

Chapter 8: Critical and Creative Thinking Skills



THINKING SKILLS

A thinking skill is any cognitive process that is broken down into steps and explicitly taught (Johnson, 2000). It is different from high-level thinking, which is simply a complex cognitive process that places high demands on the processing taking place in short-term memory. In contrast, by breaking complex processes into steps, a thinking skill makes cognitive processes easier to learn.

Thinking skills should be introduced and taught using a thinking frame. A thinking frame is a concrete representation of a particular cognitive process broken down into specific steps (see Figure 8.1). These should be put up in poster form to facilitate teaching the skill and to help students remember the steps.

Figure 8.1. Thinking frame for Creating Groups.

<p>Inductive analysis/Creating Groups: Students will impose order on a field by identifying and grouping common themes or patterns.</p> <p>Thinking Frame</p> <ol style="list-style-type: none">1. Look at the whole.2. Identify reoccurring items, themes, or patterns.3. Arrange the parts into groups.4. Describe the whole in terms of groups.

There are two types of thinking skills: creative thinking skills and critical thinking skills. Critical thinking involves convergent thinking or thinking that converges on a single point. It involves the following types of thinking processes: organizing, analyzing, evaluating, or using given information to come to a specific conclusion.

CREATIVE THINKING SKILLS

Creative thinking skills utilize divergent thinking; thinking that diverges from a single point. The following types of cognitive processes are used here: generating ideas, integrating ideas, or seeing things in new ways. The thinking frames for five creative thinking skills are outlined in Figure 8.2.

Figure 8.2. Thinking frames for creative thinking skills

<p>Fluency: Generate as many ideas as possible without evaluating.</p> <p>Thinking Frame</p> <ol style="list-style-type: none">1. Look at the idea or problem.2. Do not worry about good or bad ideas.	<p>Integrate: Connect, combine, or synthesize two or more things to form a new whole.</p> <p>Thinking Frame</p> <ol style="list-style-type: none">1. Look at all things.2. Select interesting or important parts from each.
---	--

<p>3. Add as many ideas as quickly as you can.</p> <p>Flexibility: Create a variety of different approaches. <u>Thinking Frame</u></p> <ol style="list-style-type: none"> 1. Look at the original. 2. Find other ways for it to be used, solved, or applied. <p>Elaboration: Embellish an original idea. <u>Thinking Frame</u></p> <ol style="list-style-type: none"> 1. Look at the idea. 2. Add things to it to make it better or more interesting. <p>Originality: Create new ideas that are unusual or unique. <u>Thinking Frame</u></p> <ol style="list-style-type: none"> 1. Find an idea or problem. 2. Think of solutions or applications that nobody else has thought of before. 	<p>3. Combine to describe a new whole.</p> <p>Brainstorming Web: Create a web to generate ideas relative to a given topic. <u>Thinking Frame</u></p> <ol style="list-style-type: none"> 1. Look at the original ideas. 2. Analyze to identify 2-5 related ideas for subheadings.. 3. Brainstorm to generate ideas for each subheading. 4. Describe.
---	---

Fluency

Fluency activities are those in which students generate ideas. Below are some examples of inner curriculum activity ideas that can be used with this creative thinking skill. Working individually or in small groups, generate a list of:

1. Things or experiences that make you feel a particular emotion (happy, sad, excited, worried, anxious, remorseful, afraid, etc.).
2. Symbol ideas for a particular emotion. They would then be used in the creation of poetry, creative writing, visual art, or dance.
3. Adjectives that describe: you, your day, your week, or your life,
4. Things, experiences, or character traits that you value.
5. Things to say to somebody who may have hurt you or made you feel badly.
6. People who you admire.
7. People to say thank you to.
8. Questions you have about life.
9. Kinds of problems we have.
10. Kinds of problems students in our grade might face.

Flexibility

Flexibility activities require that students look for a variety of different alternatives or approaches. For example, students could:

1. Describe a variety of ways to express an emotion.
2. Describe a variety of possible reactions to a particular situation.
3. Describe or express an emotion in a variety of ways.
4. Describe a variety of alternative solutions, approaches, or decisions to a particular situation or problem.

Elaboration

Elaboration requires ones to add to the original, to embellish it in some way, or to make it better. Students here might:

1. Use creative writing to add to and elaborate on a particular event or experience in their lives.
2. Use a piece of art, poetry, creative writing, music, or dance.

Originality

Andrew P. Johnson, Ph.D.

