head with others, we have many more opportunities for making sense of the concepts
- uncovers one's own ideas as the starting point for learning and then continuing to make connections to new ideas; learning is not a process of absorbing others' ideas.



<p>Thinking Moves make the act of thinking explicit for both learners and educators. The Moves specify what learners can do when they think, and remind educators what learners need to do to learn.</p>	<p>Thinking Routines are sets of instructional steps that enact the Thinking Moves. They align with research on learning. Used regularly, learners become familiar with the routines as they build the habit of mind for thinking and engage in learning actively.</p>
<ol style="list-style-type: none"> 1. Observing closely and describing what's there 2. Building explanations and interpretations 3. Reasoning with evidence 4. Making connections 5. Considering different viewpoints and perspectives 6. Capturing the heart (core) of a concept and forming conclusions. 7. Wondering, sparking curiosity and asking questions 	<ul style="list-style-type: none"> • Concept Map • 3-2-1 Bridge • Walkabout • Jigsaw Research Discussion • Sentence-Word-Phrase • Micro Lab • Think-Pair-Share • Turn & Talk • Connect-Extend-Challenge-Apply • Notice Think Wonder • Predict-Explore-Revise

The Thinking Routines used in the Faculty Learning Program and can easily be applied in large lecture classes. The directions provided are general descriptions of how to lead each routine. There is a myriad of variations to the basic structure of each routine that educators are encouraged to explore and customize for their own instructional situation.

Thinking Routine	Thinking Moves
Concept map	Make connections
3-2-1 Bridge	<ul style="list-style-type: none"> • Make connections • Build explanations and interpretations
Walkabouts	Explore beliefs, opinions, and prior knowledge
Jigsaw Research Discussion (Reading Partner, Expert Group, Case Studies)	<ul style="list-style-type: none"> • Make connections • Build explanations and interpretations • Reason with evidence • Consider different viewpoints and perspectives
Sentence-Phrase-Word	Capture the heart (core) of a concept and form conclusions
Micro Lab	Consider different viewpoints and perspectives
Think-Pair-Share	<ul style="list-style-type: none"> • Consider different viewpoints and perspectives • Make connections • Reason with evidence
Turn & Talk	Consider different viewpoints and perspectives
Connect, Extend, Challenge, & Apply	<ul style="list-style-type: none"> • Make connections • Wonder, spark curiosity, and ask questions
Notice Think Wonder	<ul style="list-style-type: none"> • Observe closely and describe what's there • Wonder, spark curiosity, and ask questions
Predict-Explore-Revise	<ul style="list-style-type: none"> • Build explanations and interpretations; • Reason with evidence • Consider different viewpoints and perspectives • Wonder, spark curiosity, and ask questions

(A) Making connections and visualizing understanding

1. **Concept Map*** (*Make Connections*)

This routine sparks learners to activate prior knowledge and generate ideas about a topic. It challenges them to retrieve from memory what they already know, and elaborate on those memories as they organize/reorganize and articulate connections among ideas. There are many ways to make a concept map, and everyone's map will look different. The concept map will evolve as learners' thinking evolves, and demonstrates that mental models are not linear.

Concept Map Directions:

- a. **Introduce the concept map.** A concept map is a visual way to show one's thinking about a topic, identifying the relevant ideas and their connections, and organizing/reorganizing the connections. Show an example. Tell your learners there are many ways to make a concept map, and everyone's map will look different.
 - b. **Form pairs and distribute materials.** Distribute a sheet of chart paper, two markers, and a sticky-note pad to each pair.
 - c. **Display the question prompt for the topic.** (e.g., How do you think people learn?)
 - d. **Explain the 6 steps for creating a concept map.** a) Generate with your partner a list of 5–6 ideas: words and brief initial thoughts that come to mind when you think about the topic; b) record your pair's ideas, one per sticky note, and pile them up on the chart paper; c) sort and cluster your ideas according to how central or tangential they are to how you're thinking about the topic. Pile central ideas near the center of the paper and more tangential ideas towards the outside; d) consider why you clustered the ideas as you did. What do they have in common? How are they related? As you consider the related ideas, separate them on the chart paper; e) connect ideas that have something in common by drawing lines between related sticky notes; and f) write a short sentence on each connecting line to explain how the ideas are connected.
 - e. **Before they begin, emphasize key takeaways.** Make clear that the most critical aspect of this routine is to discuss the connections and questions that come up as learners articulate their thinking and create a map of their conceptual understanding of the topic.
2. **3-2-1 Bridge*** (*Make connections; Build explanations and interpretations*)
This routine invites learners to uncover their initial thoughts, ideas, questions, and understandings about a topic, and then, after engaging in learning experiences and experiencing some instruction, to connect these to new thinking and ideas. The learning experiences from beginning to end of the bridge should be thought provoking and meaningful, and they should be offered in stages, so that learners' understanding develops and deepens over time.

