“We can all create a desired future instead of merely accepting what life offers.” — Sidney Parnes
“Imagination is more important than knowledge. For while knowledge defines all we currently know and understand, imagination points to all we might yet discover and create.” — ALBERT EINSTEIN
The Creative Education Foundation and CPSI delight in your engagement with the Creative Problem Solving process as a practical, flexible lever for personal, organizational, and social transformation. Published for the Creative Education Foundation’s (CEF) annual Creative Problem Solving Institute (CPSI), this book is your go-to resource guide. It contains methods, tools, and techniques for use in your coursework, studies, and continued application of Creative Problem Solving.

Why is it important to learn Creative Problem Solving skills? Because we all have to make critical decisions. Whether you’re a student, a parent, or a professional, you face problems and opportunities every day — all of which can be addressed through Creative Problem Solving.
Special Thanks & Acknowledgements

The Creative Education Foundation (CEF) is deeply grateful to those whose efforts made this guide possible. In particular, we acknowledge the groundbreaking work of Alex Osborn, Sidney Parnes, PhD; and Ruth Noller, EdD. Alex Osborn helped us learn that it is “easier to tone down a wild idea than it is to think up a new one.” He also crafted creative thinking techniques that are now used worldwide. Osborn founded CEF in 1954 and launched the Creative Problem Solving Institute (CPSI). Parnes joined him the next year and became a guiding force for both CEF and CPSI.

Parnes partnered with Osborn beginning in the 1950s to develop methods for teaching creative thinking and problem-solving. After founding the Creative Problem Solving Institute, CEF sponsored, with Parnes and Noller teaching, the nation’s first creative studies graduate courses at SUNY Buffalo State. Parnes’ work focused on helping people learn and practice deliberate creativity in their personal and professional lives as well as in academic settings.

CEF also thanks its dedicated volunteers who continue to refine the materials used to teach Creative Problem Solving as the craft evolves. This version of the CEF Resource Guide was developed by the CEF Training & Materials Committee and CEF staff: Beth Barclay, Dan Bigonesse, Stephen Brand, PhD; Clare Dus, Gert Garman, Sunil Gupta, PhD; Karen Lynch, Dimis Michaelides, MBA, MA; Suzie Nussel, Kristen Peterson, MS; Elizabeth Power, MEd; Rosemary Rein, PhD; and Beth Slazac, MS.

Much gratitude to the contributions of the original authors of previous versions of this guide, which were developed through the efforts of a number of people including Tony Billoni, Cyndi Burnett, EdD; Suzanne Chamberlain, MS; Jeanne Chatigney, Roger Firestien, PhD; Diane Foucar-Szocki, EdD; John Frederick, EdD; Paul Groncki, PhD; Bill Hartwell, Chris Heinz, Tim Hurson, Hedria Lunken, MS; Siri Lynn, Blair Miller, MS; Cheryl Nee-Gieringer, MA; Russ Schoen, MS; Bill Shephard, Sarah Thurber, MS; and Jonathan Vehar, MS.

Special thanks to the International Center for Studies in Creativity at SUNY Buffalo State College, FourSight LLC, Blair Miller, Gerard Puccio, PhD; and Sarah Thurber, MS for their contributions to the field and specifically for their help with permissions, production, and process.

Finally, appreciation to the generosity and thought leadership of the CEF and CPSI community in sharing best practices and evolving work in creative studies.
Why Creative Problem Solving (CPS)?

Mastery of Creative Problem Solving as a practice equips you to:

- Create an environment in which creativity and innovation thrive.
- Use a broad set of tools and methods to foster key behaviors conducive to creative thinking.
- Engage personal, organizational, and social benefits of CPS.
- Use tools for divergent and convergent thinking.
- Practice specific CPS methods in the service of personal, organizational, and social challenges.
- Practice deliberate creativity as an integral part of work and life.
- Apply core principles of the Creative Problem Solving process in multiple settings.
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Setting the Stage

Creativity: What is your definition of creativity? How inclusive is it? Where are the boundaries around it?

Some definitions of creativity:

- “Novelty that is useful.” First referenced in 1724 in the text, The Irish Historical Library, and later stated by Stan Gryshiewicz, PhD, Center for Creative Leadership.
- “Creativity is the production of novel and useful ideas in any domain.” Professor Teresa M. Amabile, PhD, Harvard Business School.
- “Creativity is the process of bringing something new into being.” Psychologist Rollo May, PhD.

Being aware of your own definition is helpful, since it impacts your approach to the process. Because creativity is subjective, there is no “wrong” definition.

CEF uses a shared understanding that has common characteristics. Creativity is thinking that:

- Is imaginative
- Includes the new and novel
- Focuses on the process
- May be deliberate

As you learn CPS, you’ll use specific tools and methods to foster deliberate creativity, problem solving, and innovation. Through the process, you’ll (re)discover and unleash your creativity.
Barriers and Bridges to Creativity

Saying that creativity may be “deliberate” means that it is intentional — something done with thought and the application of specific processes. The more the tools and skills associated with creative thinking and Creative Problem Solving are used, the more ingrained the habit of creative thinking becomes and the easier it is to utilize in many contexts.

Of course, there are both barriers and bridges to the practice of deliberate creativity.

**BARRIERS**

As with any practice of effort, some barriers are quite common. When people feel they are being judged negatively for their efforts, these barriers can also become self-protective statements:

• “We don’t have time!”
• “It takes too many resources.”
• “I’m just not the creative type.”
• “In this culture? You’ve got to be kidding.”
• “Not me! I’m not hanging myself out to dry like that.”
• “I don’t have a creative bone in my body. Not my skill-set.”
• “Don’t we have an art department that does that?”
• “I don’t want to look stupid.”
• “We tried that before. It won’t work.”

Notice that all of these focus on time, resources, culture, internal and external judgment, and perceptions of talent or skill. Whether these are external statements or internal self-talk, they have a dramatic impact: they help others believe that they aren’t, can’t be, or shouldn’t be creative — and that simply isn’t the case. So, remember that everyone has tremendous creative potential that can be unlocked and harnessed. The challenge is to identify the factors that affect awareness and use of creativity. Once an individual knows those, it’s easier to make productive choices about how to use, improve, and refine skills that support creativity.

