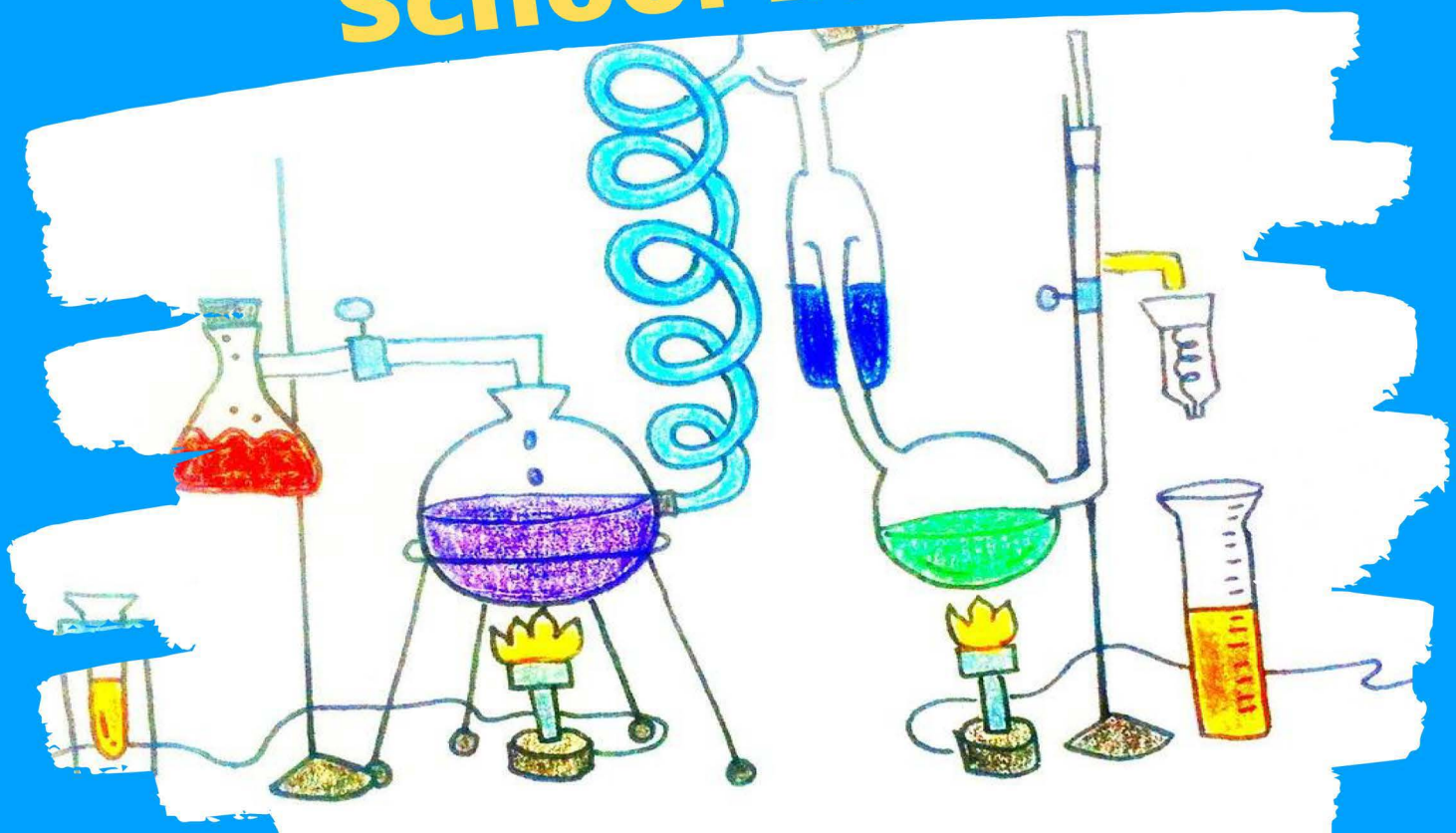
Activate Your GENIUS MODE

School Edition



A handbook to promote and implement creativity in schools

by David Dubczak, M.Ed

Activate Your Genius Mode:
The School Handbook

By David Dubczak

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Acknowledgements

First and foremost, my students over the past decade of teaching who have shown me creativity, and also taught me that they can be most creative when we teach them how.

I owe a debt to my graduate professors at Iowa State University, who helped me discover a love for creativity studies over the years I was slowly earning my degree.

I need to thank my school administrators, who allowed me more leeway and freedom than, I think, any other teacher in the country when it comes to creating, planning, and implementing new curriculum.

And finally, to my wife, Laura, who makes me want to impress her (and keep this book free of grammar errors for when she does the copy editing).

Our dog, Avila, does not care as much about grammar.

To all students, teachers, and dreamers, who stand in the shadows of giants, unafraid to look forward.

Enjoy activating your genius mode!

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Introduction

I really have a "Genius Mode?"

Take a moment and think of a genius.

Who came to mind? Mozart? Elon Musk? Einstein? Picasso? What about Robin Williams? Or J.K. Rowling?

What about you?

If you didn't name yourself, why not? Is it because you look at people like Picasso or Robin Williams or J.K. Rowling and assume that, because you can't do what they can do, you're not a genius?

Never mind that Picasso and Williams and Rowling spent tens of thousands of hours perfecting their art. They were exceptionally good at their art form, but they also *learned* their genius.

You see, with a few exceptions, geniuses are made, not born. A few people – two or three – every hundred years or so are born geniuses. People like Mozart, and Stephen Hawking, and Albert Einstein – they were born geniuses. Somehow, they wound up being born with something the rest of us don't have.

The rest of us? We all have the same thing. Two or three people every hundred years isn't enough to invent airplanes, create vaccines, electrify the world, revolutionize home computing, and fly to the moon. Those achievements belong to regular people who *learned* to be geniuses.

Two or three people every hundred years won't be enough to solve climate change, end racial disparity, eliminate poverty, close the achievement gap, solve world hunger, or finally build a flying car! Those achievements will go to regular people who *learned* to be geniuses.

There is such a thing as **accidental genius**, people who have flashes of brilliance and are able to do something with it. Accidental genius, and the people who use it to change the world, should be celebrated.

However, your ability to act like a genius doesn't have to be accidental. **Genius** is the ability to combine two or more things or ideas into a new thing or idea. The ability to do this is something that can be improved with practice. With practice, we can all be a genius, and we don't have to rely on accidental geniuses to change the world!