3-2-1 Bridge Directions:

- a. **Start the Bridge.** Have learners take out their Learning Journals. Explain that they'll be given a prompt and asked to record their thoughts about it in three phases. Ask them not to overthink their responses. This is an opportunity to freely brainstorm their initial thoughts, and there is truly no right or wrong response.
- b. **Display prompt.** (e.g. How do people learn?)
- c. **Phase 1: Ask your learners to "record 3 words."** Have them quickly write three words that come to mind when they think about the prompts.
- d. **Phase 2: Have them "ask 2 questions."** Now ask learners to write two questions they wonder about when thinking about the prompt.

- e. **Phase 3: Ask them to develop an analogy or metaphor.** Display the definitions of analogy and metaphor and have them write one that encapsulates their ideas about the prompt.
- f. **Put away for now.** Let learners know they'll return to these ideas later. Before they put away their journals, remind them to date and title the entry so they can easily find it again. Later, after additional experiences over a period of time, they will return to this and complete the "bridge."

When the time is right after additional learning experiences, reintroduce the 3-2-1 Bridge routine.

- g. **Return to the Bridge.** Tell learners that, as before, in this routine they'll be given a prompt and asked to record their thoughts about it in three phases. This time, their focus will be on *comparing prior understanding to current thinking*. Ask them to draw a line under their previous entries.
- h. **Display the original prompt again.**
- i. **Ask your learners to "compare 3 words."** Have learners review the words they wrote previously, then write down 3 words that come to mind now when they think about the topic. If the words do not change, that is okay. They do, however, need to consider and write down why the words have or haven't changed.
- j. **Ask them to "compare 2 questions."** Have them review the original questions and determine if they have or haven't been answered yet, and write down new questions that have arisen.
- k. **Ask them to review an analogy or metaphor.** Ask learners to review their previous analogy or metaphor and consider whether to revise it to reflect what they now think about the prompt. If they don't revise it or create a new one, that's okay. But they need to consider and write down why it has or hasn't changed.
- l. **Have them discuss with a partner.** Ask learners to discuss their latest bridge with a peer, using the following prompts: What changes did you make or not make? What prompted the changes? What made changes unnecessary? How has your thinking about the topic evolved or deepened?

(B) Exploring and diving deeper into texts

1. **Walkabouts*** (*Explore beliefs, opinions, and prior knowledge*)

This routine is useful for exploring big ideas in broad focus, like the 5 Foundational Ideas on Learning. Learners read through short text and the conversation draws on their personal experiences, opinions, and knowledge.

Directions:

- a. **Write an abbreviated title for each idea on a chart paper**, and place the charts around the room. (Place on different tables or affix the papers onto the

- wall.)
- b. **Display and review the instructions**, including the discussion prompts. Everyone receives a set of the whole Research Discussion.
 - c. **Divide community into small groups based on the number of big ideas**, each stationed in front of one of the charts. If the small groups are larger than six people, consider making two sets of chart papers. Give each group a different-colored pen/marker.
 - d. **Explain that you'll keep time**, and have them rotate clockwise to the next chart about every 5-8 minutes. Groups may need more time in the later ideas in order to read what others before them have written. Consider adjusting the rotation to give less time for the early charts and more for the later ones.
 - e. **Recall the discussion prompts**. What ideas come to mind when you consider this idea? What connections can you make to others' responses? What questions arise as you think about the ideas and consider the responses and comments of others?
 - f. **Circulate to help learners articulate their thinking and make connections**. Use the Discussion Map.
 - g. **Begin Whole-Group Share**. Once the groups have rotated through all the ideas, have them return to the chart paper at which they started to read what others have written. Allow time for the learners to review the chart, and then invite each group to share its thoughts using the following questions: What themes emerged? Were there common issues and reactions across the groups? What questions surprised you? Use the Discussion Map.

