Using CPS Tools to Teach Your Team
Creative & Critical Thinking Strategies

This article refers to 2011-12 Destination ImagiNation® program materials.
See the last page for a list of supplemental resources.

If you have been a Team Manager or Coordinator for even one year, you know a great deal about being your team's facilitator. You know how to arrange for meeting or work space; remind your team about deadlines; schedule speakers, field trips and demonstrations; help your team locate resources, and are just generally supportive of your team's efforts. But did you know that you can take your teams to the next level by teaching them how to use Creative Problem Solving (CPS) Tools? This past December, a group of Iowa Team Managers and Coordinators who attended an Advanced Training Workshop learned how to do exactly that by familiarizing themselves with a specific set of creative and critical thinking strategies. You, too, can do the same by reading about these strategies in your program materials, and implementing the strategies next season.

Creative problem-solving is a process that can be defined as a set of steps directed toward a goal (which is exactly what your teams do when they solve a Challenge). It is made up of creative and critical thinking, both of which influence each other. Using creative thinking, a team may produce lots of ideas, for example, but then needs to narrow down its options by thinking critically. The team's final choices may in turn generate new ideas, which then need to be focused in a specific direction, or narrowed down. When creative problem-solving takes place appropriately, there is no end to the generation of ideas and the focusing of those ideas. Ideally, a team should be able to set new goals at the end of the Destination ImagiNation® season based on this process.

Creative thinking involves the generation of multiple ideas, imagining unusual possibilities, making meaningful connections, and elaborating upon options. Your team's goals should include Fluency (generating as many options as possible), Flexiblity (generating options from different categories or basically ideas that are different from each other), Originality (generating unusual or unique options), and Elaboration (adding details to options). You can encourage your team to generate ideas by following the rules found on page 9 of *Roadmap*:

- **Defer judgment.** Don't judge or evaluate ideas your group is producing; it will slow you down.
- **Seek quantity.** The more ideas you generate, the greater the likelihood that some of them will be unique or promising.
- **Encourage freewheeling.** Wild ideas can point the way to promising and highly original possibilities, or can trigger an idea for someone else.
- **Look for combinations.** When you combine two or more ideas, or one person hitchhikes onto another person's ideas and adds to it, the possibilities for new ideas become endless.

Critical thinking involves focusing, analyzing, evaluating and judging in order to make effective decisions. Before a team narrows its options, in other words, it should examine its possibilities by taking a close look at them. Its goals should be to organize and analyze possibilities, refine and develop promising ideas, rank options according to priorities the team sets, and finally, choose certain options based upon their quality and uniqueness. You can encourage your team to think critically by following the rules found on page 10 of *Roadmap*:

- **Use affirmative judgment.** Being critical of ideas and thinking critically are not the same thing. Critical thinking is all about thinking about the potential of ideas, not attacking them.
- **Be deliberate.** Narrowing your options is not a simple matter of voting on them, but instead of using specific strategies that focus on options and goals, and prevent conflict.
- **Consider originality.** When your team looks at ideas, they should consider new or better options that move them forward in cooperation with their goals. A team should evaluate the quality of ideas and choices, in other words.
- **Stay on course.** Ask your team to define its goals, and then evaluate whether its decisions are helping them make progress in a positive way.

When people refer to brainstorming, or making a list of ideas, they are really discussing a single creative thinking strategy. There are other creative thinking tools. Just as a carpenter's toolbox has more than a hammer in it, a CPS Toolbox has more than one tool in it. In general, brainstorming is a *Generating Tool* that is used when a team needs many ideas. It promotes the free-flow of ideas, and encourages participants to generate multiple options. The more options that are produced, the better the chances are of having the best solution. Teams sometimes feel they are done with the brainstorming process when they have 10 to 15 ideas listed. This is the time when the first

ideas have surfaced, when a plateau has been reached, and team members can't think of anything else to say. Linus Pauling once said, "The best way to get a good idea is to get a lot of ideas." Tom Kelley, author of *The Art of Innovation*, states that when a group generates 100 ideas in an hour, that's a good brainstorming session. When was the last time your team generated 100 ideas?

You can learn more about some specific Generating Tools in the 2011-12 *Roadmap*. Among these are the **Idea Generation Chart** found on pages 35-36, and **ABC Brainstorming** found on page 62. Both tools allow participants to generate many different ideas quickly, and then to group similar ideas into categories so that teams can then combine ideas and eventually narrow down their choices.