Genius: *The ability to combine two or more things or ideas into a new thing or idea.*

And what does it take to be a genius? It takes creative thinking.

Creative Thinking

The key to activating your "Genius Mode!"

Creativity is the engine that drives innovation. Creativity is responsible for art, music, and activities of fulfillment and enjoyment. Creativity solves problems, from the tiniest of everyday annoyances to huge, worldwide issues of poverty and pandemic.

As someone who runs a business, a creative workforce is one of your biggest assets. A creative workforce is independent, forward-thinking, and enthusiastic. A creative workforce is self-motivated and eager to solve the problems facing your business. *All departments and workplaces can benefit from more creative practices.*

A common myth persists in the business world: the notion that some people are creative, and some people are not (see our award-winning short documentary, "The Myth of Creative People" - https://youtu.be/lxkZEEtbdrI)

In reality, *all people* can be creative. Creativity is a skill that can be learned.

However, while most businesses acknowledge the value of creativity, their actual practices may stifle rather than promote it – usually unintentionally. This happens due to schedule pressure, efficiency goals, and pressure to meet growth targets.

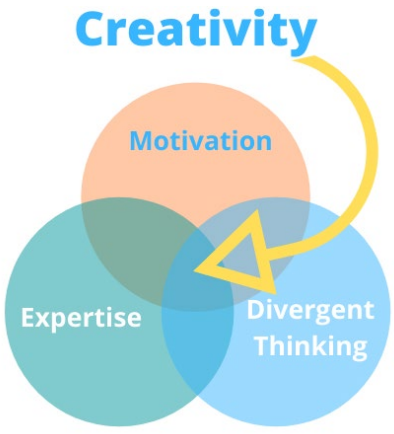
What creativity isn't

In order to identify what creativity is, we need to be clear about what creativity *isn't*. Creativity isn't *artistry*.

One more time: creativity is not artistry. Artists are creative, there is no doubt about it. But, too often, people see themselves as having no artistic skills, and assuming, then, that they are not creative. Artistry and creativity are two separate skillsets.

What creativity is

Most academic definitions agree that creativity is the "ability to generate ideas or solutions that are novel and appropriate." *Novel* meaning new, and *appropriate* meaning relevant to the task at hand.



*Creativity: The ability to generate ideas or solutions that are **novel** and **appropriate.***

*More simply: Making something that is **new** and **useful**.*

Creativity happens at the intersection of *Motivation, Expertise,* and *Divergent Thinking Skills*.

Motivation is the combination of psychological factors that drive people to work. For more of an overview, again see "The Myth of Creative People" (https://youtu.be/lxkZEEtbdrI). ***Expertise*** is subject-matter knowledge or skillset. ***Divergent Thinking Skills*** form the ability to generate many possible ideas.

Why is creativity not artistry? Let's look at a painter, for example. Painting is a specific *expertise* – it is a skill that some people learn. With time, practice, and education, you can increase your painting skill. Some people have the *motivation* to use their painting *expertise* to create a *novel* painting. *That* is creativity, not just the ability to paint in itself. In fact, if you became a skilled enough painter to create an exact replica of the Mona Lisa, that would not be a creative task.

Likewise, a mechanic could have the *motivation* to use his or her *expertise* as a mechanic to design a car that gets better fuel mileage. Doing so would require several new ideas, requiring the use of *divergent thinking.* Though the mechanic may not consider him or herself to be an artist, this pursuit certainly demonstrates creativity.

Creativity is a habit and mindset that can be cultivated by increasing certain supporting habits.

What can be creative?

It is difficult to create a holistic model of creativity, because creativity manifests itself in many different ways. Are there creative people? Creative processes? Creative products?

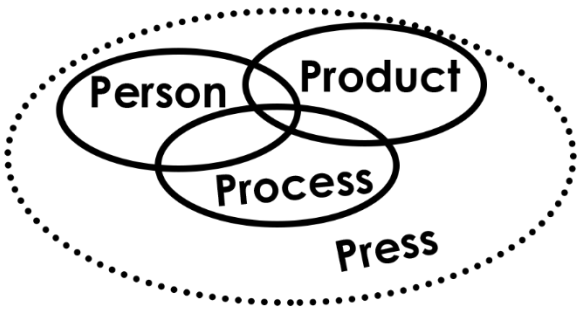
Mel Rhodes, in 1961, landed on a model many researchers agree with today, called **The Four P's.** This is an approach that is used to break down aspects of creativity for study.

Person: How people are creative; how creative someone is; the characteristics associated with creative people.

Product: The artifacts of creativity; what is a creative product; what makes something creative; how can you tell if something is creative.

Process: How people create or can use and apply their creativity.

Press: The climate surrounding the person, process and product, in which creativity flourishes or is squelched.

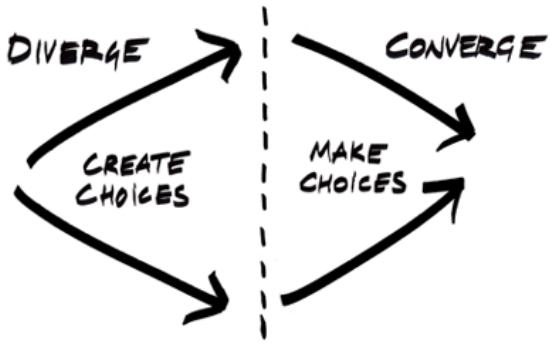


The Big Picture

Cycles of Divergent and Convergent Thinking

If there is only one thing you should remember about creative thinking, it is that creative thinking flows from cycles of *divergent* and *convergent* thinking, and that the two types of thinking should be done *separately*.

Divergent Thinking has several different definitions. Earlier, we defined it as "the ability to generate many possible ideas." Divergent thinking also involves going in different directions or finding many types of ideas, seeking wild and unusual ideas, building on ideas, and – most importantly – deferring judgement.



Deferring Judgement means not deciding whether an idea is a good idea or a bad idea… *yet*. Any idea that is had is worth writing down, if for no other reason than it helps to create choices to build off of later.

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*Creative thinking flows from cycles of **divergent** and **convergent** thinking, and the two should be done **separately**. Inexperienced creatives often do them together.*

Inexperienced creatives often struggle to defer judgement. As soon as they have an idea, they decide whether it's a good idea or not. Experienced creatives write down every idea, and use them as fuel for creating more ideas.

Inexperienced creatives stop when they get their first "good" idea. Experienced creatives generate many more ideas than they could ever use, in order to venture into unfamiliar, and thus unique, territory.