The Jigsaw (Reading Partner, Expert Group, and Case Studies) is a cooperative learning strategy. This routine's structure works well when participants have to process and synthesize a lot of complex information in a limited amount of time, as the content is chunked in different ways. It minimizes extended listening time and holds participants individually accountable for their learning. Staggering the information processing in different conversation configurations gives them the chance to make more elaborate memories. Be sure to ensure quiet time for participants to read and consider the ideas individually, and then offer sufficient time to talk out the ideas with others. The educator helps learners find ways to voice the information in their own words, make personal connections with the material, and generate examples that help explain the material to their group. She also encourages learners to help each other understand the material and be confident to present the material to others.

2. **Reading Partner Jigsaw** (*Make connections; Build explanations and interpretations; Reason with evidence; and Consider different viewpoints and perspectives*)
This variation of the jigsaw is used in the FLP Research Discussions. There is a good deal of complex information for learners to consider and integrate into their mental models. The information is organized into a few big ideas that is then divided amongst the group. Since they are first talking with one or two people, everyone has opportunity to express their thoughts on their topic.

Reading Partner Jigsaw Directions:

- a. **Display and review the instructions**, including the discussion prompts. Everyone receives a set of the whole Research Discussion.
 - b. **Divide community into small groups.** Group size is based on the number of big ideas in the reading, which dictates how many reading partners need to be formed. For instance, if there are 3 big ideas, each group should comprise at least 6 people with 3 sets of reading partners.
 - c. **Have participants choose a reading partner** within the group.
 - d. **Divide up the big ideas from the Research Discussion** so that each set of partners reads one of the ideas and, collectively, that all the ideas are read by the group.
 - e. **Monitor to make sure everyone has a reading partner** and that all ideas will be read by members within the small groups. Ensure quiet so that everyone can read. As participants finish the reading, let them know they can start talking quietly with their partner. **Remind them of the prompts to use:** What does each idea mean? How do the ideas relate to what you already know?
 - f. **Monitor the pace within groups** to make sure reading partners finish at approximately the same time so as to begin small group discussion.
 - g. **Segue to small-group discussions.** When it seems that partners have discussed their idea, have them share within their groups. Use these prompts: What is your topic about? What questions came up? What are connections between the big ideas?
 - h. **Circulate to help learners articulate their thinking and make connections.** Use the Discussion Map.
 - i. **Monitor pace of discussion across groups.** Monitor across small groups to ensure that groups finish at approximately the same time, in order to either conclude the discussions or transition to Whole-Group Share.
 - j. **If you plan a Whole-Group Share** remind the groups to identify one or two salient themes that emerged from the conversation and be ready to share out. When ready, lead a whole-group discussion using the Discussion map.
 - k. **If not doing a Whole-Group Share** provide a summary/synthesis of connections, salient points, and common threads that emerged across the small-group discussions as you circulated.
3. **Expert Group Jigsaw** (*Make connections; Build explanations and interpretations; Reason with evidence; and Consider different viewpoints and perspectives*)
Like Reading Partner Jigsaw, this variation of the jigsaw is used when there is a lot of complex information for learners to consider and integrate into their mental models. Again, the information is organized into a few big ideas. In contrast to Reading Partners, in Expert Group learners are first discussing the ideas with more than one or two people, and so, it's possible not everyone will express their thoughts out loud at first.

