

**Creative Product Problem-Solving Game:
Exploring Torrance's Creative Strengths by
Making an Object from a Set of Given
Materials**

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Abstract

Creativity is a talent that undergirds invention and innovation, making it an important skill in today's society. Although students are often told to "be creative," they many times do not know how and have little practice in this skill. This document presents an analysis of 33 creative products made by adult participants at a state conference for educators working with preK-12 gifted students or their teachers as a

model for what teachers can do in their classrooms to allow students to practice creative thinking. During the conference presentation, Torrance's creative strengths were reviewed with photographic examples, definitions, and suggestions printed on handouts. For the problem-solving game, each participant was given an identical set of recycled/craft materials, and about 30 minutes to create an object or scene fitting with a given theme. This presentation was delivered each of the two days of the conference with a different theme each day: "under water" was the theme the first day and "cool space" was the theme for the products on the second day. Participants each created an object that exhibited creative strengths and followed game-rules using the additional tools of scissors, glue, markers, and thread. Photographs of the final products are shown with their creative strengths identified. Most participants were successful in developing products that showed five creative strengths as required by the game rules. The most common approach to making a creative product that exhibited creative strengths was to tell an original story involving some motion that was detailed, artistically appealing, or humorous, and contained characters with emotional expressions. Because of the success and enthusiasm of participants for the game, the authors recommend it for students, clubs, and recreational activities. [7 Tables, 33 Figures, 6 References]

Introduction

The Importance of Creativity Today

Creativity is particularly important these days because of the need to use creative thinking in solving the tremendous problems the world is facing. Innovative ideas are needed to solve the negative effects of global climate change, the need for greener sources of energy, the shortage of many raw materials and

resources, strained political situations, ecological problems, aging populations, increasing speed of communication through technology, and poverty, among others (Marx, 2006). All countries need creative people to provide inventions and new processes to sustain economic growth in an environmentally sound way. Creativity helps in exploring the problems people face in daily life and in generating a variety of solutions, easing transitions. Furthermore, creative thinking exercises are generally fun and engaging for participants, allowing many to experience “flow” – a mental state in which the person is immersed in energized focus and successful accomplishment (Csikszentmihalyi, 1997). What better place to begin developing creative thinking skills than in school? The following section discusses some issues related to this.

Practicing Creativity at School

Often at school, students are told to “be creative” without really knowing how to do that and without having dedicated practice in creativity skills. Creative behavior is cultivated in environments that encourage risk-taking rather than certainty; investigating the unknown and revising the known. Creativity also involves novel approaches to imagining what might be. This document describes a game that provides a setting to facilitate creative behavior. The activity is appropriate for gifted and talented students, but also for *all* students in the classroom. It can be used to reinforce learning by making the “theme” match a unit of instruction. It can also stretch the thinking of the students to revise what is known by challenging them to interpret the produced artifact from another point of view. It is important that students have the opportunity to share their work and to showcase the creative strengths evidenced by the work. Providing students a chance to think about their thinking through sharing of products creates an

opportunity for them to grow creatively through self-analysis and through the examples of classmates.

Added Advantage of Recycled Items

The creative problem-solving game featured in this document includes recycled objects in the list of given items. Using recycled items adds to a student’s flexibility skills because recycled items may be intended for one use related to a specific product, but the student uses the items for her/his own purposes in making a new product. This may be considered flexibility in generating multiple uses for an item. Students also practice their ability to generate multiple views of things as they envision the item being used upside-down, cut into pieces, rotated, or distorted in some way. This type of activity supports higher order thinking in that it stimulates criticism of the existing uses of everyday items and helps the student think of innovative ways to use or re-use objects. In addition, using recycled items contributes to the economy and preservation of the environment by reducing the amount of raw materials needed to make new products. This game is a good way to reinforce environmental awareness when the items provided are all, or mostly, recycled materials.

E. Paul Torrance

This problem-solving game focuses on many of the creative strengths identified by renowned creativity researcher, E. Paul Torrance. Because of Dr. Torrance’s huge contributions to the field, some background information on his life is given here.

Ellis Paul Torrance was born in 1915 in a rural Georgia community. As the son of a sharecropper, Torrance was expected to complete farming tasks. However, he was characterized as physically weak. Fortunately, he was nurtured in his academic endeavors by his family and teachers. Encouragement from his

teachers led Torrance into the field of education. As a classroom teacher and counselor, Torrance became interested in creativity while working with “difficult” students who were described as having “off-beat” ideas. The time spent with these students and further educational pursuits lead Torrance to the development of a measure of creativity for elementary children, the *Mother Goose Problems Test* (1960). Torrance also worked with veterans having disabilities and active military members, which gave him the opportunity to define, measure, and work to extend the development of creativity concepts. Torrance’s professional pursuits continued at institutions of higher education where he designed the *Minnesota Tests of Creative Thinking* (1965). Based on longitudinal research

studies, Torrance developed the Torrance Tests of Creative Thinking (Torrance, Ball, & Safter, 1992) that contain verbal and figural components designed to measure creative strengths (Hébert, Cramond, Neumeister, Millar, & Silvian, 2002).