Convergent Thinking is the ability to evaluate choices and determine which direction you want to go.

The problem with creative thinking in schools

In schools, the type of thinking required on tests and in many live classroom sessions is finding the right answer. Finding the right answer is *convergent thinking*. Creative thinking relies on effective cycles of divergent and convergent thinking, but in the quest to be able to find the right answer, divergent thinking often gets left by the wayside. Remember to teach both *divergent* and *convergent* thinking techniques, and to do them separately.

Types of Creative People

Creativity often depends on the person, his/her familiarity with the subject, and influence on the world

Many creativity psychologists use this framework for understanding types of creative behavior. This framework, however, is a guideline, and the lines between the categories are blurred. It is simply used to help us understand types of creative behavior in people.

	Definition	Real-World Examples
MINI-C	A person who creates something that is new and appropriate *only to that person*. Emphasis is on the personal meaning the creative act has to the individual. *"not just copying but rather a transformation or reorganization of incoming information and mental structures based on the individual's characteristics and existing knowledge" (Moran & John-Steiner, 2003, p. 63).*	-A new writer who writes their first novella or screenplay. -An artist who draws their first landscape. -Creating a new recipe in your own kitchen.
LITTLE-C	A person who creates something new and appropriate *as seen by the average person*. The influence of the creative act doesn't greatly influence the field or domain.	-Creating a new recipe in your kitchen that other people enjoy. -Someone's first published book.
PRO-C	A person who is recognized as a professional in their field, and is recognized as creating novel and appropriate contributions to that field. They have not yet gained widespread fame or notoriety outside their field.	-An author that makes his or her living publishing books. -A chef that runs a unique restaurant. -An engineer improving the fuel mileage of cars.
BIG-C	A person who has revolutionized his or her profession, influenced other domains, and gained widespread recognition for doing so.	-Walt Disney -Charles Dickens -Elon Musk -Wolfgang Puck -Steven Spielberg

Creative Tasks in School

Novel, Complex, and Ill-Defined

Creative tasks are…	Which means…
NOVEL	Allows the student to be able to produce a product that is either… …new to them (mini-C or little-C), …new to the world (pro-C or big-C), …original, …something that is not encountered in quite a distinctive manner before in the social context.
COMPLEX	Any of the following: • Uses multiple domains of knowledge (e.g., science and literature, math and history). • Imposes multiple constraints (e.g., egg must survive a fall from the building and then travel 20 feet). • Requiring many different sources of information (e.g., user surveys and weather reports) • Using knowledge or resources in an atypical manner (e.g., creating a water filter out of household objects)
ILL-DEFINED	There is no single outcome or solution. "Correctness" depends on whether the problem was solved, not specific solution used, or the specific method used.

What about social context?

Creative output may be novel in one context but not another. For example, a short story written by a 5th grader may be considered novel in the 5th grade class, but not to a professional publishing company.

The purpose of having a definition for creativity is to bring us closer to understanding what a creative task looks like, not to have a "checklist" for creativity. When we're trying to teach students to be creative, we don't need to compare their creative output to the Big-C creatives; they will use the same thinking skills to make products that are creative to *them.*

Consider the social context for the person or product when determining whether something is creative.

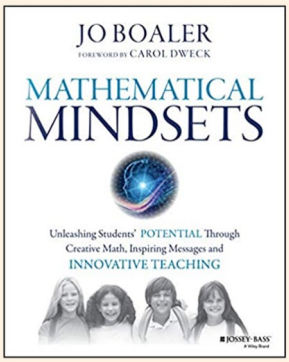
When a 7th grade art student shows you a painting, don't respond by saying, "That's okay, but you should see what Van Gough does!" What is creative to *the context?*

Fake Creativity vs. Real Creativity

The art of designing truly creative tasks

For a task to be considered creative, it must be 1) novel, 2) complex, and 3) ill-defined. We need to ensure we can recognize when a task is truly creative, vs. when it simply looks creative.

Book Recommendation!



Tasks that look creative*	Tasks that are creative
Reading a scene from a book and drawing that scene from the character's perspective. (Not ill-defined)	Reading a scene from a book and imagining the reaction of other characters, who aren't in the scene, being told about the scene. (More ill-defined)
Drawing a poster explaining the three branches of government. (Not complex or ill-defined)	Determining the best way to explain the three branches of government to a new immigrant to the United States. (More complex and ill-defined)
Building a model of a volcano. (Not novel or ill-defined)	Design a machine that would allow a human to explore the inner-structure of various types of volcanoes. (More novel and ill-defined).
Build a model of a 3D Shape. (Not novel or ill-defined)	Design a building that has the largest inside volume with the least surface area on the outside walls. (More novel and ill-defined)
Draw the still life scene you see here (Not novel or ill-defined).	Create a still life scene that uses contrast between light and dark to highlight something important (More novel and ill-defined).
Given this data set, determine whether there is a correlation between sales and weather conditions (not ill-defined).	Design a method for collecting data, and use it to determine factors that are correlated with an increase in sales (More ill-defined).

*These are illustrative guidelines. One other factor to consider is what is novel, complex, and ill-defined *to the student*? This may be different than to the teacher, or to society.

Three Important Processes for Creativity

Different tools for different purposes

The rest of this guide focuses on three processes: The Creative Process, the Creative Problem-Solving Process, and the Creativity Formula. They are related, but separate, tools that have different purposes.

The Creative Process

Person | Product | Process | Press

This is an individual process many people go through while doing creative work. It has four stages: **Preparation, Incubation, Illumination, Verification.** Understanding this process is helpful in turning someone from an accidental creative into an intentional creative.

The Creative Problem-Solving Process

Person | Product | Process | Press

This is a formal, organizational process, often led by a facilitator, used by an organization when they have a specific problem to solve. Similar to the Creative Process, it also has four stages: **Clarify, Ideate, Develop, Implement.** This is very useful in group work, and allows the group to create something truly unique that no single individual could create on their own.

The Creativity Formula

Person | Product | Process | Press

This formula explains the elements that must be present, both environmentally and individually, for creativity to happen. Each element is something that can be coached and improved with practice, leading to more creative behavior over time. Missing one part of the formula hinders creative thinking. The formula is:

Creativity = Psychological Safety + Curiosity + Divergent Thinking

The Creative Process Person | Product | Process | Press

Your individual thinking solution

In general, most people follow a well-researched, four-step process when finding creative solutions to a problem. This is mostly an informal, individual process. Writers, technicians, engineers are just a few examples of the people who can benefit from an understanding of this process.