Expert Group Jigsaw Directions:

- a. **Display and review the instructions**, including the discussion prompts. Everyone receives a set of the whole Research Discussion.
 - b. **Divide community into small groups, based on the number of big ideas.**
 - c. **Assign each small group a big idea to read and discuss.** In this way, each small group becomes the community expert on that one idea. (If the groups are larger than six people, consider assigning two Expert Groups per big idea.)
 - d. **Ensure quiet so that everyone can read.** As participants finish the reading, let them know they can start talking within their small groups. **Remind them of the discussion prompts.** What does each idea mean? How do the ideas relate to what you already know?
 - e. **Circulate to help learners articulate their thinking and make connections.** Use the Discussion Map.
 - f. **Monitor pace of discussion across groups.** Monitor across small groups to ensure that groups finish at approximately the same time, in order to transition to either whole-community or “new-group” discussion, as follows.
 - **Small-Group to Whole-Group option:** For explanations by the Expert Groups and collaborative meaning making by community. After their small-group discussions, have the Expert Groups take turns explaining their understanding of their big idea to the whole-community. Members in the community listen intently, ask questions, and articulate broader connections.
 - **Small-Group to new Small-Group option:** For explanations by the Expert Groups and collaborative meaning making among small groups. (This disseminates ideas among the community without a Whole-Group Share.) After their small-group discussions, form new small groups comprising at least one member from each Expert Group. **Circulate to observe and listen** as the “experts” explain their understanding to others in their new small group. After the small-group discussions, provide a summary/synthesis of connections, salient points, and common threads that emerged across the discussions as you circulated.
4. **Case Studies Jigsaw** (*Make connections; Build explanations and interpretations; Reason with evidence; and Consider different viewpoints and perspectives*)
This variation of the jigsaw is useful when there is one big idea for the community to examine in depth through multiple case studies. Participants are pushed to specify how the individual details from each case can be applied more broadly.

Case Studies Jigsaw Directions:

- a. **Display and review the instructions**, including the discussion prompts. Each group will have one set of the Research Discussion, copied such that individual cases can be distributed to each member within the small group.
- b. **Divide community into small groups.** Three to five people per group. It is not necessary to make groups based on the number of case studies, though group size should not exceed number of case studies. That is, if there are four case studies then group size can be less than, but should not exceed, four people. If

there are more cases than group members, then some individuals can read more than one case.

- c. **Each person reads their case or cases.** Ensure quiet so that everyone can read.
 - d. **Remind them the discussion prompts.** Each person shares a summary of their case study with their small group, including any questions that emerged for her/him. What are the connections across the case studies? What are the implications for practice?
 - e. **Circulate to help learners articulate their thinking and make connections.** Use the Discussion Map.
 - f. **If doing a whole-community discussion,** then the facilitator reminds groups to identify 1 or 2 salient themes that emerged from the conversation to share out. Facilitator leads a whole-group discussion using the Discussion map.
 - g. **If not doing a whole-community discussion,** then the facilitator provides a summary/synthesis of connections, salient points, common threads that emerged across the small group discussions.
5. **Sentence-Phrase-Word*** (*Capture the heart [core] of a concept, what it means to each individual, and form conclusions*)

This routine prompts learners to dig deeper into ideas from a reading by engaging with and making meaning from the text *again*—this time, with particular focus on capturing the essence of the text: what speaks to them. The round-robin share guides learners to share and record their ideas, emphasizing their *reasoning* for selecting what's of interest to them.

Sentence-Phrase-Word Directions:

- a. **Have learners reread a section of text using the active reading strategy:** underline what's interesting, circle what's confusing, and write questions in the margins.
- b. **Ask them to select a sentence** that captures the idea, then a **phrase** that helped them gain a deeper understanding of the idea (the phrase should come from a different sentence), and then a **word** that either caught their attention or struck them as powerful or important.
- c. **Form small groups of those who read the same section of text.** Distribute a sheet of chart paper to each group.
- d. **Begin round-robin share within the small groups** as follows: First learner shares his sentence and explains why it was chosen as his selection is recorded on chart paper. The group comments on and discusses the selection. Then the next person shares her idea, it's recorded, and the group discusses the selection...and so on, until everyone has shared a sentence. Repeat process for phrases and words.
- e. (Optional.) **If you plan a Whole-Group Share** ask groups to look at their recorded selections, think about their discussion, and determine the essence of their group's idea to share with the whole community.

(C) Sharing multiple perspectives and retrieving prior knowledge

1. **Micro Lab*** (*Consider different viewpoints and perspectives*)

This routine ensures that everyone has a chance to participate in the group discussion. The structure helps groups to make connections between ideas, explore alternative perspectives, and consider the contributions of each individual's ideas.