Minnesota State University, Mankato

www.OPDT-Johnson.com

dr.andy@charter.net

Originality requires one to create something new. The symbols described in the second idea under fluency could be used to create poetry, creative writing, visual art, music, or dance. Originality could involve the arts in the form of new works, but it could also involve the sciences in the form of original solutions to human problems.

CRITICAL THINKING SKILLS

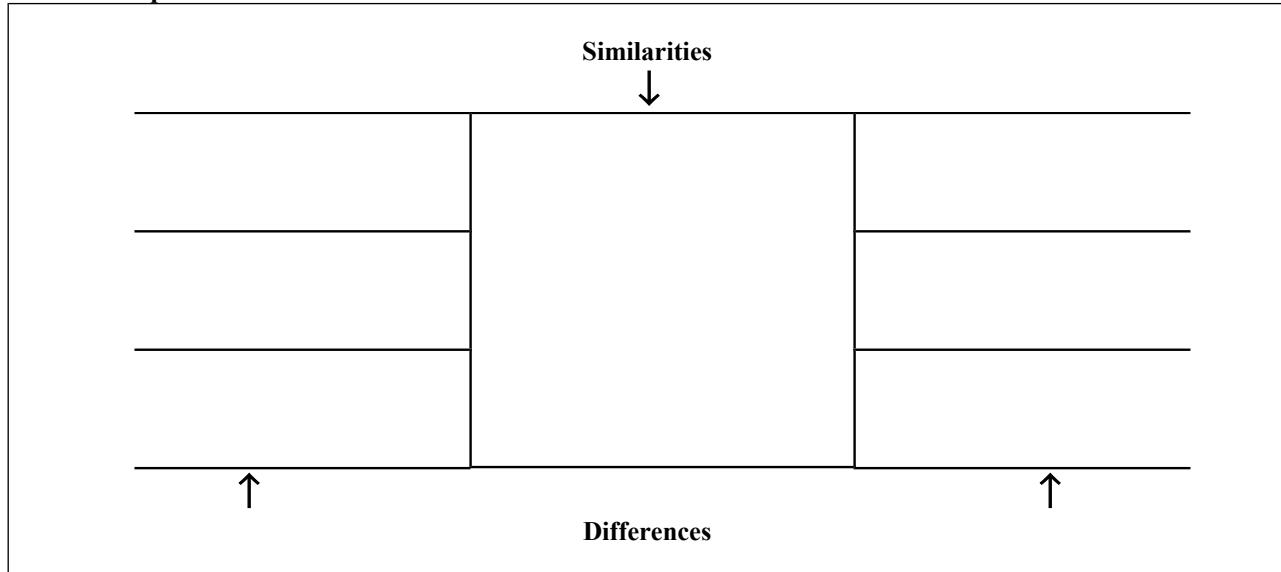
Critical thinking involves convergent thinking; thinking that converges on a single point. It involves the following types of cognitive processes: organizing, analyzing, evaluating, or using given information to come to a specific conclusion. The thinking frames for eight critical thinking skills are outlined in Figure 8.3.

Figure 8.3. Critical thinking skills.

<p>Inferring: Go beyond the available information to identify what may reasonably be true.</p> <p><u>Thinking Frame</u></p> <ol style="list-style-type: none">1. Identify what is known.2. Identify similar situations or important knowledge.3. Make a reasonable guess based on 1 and 2.	<p>Decision Making: Examine the options and alternatives in order to decide on a course of action.</p> <p><u>Thinking Frame</u></p> <ol style="list-style-type: none">1. Identify the problem or decision.2. Generate decision options.3. Evaluate costs and rewards of options.4. Make a choice based on the above.
<p>Compare and Contrast: Find similarities and differences between/among two or more items.</p> <p><u>Thinking Frame</u></p> <ol style="list-style-type: none">1. Look at all items.2. Find the similarities.3. Find the differences.4. Conclude and describe.	<p>Ordering: Arrange events, concepts, or items in sequential order based on a criterion.</p> <p><u>Thinking Frame</u></p> <ol style="list-style-type: none">1. Look at or define a criterion.2. Look at the whole.3. Arrange items within the whole according to the criterion.4. Describe the whole in terms of the new order.
<p>Analyze: Break an item or event down into its component parts.</p> <p><u>Thinking Frame</u></p> <ol style="list-style-type: none">1. Look at the item or event.2. Identify important parts.3. Describe each part.4. Describe the whole in terms each part	<p>Evaluation/Critique: Make a formal critique based on a set of criteria.</p> <p><u>Thinking Frame</u></p> <ol style="list-style-type: none">1. Look at or define a criterion.2. Look at the subject.3. Compare the subject to the criterion.4. Describe the subject relative to the criterion.
<p>Supporting a Statement: Use appropriate reasons, detail, or examples to support a statement, idea, or conclusion.</p> <p><u>Thinking Frame</u></p> <ol style="list-style-type: none">1. Make a statement or claim.2. Gather information/data to support the statement.3. Organize the information.4. Describe the original statement in terms of the new information.	<p>Creating Groups: Impose order on a field by identifying and grouping common themes or patterns.</p> <p><u>Thinking Frame</u></p> <ol style="list-style-type: none">1. Look at the whole.2. Identify reoccurring items, themes, or patterns.3. Arrange into groups.4. Describe the whole in terms of groups.