Students of all ages can become more creative when they realize how they are thinking when they are trying to design creative solutions. Understanding this process helps you go from being an accidental creative to an intentional creative.

The first step is the **Preparation** stage, in which a person realizes he or she has a problem that needs a solution, and this solution may not yet exist.

The second step is the **Incubation** stage. Here, the person is thinking about the problem and imagining several different solutions (divergent thinking), thinking through all the possible ways to solve the problem. This can be conscious – actively sitting and working on the problem, or unconscious – in the back of the mind, until a connection is made and the solution presents itself.

The third stage is the **Illumination** stage, in which a likely solution becomes apparent. Think of this as being the "lightbulb" moment.

This is followed by the **Verification** stage, in which the person tests the solution to see if it is appropriate.

Bill Bowerman is one of the co-founders of Nike. In the 1970's, he was a college track coach dealing with a problem: colleges were installing synthetic track surfaces, and typical track shoes with metal cleats damaged the surface and were banned.

Bowerman's realization that he needed to design a shoe that could grip the surface without damaging it was his **preparation**. He spent months thinking about this consciously, but also spent time doing other things, like eating breakfast. During those months, the problem was **incubating** in his mind. One morning, while eating breakfast, his wife made waffles, and an idea was **illuminated:** the texture of the waffle might be a way to grip the track surface. To **verify** his idea, he mixed together some urethane, poured it directly into the waffle iron, and applied the result to the sole of a track shoe.

After months of tweaking and testing, the Nike Waffle Trainer debuted in 1974. The creative process was in action.

The Creative Problem-Solving Process

Person | Product | Process | Press

A formal process for group work

The Creative Problem-Solving Process has been around, in one form or another, since the 1940s. The basic steps and questions have been tweaked, modified, and published in many different configurations in research literature since. The model used here has been published by Roger Firestien, and used by creative facilitators across the world.

This model has several strengths: It helps ensure people are working on the right problem, it helps in the discovery of truly unique ideas, and it helps ensure bad ideas are not implemented. Teaching this process in schools can help groups better function and produce high-quality work.

The process below comes from Creativity Unbound (2007) by Miller, Vehar, Firestien, Thurber, and Nielsen.

1. Clarify

Goal: To understand the challenge at hand. (What's the goal? What's the key information? What's the problem you're trying to solve?)
Start here when: You have a general goal in mind, but need to refine it.
Finish with: An open-ended question that invites new ideas about the challenge.

2. Ideate

Goal: To explore *lots* of ideas to help you address your challenge.
Start here when: You need novel, useful ideas to meet your challenge.
Finish with: Selected ideas to help solve the challenge.

3. Develop

Goal: To turn promising ideas into workable solutions.
Start here when: You have some good ideas that need strengthening.
Finish with: A well-developed, detailed solution.

4. Implement

Goal: To put your idea into action.
Start here when: You have a strong solution that's ready for action.
Finish with: An action plan that shows how to test and sell your solution.

The Creativity Formula

Person | Product | Process | Press

What we need in our lives and environment for creativity to flourish

Processes are important in being able to produce creative output, but the underlying skills and environmental factors can help us as we go through these processes – having an environment primed for creativity helps us ideate and diverge more freely.

That's why I developed the creativity formula. After studying creative classrooms, businesses, and people, I found an underlying trend in three elements that always seemed present in creative environments. To help make it easier to remember, I made it a formula:

Creativity
=
Psychological Safety
+
Curiosity
+
Divergent Thinking

Once you are able to create an environment where all three of those elements are present, your creativity will explode. This creates the conditions best suited for people to go through the creative process.

Psychological Safety ensures your brain isn't in "fight or flight" mode. Research shows creativity is diminished when the brain feels threatened. It is the ability to ask questions and experiment without fear of punishment or reprimand.

Curiosity is the ability to notice one's environment, pay attention to details, and use it to generate questions. Curiosity allows people to make connections, and these connections help us make creative things. Questioning is one of the key elements to creative output.

Divergent Thinking is the ability to generate many ideas, or the ability to make one's mind go in many different directions. It requires the ability to withhold judgement, build on ideas, and venture out wildly.

Psychological Safety in the Classroom

Make mistake-making a rule

In the business world, writers often focus on *research and development failure*, the processes set up to ensure that innovators are allowed to fail, and what to do if they do fail. Much has also been written on the need to ensure that problems are able to be freely discussed, instead of hidden.

One powerful story is that of former Ford Motor Company CEO Alan Mulally. His predecessor at Ford considered talking about problems a sign of weakness, while Mulally insisted it was a sign of strength. Mulally requested that reports sent to him be color-coded: things going well in green, new issues in yellow, and problems with no apparent solution in red.

At one early meeting with a group of executives, most reports were in green, with a few yellows. Mulally asked the group, "This company lost $17 billion dollars last year, is there *anything* not going well?" A brave executive explained a problem with a liftgate actuator that had stopped production. While the rest of the executives avoided eye contact and looked at the floor, Mulally responded by clapping. Subsequent meetings had a rainbow of colored reports!

Quick Note:

Obviously, there are places where mistakes shouldn't be allowed. Multiplication tests, spelling tests, identifying colors, and knowing what year the US Constitution was ratified, for example.

However, these are all tasks at the lowest levels of Bloom's Taxonomy. Tasks at the higher levels – C*reating* and *Evaluating* – should be tasks with no definite right answer, affording opportunities for experimentation, mistakes, and failure. In other words, novel, complex, and ill-defined.

A big issue I hear from educators today is that students struggle to experiment when they don't know the answer, and they're afraid of doing something wrong. The way to combat this is not only to encourage experimentation, but make mistake-making a rule.

Psychological Safety Means:

You can do this by:

Being able to express ideas and experiment without fear of punishment or reprimand.
- -Not saying "No" or "Not Quite" while ideating
- -Giving tools to think through ideas, such as POPIT
- -Using "dumb questions" as a way to reveal what is unknown

Seeing accomplishments as being a result of actions, not abilities.
- -Praise achievements, not abilities
- -Focus on outcomes, not shortcomings

Embracing Failure
- -Sharing and celebrating struggles and mistakes
- -Having a process for dissecting and learning from the failure
- -Allowing time for revision as part of the process

Creating Psychological Safety

Being able to express ideas and experiment without fear of punishment or reprimand

Not saying "No" or "Not Quite" while ideating

First, this is with a type of question that allows for open-ended exploration, not something that needs a specific answer. "Which Amendment ended slavery?" needs a specific, correct answer. "How can we get more Americans to participate in elections?" is open-ended and offers opportunities for exploration.