Micro Lab Directions:

- a. **Pose prompts for individual reflection in Learning Journal.** Have learners respond to a series of prompts to retrieve their memories on a topic.
- b. **Introduce the Micro Lab routine**, in which they'll share their reflections in groups of 3. Have them number off 1-2-3 and form groups of 3.
- c. **Start the sharing:** Ask Number 1s to share their ideas with their groups for 2 minutes. No one speaks except the person sharing in each group. Other group members listen and take notes. **Allow 20–30 seconds of silence** for everyone to take in and mentally review what was heard.
- d. **Start the sharing for Numbers 2 and 3:** Repeat c. above until all members of each group have shared their thinking.
- e. **Begin small-group discussions.** Groups may now have an open discussion for 5 minutes. Encourage groups to make connections between what other members have said or to ask questions for clarification.

2. **Think-Pair-Share** (*Consider different viewpoints and perspectives; Make connections; Reason with evidence*)

This routine is used to prompt individuals to first think on their own before sharing their ideas. It creates wait-time for learners to retrieve from memory what they know and believe, then pushes them to express their reasoning with just one or two peers before sharing with more people. Learners progressively hear and consider more viewpoints, and also build confidence to share with the larger community after first trying out their ideas with just a few peers.

Think-Pair-Share Directions:

- a. **Think – Pose prompts for individual reflection in Learning Journal.** Have learners respond to a series of prompts to retrieve memories on a topic.
- b. **Pair – Turn to a partner and talk about their reflection.** As much as possible, have learners talk with one other person so everyone has the chance to participate. This pair talk can also be structured to ensure equitable time for talking and listening. The first partner gets 2-minutes to talk while the second partner listens closely and remains silent the entire time; the partners switch. Optional afterwards, the pair gets another 2 minutes to talk freely.
- c. **Share – Begin whole-community discussion.** Once the pairs have rotated, call everyone together to share their partner conversations. Use the following questions: What ideas came up in your conversations? What thoughts came to mind from what your partner said? Use the Discussion Map.

Think-Pair-Share Variations:

- **Plus2.** After learners write down their thoughts, have each person pass their paper to the person on their right. On their peer's paper they just received, add two thoughts; then, pass the paper to the right again for a new peer's paper, and add two thoughts on to the new paper. Return the papers to original author, and then those three learners form a threesome to discuss everyone's thoughts.
- **TP-Square.** After the initial Think-Pair, have two pairs get together to form a foursome for further conversation before the whole-community discussion. To keep the group on topic, it's important to have a second level discussion prompt that pushes them to compare and synthesize their collective ideas.

3. **Turn & Talk** (*Consider different viewpoints and perspectives*)

This routine is used to help learners access their prior knowledge or ideas about an experience or topic, and express it to a peer. Turn & Talk is periodically introduced as a quick way for learners to engage with the topic, think about what they already know about it, and discuss and check their understanding with a peer. This routine is typically interjected as a stand-alone, but you may choose to follow it up with a small- or whole-group discussion.

(D) Cultivating self-regulated learners

Connect, Extend, Challenge,* & Apply (*Make connections; Wonder, spark curiosity, and ask questions*)

This routine is useful to frame the reflection and discussion at the end of class or a unit. The Connect and Extend questions invite learners to make connections between new ideas and prior knowledge. Here, they are specifying how they have elaborated on the memories they have retrieved. The Challenge questions cultivate self-regulated learning, as learners are encouraged to monitor ongoing questions, confusions, and difficulties as they reflect on what they are learning. The Apply question nudges learners to put in writing how what they're learning applies in other situations, and thus adds an aspect of learning transfer to the reflection.

Connect Extend Challenge & Apply Directions:

- a. **Make space for reflection in Learning Journal.** Have learners divide their page into four areas for writing down their inquiring thoughts.
- b. **Display prompts for reflection.**
 - i. **Connect.** How are the ideas and information discussed in this lesson connected to what you already know?
 - ii. **Extend.** What new ideas extended or broadened your thinking in new directions?
 - iii. **Challenge.** What still seems challenging or confusing? What questions or wonderings do you have?
 - iv. **Apply.** What one or two ways can these ideas be applied in other situations?
- c. **Form small groups for sharing.** Have learners talk about their reflections

within their groups. It's helpful for learners to consider others' reflective thoughts in relation to their own. There might be a different perspective, connection, question, or application they had not considered.