1. Web of Comparison. The comparison web uses the thinking skills of comparing and contrasting. Students use this to compare and contrast themselves with another person. This person can be from the class, the school, the community, history, or some place in the world. This helps students begin to see the commonality of the human condition. This would be a good warm-up activity for the first weeks of school.

Figure 8.4. Comparison Web.



A comparison web can also be used in class discussions to help people with differing views find common ground. Here, the teacher identifies a topic and then describes it using a dualistic statement. For example, “*We should have a moment of silence every day in our school.*” Students initially say if they agree or disagree with this. This can be done with a show of hands, students can state their position as the teacher lists names on the board, or it can be done with a secret ballot. Students are then paired up with a classmate who has the opposite position. They use the web to identify differences and similarities. The ground rule here is that for every difference, they must find something in which both agree.

2. Ordering. Ordering can be used with values clarification activities (see Chapter 5) to rank any item, event, person, experience, or trait according to a given criteria. The *Orderizer* in Figure 8.5 can be used here. First, students use the left side of the *Orderizer* to generate a list of things. Then they examine or define a criterion. The criterion is then used to analyze the list. Students then put the items in order in the right column.

Figure 8.5. Orderizer.

<i>Things:</i>	<i>Criteria:</i>
<i>generate a list.</i>	<i>put them in order</i>
	1. 2. 3. 4. 5. 6.

For example, students could generate a list of (a) inventions from the 1970s and order them from most

Andrew P. Johnson, Ph.D.

Minnesota State University, Mankato

www.OPDT-Johnson.com

dr.andy@charter.net

significant to least significant to their immediate lives; (b) things they have done in the last week and order them from happy to sad; (c) items to take to Mars and order them from most important to least; (d) things to do on a weekend and order them from exciting to boring; (e) things to say to ask somebody out and order them from most usable to least; (f) characters in a story and order from them most like them to least like them; or (g) solutions to a problem and order them from most pragmatic to least pragmatic.

Ideas for things to order: events in a story, things done last week, bad experiences, good experience, president, activities, things to take on a trip someplace

Ideas for criteria: Most like them to least like them, happy to sad, important to not important, most valuable to least valuable, near to far, exciting to boring, effective to least effective, or most healthy to least healthy.

3. Inferring. Inference is the act of using clues and background knowledge to make some sort of informed conjecture as to what may be true. This can be used with persons or events in a story or in history, and it can also be transferred to personal and real life situations (Johnson, 1996).

Figure 8.5. Infer-O-Gram.

<i>Question:</i>	
what you observe - clues	what you know - background knowledge
1.	
2.	
3.	
4.	
5.	

Inference:

For example, in Chapter 1 of the book *A Wrinkle in Time* (L'Engle, 1962), a strange little woman knocks on the door in the middle of a dark, stormy night. She is soaked to the bone. Her boots are wet and she can't take them off by herself. An inference question might be, "*What kind of person is this?*" On the left side of the Infer-O-Gram, students list the clues taken from the book. On the right side is listed any background information that students might think is important. This could be information about related characters or situations. Based on this, an informed guess or conjecture is made. Other examples are: "*What might have happened in Chapter 12 if Meg had failed?*" Or, "*Describe Meg and Calvin's friendship at school in the upcoming year.*" Students might also use inference to make a guess as to what might happen next in the story.

Students can also use inference for personal situations. For example they could infer (a) how somebody else felt in a certain situation, (b) what happened in a particular situation, (c) why somebody behaved in a particular manner, or (d) what might happen next in a particular situation.

4. Creating Groups. Activities for creating groups or inductive analysis are described in Chapter 6.

Andrew P. Johnson, Ph.D.