Consider a social studies teacher asking, "How can we get more Americans to participate in elections?" Suppose a student answers, "Give everyone the day off to vote." If the teacher responds, "No, that won't work, how are you going to buy food or gas that day if no one is at work?" that shuts down a student's desire to keep ideating.

Give all answers consideration. Yes, even "dumb" answers. A protocol for thinking through dumb answers *later* might be helpful, such as POPIT.

Use tools to think through ideas, such as POPIT

POPIT is a useful tool not just for evaluating ideas, but also for ensuring quality of ideas.

Honestly: I teach middle school. I know what goes through a middle school student's mind when I say, "There are no bad ideas." So, if a student is intentionally throwing out wild ideas you don't think are helpful, throw POPIT at them – let's think through these ideas together.

One question I ask, as a creative warm-up, is, "You're on a field trip out of state and the bus breaks down. How can you get home?" One of the stereotypical "bad" kids said, "Steal a car!"

And so, we go through POPIT.

Plusses: Stealing a car would allow at least a few people to get home.

Opportunities: You could also take the car to the auto parts store to get the parts to fix the bus. Or, you could take the car to the bus barn and get a rescue bus.

POPIT:

Plusses – What's good?

Opportunities – What opportunities might result?

Problems – What are your concerns?

Inquiries – Turn problems into possibility questions:
-"What might be all the ways…"
-"How might we…"

Thoughts – What are the new ideas to overcome the issues?

Problems: I'm concerned that stealing a car is illegal, and you could face long-term consequences for doing so. In addition, you're in 7th grade, and you don't have a driver's license.

Inquiries: So, how might we get a legal ride? And how might you get transportation without actually having to drive, since you don't have a license?

Thoughts: Instead of stealing a car, we could borrow a car, and ask the owner to drive us. We could call a taxi. Or, the bus driver could drive the car.

And, because we went through POPIT, we wound up with some actual good ideas. Bad ideas can be a way to work toward good ideas.

Using "dumb questions" as a way to reveal what is unknown

I thought I had a great critical-thinking activity planned. We were going to have a whole-class debate over, "Should we send people to explore Mars?" It was going to be great. We were going to discuss risk vs. reward – what could people learn on the ground that robots can't? Is it worth the risk of sending people? I was really looking forward to this exercise.

And then, one of my seventh graders asked, "I have a question: is Mars the red one?"

That seems like a dumb question, but it led us to reveal that 1) we didn't understand the challenges of going to Mars, 2) we needed more information on the methods of traveling to Mars, 3) we needed to know more about astronauts and space exploration in general, 4) we needed to know that Mars is our closest neighbor.

"Dumb" questions can be a great way to reveal what you don't already know. They can also get us out of a thinking rut, where we can't see a problem out of the framework we already know.

The Polaroid instant camera was developed after the inventor, a photographer, spent a day-long photography adventure with his young daughter. After spending all day taking pictures, he told his daughter they needed to wait a day for the film to develop before they could see them.

His daughter asked one question that may have seemed like a dumb question: "Why?"

That one simple question led to the line of thinking that eventually gave rise to the Polaroid instant camera.

Use dumb questions as a launching point for a lesson or investigation. Allowing for dumb questions frees people up to be able to give wild ideas, which is important for creative ideation.

Creating Psychological Safety

Seeing accomplishments as a result of actions, not abilities

"We were seeing much weaker applicants. A lot of these kids didn't just need discipline, they needed a mental makeover. They'd never belonged to a sports team, they'd never had a real job, they'd never done anything. They didn't even have the vocabulary for ambition. They'd followed instructions their whole life."

Is that a senior manager describing his unmotivated employees? An HR Director bemoaning the dearth of applicants?

That was General Charles C. Krulak describing new recruits to the U.S. Marine Corps.

When people are just told what to do their entire lives, it doesn't lead to much of a feeling that they have control over their lives. That is what we call *Locus of Control*.

People with an *Internal Locus of Control* believe they control the course of their lives.

People with an *External Locus of Control* believe their lives are governed by forces outside their control.

Gen. Charles C. Krulak, USMC

General Krulak had to implement changes into the Marine Corps Basic Training. While much of their changes have been unpublished, Locus of Control researchers have published many similar methods.

You want your students to be *Biased Toward Action* - capable of taking action when needed, believing that they can, and inclined to do something over doing nothing.

That's what the Marine Corps wanted, and that's what you want, too: A *Bias Toward Action*.

In order to help students learn to believe it is their actions, and not outside forces, that govern outcomes, you can 1) Praise achievements, not abilities, and 2) Focus on outcomes, not shortcomings.

Praise achievements, not abilities

When people are praised for their accomplishments, they learn *they* are in control of the results of their work.

When people are praised for their natural abilities (e.g., "You're such a good leader," "You're really good at math," "You learn really quickly") they believe their skills and talents are innate and unchangeable.

Instead of saying…	**Say this instead…**
You're so good at that.	I noticed how hard you worked at that.
You're a great leader.	I noticed how effectively you worked to earn your team's trust.
You're a fast learner.	That training wasn't easy. Getting through it is a great accomplishment.

Focus on outcomes, not shortcomings

Studies show focusing on someone else's shortcomings activates their fight or flight response and impairs learning, instead of enabling it. Studying information from fMRI scans shows that brains respond to critical information as a threat.

However, how *you* feel is an undeniably true source of information.

Take note of actions, or a student's actions, that produced a positive outcome. Point these out. This helps create a vision of what excellence looks like that people can strive to achieve, rather than activating their fight or flight response to avoid.

Likewise, when giving feedback, focus on helping the student see the *outcome* from your point of view, instead of *themselves*.

Instead of saying…	**Say this instead…**
Here's what you should do.	Here's what I would do.
That didn't really work.	When you did *x*, I felt *y* or I didn't get that.
You need to improve your communication.	Here's exactly when you started to lose me.
You lack strategic thinking.	I'm struggling to understand your plan.
You should do *x* [in response to a request for advice]	What do you feel you're struggling with, and what have you done in the past that's worked in a similar situation?

*From "The Feedback Fallacy," Harvard Business Review, March-April 2019.

Creating Psychological Safety

Embracing Failure

Edison supposedly needed 1,000 attempts to make a light bulb. Can you imagine if he only had one?

Embracing failure doesn't mean allowing a student to fail a class, a test, or a grade level.