- d. (Optional.) **If you plan a Whole-Group Share** ask groups to offer key points from their discussions with the rest of the community.

(E) Making careful observations

Notice Think Wonder* (*Observe closely and describe what's there; Wonder, spark curiosity, and ask questions*)

This routine helps stimulate curiosity and sets the stage for inquiry. It teases apart inferences and evidence, pushing on learners to offer the observations that led to particular interpretations. In the FLP, it is used as the observation instrument in Peer Observations during Part 2.

Notice Think Wonder Directions:

- a. **Make space for inquiry in Learning Journal.** Have learners divide their page into three areas for writing down their inquiring thoughts. Explain that for each area of inquiry, you will display a set of questions for them to consider and write down their thoughts in their Learning Journal. The community will have a chance to discuss at the end.
- b. **Show an object for close inspection.** The object may be anything tangible such as, an image, artifact, or video/audio clip.
- c. **Display the Notice prompts.** Have learners examine the object and write down as many details that they Notice with their senses, in relation to the topic: see, hear, feel, smell, etc. In the Peer Observation, the following prompts are used: What do you see and hear happening in the video clip? What is the educator saying and doing? What are the learners saying and doing?
- d. **Display the Think prompts.** Have learners pause for a moment to ponder their observations. Give learners about 3-5 minutes quiet time to write down what their observations make them Think. Prompts include: What do you think is going on? What can be inferred, assumed, speculated about, or reasoned from the observation details?
- e. **Display the Wonder prompts.** Have learners write down inquiring thoughts that came up for them based on their observations and interpretations. Give them another 2-3 minutes quiet time to write. Prompts include: What does that make you wonder? What suggestions and implications can be derived based on observations and inferences?
- f. **Begin whole-community discussion, begin with observations.** Call everyone together to share their inquiring thoughts. It is tempting for learners to begin offering their assumptions and conclusions, so insist on listing out as many observations collectively before inviting them to share their interpretations. Use and suggest simple sentence stems like "I notice, I think, I wonder" will put them in the habit of mind to frame their comments appropriately.

(F) Deepening and evolving understanding of concepts

Predict-Explore-Revise (*Wonder, spark curiosity, and ask questions; Build explanations and interpretations; Reason with evidence*)

This routine was used in the program's hands-on activities (Phases of the Moon and Two Balloons) to encourage learners to document their evolving understanding. The initial Prediction or explanation makes one commit to an idea, Exploration offers opportunities to explore more deeply and collect more information and consider different viewpoints for their explanations, and Revision provides opportunities for learners to write down their thinking as it evolves and gets more complex. The opportunity to revise their thoughts signify to learners that they are not expected to know everything from the beginning, and that it is okay if their answers change. Their understanding is shifting and deepening, as they actively engage in the explorations, talk with peers, and reflect on their connections.

Predict-Explore-Revise Directions:

- a. **Pose a question to prompt a prediction or explanation.** Prompt learners to write down their initial thoughts/prediction (in their Learning Journals, if they wish), including their reasoning. Emphasize that others will not read what they write, and they'll have opportunities to add to and revise their responses.
- b. **Introduce a demonstration and/or hands-on exploration.** Provide an opportunity for learners to gather information about a phenomenon and evidence that helps them elaborate on their reasoning and explanation. Learners are prompted to consider what additional information would be helpful. Throughout, learners discuss their observations and thinking with others, in small- and/or whole-group.
- c. **Ask them to revise their writing.** Give learners time to record new ideas that emerged from the experiences and discussions, and add to/revise their reasoning as their understanding of the topic evolves. If there are multiple explorations and conversations throughout the activity, allow multiple opportunities for learners to pause and revise their writing. Have them draw a line between revisions as they document how their thinking is changing and deepening.

*These routines are modified from: *Making Thinking Visible: How to Promote Engagement, Understanding, and Independence for All Learners*. Ron Ritchhart, Mark Cheuch, Karin Morrison. 2011 Jossey-Bass.