Table 1 includes the creative strengths identified by Torrance, many of which are used in scoring the Torrance Tests of Creative Thinking. These strengths are ways of viewing or thinking about situations or problems or ways of presenting ideas. Referring to this table before, during, and after the game presented here will help players become more familiar with these ways of thinking, apply them to a problem, and recognize them in the work of others.

Table 1. Torrance’s Creative Skills and Strengths

Skill or Strength	Explanation	Tips for Applying the Skill to the Problem-Solving Task
Fluency	The ability to produce many ideas, bypassing initial “common” ideas to get to more unique or creative ones.	Make a list of possible ideas before deciding what your product will be. Keep trying to generate a few more even after you have found a good idea. There may be an even better idea on its way!
Flexibility	The ability to generate ideas from a variety of categories.	Try to generate ideas from every room in the house, for different occupations, from different natural environments, that start with different letters of the alphabet or correspond to different cultures or historic time periods.
Originality	The ability to think of ideas no one else in the class has considered.	Generate wild and off-the wall ideas. Choose a random idea (open a book and point to a word without looking) and generate ideas that are somehow related to it.
Elaboration	The act of adding details to your ideas or product to improve it.	What textures, appendages, extra features, background scene parts, outlining, or details can you add to make the product more interesting or exciting?
Internal Visualization	The property of showing the interior or contents of an object.	Is there a way to show what’s inside your object? A cut-away view or a window might work. Can the door or mouth or purse be open to show the contents?
Unusual Visualization	The property of showing a perspective or aspect that is uncommonly portrayed.	Can you provide a non-standard position or view of your object? Maybe it is magnified or shrunken. What about a view from below or above. Perhaps it is foreshortened or exaggerated or contorted.
Three-Dimensionality	The property of having length, height, and depth.	Can you make your object seem “chunky” rather than flat? Can you add shading to make a drawing seem to have depth and shadow?
Breaking boundaries	The ability to break unspoken rules or conventions	What unspoken rules can you break? Perhaps you use a material in a way the manufacturer did not intend. Maybe your product spills over its customary space. Think of what is conventional and then disobey that “rule.”

Table 1. Continued: Torrance's Creative Skills and Strengths

Skill or Strength	Explanation	Tips for Applying the Skill to the Problem-Solving Task
Movement or action	The suggestion of motion by pose, position, motion lines, blurring, or mechanical movement.	Is there a way your product can be hinged or allowed to move, rotate, spin, or pivot? Can you pose it in a stop-action way? Is there some action happening that you can accentuate with motion lines?
Speech or Sound	The property of making a noise or showing speech through a speech bubble.	Can your object make a sound? Can you represent a talking balloon or bubble on it? Can you provide a label that tells what the character is saying or the noise part of the item is supposed to make?
Colorfulness	Sensory impact of imagery that includes visual, auditory, tactile, olfactory senses.	Does your product convey the sharpness of the thorns or the softness of the velvety fabric? Can you smell the lemon or rose on it? Are your senses stimulated by the images?
Emotional Expressiveness	The property of expressing emotion through facial or body language or talking bubbles.	Does your product convey emotion through facial expressions, body language, or title/label? Emotions are interesting.
Story-telling Articulateness	The ability to convey what happened before and what is about to happen through position, props, and title/label.	When we look at your product, can we tell what is going to happen next? Can we see the history of the object?
Fantasy	Imaginary characters, lands, events.	Does your object portray any fantasy characters, historical figures, famous persons or storybook characters like elves, fairies, dragons, unicorns, Little Bo Peep, President Obama, or Paul Bunyan?
Richness of Imagery	Artistic appeal of the images or product.	Is your artwork and creation artistically appealing? Can you smooth the lines or make adjustments to improve its appearance and appeal?
Effectiveness of Title	Title conveys abstract idea or effective description.	Choose a title that presents an abstract or "Big" idea. Or make your title contain some interesting descriptive words that reveal secret information or aspects of the object the viewer may not notice.
Humor	Exaggerated scene, puns, jokes, wordplay.	Is there something funny happening? Is there a word play or pun involved? Can you tell a joke with your scene?
Parody	Recreation of a well-know item in a new way.	Is there a well-known work of art or situation that you can re-create in a charming or humorous way?
Abstract Ideas	An idea that is not directly observable; a quality or characteristic that is not physical.	Is there some quality that this creation embodies? Does the item or scene being made give a message?
Resistance to Premature Closure	Not jumping to the obvious; waiting to generate many possible ideas and then choosing an unusual one.	What does the item look like? What unusual way can I interpret it? If an item is used as what it was intended to represent, then one has prematurely closed off ideas. Ask yourself how you can use the item in a unique way.