“Learn the craft of knowing how to open your heart and to turn on your creativity. There’s a light inside of you.” — JUDITH JAMISON
BRIDGES

Along with the barriers that inhibit the ability to express creativity, there are also bridges. These key elements support deliberate creativity and creative thinking. They include the choice to:

- Shift from “Yes, but” to “Yes, and” thinking.
- Foster a “What if?” outlook (remaining curious).
- Suspend or defer judgments to maintain openness to new ideas.
- Recognize that every experience informs creativity.
- Embrace incubation and letting the brain work “out of awareness” on ideas.
- Develop a climate for creativity; changing the physical environment or mental/emotional outlook to be open to new ideas.
- Use Creative Problem Solving tools to hone practice.
- Work ideas instead of using them (allowing them to change and develop).
- Balance the use of imagination, knowledge, and evaluation.
- Develop an internal observing “wise self.”
What is Creative Problem Solving?

CPS is a proven method for approaching a problem or a challenge in an imaginative and innovative way.

It helps people re-define the problems and opportunities they face, come up with new, innovative responses and solutions, and then take action. The tools and techniques used make the process fun, engaging, and collaborative. CPS not only helps create better solutions, it creates a positive experience that helps speed the adoption of new ideas.

Noted CPS educator and practitioner, Ruth Noller, EdD, described CPS as the sum of its parts:

- **Creative** specifies elements of newness, innovation, and novelty.
- **Problem** refers to any situation that presents a challenge, offers an opportunity, or represents a troubling concern.
- **Solving** means devising ways to answer, to meet, or to satisfy a situation by changing self or situation.

Ruth Noller also created a symbolic equation for Creative Problem Solving:

\[ C = fa(K,I,E) \]

*Creativity is the Function of combining Knowledge, Imagination, and Evaluation, all of which are tempered by “attitude.”*

Fostering a positive belief that each person is creative is the key to engaging knowledge, imagination, and evaluation.

“Creative Problem Solving” generates variations on the method can be traced back to the work of Alex Osborn in the 1940s, developed with Sid Parnes in the 1950s, and nurtured at SUNY Buffalo State and the Creative Education Foundation. Osborn noted in his breakthrough book, *Applied Imagination*, that Hindu teachers had been using brainstorming for over 400 years and Walt Disney encouraged it among his artists in the 1920s (later called “dreaming as a team”). Osborn formalized the tool in the 40s. The Creative Education Foundation focuses on an evolution of Osborn-Parnes’ CPS model, called the CPS Model.
Assumptions and Principles of Creative Problem Solving

CPS begins with two assumptions:

Everyone is creative.
Creative skills can be learned and enhanced.

The core principles are:

Divergent and convergent thinking must be balanced. Keys to creativity are learning ways to identify and balance expanding and contracting thinking (done separately) and knowing when to practice them.

Pose problems as questions. Solutions are more readily invited and developed when challenges and problems are restated as open-ended questions with multiple possibilities. Such questions generate lots of rich information, while closed-ended questions tend to elicit confirmation or denial. Statements tend to generate limited or no response at all.

Defer or suspend judgment. As Osborn learned in his early work on brainstorming, the instantaneous judgment in response to an idea shuts down idea generation. There is an appropriate and necessary time to apply judgment when converging.

Focus on “Yes, and ...” rather than “No, but.” When generating information and ideas, language matters. “Yes, and” allows continuation and expansion, which is necessary in certain stages of CPS. The use of the word “but”—whether preceded by “yes” or “no”—closes down conversation, negating everything that has come before it.

“It is easier to tame a wild idea than it is to push a closer-in idea further out.” — Alex Osborn
Divergent and Convergent Thinking: The Dynamic Balance of Creativity

In *Applied Imagination*, Alex Osborn noted two distinct kinds of thinking that are essential to being creative:

**Divergent Thinking**: Generating lots of ideas and options  
**Convergent Thinking**: Evaluating ideas and options, and making decisions

People engage in both kinds of thinking on a daily basis. The secret to creating new ideas, however, is to separate divergent thinking from convergent thinking. This means generating lots and lots of options before evaluating them.

**DIVERGENT THINKING GUIDELINES**

Both Osborn and Parnes note the importance of removing the barriers to divergent thinking. In his book *Magic of Your Mind*, Parnes noted the importance that criticism is taboo, free-wheeling is desirable, quantity breeds quality, and combinations and improvement are sought.

These suggestions have been condensed into guidelines for divergent thinking:

**Defer Judgment** – Deferring judgment isn’t the same as having no judgment. It just says, “hold off for a while.” Avoid judging ideas as either bad or good in the divergent-thinking phase.

Deferring judgment is a key component to any successful problem-solving session. Without it, generating novel solutions becomes almost impossible.

**Combine and Build** – Use one idea as a springboard for another. Build, combine, and improve ideas.

**Seek Wild Ideas** – Stretch to create wild ideas. While these may not work directly, getting way outside the box allows the space needed to discover extraordinary ideas.

**Go for Quantity** – Take the time necessary and use the tools in this guide to generate a long list of potential options.

To make it easier to generate a long list, set a concrete goal such as at least 50 ideas in 7 minutes for groups or 30 ideas in 7 minutes if solo before going to the next step. This sharpens focus and prompts the changes the brain needs to get moving. It also supports “deferring judgment.”
In the 1970s, Sid Parnes and Ruth Noller conducted a ground-breaking research study called the **Creative Studies Project**. This research demonstrated that students trained in divergent thinking techniques were able to produce twice as many quality ideas as those who did not have creativity training.

“The best way to have good ideas is to have lots of ideas and then throw the bad ones away.” — LINUS PAULING
CONVERGENT THINKING GUIDELINES

At certain points in the process, thinking and focus need to shift.

To select the best of the divergent options, determine their potential value. In the convergent thinking process, choice is deliberate and conscious. Criteria are purposefully applied to screen, select, evaluate, and refine the options, all the while knowing that raw ideas still need development.

Scott Isaksen, EdD, and Don Treffinger, PhD, proposed convergent thinking guidelines in Creative Problem Solving, the Basic Course (1982).

Use the guidelines that follow when it’s time to make decisions about the ideas generated by divergent thinking.

**Be Deliberate** – Allow decision-making the time and respect it requires. Avoid snap decisions or harsh judgments. Give every option a fair chance.

**Check Your Objectives** – Verify choices against objectives in each step. This is a reality check – are the choices on track?