It means that, whenever you give creative tasks that have no single correct outcome, allow space for experimentation and failure, and then have resources for recovering from that failure.

Sharing and celebrating struggles and mistakes

A major struggle with students today is the willingness to make mistakes. The reasons range from being afraid to look bad in front of their peers, to parent pressure to get "A's" to teacher demands to "do things right the first time."

Open-ended challenges, if appropriate for the student's skill level and truly open-ended, should be difficult to get right the first time. Outside of school, many of the biggest challenges need dozens of attempts before the best solution becomes clear.

At the end of work sessions or class periods, allow a few minutes to share mistakes and struggles. Initially, this will be slow and awkward. But, with persistence and regularity, classrooms gradually learn to embrace mistakes.

Some teachers have made a "Mistake Board" where students can post their mistakes for others to see.

Taking time to discuss and celebrate mistakes destigmatizes mistake-making. So, not only take time, but make an effort to celebrate. Use your teacher corniness to clap and cheer! Make the rest of the class clap and cheer! Failures that lead to learning should be celebrated, not hidden, and not seen as a sign of weakness, or as a middle school student may put it, "being dumb."

Having a process for dissecting and learning from the failure

This isn't always a skill that comes naturally for students. In fact, it rarely does. Field professionals also struggle with this ability. Failure researchers Välikangas, Hoegl, and Gibbert show that, to the untrained, *failure trauma* can prevent further innovation, and that processes can be put in place to not only help us learn from them, but keep small failures from mushrooming into catastrophes.

Keep the failures small

- Encourage early reporting of small problems. This doesn't mean you have to solve the problem for them, but you can assist in thinking.
- Assist students in making self-directed benchmarks for the project, and reporting to you if they don't meet the benchmarks. This can detect failures before the final project comes due.
- Help students understand what a failure is. Sometimes it's trying a wrong technique or method, and sometimes it's just the inability to come up with a solution.

Disengage

- The more time and effort that is invested in the failure, the harder it is to cope with the failure. Recognize this impact, and allow time to disengage when the failure happens.
- Perhaps take a walk around the library, read for a few minutes, or go get a drink.
- Communicate that it's OK to be upset and disappointed, and that their most important goal right now is just to cool down, and we'll figure out what happened later.

Analyze

- Focus on "What happened?" over "Who did it?"
- There are three types of mistakes: Careless mistakes, systematic mistakes, and misconceptions. What kind of mistake was made?
- What was I trying to do? What went wrong? When did it go wrong? Why did it go wrong? What will you do differently next time?

Allowing time for revision as part of the process

When I was in 8th grade, I participated in the typical science class egg drop competition, where we all built contraptions to allow an egg to survive a drop from a building. I had what I thought was the perfectly unique design, certainly something no one else was trying: I would use a coffee can, pack it full with sand, and place the egg in the middle. My theory was that if the can would be incompressible, the egg in the middle would not break.

I was wrong. The egg broke spectacularly. However, my class didn't get the chance to revise our projects and try again, learning from our first attempts. If real-world research and development organizations get time after time after time, your class should at least get two shots.

Curiosity in the Classroom

The greatest innovations begin with, "I wonder…"

It's no secret students in younger grades ask more questions (considerably more questions) than students in older grades. In many situations, the ability to stay focused is more important than asking questions.

In the words of researcher Susan Engel,

> *Teachers feel they should emphasize routines, follow scripts, and make sure children master preset academic goals, especially in the early grades, and in classrooms that teach students whose families have low incomes. The push toward testable mastery of concrete information and skills may buttress an underlying implicit idea about children: that they will only learn what they are taught, that they will not learn if they are not offered an extrinsic reward (or threatened with punishment), and that they are best off learning what adults decide they should learn.*

The benefits of curiosity are many, but most important to creativity, they spur us to make connections – connections between things, objects, ideas, and problems. These connections allow us to be creative and innovate.

In the early 1900s, most potential airplane inventors were convinced any potential aircraft would have to be self-stabilizing, as humans wouldn't be able to control it. The Wright Brothers, however, were bicycle builders, and they made an important connection: if humans could balance and control a bicycle, they could control an airplane. Their system of human controls is what finally allowed airplanes to fly.

Curiosity in the classroom can be promoted by:

- Encouraging and modeling frequent questioning
- Asking students, "What have you been curious about?"
- Google time!
- Sharing interests and expertise outside of the class subject
- Allowing time for tangents

Encourage and model frequent questioning

If you want your students to ask questions about the world, it helps if they see you do it! You can stop mid-lesson to ask questions that come to mind, on-topic or not.

Better yet, plan for it, but make it look spontaneous. If you're studying musical composers, you can spontaneously think, "That's interesting, I wonder why Mozart wrote 46 symphonies and Beethoven only 9?" And then, let people look into it.

They don't necessarily need to be on topic. Notice and explore things you find fascinating, and build a culture of curiosity.

Asking students, "What have you been curious about?"

Many teachers include some sort of warm-up activity, or "bell-ringer." This is a great bell-ringer question: "What have you been curious about in the past two days?"

Taking time to consider your own curiosities can help you take note of more curiosities in the future. It helps bring curiosity to the forefront of the mind. Unconsciously, it helps us seek out questions and ponder the answers.

Google Time!

This follows asking what students have been curious about. Most schools allow students some sort of internet-connected device access. So, discuss your students' curiosities, and then give them time to Google them!

Sharing interests and expertise outside of the class subject

Remember show-and-tell? Every student is an expert on something. It may be Fortnite or TikTok, but every student is an expert on something. Allow students who have interests and expertise outside of your subject an opportunity to share, and encourage (and model) asking questions about it.

The best outcome is when the answers lead to more questions. Start a dialogue of information-sharing, just for fun. This will start to build a habit of curiosity.

Allow time for tangents

Most researchers seem to note that this is what kills student curiosity – a student asks a question that seems off-topic, or not quite on-topic, and the teacher shuts down the question in an attempt to stay on topic.

Good use of time in classrooms is important. However, if you can't take the time to answer the not-quite-on-topic question immediately, make a public note of it and allow time for investigation before the end of the class period.

This shows that our questions and curiosities are valuable and should be investigated, rather than discouraging us to think about anything besides that day's lesson.

Divergent Thinking in the Classroom

The greatest innovations begin with, "I wonder…"

Divergent thinking is the ability to generate many different ideas. Divergent thinking is measured in *fluency* (number of ideas), *originality* (uniqueness of ideas), and *flexibility* (category shifts in ideas).