- An **Idea Generation Chart** is divided up into rows and columns forming boxes, or cells, with each cell reserved for a single idea. To use this tool, have the team identify a single goal or requirement from its *Team Challenge*, such as "What kinds of lighting can we use for theatrical effects?" Then, pass out copies of the Idea Generation Chart to each person. Without discussion, have team members write down their ideas in the boxes, one idea to a box. Afterward, have students cut apart the boxes on the dotted lines. Taking turns, team members should present their ideas and group similar ones. Can you see how the next step would be for the team to narrow its options by discussing its favorite ideas or groupings?

  A variation on this idea is to pass out copies of the Idea Generation Chart to each person, leaving a couple of blank charts in the middle of a table. Ask team members to complete one row of ideas, then exchange their chart with one of the ones in the center of the table, and complete another row. Repeat this process until all of the boxes are completed. The advantage of using this method is that team members can use their fellow team members' ideas as a jumping-off point.

- In **ABC Brainstorming**, teams brainstorm ideas whose first letter begins with the letters of the alphabet. First, identify the task the team needs to accomplish, such as "How can we learn about the properties of wood and glue so that we can build a strong structure?" You can use this tool with a whiteboard or blackboard, any kind of chart paper, or a wall or table on which you can paste Post-it® Notes. Make sure that the writing surface is divided into areas for all the letters of the alphabet, and have each student add his or her ideas. One of the advantages of using Post-it® Notes is that you can group similar or popular ideas together.

Some other Generating Tools besides brainstorming include **SCAMPER**, **Morphological Matrix**, **Attribute Listing** and **Force Fitting**. Has your team ever used these strategies?

- **SCAMPER** is a trigger word that is ideal for generating many, varied and unusual ideas. Each letter in SCAMPER stands for an open-ended question or phrase that may trigger an idea or a different point of view. It is a playful tool, so if one letter in SCAMPER does not generate ideas, then move on to another letter. To use the tool, tape a sheet of chart paper to a wall, and draw 2 columns, one for the letters found in SCAMPER, and another column that is blank. Next, identify a specific task or challenge that your team needs to accomplish. Ask open-ended questions of students that relate directly to each letter, such as "How can we . . . ?" or "In what ways might we . . . ?" As the students answer your questions, jot down their answers in the second column. You can also have another adult or a team member listen for answers and jot them down. Remind students that all ideas are acceptable, and that wacky or unusual ideas are welcome. An example of how to use the SCAMPER Generating Tool might be for the following task: "How might we improve a skate board so that it does a job instead of just being used for recreation?"

  S - Substitute. What might you take away and put back in its place to solve this task or challenge? What can you replace? What can you exchange? Who else? What else? What about other ingredients? Other materials? Is there another way to do this?
  C - Combine. What 2 things might you put together to help solve this task or challenge? What can you combine this object with? How about a blend? An alloy? An assortment? An ensemble? How can you combine purposes?
  A - Adapt. How might you change something about the task or challenge to solve it? What might you change or do differently? What else is this like? Does the past offer a parallel? Whom could you emulate? What could we copy?
  M - Modify, Magnify, Minify. What might you make smaller or bigger to solve this task or challenge? How might it change if it were bigger or smaller? What can you increase or reduce? How might you diminish or enhance attributes?

P - Put to other uses. What might you use in a different way to solve this task or challenge? Are there other uses for this object? What properties suggest another way to use this? Could its form, weight, or structure suggest another use? Can you change the context?

E - Eliminate. What might you get rid of to solve this task or challenge? Is there something you might leave out? Condense? Can you use fewer parts? What might you remove? Can you make it lighter? How can you make more with less?

R - Rearrange or Reverse. What might you mix up or move around to solve this task or challenge? How can you reorder this? Can you reverse roles? Turn upside down? Backwards? Inside out? Can you look at this from a different point of view? What if you were to rearrange any parts, timing, objectives? What if you transpose cause and effect?

- **Morphological Matrix** is a Generating Tool that is helpful when a team needs to produce a large number of options quickly. It is especially helpful for generating unusual or unique solutions or scenarios. This tool is also known as the Mix and Match Tool. You can read about the Mix and Match Tool for competitive teams on page 74 of *Road Map*. For elementary and *Rising Stars!*® teams, you'll want to use the Mix and Match Tool found on page 8 of the *Rising Stars!*® Challenge. To use the tool, a team needs to identify its task or challenge. For example, let's say a team wants to develop an unusual magical object for its storyline. Next, the team would identify some basic categories for the characteristics of this magical object, such as shape, appearance, texture and smell. For each of these categories, the team would generate ideas, such as shown in the chart below.