**Improve Your Ideas** – Not all ideas are workable solutions. Even promising ideas must be honed and strengthened. Take the time to improve ideas.

**Be Affirmative** – Even in convergence, it’s important to first consider what’s good about an idea and judge for the purpose of improving, rather than eliminating, ideas.

**Consider Novelty** – Do not dismiss novel or original ideas. Consider ways to tailor, rework, or tame.

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**Convergent Thinking Guidelines**

- Be Deliberate
- Check Your Objectives
- Improve Your Ideas
- Be Affirmative
- Consider Novelty

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Roles in Group Facilitation and Ownership

Effective brainstorming comes by setting up distinct roles. In *Applied Imagination*, Alex Osborn was the first to address the role and responsibility of the facilitator (or leader of the “brainstorming panel”). Later, the roles of client and resource group were identified by Treffinger, Isaksen, and Firestien in *Creative Problem Solving: The Basic Course*.

THREE KEY ROLES:
THE CLIENT, THE FACILITATOR & THE RESOURCE GROUP

The Client:

- Owns the “problem” and defines the challenge to be worked on
- Is the key decision-maker or implementer
- Selects the group to work on the challenge
- Provides direction throughout session
- Is responsible for or approves all convergence

The Facilitator:

- Is responsible for managing the CPS process
- Manages logistics, idea flow, and group development
- Makes sure the client gets what he/she needs from the group
- Meets with the client before gathering the resource group and afterward to debrief and apply back learnings from the session

The Resource Group:

- Serves the needs of the client
- Provides energy, ideas, insights, and diverse points of view during all divergent phases
- Adds new perspectives, especially if they represent members not directly involved with the situation
CPS Process & Model

EVOLUTION OF CPS

Creative Problem Solving has changed and evolved over the past 60 years. Many organizations and individuals have contributed to this evolution. Through continuous research, development, and training related to CPS, the International Center for Studies in Creativity at SUNY Buffalo State has been, and continues to be, a primary contributor to this evolution. The changes that have taken place relate to the steps in the model and the language used to describe them.

Over time many divergent and convergent tools have been developed, which greatly enhance innovation and design thinking. During all CEF training, tools are presented at the appropriate steps but may also be used at other times.

THE STAGES IN CPS MIRROR THE WAY PEOPLE NATURALLY SOLVE PROBLEMS

At the same time that CPS is a structured process, it’s also a flexible one. CPS is cyclical, and as users move from step to step, it becomes possible to jump back and forth between the four stages. When CPS becomes a regular and frequently used way of thinking and working, each step can be used as needed, when needed. Mastery of the fundamentals of CPS enables adapting the process to every situation encountered.
CPS Model

In the most recent iteration of the CPS Model, there are four stages with six explicit steps. Within each stage, each step uses divergent and convergent thinking.

<table>
<thead>
<tr>
<th>STAGE</th>
<th>STEP</th>
<th>PURPOSE</th>
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<tbody>
<tr>
<td>CLARIFY</td>
<td>Explore the Vision</td>
<td>Identify the goal, wish, or challenge.</td>
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<tr>
<td></td>
<td>Gather Data</td>
<td>Describe and generate data to enable a clear understanding of the challenge.</td>
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<tr>
<td></td>
<td>Formulate Challenges</td>
<td>Sharpen awareness of the challenge and create challenge questions that invite solutions.</td>
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<tr>
<td>IDEATE</td>
<td>Explore Ideas</td>
<td>Generate ideas that answer the challenge questions.</td>
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<tr>
<td>DEVELOP</td>
<td>Formulate Solutions</td>
<td>To move from ideas to solutions. Evaluate, strengthen, and select solutions for best “fit.”</td>
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<tr>
<td>IMPLEMENT</td>
<td>Formulate a Plan</td>
<td>Explore acceptance and identify resources and actions that will support implementation of the selected solution(s).</td>
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Clarify – Explore the Vision

Purpose
Identify the goal, wish, or challenge.

Diverge
• Generate goal or wish statements.
• Ask participants in ways that allow narrative (use an invitational language stem):
  “I wish...” and “It would be great if....”

Sample Diverging Questions
• What are goals you’d like to accomplish?
• What’s been on your mind? Why?
• What do you wish worked better? What are the challenges?
• What would you like to do differently?
• What have you never done that you would like to do?
• Imagine yourself one year from today. What goals, dreams, or visions have you accomplished?
• If you had unlimited time, funds, and support, what would you accomplish?
• What is going on at home or in our communities that should change?

Tools for Diverging: Brainstorming, Brainwriting

Converge
Choose the goal/wish/challenge using the tool, 3 “I”s:

1. Is it Important?
2. Do you have Influence?
3. Do you need new Ideas?

Tools for Converging: Dot Voting, Highlighting (Hits, Cluster, Restate)

Outcome
Statement of key goal, wish, or challenge to address.
Clarify – Gather Data

Purpose
Describe and generate data to enable a clear understanding of the challenge.

Diverge
• Generate as much data/facts/feelings as possible.
• Ask questions: **Who, What, When, Where, Why, How?**

Sample Diverging Questions
• Ask yourself, “What do I know about this challenge?”
• What is a brief history of the situation?
• What is the origin of this challenge? When did it become a challenge?
• How does this challenge make you feel?
• Who else is involved? What is their role? Who are the key decision-makers?
• Why is this a challenge?
• What is your influence over the situation?
• What are the different components of the challenge?
• What have you already tried?
• What does your gut tell you? What is your ideal outcome?
• What are the success criteria?

Tools for Diverging: Brainstorming, Brainwriting, 5 “W”s & an H

Converge
• Review and select the most important data that best helps you understand your challenge statement.
• Take all the data that you have checked and group it into clusters with the same theme. You can make as many clusters as necessary.
• Take a moment and use one or two words to restate or label each cluster.

Tools for Converging: Dot Voting, Highlighting (Hits, Cluster, Restate)

Outcome
Significant data, information, and success criteria to enable a clear understanding of the challenge.
Clarify– Formulate Challenges

Purpose
Sharpen awareness of the challenge and create challenge questions that invite solutions.

Diverge
- Generate a long list of challenge statements phrased as questions. Look at your challenge from as many directions as you can imagine.
- Use the invitational language stems with: “How to ...” (H2), “How might I ...” (HMI), and “In what ways might we ...” (IWWMW).