Minnesota State University, Mankato

www.OPDT-Johnson.com

dr.andy@charter.net

5. Supporting a Statement. Here students make a statement or claim about themselves or a real-life situation and then look for evidence to support that claim. For example, “*I am a good person.*” Students would then look for instances in their life that supported this claim. Other statements might include: “*I am a good friend.*” “*Pat is a good friend.*” “*Using positive comments about others helps in social situations.*” “*I have changed.*” “*This is a harmful friendship/relationship.*” “*I will be able to handle this situation.*” “*I usually do my best.*” “*I try to be considerate of others.*”

Figure 8.7. Support a Statement.

<i>statement/claim:</i>	<i>Evidence or Supporting data</i>

PROBLEM SOLVING

Problem solving is a strategy that uses both creative and critical thinking. There are a variety of strategies that can be used to find a solution. Two are described here:

Creative Problem Solving

Creative Problem Solving (CPS) begins by defining the problem and generating ideas for solutions. The key to successful implementation of this strategy is to produce as many ideas as you can. There should be no evaluation of these initial ideas, as this would prevent the full range of possibilities from being explored. Instead, students should get all the ideas generated and listed, then engaged in an evaluative discussion in order to chose the one that seems to be the best. Often two or three of the ideas will be combined for the final solution. The final steps are to refine, implement, and review and evaluate the solution. The CPS steps are listed in Figure 8.8.

Figure 8.8. Thinking Frame for CPS

<u>CPS</u>
1. Define the problem.
2. Generate as many solutions as possible.
3. Choose a solution that seems the best.
4. Elaborate and refine

The CPS Organizer in Figure 8.9 can be used to guide students’ thinking processes here. To make this an inner curriculum activity, do the following:

1. Choose interpersonal problems or personal decisions from literature, history, or current events. Put students in small groups to find an answer.
2. As a writing prompt or journal activity, have students choose a problem from their life. Students can share their individual problems and answers in small groups. To extend this, ask students to try their solution and report back.
3. Choose a common problem that students at your particular grade level seem to face. (See activities 9

Andrew P. Johnson, Ph.D.

Minnesota State University, Mankato

www.OPDT-Johnson.com

dr.andy@charter.net

and 10 under fluency.) This can be a powerful small group learning experience for students as they are exposed to a variety of perspectives and alternatives.

4. In a small group, find a person who is willing to share a personal problem from his or her life. This is best done with students in middle school and above and should be done only after a level of trust has been created. No students should be forced to share a personal problem. Also, warn students to be careful as to the types of problems they probably would not want to share in a small group (problems that might embarrass or hurt a classmate or family member).

Figure 10.2. CPS graphic organizer.

<i>problem:</i>	
<i>ideas:</i>	<i>best solution:</i>
<i>Elaborate and refine:</i>	
<i>final solution/plan:</i>	

Means End Analysis

Means End Analysis (MEA) begins with a description of the desired state. “*Where would you like to be?*” “*What is a goal that you have?*” “*What outcome would you like to bring about in your life?*” This is followed by an analysis and description of the current state. In MEA, the problem is how to eliminate the difference between the current and desired state. The next step is to define the steps necessary to bring about this end state. This is followed by an analysis of the means necessary to reach the end state. “*What things need to occur?*” “*What do you need to do to make this happen?*” Finally, a plan is constructed to get from point A (current state) to point B (end state). You may recognize that this problem-solving strategy is very similar to the process used in designing new curriculum. The MEA steps are listed in Figure 8.10. The MEA Organizer in Figure 8.11 can be used to guide students’ thinking processes here.

Figure 8.10. Thinking Frame for MEA

- | |
|---|
| MEA
1. Describe the desired outcome
2. Describe the current state.
3. Define the steps necessary to reach the end state.
4. Construction and implement a plan. |
|---|

Figure 8.11. MEA organizer.

<i>goal/end state:</i>
<i>current state:</i>
<i>necessary steps/things to do:</i>
<i>other considerations or materials:</i>
<i>the plan:</i>

References

- Johnson, A. (1996). Inference: A thinking skill to enhance learning and literacy. *Wisconsin State Reading Association Journal*, 40, 19-24.
- Johnson, A. (2000). *Up and out: Using creative and critical thinking skills to enhance learning*. Boston, MA: Allyn and Bacon.
- L'Engle, M. (1962). *A Wrinkle in Time*. New York: Bantam Doubleday Dell Books.