Divergent thinking always begins with an open-ended question of some sort – "What new Constitutional amendments are needed today?" "What's the best way to estimate the volume of this building?" "How might animals evolve in the next thousand years?" "What features would you need in an online planner app?"

It is important to remember that divergent thinking is *not,* in itself, creativity. It is an important step in the creative thinking process, but divergent thinking is only the aspect of idea generation. Only a fully-realized idea is technically "creative."

The next few pages will give ideas and exercises to promote divergent thinking, but first, let's examine what inhibits divergent thinking.

Rules for Diverging:

Defer Judgement – Go with whatever comes to mind. Don't judge or evaluate the idea until later.

Strive for Quantity – More ideas mean a greater chance of having a good idea. Once you have all the typical ideas, push to consider new ones.

Seek Wild and Unusual Ideas – It's easier to tame a wild idea than invigorate a weak one. The wilder, the better.

Connect and Build – Let one idea spur other ideas. Build, combine, and improve ideas.

Inhibitor #1: Failure to reserve judgement

Asking students – or adults – to reserve judgement is asking them to go against their basic instincts. No one wants bad ideas implemented, and the need to judge ideas immediately stems from a desire to avoid uncertainty. Evaluating ideas right away is natural, but students need to learn to tame this need in order for creativity to flourish.

I like to say, "Every idea you have is worth writing down." Ideas can be self-judged or judged by the group, but judging ideas during divergent thinking inhibits thinking ability. After you have produced far more ideas than you could ever need, then you can evaluate and judge the ideas.

Divergent thinking should be fun, free-spirited, and flowing. Accept any idea given as valid and true, build on it, and go for more.

Inhibitor #2: Knowledge constraints

Knowledge constraints are your existing knowledge on a subject. If I were asked to design a radically new car, the car I designed would probably still have four wheels and a steering wheel because, to me, that's what a car is. My existing knowledge about cars inhibits my

ability to think of something new. Neuroscience suggests this is useful in our brain's ability to save energy, but harmful to our ability to think creatively.

The big problem classrooms face is when the teacher gives students an example. That example then becomes a knowledge constraint (which is why students often turn in simply variations of the example instead of original work).

Knowledge constraints can't always be avoided, but they can be mitigated. Divergent thinking techniques and exercises (page 37) can help us overcome our knowledge constraints, as well as being aware of our knowledge constraints.

Inhibitor #3: The belief that there is a single answer

Some studies have shown that students think at the upper levels of Bloom's Taxonomy (Synthesis and Creating) in classrooms only 20-25% of the time. The other levels (Knowledge, Comprehension, Application, Analysis) are comprised of tasks that primarily expect a "right answer" and comprise 60-80% of the thinking time.

This means, even when you ask an open-ended question or provide an open-ended task, *students may still think the same way they do when trying to find a single right answer.*

To overcome this, students need to 1) know there is not a single right answer, and 2) have regular practice in tasks where there is truly no pre-defined "right" answer.

Practice Divergent Thinking

Practice getting your mind going in many different directions

Divergent thinking is a skill, and, like any skill, the ability to think divergently can be improved with practice.

These are strategies to practice divergent thinking, outside of the context of actual problem-solving. You can see dedicated tools for diverging during actual problem-solving on page 32.

These can be used as a warm-up to a problem-solving session, or as independent exercises done outside the context of an actual problem.

These exercises are all intended to teach students how to think in scenarios where they are not trying to find a single, right answer.

Ask silly, open-ended questions

Sometimes, you simply need to *practice* divergent thinking. In that case, I've prepared for you a list of some silly, open-ended questions, all designed to allow participants to generate multiple ideas. Feel free to add your own!

- How might the world be different if the wheel had never been invented?
- What are all of the things a self-driving car needs to know and pay attention to?
- You are on a trip eight hours away from home and your car breaks down. How can you get home?
- You are flying a drone and you get it stuck in a tree? How can you get it back?
- What are some ways to clear snow off a driveway without a shovel or snowblower?
- When you get home, you need to mow the lawn and make dinner, but you don't have time to do both. How can you make sure both are done?
- You have been dropped off in a random town in a foreign country where they don't speak the same language as you. You have no money. How do you get home?
- How would the world be different if we didn't need sleep?
- How can the school benefit from a donation of 1 million ping-pong balls?

Problem/Constraints

Adding constraints, limitations, or restrictions helps you focus on a specific problem and helps prevent your mind from wandering.

Constraints can often lead to your most creative ideas! In the classic film "Back to the Future," the iconic clock tower sequence at the film's climax was not in the original script. It was created when the producers insisted on cutting $5 million from their budget, and the directors had to make this scene using sets they had already built. (The original plan was to have Doc and Marty take their time machine into the desert and have a nuclear bomb dropped on it).

Example constraints:

Problem: You are just about to depart on a two-week road trip with your family. Your boss calls with an urgent request for you to complete next week.

Constraint: You cannot cancel your trip or refuse your boss.

Problem: You need to throw a last-minute surprise birthday party for your coworker.

Constraint: You cannot spend any money.

Problem: Write a short story or play.

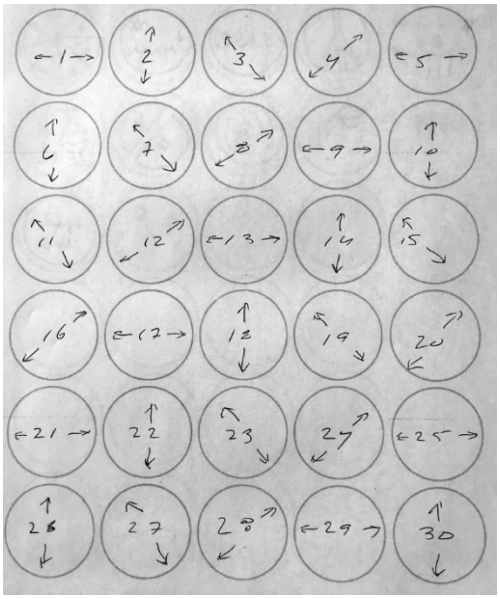
Constraint: It must include a hammer, a chef named Carl, and the phrase, "I never said I did."

Thirty circles

Given a sheet of paper with 30 blank circles, take three minutes and fill in as many circles as possible with little doodles. There need be no rhyme or reason (though there can be if the individual participant desires).

The reason for 30 circles is quantity over quality. Stop self-censoring and thinking about whether an idea is good or bad – you can always do that later.