Sample Diverging Questions
- Rephrase challenge statement from Explore the Vision as a HMI question.
- Rephrase key data as questions.
- Rephrase barriers to success as questions.
- Phrase questions from other perspectives: stakeholders, a child, a mentor, or a famous person.

Tools for Diverging: Brainstorming, Write Data as Questions, Word Dance, Ladder of Abstraction

Converge
- Select the challenge statement that addresses what really needs to be addressed or solved.
- Set aside questions that are really ideas and revisit them in the next step.
- Check to make sure the challenge statement is brief, focused, and beneficial.

Tools for Converging: Dot Voting, Highlighting (Hits, Cluster, Restate), 3 “I”s

Outcome
A refined challenge question (reframed problem) that invites solution and stimulates new thinking.
Ideate – Explore Ideas

Purpose
Generate ideas that answer the challenge questions.

Diverge
• Using short phrases or headlines, generate ideas to answer your challenge question.
• Generate a long list of ideas.
• Stretch for as many ideas as possible, then generate more.

Sample Diverging Questions
• What ideas immediately come to mind to answer your challenge question?
• What are all the ideas you can imagine for solving this?
• What ideas would key stakeholders have?
• Imagine you are (a child, the CEO, a movie star, etc.). What ideas do you have?
• What are the worst ideas, the ones that will get you fired? Now reverse them.
• SCAMPER: What can you Substitute, Combine, Adapt, Modify, Put to other uses, Eliminate, or Rearrange?

Tools for Diverging: Brainstorming, Excursions, Forced Connections, SCAMPER

Converge
• Review the ideas; mark them as “workable,” “innovative,” and “may solve the challenge.”
• Keep some of the wild and unusual ideas in the mix.
• Group the ideas you have chosen into thematic clusters representing paths to solving the challenge. When you are done, give each cluster a 1-2 word name that captures its essence.
• Choose the cluster(s) that appears to be the best path to take. Restate it as an idea, adding the starter phrase, “What I see myself doing is ...” to the beginning of the cluster title.
• If more than one cluster is appealing, you can use the criteria generated in the next stage (Develop) to choose the strongest solution.

Tools for Converging: Dot Voting, Highlighting (Hits, Cluster, Restate)

Outcome
List of ideas or alternative actions that may solve the challenge.
“What I see myself doing is ....”
Develop – Formulate Solutions

Purpose
Move from ideas to solutions. Evaluate, strengthen, and select solutions for best “fit.”

Diverge
• Generate a list of options to strengthen the idea(s) and categorize them by level of potential.

Sample Divergent Questions
• What do you like about the solution? What are its advantages or positive points?
• What would become possible in the future if this came to pass?
• What are the spin-offs or possible future gains? (Use the statement starter, “It might ...”)
• What are possible limitations? (Be sure to pose these as questions: “How to ...,” “How might I ...,” and “In what ways might we ...”)
• Generate ways to overcome concerns one at a time, in order of their importance.

Tools for Diverging: Brainstorming or PPCO (Pluses, Potentials, Concerns, ways to Overcome concerns)

Converge
• If you have multiple solutions, use an Evaluation Matrix to help select and further refine.
• Revisit the success criteria from the second step, Clarify – Gather Data. Clarify to be as specific as possible. For example: “Will it be operational in three months?” is more specific than “Will it be ready soon?”
• Review your solution statement along with your lists from PPCO.
• Select the most important options to incorporate and create a more robust solution that starts with, “NOW what I see myself doing is ....”

Tools for Converging: Dot Voting, Evaluation Matrix

Outcome
Solution to be implemented. Restate (“NOW what we see ourselves doing is ...”).
Implement – Formulate a Plan

Purpose
Explore acceptance and identify resources and actions that will support implementation of the selected solution(s).

Diverge
- Generate a list of “assisters” who can help make your solution a reality. Include ways to enlist their help.
- Generate a list of “resisters” and ways to overcome their resistance.
- Generate a long list of short statements of all the actions needed to make your solution a reality.

Sample Diverging Questions
- Who might assist you with your solution?
- What resources are available (people, materials, money)?
- How can you gain acceptance for this solution?
- How can you build enthusiasm?
- Who might resist or need to be convinced?
- What are some things you might need to work to overcome?
- What are some contingencies you might develop for your solution?
- What steps might you take to put your solution into action?
- Where might you start?
- What short-term actions do you need to take? What mid-term actions do you need to take? What long-term actions do you need to take?
- How can you maintain enthusiasm for this solution?
- What can you do in the next 24 hours?

Tools for Diverging: Brainstorming, Brainwriting, Assistors/Resisters

“If you can dream it, you can do it.” — WALT DISNEY
Converge

- Review your list and select all actions needed to ensure success.
- Create a plan: What to do? Who will do it? By when will it be done? Who will check or who needs to know when it’s done?
- Arrange your actions according to when they need to be completed, from soonest to latest.
- Assign each action to a person, affix specific dates, and make sure someone is checking to ensure that all actions are getting done.
- Assign at least one “jump start” action that can be completed in the next few hours and then the next 24 hours.

Tools for Converging: Dot Voting, Highlighting (Hits, Cluster, Restate), Action Plan

Outcome

Use the tool Action Plan. List resources and action steps needed to sell or implement selected solution. Sort the action steps by short-, mid-, and long-term and specify what, who, by when, and who checks the step.

<table>
<thead>
<tr>
<th>What?</th>
<th>Who?</th>
<th>By When?</th>
<th>Who Checks?</th>
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<tr>
<td>Short-term</td>
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<td>Mid-term</td>
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<td>Long-term</td>
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“Problems are only opportunities in work clothes.” — HENRY J. KAISER
“If we cannot now end our differences, at least we can help make the world safe for diversity.” — JOHN F. KENNEDY
Divergent Tools
Benefits

- Offers versatility for working with groups (or alone), especially to solve problems
- Equalizes the room - allowing all group members to give input
- Promotes creative collaboration by groups

Instructions

1. Write down a statement of the challenge so it is visible to all.
2. Remind the group of the Divergent Thinking Guidelines.
3. Set a quota of ideas (options) and keep going until you meet it.
4. Gather and record concise and specific ideas.
5. Ideas should be stated in “headline” form and be recorded in written form so that all participants can see and read them. Record ideas as they are stated (do not edit!).
6. Periodically (every 15 ideas or so) check with the client or the group to make sure the ideas are going in the right direction.
7. Proceed until you have met your quota, or you have enough ideas to answer the challenge.