The Creative Problem-Solving Game

How the Game Works

In this game, participants follow certain rules, presented in Table 2, to create a three-dimensional product that fits with a given theme and shows a variety of creative strengths. In the

two versions of the game presented at the conference and described here, the themes were "Under Water" and "Cool Space." Both of these themes could be interpreted in a number of ways allowing the participants ample room to be creative. For example, "Under Water" might be

an ocean bottom, a flood scene, the bottom of a bathtub or under a glass of water; “Cool Space “ might be interpreted as outer space planets or space travel, a teenager’s room, inside a refrigerator, a place with a cool or frigid climate, or a mental state of calm relaxation.

Table 2. Rules for the Creative Problem Solving Game

Abbreviated Rule	Explanation
Identical set	Every student or participant needs to have an identical set of materials/items.
One set only	Participants only receive one set of materials; if the participant cuts something in half, the participant needs to make use of it that way and cannot seek a new set of materials to start over.
Everything used	Every participant needs to use all of the materials in the creative product, including scraps or cuttings. It is permissible to “stuff” these items into another item or “hide” them under other parts, but they must all be present. One cannot trade items with another participant.
Time limit	The teacher sets a time limit (usually 30-90 minutes) and everyone needs to keep within that time limit. For the current activity, the time limit is 35 minutes.
Theme	All work must fit with a given theme. This theme may be related to the curriculum.
Creative strengths or challenges	Participants are asked to include five creative strengths in their work or make their work comply with other “challenges.”
Title	Each creative product needs a descriptive of creative title.
Allowed tools	Participants are limited to certain tools for use in making the creative product- these may be scissors, craft glue, needle and thread and markers [These are the tools allowed in the current activity] or others such as stapler, paper punch, electric drill (consider safety issues) hot glue (consider safety issues).
Creative thinking	Participants can engage in a whole group , small group, or individual creative thinking exercise related to the given materials before beginning to make a product.
Talking allowed	Participants may speak to each other while making the creative products.
Relaxed atmosphere	This is not a contest- everyone should be able to produce a successful, unique, creative product. Relax and have fun!

Each participant was provided an identical set of low-cost craft and recycled materials or items from which to construct his/her product or scene. Participants only received one set of materials and could not seek a new set of materials to start over during the creative process. Every participant was also required to exhaust the entire set of given items, including scraps or cuttings, using a limited set of tools such as scissors, craft glue, needle and thread, and markers (used during the conference presentation) or others such as stapler, paper punch, and so on. It was permissible to “stuff” items into another item or “hide” items under other parts, but all items needed to be present. Participants were not allowed trade items with other participants. Table 4 gives suggestions for items that might be included in an activity and criteria for choosing items are discussed in a later section of this document.

As mentioned previously, all work must fit with a given theme. For those wanting to implement this game in a school setting, the theme may be related to the curriculum and used as a way of reviewing or expanding the concepts. It is a good idea to provide students with a copy of Table 1 so that they can review the strengths from time to time and see if they can incorporate them in their work. Students who are less familiar with the creative strengths appreciate the additional help of having a list of them available. Participants are asked to include at least five creative strengths from Table 1 in their work (as was done during the conference presentation) or make their work comply with other “challenges”, as shown in Table 3. These challenges can be implemented for experienced participants to increase the level of complexity of the activity. The teacher sets a time limit (usually 30-90 minutes) and provides extra challenges depending on the skill level of participants. Each creative product needs a descriptive title;

incorporating word play or puns adds to its creativity.

Table 3. Possible Additional Creative Challenges

Creative Challenges: Include three of these in your product.
Something from another planet
Involves reflection
Somehow related to war
Represents a line from a song or song title
Could be found in a jungle
Starts with the letter "S"
Has a twin, duplicate, or double
Makes a loud noise
Is very valuable
Something a president would want
Found in a bedroom
Can fit in a suitcase
Cannot be killed

If time permits, participants may also engage in whole group, small group, or individual creative thinking exercises related to the given materials before beginning to make a product. It is often effective to ask participants to give possible interpretations of the theme and to suggest uses for the various given items. Participants may speak to each other while making the creative products in a stress-free, cooperative atmosphere. This game is not contest; everyone should be able to produce a successful, unique, and creative product in a relaxed environment.