See more: Tim Brown, TED 2008, "Tales of Creativity in Play."



(A blank 30 Circles worksheet is in the resources section)

Far analogies

Practicing making connections between dissimilar items helps your brain become used to making connections, which increases creativity. Our brains are designed to use the least amount of effort when thinking, which is what makes it hard to think differently. Repeated practice at forcing your brain to think "away from the path of least resistance" makes it easier for our brains to work that way consistently.

Far analogies is an exercise where you take two dissimilar words or objects, and force yourself to make a connection between them by writing a chain of words.

For example – Rubber and Bread.

Make a chain of words that links them:

Rubber – Tire – Car – Road – Store – Grocery Store – Bread

Example: Outer Space and Bowling
Outer Space – Flying – Fly Ball – Baseball – Strike – Bowling

Example: Calendar and Couch
Calendar – Dates – Day and Night – Nap – Couch

What makes this exercise fun is, given the same two words, many different people will produce many different chains. Regular practice at exercises such as this help the group learn to make connections and think creatively on a regular basis.

Wild metaphors

Similar to far analogies, wild metaphors also force our brains to make connections between two dissimilar items, which makes it easier for our brains to make connections on a regular basis.

To make a wild metaphor, take two dissimilar items and connect them with the sentence:

_____ is like _____ because _____.

Examples:

White paint is like a deck of cards because I can make any pattern I want.

A clock is like a sponge because it changes over time.

Tea is like a nap because I can have some whenever I want.

These metaphors don't need to be particularly humorous or catchy, just a phrase that connects the two dissimilar items in some way. Regular practice makes it easier for our brains to make connections, leading to more creative output.

Five things in a category

This is a warm-up technique favored by improv comedians. To them, this helps free up their minds and get them used to creating associations between things.

Name a category, and then name five things in that category. The key here is to be *fast*, not *right*.

For example: **Cats**

Some might limit their answers to: Siamese, Tabby, Persian, Bengal, Munchkin.

But, don't limit yourself. These five are equally good: Tabby, Garfield, Yellow, Fat, Big.

Also, there's no need to be right, just fast: Tabby, Garfield, Lalala, Dog-like, Angry.

Often times, improv comedians stand in a circle. One person gives the category, and the next person gives the five things – quickly, not accurately. Then, that person gives a different category to the next person.

Practicing this exercise, over time, can improve your ability to make connections and generate ideas while divergent thinking. Make it a fun game in the classroom!

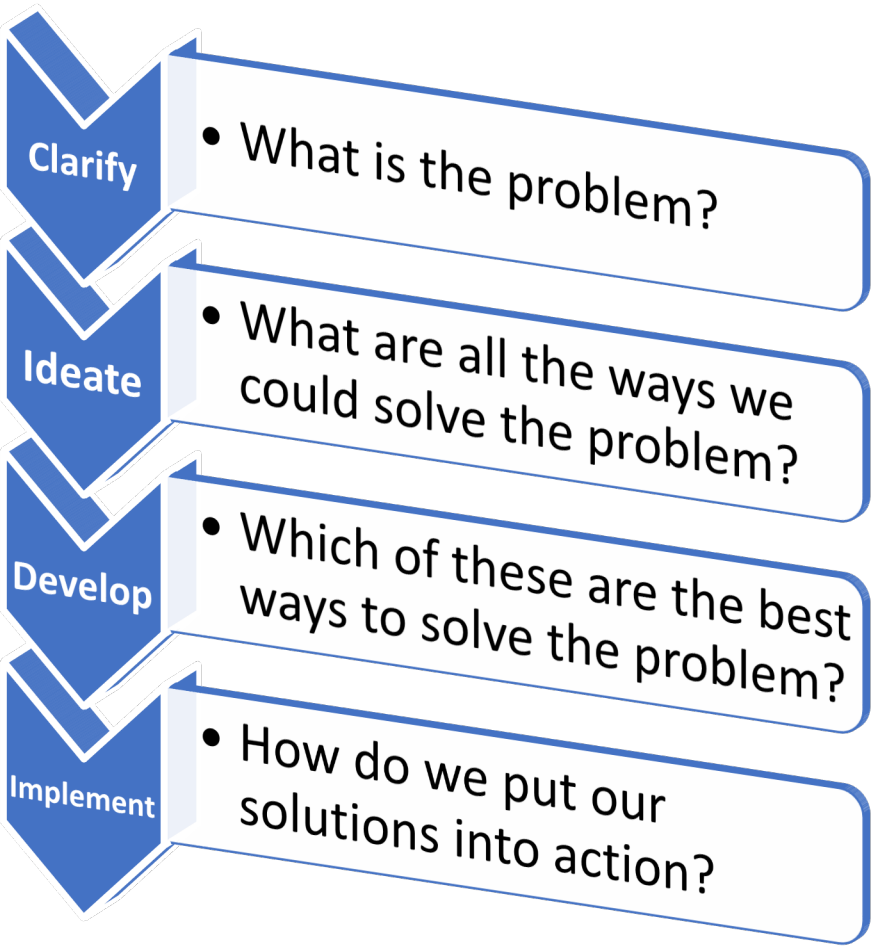
The Creative Problem-Solving Process in the Classroom

How to make creative groups

As a teacher, your job is to give the students a problem to solve that is 1) Novel, 2) Complex, and 3) Ill-Defined. The problem should have an opportunity for students to land on a single, well-defined solution, but that solution should not be one that you have identified from the onset as being "correct." There should be many different outcomes that could all be correct, but the goal for the students, at the end, is to have considered many, but evaluated and chosen one or a few.

For examples, see page 10.

Once you have given the students the problem to solve, begin working through the Creative Problem-Solving Process.



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About the Author

David Dubczak, a.k.a Creative Dave, loves helping people be more creative. He believes everyone has their own secret "Genius Mode," and creative thinking is the key to unlocking it.

As an educator, his passion is teaching kids to fail. In research and development industries, the ability to fail and learn from failure is incredibly important. Schools today don't share that view, and he's trying to change it.

David is also an award-winning playwright, and his video productions have won several awards with organizations such as the Iowa Motion Picture Association, Broadway World, and the Festigious International Film Festival Los Angeles.

David earned his Bachelor of Science in Education at Drake University, and his Master of Education in Instructional Design and Technology at Iowa State University. He loves to speak and workshop on creativity and productive failure.

Book him at CreativeDave.net, and see his other productions at ConjunctionMedia.com