Use in: All steps of CPS when engaging divergent thinking

Origin: Brainstorming, as invented by Alex Osborn (Applied Imagination, 1953/1963), was defined as a “group’s attempt to find a solution for a specific problem by amassing ideas.”
Benefits

- Equalizes the contribution of the resource group and allows for more introverted people to communicate their thoughts/ideas
- Allows for time to reflect and incubate on ideas without the pace of the session feeling slow
- Provides opportunities for deliberate builds on others’ thoughts/ideas
- Allows for a change of pace during a loud, raucous meeting (a silent process)

Instructions

1. Give each participant a Brainwriting form.
2. Have participants write the statement of the challenge at the top of the form.
4. Ask participants to think of three ideas and write them down, one in each box in the first row (complete only one row).
5. Have participants exchange their Brainwriting forms.
6. On the new form, ask participants to write three ideas, on the second row — either new ideas or a build on the ideas written in row one.
7. Swap forms again.
8. Continue to swap forms until all the forms are full.
9. Provide additional forms, if needed.

Note: As an option to exchanging forms, each participant puts their form in the center of the table when done, then selects one from center to write on next.

Use in: All steps of CPS when engaging divergent thinking

**Benefits**

- Offers versatility for working with groups
- Equalizes the room - allowing all group members to give input
- Promotes creative collaboration by groups
- Increases speed and efficiency

**Instructions**

1. Start with the challenge or question being brainstormed.
2. Use 3”x 5” sticky notes and a dark, felt-tipped marker.
3. Write one idea per sticky note in headline form (2-5 words). Do not go into detail.
4. Write legibly! Others will need to read what you’ve written.
5. Call out your idea once you’ve written it or when you hand it in.
6. Keep an ear open for what others are calling out. If a build on someone else’s idea occurs to you, write it down. If not, just move on with your own thinking.
7. Remember, the more ideas, the better!

**Use in:** All steps of CPS when engaging divergent thinking

Benefits

• Orients the brain to generate options
• Frames the situation by inviting solutions to explore options and ideas, rather than shutting down conversations with a traditional statement
• Uses stems that ask for open-ended information to start responses while generating or diverging when using the Creative Problem Solving process

For example: By starting the concern about cost with “How to ...,” you naturally begin to generate ways to overcome the concern about cost: “How to make it less expensive?” or “How to obtain funding from other sources?”

Use when you need to:

<table>
<thead>
<tr>
<th>Explore the Vision</th>
<th>Formulate Challenges</th>
<th>Explore Ideas</th>
<th>Formulate Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>• It would be great if...[IWBGI]</td>
<td>• How to...[H2]</td>
<td>• Will it...[WI]</td>
<td>• Now what I see myself doing is...[NWISMDI]</td>
</tr>
<tr>
<td>• I wish...[IW]</td>
<td>• How might...[HM]</td>
<td>• Does it...[DI]</td>
<td>• Now what I see us doing is...[NWISUDI]</td>
</tr>
<tr>
<td></td>
<td>• In what ways might we...[IWWMW]</td>
<td>• What I see myself doing is...[WISMDI]</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• What I see us doing is...[WISUDI]</td>
<td></td>
</tr>
</tbody>
</table>

Benefit
• Helps you gather data effectively

Instructions
Ask questions using each of the 5 ”W”s and an H:

1. Who?
   • Who is involved? Who else? Who makes the decisions?
   • Who benefits from the problem being solved? Who loses?

2. What?
   • How can you summarize the problem? What has happened until now?
   • How have you already tried to solve the problem?
   • What has already worked? What hasn’t worked?
   • What do you think of the situation personally?
   • What is your attitude toward the problem?
   • What results would be satisfying?
   • What has helped you so far? What obstacles have you encountered?

3. Where?
   • Where does this happen? Where doesn’t it happen?
   • Where have you found help? Where have you encountered obstacles?

4. When?
   • When did the problem arise?
   • When does this problem happen?
   • When do you want to take measures to solve this problem?
   • Since when has the problem been a major concern?

5. Why?
   • Why is this problem important to you?
   • Why might it be an opportunity for you?
   • Why did you get help? Why have others not helped?
   • Why did you encounter obstacles?
6. How?

- How are you involved in this problem? How do you “own” it?
- How has this evolved? In what ways?
- How long has this been a concern/goal/wish?

**Use to:** Gather Data

**Origin:** This is credited to Hermagoras of Temnos, a 1st century BC Greek rhetorician. It is also credited to W. Edwards Deming and to Sakichi Toyoda of Toyota in association with the management of process and quality. How and sometimes How Much are generally credited to GM Saturn, Toyota, and the Kaizen process.

“We can all create a desired future instead of merely accepting what life offers.” — Sidney Parnes
**Benefit**

• Helps you develop additional challenge questions by getting to root cause and effect

**Instructions**

After generating a number of challenge questions or when production of challenge questions slows down:

1. Direct the challenge owner to look over the list and identify one challenge question of particular interest – one that seems to address his/her issue.
   
   Label the question as “A” and ask:
   
   • Why is this an important challenge to solve?
   
   • What would be the outcome if it were solved?

2. Turn each response into another “how to” question.
   
   For the newly resulting “how to” question, repeat the above questions, such that you are generating even more “how to’s.”

3. Continue this line of probing until response becomes too abstract and/or too far removed from the issue.

4. Return to the original challenge question (“A”) and ask the challenge owner:
   
   • What’s stopping you from doing/achieving that now?

5. Turn each response into another “how to” question.
   
   For the newly resulting “how to” question, repeat the above question, such that you are generating even more “how to’s.”

6. Continue line of probing until response is too far removed from the issue.

7. Return to the original list of questions and repeat for another question that the challenge owner identifies as interesting/meaningful.

**Use to:** Formulate Challenges

**Origin:** The notion of extracting different levels of abstraction can be traced to the work of S.I. Hayakawa in 1978, which was based on the work of A. Korzybski in 1933. Further work done by:


A sense of accomplishment builds my business confidence ->
   How to build my business confidence?

   Why is it important?

Being more productive will help me feel a sense of accomplishment each day ->
   How to feel a sense of accomplishment each day?