	Shape	Appearance	Texture	Smell
1	star	fire engine red	metallic	flowers
2	stick	silver	slippery	chocolate chip cookies
3	sphere	gold	wet	rotten eggs
4	figure eight	see-through	sticky	freshly cut grass
5	half moon	black as midnight	hot	sawdust
6	wavy line	white	icy	gasoline fumes
7	cube	glittery	itchy	dirty socks
8	pyramid	dotted	rubbery	new car
9	wheel	striped	sand paper	herbal shampoo
10	octagon	angled	crumpled	wet paper

By choosing individual items from each category, the team can develop almost endless unusual combinations for its solution, an example of which might be a magical sticky silver star that smells like gasoline fumes. The team can make deliberate choices about items in each column, or random ones using a pair of dice, a team member's phone number, zip codes, or a numbered spinner. The next step in using this tool would naturally lead a team to other questions about its storyline, such as "What special powers does the star have?" "Does the star cause a problem, or solve a problem?" Who will use the star, and why?" Morphological Matrix tool is used whenever a large number of options are needed quickly, such as for combining unique features for a prop or device, developing an unusual situation for a story, combining different costume elements to create an unusual costume, or developing unusual purposes for an everyday device.

- **Attribute Listing** is a Generating Tool that is perfect for when you need a new way to look at an object, task, creation or procedure. It allows you to explore ways to change, modify, improve or enhance the characteristics or qualities of something. The tool stretches the imagination in a systematic way by breaking an object, task, creation or procedure into its components. When a team already has a partial solution in mind, but needs to improve it or flesh it out, it's time to dust off the Attribute Listing Tool. Start off by identifying the task the team needs to accomplish, such as "How can we improve our bird costume?" Then, break the task—in this case, a bird costume—into some logical components or characteristics (known as attributes), such as *beak*, *feathers*, *body*, *wings*, *tail*, and *feet*. Taking one attribute at a time, discuss ways that each of these components could be improved, enhanced, or developed to be more unique or unusual. Encourage playfulness! An example of how this tool might play out is illustrated on the next page. Once the team sees its options, it can circle the ones it

finds promising, and develop these ideas. This is also a great way to develop a character by choosing such attributes as *voice, movement*, *physical appearance*, *props*, and *clothing*. If a team gets stuck, it can return to its list of options and examine others.

Task: How can we improve our bird costume?	
Attributes	**Ideas**
beak	worm in mouth, spectacles sit on beak, lipstick, wears dental braces, always sucks a lollipop, super-long tongue
body	beverage can tabs for feathers, sequins, tuxedo with feather duster boutonniere, wears fire fighter coat, wears tutu
wings	airplane wings, dragonfly wings, see-through, striped, checkered, polka dots, helicopter propellers
tail	flames, crepe paper streamers, kite tail, bumps into everything because it's too big, wears splint because tail is broken
feet	yellow rubber gloves, striped socks, nail polish for the toes, tap shoes, boots, mis-matched shoes, mis-matched socks, really hairy legs

- **Force Fitting** is a Generating Tool that enables team members to see creative connections between 2 or more ideas or objects that are not normally related to each other. If you have ever been asked to describe, for instance, what comes to mind when someone says *orange*, you might have responded with the word *sunset*, and perhaps an unconscious image came to mind of a paddle boat resting in the middle of a summer lake during sunset. This is force fitting. This tool, which is appropriate for team members of any age, can be found on pages 9-10 of the *Rising Stars!*® 34-page resource booklet found in the Resource Area of IDODI, http://www.diatlas.org/members/login.php. (Note: This is not the same document as the *Rising Stars!*® Challenge.) An example of how Students for a Creative Iowa uses this tool is the way its *Instant Challenge* Writing Committee develops many of the practice Challenges used at the annual Instant Challenger team workshop. A theme is selected, such as *frames*, *bags*, or *tubes*, and then a list of possible titles using these theme words is generated. By forcing together the theme word and the title, many different options—in this case, *Instant Challenges*—are produced. To use this tool, a team should first identify its task or challenge, such as, "How can we enhance our Original Soundtrack to make it more unique?" Next, the team needs to generate some options that answer this question, such as materials found in a garage (maybe a bicycle, a rubber mallet, a basketball, a hoe, and a pair of old boots). The team pairs up one option (or object, in this instance) at a time with the task statement, generating a list of ways that each option can be used.