   Why is it important?

Because I will be more productive in an organized office ->
   How to be more productive in my home office?

   Why is it important?

A. How to better organize my office?

   What’s stopping you?

Because I don’t have an organizational system in place ->
   How to find an organizational system for my home office?

   Why is it important?

I don’t have time to research the best system ->
   How to carve out time to research home office systems?

   Why is it important?

I’m completely over-extended with my current project load ->
   How to build more time into my schedule?
Word Dance

Benefits

• Generates more challenge questions and stronger challenge questions
• Reveals assumptions and generates alternative views

Instructions

1. Rewrite the challenge question at the top of a sheet of paper.
2. Circle the verb or action in the question.
3. Write that word below, then generate a list of alternates.
4. Circle the object or outcome in the question.
5. Write that word below, then generate a list of alternates.
6. Mix and match to make new challenge questions with the verbs and objects to create a better version of the challenge question that invites even more ideas.

Example

Challenge Question: How might I open a restaurant?

Open: launch, revive, begin, start, embark upon, initiate, kick off, set in motion, start the ball rolling

Restaurant: dining experience, business establishment serving food, cafeteria, eatery, grill, greasy spoon, luncheonette

Alternate Challenge Statements:

• How might I embark upon a business establishment serving food?
• How might I launch an eatery?
• How might I initiate a luncheonette?

Use to: Formulate Challenges

Benefits

- Helps groups break out of ruts during divergence
- Generates more ideas
- Combines easily with other divergent tools

Instructions

1. Use SCAMPER (the mnemonic for Substitute, Combine, Adapt, Modify, Put to other uses, Eliminate, Rearrange) to stimulate new ideas while facilitating brainstorming.

   **Substitute:** What can we substitute? Are there parts, materials, ingredients, or segments that can be swapped in? Who else might be included instead? What other process might be used instead? Might we substitute something that doesn’t belong here?

   **Combine:** What might be combined or blended? What sort of ensemble could be used or created? Might we combine parts or materials? How might we combine purposes? What products or processes will fit well together? How might we combine applications?

   **Adapt:** Can something be brought over to work in this context? Can we borrow an idea from a competitor or another industry? Does the past offer a similar situation?

   **Modify (Magnify or Minimize):** How might we change the form (color, size, weight, shape)? What might we add, lengthen, strengthen, or subtract? How might we increase the value? What might we streamline? What might we change from the process, price, strategy, or offering? What might we increase or decrease the significance of?

   **Put to other uses:** What else might it be used for? How might the product be used to work for a different market? What might we take somewhere else to improve life?

   **Eliminate:** What might we get rid of or omit? What might we stop doing instead of fixing it? How might we simplify the process by removing steps? What might we get rid of to reduce complexity?

   **Rearrange:** What other patterns, arrangement, or layout might work? What might we reverse or transpose? How might we reverse engineer it? How might we change the focus to look at it backwards first? What if we turned it inside out or upside down?

**Use to:** Explore ideas

Benefits

• Generates unusual and unexpected ideas

Instructions

Choose a random object (toy, orange, rubber band, table cloth), mental image (train, beach), or picture (zebra, a Monet, flower). There are two approaches you can use to generate ideas.

Approach 1:

Relationships

1. Ask, “When you look at (or think of) this thing, what ideas come to mind for addressing this challenge?”
2. Ask, “In what ways is the challenge like (the object, image or picture)?”
3. After you come up with some relationships, generate ideas these relationships stimulate.

For example: “The challenge is like an orange because it has a number of inter-connected sections.” This might stimulate ideas to discover what holds the section together, look at each of the sections individually, or remove the barriers and create a seamless whole.

Approach 2:

Characteristics

1. Brainstorm characteristics of the object.

For example: Ask yourselves, “What are the elements of this item and what else does it make me think of?” Response: “A table cloth may be smooth, white, foldable, soft, stain-resistant, woven, etc.” The more characteristics you can generate, the better.

2. Think about how each characteristic can stimulate new thinking around your challenge.

For example: “What new ideas can you create if you think about folding your challenge to make it smaller or adding a resistant characteristic to make it stronger?”

Use to: Generate or Explore Ideas

Benefits

• A useful tool to reenergize a group during a brainstorming session and continue to elicit new ideas
• Generates novel and unusual ideas by working with metaphors

Instructions

1. Collect a series of intriguing visuals to use as stimuli. Use toys, objects in the room, or pictures. Pictures should not be readily identifiable.
2. Ask participants to relax and go on a mental excursion.
   
   **Script:** “Allow your mind to drift away from the challenge and float to your favorite vacation spot. Focus on what it looks like, smells like, sounds like, and feels like. Notice the rich colors and beautiful weather.”
3. Come back and focus on the object. Write down any three observations, impressions, reactions, or thoughts about the object. Don’t edit yourself. Record your observations.
   
   **Prompts:** “What do you see? What do you feel like? What would it be like if you were here? What memories have you had like this? What experiences have you had like this? What might this taste/sound/smell/feel like?”
4. Repeat step 3 with each visual stimulus.
5. Take each of your observations and make a connection to the challenge. Each connection should answer, “My challenge is like (name of stimulus) because....” Record your connection on post-its (one connection per post-it).

Use to: Generate or Explore Ideas

Benefits

• A highly useful tool to break down one big idea into discrete, manageable steps

Instructions

Diverge:
1. Begin with a solution statement beginning with “What I see myself doing is ....”
2. Using sticky notes, generate a list of all the possible actions (one action per sticky note) that might be taken in order to make your solution a reality. Generate possible sources of assistance (assisters) and possible sources of resistance (resisters). Generate actions to leverage your assisters or overcome resisters.

Converge:
4. Arrange the actions into clusters of “short-term,” “medium-term,” and “long-term” actions. You determine the time frames based upon your situation.
5. Within each cluster, arrange the steps in order.
6. For each action, specify who will be responsible and when it will be completed. Each step should also have someone who will check to ensure things are getting done. Make sure you create at least one action that can be completed in the next 24 hours – this will jump-start the process, making your proposed solution a reality.
7. Transfer the What, Who, By When, and Who Checks to a table for tracking. Add additional criteria as needed: “How,” “With Whom” (who else will be helping), “Why,” “Start Date,” and “Success Indicators.”

Use to: Formulate a Plan

<table>
<thead>
<tr>
<th>What?</th>
<th>Who?</th>
<th>By When?</th>
<th>Who Checks?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-term</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mid-term</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long-term</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Benefit

• Useful when you have a large group of people who need to work together to build consensus and converge on options

Instructions

1. Review all items that were generated to ensure a shared understanding.
2. Give each person dot stickers. Everyone should have the same number of dots (or you can instruct everyone to make a mark).
3. Have everyone place a dot (or make a mark) beside the option they like best. (Ask people to choose first, then write them down, before they go up to place their dots beside their favorite ideas/options to avoid “group think”).
4. Look for clusters with the most dots or “Hits.” The clusters with the most “Hits” are the options that should be worked on first.

Hits are items that

<table>
<thead>
<tr>
<th>Are on target</th>
<th>Jump off the page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are relevant</td>
<td>Excite you</td>
</tr>
<tr>
<td>Are clear</td>
<td>Sparkle at you</td>
</tr>
<tr>
<td>Are interesting</td>
<td>Feel right</td>
</tr>
<tr>
<td>Intrigue you</td>
<td>Solve the challenge</td>
</tr>
<tr>
<td>Seem workable</td>
<td>Go in the right direction</td>
</tr>
</tbody>
</table>

Use in: All steps of CPS when engaging convergent thinking

Origin: The characteristics of a “Hit” were first presented by Roger Firestien and Donald Treffinger in the Journal of Creative Behavior (Vol 17, no. 1, 198).
Benefits

- Helps you narrow down and focus on what is important
- Helps to screen, select, and sort ideas that are interesting, intriguing, or useful
- Gives a first pass-through for converging a list of ideas
- Condenses a large number of ideas into more meaningful or manageable categories

Instructions

1. Review all the ideas generated during the divergent steps. Keep in mind the Convergent Thinking Guidelines.
2. Have each participant mark the ideas that are “hits” (exciting, interesting, jump off the page) with either sticky dots, a magic marker, or by removing the sticky note (with the idea on it) to another location.
   
   Tip: Give guidelines about how many ideas should be marked based on:

   a) the total number of ideas you’re working with
   b) the depth and breadth of ideas
   c) how many you want to consider taking into the next step

   For example: With 100 ideas, you might ask each person to mark 3-5; with 20 ideas, you might ask everyone to mark 1-2.

3. Identify all the ideas that relate to each other thematically and group them together on a clean page in clusters. Create a short 1-3 work headline for each cluster.
4. Restate the hot spots appropriately (as a problem statement, an idea, etc.).
5. Make sure that the cluster is restated specifically enough to be useful. If you are looking for ideas, make sure the restatement is stated as an idea. If it’s a challenge question, make sure it has an appropriate “How to...” or similar stem on it.

Use in: All steps of CPS when engaging convergent thinking

**Benefits**

- Creates a systematic way to analyze multiple solutions
- Helps build consensus as it allows the group to select and evaluate a variety of promising solutions against selected criteria

**Instructions**

After generating a number of possible solutions:

1. Generate criteria. Make a list of criteria to use to evaluate potential solutions (i.e., within our budget or will appeal to the target).
2. Choose the criteria that are most important or most influential for your decision.
3. Put the criteria into positive question form, so that answering YES gives the criteria a positive response.
   
   **For example:** The answer should be YES when asked, “Will it be ___?” Write it as “Will it be within our budget?” rather than “Will it be too expensive?”
4. Create a matrix, with the key criteria heading various columns. Simple challenges might have 3-4 criteria; more complex challenges might have more.

<table>
<thead>
<tr>
<th>Will it be within budget?</th>
<th>Will it be finished on time?</th>
<th>Is it revolutionary?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Option A</strong></td>
<td>🙁</td>
<td>😊</td>
</tr>
<tr>
<td><strong>Option B</strong></td>
<td>😞</td>
<td>😊</td>
</tr>
</tbody>
</table>

5. Use a simple rating system to indicate how well an idea satisfies each criterion.

**Potential rating systems:**

- Smiley faces: a frown doesn’t satisfy; a horizontal line sort of satisfies; a smile satisfies a lot.
- Scale of 1-5 where 1 doesn’t satisfy the criterion and 5 completely satisfies it.
- Satisfies = +; in the middle = 0; doesn’t satisfy = –.
6. Fill in the matrix one column at a time, comparing the solutions to each other against one criterion. This leads to increased objectivity and focus.

7. When you have filled in the entire matrix, you can get a sense of how your ideas stack up against each other.
   You are not conducting a mathematical exercise; you are looking for an overview.

8. Go back again, column by column, and see how you can strengthen each idea to improve its rating.

Once you have gone through the matrix a second time, select those ideas that perform best against the criteria for further development.

**Use to:** Formulate Solutions


“Of all the gifts we have as humans, the one that stands out, giant-like above all the rest, is our ability to be creative. It is responsible for all the progress we enjoy today.” — Sidney Parnes
Benefit

• Helps evaluate whether a goal, wish, challenge, or opportunity is appropriate for you or your group to address

Instructions

1. Do you (or your group) have Influence over the challenge? If the challenge is something completely out of your control or authority, you may not want to spin your wheels on it.

2. Is the challenge of Importance to you (or your group)? Are you motivated to address it, and will you have the energy to carry your solution through?

3. Does the challenge require Imagination? Will it call for new thinking or an innovative solution?

If you can answer “yes” to all three of these questions (Influence, Importance, Imagination), the situation will probably benefit from CPS.

If your answer to any of these questions is “no,” you may want to think about redefining your challenge in a way that does meet the 3 “I”s criteria, or perhaps working on a different challenge.

Use to: Generate Ideas, Explore the Vision, and Formulate Challenges

Origin: Based on the work of Bill Shephard, Roger Firestien, Don Treffinger, and Scott Isaksen.

“Creativity takes courage.” — HENRY J. KAISER
Benefits

• Strengthens or evaluates an idea
• Avoids premature idea-killing by using the principle of “Praise First”
• Develops ways to overcome an idea’s weaknesses
• Works on single ideas
• Creates motivation by looking at ways to overcome challenges

Instructions

1. **Pluses:** Make a list of at least three pluses, likes, or specific strengths of your idea by answering: What is good or unique about your idea now?