Just as you can choose different Generating Tools as strategies for creative thinking, you can also choose different *Focusing Tools* as strategies for critical thinking. When a team has to narrow its options by choosing the best ideas for its solution, it is very easy for good teamwork to fall aside and hard feelings to develop if a systematic approach is not used. Such an approach needs to involve the heart and mind of all team members, which can minimize conflict. Voting is out; strategies are in. Some Focusing Tools that you will find helpful include **ALoU**, **Evaluation Matrix** and **Paired Comparison Analysis**.

- **ALoU** is a Focusing Tool that enables a team to define and develop a single option. It also enables a team to compare a couple of appealing options, and select the best one. Using a chart, the team lists all of the option's Advantages, its Limitations (including a way to overcome them), and ways to modify the option to make it Unique or Unusual. The elementary or *Rising Stars*!® version of this tool is called the Strong-Weak-Special Tool and can be found on pages 11-12 of the *Rising Stars!*® 34-page resource booklet found in the Resource Area of IDODI, http://www.diatlas.org/members/login.php. (Note: This is not the same document as the *Rising Stars!*® Challenge.) To use this tool, the team first needs to identify the option it wants to examine. Let's say a team has two different ideas about launching a vehicle, such as using a wind-up spring, or using a catapult. Each option needs to be examine separately, using a chart for each one. On the first chart, label 3 columns as shown on the next page. Use colored markers to keep discussions on task, and follow the tips in each column. Afterward, repeat the same procedure with the second option. After using ALoU, it is often necessary to use a Generating Tool to further develop the option that is most appealing.

(A)dvantages	(L)imitations and how to (o)vercome them	(U)nique or (U)nusual Features or Possibilities
Use a **black** marker to represent concrete or real things. Focus on the positive aspects of this option. List things that already exist that are beneficial or supportive of this option.	Use a red marker to represent Limitations, or things that might prevent, stop or impede you. Use a green marker to represent ways in which each Limitation can be overcome. Green is like a "green light," and conveys the idea of moving forward. It is important not to word a Limitation in a negative way. Do not allow teams to list a Limitation without also generating a way to overcome it. Ask open-ended questions such as, "How might we overcome . . .?" or "How can we do this differently to make it work?"	Use a blue marker to express the idea of "pie in the sky," "the place of dreams," or "the sky's the limit." The team should ask itself, "How can we develop this option to create some unique or unusual possibilities?" "Wouldn't it be nice if . . .?" "Could we . . .?" Focus the team on possibilities, and generate as many ideas as possible. List dreams, wishes and desires that might come about if this option were a reality.

- **Evaluation Matrix** is a Focusing Tool that a team can use when it wants to make a decision about the best options for a solution. Using the tool, a team can select, weigh or choose from among the options it has generated. This tool is appropriate to use when there are many options (8-15) to consider. Each option is rated against some factors or criteria, and then the team analyzes the results of its ratings, and selects several of the best possibilities to explore further. This further exploration usually involves a Generating Tool. Evaluation Matrix is also known as Choice Helper, which you can read about on page 95 of *Roadmap.* To use Evaluation Matrix, a team first identifies its task or challenge, such as, "What *Team Challenge* shall we do this season?" Then it lists some criteria, or factors, that might affect the final decision, such as *resources*, *budget*, *unique possibilities*, *expertise* and *fun*. The team determines how it will rank each of these factors. A ranking system could use 4 = Excellent, 3 = Good, 2 = Fair, and Poor = 1, or it could use facial icons, such as a smiley face = yes, a solemn face = maybe, and a frowning face = no. Any system works! An Evaluation Matrix chart might look like the chart shown below.

Task: What *Team Challenge* shall we do?						
Options	Criteria (Factors)					Overall Ranking
	Resources	Budget	Unique Possibilities	Expertise	Fun	
A - Technical/Mechanical						
B - Scientific						
C - Fine Arts						
D - Improv						
E - Structure						
projectOUTREACH - Community Service						

To keep the group's discussion focused on one criterion or factor at a time, work vertically. In the example shown above, start with *Resources*, and evaluate this factor for each of the *Team Challenges.* Then proceed to the next factor, *Budget*, and do the same. Continue until you reach the last column, which will enable the group to summarize quickly the overall ranking of each option, and to find the best solution.