2. **Potentials:** Make a list of at least three opportunities starting with, “It might ...”
   What are speculations, spin-offs, or possible future gains from your idea?
   What are the ultimate potentials of this idea/what could it eventually lead to?
   What opportunities might result if your idea were implemented?

3. **Concerns:** Make a list of all concerns you have about your idea by answering “What concerns are there about this idea?” Phrase your answers in the form of a question starting with, “How to ...,” or “How might ...,” or “In what ways might ...” This invites solutions for how to overcome each one of these concerns, eliminates negative words/phrases.
   **For example:** If you’re concerned about the idea being too costly, say: “How to make it affordable?” not “It’ll cost too much” or “How not to make it so expensive?” *This allows for improvement of the idea.*

4. **Overcome:** Generate ways to overcome concerns one at a time, in order of their importance.

5. Modify and strengthen the original idea by leveraging the Pluses and Potentials, and incorporating the newly brainstormed ideas to Overcome the Concerns.

6. Write an improved statement of your solution: “Now what I see myself (us) doing is ...”

**Use to:** Diverge/converge, generate ideas, refine preemptive feedback

**Origin:** PPC was developed by Diane Foucar-Szocki, Bill Shephard, and Roger Firestein, PhD, although the principle dates back to Aristotle, who advocated looking at pluses and minuses of any ideas. It later was evolved by Hedria Lunken, MS, who added the “O” to PPC — to deliberately include brainstorming ideas to overcome each concern.
Where brainstorming begins —
The Creative Education Foundation.

Our mission: “We spark personal and professional transformation by empowering people with the skill set, tool set, and mindset of deliberate creativity.” As a 501(c)(3) non-profit organization, we connect leading creativity experts and practitioners with beginners from across diverse backgrounds and fields.

Our dream is that all people — regardless of economic background, education, or culture — have access to the tools to solve challenges and create a better world.

Founded in 1954, The Creative Education Foundation (CEF) has a rich legacy. Our founder, Alex Osborn, and Dr. Sidney J. Parnes were leaders of the deliberate creativity movement. Their passion extended to many contributions, including:

- Osborn co-founded the advertising firm BBDO and invented “brainstorming”
- Osborn wrote the classic book *Applied Imagination* (1953)
- Osborn and Parnes developed the Osborn-Parnes Creative Problem Solving Process
- Osborn and Parnes established the longest-running creativity conference (CPSI)

For more than 60 years, CEF has worked closely with leading corporations, academic institutions, and community organizations.

We invite you to join us.

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Alex F. Osborn 1888-1966

Dr. Sidney Parnes 1922-2013
Origins of Creative Problem Solving

Osborn, the “O” in the international advertising agency BBDO, formalized brainstorming in 1939 as a problem-solving tool at BBDO. Brainstorming was the first of many nominal group techniques for generating ideas.

Osborn studied creative people to identify the natural process of how they intuitively create good ideas. With the goal of approaching problems with greater imagination, he incorporated his learnings into the first versions of the CPS process, helping people learn how to be more deliberately creative.

A natural educator, Osborn believed that if people were going to be creative in business, they needed to learn creative thinking skills when they were in school. Osborn’s *Applied Imagination*, published in 1953, was the first creativity textbook.

In 1954, Osborn created the Creative Education Foundation, which was sustained by royalties earned from his books. Along with Dr. Sidney Parnes, Osborn developed the “Osborn-Parnes Creative Problem Solving Process” (commonly referred to as CPS). That same year, launched the Creative Problem Solving Institute, the world’s longest-running international creativity conference.

In 1967, Dr. Parnes started a pilot program in creativity at Buffalo State and became the founding director of what is now the International Center for Studies in Creativity (ICSC).

Despite the death of Osborn in 1966, Dr. Parnes continued to develop and modify Osborn’s original seven stage CPS model. After numerous adaptations the Osborn-Parnes Five Stage CPS model was born. This model’s stages were Fact Finding, Problem Finding, Idea Finding, Solution Finding, and Acceptance Finding. The advantage of this model was the depiction of the alternating process known as divergent and convergent thinking. This notion of divergent and convergent thinking occurs in every stage of this model.

In the early 1970s, Parnes launched the Creative Studies Project with colleague Dr. Ruth Noller. This truly pioneering initiative validated that creative studies content could indeed be taught and learned effectively. This allowed for creativity studies to gain traction and academic support.

Drs. Parnes and Noller continued teaching creative studies and in 1981 Dr. Scott Isaksen joined the faculty to assist in the now formalized Masters of Science degree in Creative Studies. In 1982 Dr. Parnes turned over the directorship of the center to Dr. Isaksen. With many fond memories and a tremendous sense of satisfaction, Dr. Sid Parnes retired in 1984 as a Professor Emeritus from Buffalo State College. Today Dr. Gerard Puccio heads ICSC, which continues to enrich the field with an evolving model and new research.
Resources

Books and Articles


“The big question is whether you are going to be able to say a hearty Yes to your adventure.” — JOSEPH CAMPBELL
References


NOTES


“The one thing that can solve most of our problems is dancing.” — JAMES BROWN
The CPS Model

In the most recent iteration of the CPS model, the basic structure is comprised of four stages with a total of six explicit process steps. Each step uses divergent and convergent thinking.

<table>
<thead>
<tr>
<th>STAGE</th>
<th>STEP</th>
<th>PURPOSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLARIFY</td>
<td>Explore the Vision</td>
<td>Identify the goal, wish, or challenge.</td>
</tr>
<tr>
<td></td>
<td>Gather Data</td>
<td>Describe and generate data to enable a clear understanding of the challenge.</td>
</tr>
<tr>
<td></td>
<td>Formulate Challenges</td>
<td>Sharpen awareness of the challenge and create challenge questions that invite solutions.</td>
</tr>
<tr>
<td>IDEATE</td>
<td>Explore Ideas</td>
<td>Generate ideas that answer the challenge questions.</td>
</tr>
<tr>
<td>DEVELOP</td>
<td>Formulate Solutions</td>
<td>To move from ideas to solutions. Evaluate, strengthen, and select solutions for best “fit.”</td>
</tr>
<tr>
<td>IMPLEMENT</td>
<td>Formulate a Plan</td>
<td>Explore acceptance and identify resources and actions that will support implementation of the selected solution(s).</td>
</tr>
</tbody>
</table>