- **Paired Comparison Analysis** is a Focusing Tool that allows a group to rank 4-6 attractive options. Two options at a time are compared, with each team member ranking the desirability of the preferred option with a number. The numbers are tallied and the results are ranked, leading to further discussions (usually with Generating Tools) about how to develop the best options. This tool is also known as Paired Choice Analysis, or PCA, and you can read about it on pages 110-111 of *Roadmap*. The elementary or *Rising Stars!*® version of this tool is called the Chooser Tool, and can be found on page 9 of the *Rising Stars!*® Challenge. A team might use

this tool to select which theme to use for a performance, to decide the best type of glue for a structure, to decide what character will be the comedian, to decide what vehicle will complete tasks best, to decide on a genre for a storyline (such as mystery, tragedy, comedy, etc.), and more. To use the PCA Tool, identify a task or challenge, such as "What is the best material to use as the support structure for our theatrical set?" As a group, list your options, but do not discuss the pros or cons because it is assumed, at this point, that all of the options have varying degrees of appeal.

> Option A: wood
> Option B: cardboard boxes
> Option C: PVC tubing
> Option D: curtain rods
> Option E: chicken wire
> Option F: window & door screens

Each team member should then be given a chart with the options paired against each other. Circle the Option in each pair that appeals most. For each circled Option, enter a number in the Value box next to it that represents how strongly that Option is preferred. (3 = very strongly prefer, 2 = moderately prefer, 1 = slightly prefer)

Option	Value	Option	Value	Option	Value	Option	Value	Option	Value
A or B		A or C		A or D		A or E		A or F	
		B or C		B or D		B or E		B or F	
				C or D		C or E		C or F	
						D or E		D or F	
								E or F	

Next, enter each team member's Option total score. Then, add all the Options together.

Option	Team Members							Total
A								
B								
C								
D								
E								
F								

Rank the results. Remember that the highest number means the strongest preference.

Top choice _____
2nd choice _____
3rd choice _____
4th choice _____
5th choice _____
6th choice _____

One of the advantages to using the Paired Comparison Analysis Tool is that it enables a team to arrive at a decision where every person knows he or she has had input into the decision. This minimizes conflict, and is much better

than voting by a show of hands! If the top choice does not work for a team, they can choose the next option without wasting time because they have already ranked their preferences.

CPS Tools are used mostly during the planning period for *Team Challenge* and *Instant Challenge*, but not exclusively. Obviously, there is less time to use these tools during *Instant Challenge*. Look for opportunities to apply Generating and Focusing Tools, but be certain you know why you are selecting a specific tool. Make sure you use the right tool for the job! Keep in mind that Generating and Focusing Tools are used independently, but always in harmony. Use a Generating Tool to produce a list of options, and then follow up with a Focusing Tool to analyze and select the best options. It is important to realize that not all CPS Tools fit all situations. If one tool does not work, then try another. Above all, remember that creative problem-solving is a process, so don't expect that a Focusing Tool will lead to the final solution.

Each year cre8iowa focuses on different topics at its Advanced Training Workshop, which is included in your Iowa membership fee. This workshop is held on the first Saturday every December, so mark this important date on your calendar. Our topics this coming season include "Helping Your Team Understand How to Make Materials Work" and "Developing Skill Sets for Your Team Challenge." There will also be a Q & A session with the Challenge Masters. See you in December!

<div align="right">
Judy Nolan
Co-Affiliate Training Director
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Resources:
1. *Creative Problem Solver's Guidebook, Third Edition: A Practical Set of Reproducible Templates to Guide Facilitators and Group Participants*, by Donald J. Treffinger (limited availability at www.amazon.com)
2. *Destination ImagiNation, Inc. 2004 CPS Toolbox Trainer Workshop Trainer's Guide V.2*
3. *Destination ImagiNation® Program Materials, 2011-2012* (available upon purchase of Team Pak from the Resource Area of IDODI, http://www.diatlas.org/members/login.php)
4. *Destination ImagiNation® Training Modules*, copyright 2005
5. *The Problem Solver's Practical Toolbox: Solving Destination ImagiNation® Challenges Using Generating and Focusing Tools*, A Joint Publication of the Center for Creative Learning, Inc. and Destination ImagiNation, Inc., copyright 2003 (available periodically at www.SHOPDI.org)