Table 4. Types of Items to Use in this Game

Item Type	Example
Long, bendable items or things with which to attach other items	Chenille sticks, wire, paper clip, rubber band, string
Long, flexible strip-like items	ribbon, paper strip, lace, yarn
Long, stiff item	Popsicle stick, tongue depressor, twig, plastic spoon, plastic stir rod, dowel rod, plastic straw
Broad sheet-like materials	piece of fabric, pieces of paper or cardboard, tissue or wrapping paper; envelope, aluminum foil
Chunky items	block of foam, wooden block, small box, pinecone, egg carton compartments
Concave base, cup, or bowl-like item	tray from frozen food, plastic bowl, paper plate, or cup
Small items	glass flat marbles, buttons, nutshells, beads, Styrofoam or packing pellets, pompom balls
Distinctive item	paper umbrella, wooden cut-out, distinctive lid
Distinctive shape	round plastic lid, star ornament, metal coin
Item that can be taken apart with parts that can be used in different ways	clip-clothespin, pen
Bulky shredded materials	hay, shredded paper, tinsel, confetti
Sticky item	sticker, sticky note, piece of duct tape placed on waxed paper
Transparent item	clear lid or cup, piece of cellophane, clear plastic glove

Increasing the Challenge of the Game

More advanced groups of participants or students may want to add additional challenges to the activity to increase the level of complexity. These additional challenges were not incorporated into the activity presented at the conference and described here, but a group that enjoys this sort of problem-solving activity may eventually seek more complex and challenging problems. Some example additional challenges are given in Table 3.

Ideas for Designing Sets for the Creative Product Problem Solving Game

The items in the set need to be of different materials and properties. Here are suggestions for what to include: try to include something from each category; consider using recycled items in the sets; think about the ease with which items may be attached with glue or cut with scissors.

Several different sheet-like-items may be included but do not exceed the size of a legal-size piece of copy paper in total area when considering the combined size of the items or there will be too much material.

Safety Issues

Especially for younger students, avoid items that are messy or tempting-to-eat and which may be or become unsanitary after handling (candies, sand, dirt). *Never* include a poisonous item. Avoid sharp items like straight pins and things with very sharp edges such as metal cut can lids.

Rubric

Table 7 presents a rubric that may be used for scoring student products. Allowing students to see the rubric before beginning their products helps them notice the various aspects of the work.

Table 5. First Example Set of Materials Used in the Conference Presentations

“Under Water” Themed Set

Blue fuzzy chenille stick (pipe-cleaner)
 5 x 8 inch blue cardstock
 4 x 5 inch light green cardstock
 6 x 8 inch green swirl pattern fabric
 Wooden dinosaur cutout
 2 pieces white Styrofoam peanuts
 Green ribbed plastic drinking straw with 2 plastic penguins attached
 4.5 x 1 inch strip gold glitter foam
 Clear square plastic container lid
 Yellow foil packet of lemon flavoring
 Five silver stars on a string
 1 foot length navy blue yarn
 2 green wire ornament hangers
 3 Pistachio nut shell halves
 Small yellow coin envelope
 White coffee filter

Table 6. Second Example Set of Materials Used in the Conference Presentations

“Cool Space” Themed Set

Pink fuzzy bumpy chenille stick (pipe-cleaner)
 1 foot of inch-wide peach grosgrain ribbon
 Green plastic palm tree drink stirrer
 Clear plastic shot glass
 Wooden clip type clothespin
 Wooden tongue depressor
 Black foam block
 Three silver stars on a string
 3 white flat glass marbles
 Red spattered cardboard frozen food tray
 5 x 6 inch red heart netting
 5 x 8 inch buff cardstock
 7 x 3 inch white envelope with spoonful of multicolored confetti paper punches inside
 2 sections of a cardboard egg carton
 Apple and star stickers
 2 black plastic drink stirrers

Table 7. Example Rubric for Scoring Student Product and Process

Category	Points			
	3	2	1	0
Material Usage	Student followed all of the rules for material usage, discarding nothing	Student did not incorporate 1 or 2 of the materials	Student did not incorporate 3 or 4 of the materials	Student did not incorporate 5 or more materials
Creative Strengths	Five creative strengths were identified in the product	Four creative strengths were identified in the product	Three creative strengths were identified in the product	Less than three creative strengths were identified in the product
Creative Process	Student had a positive attitude, showed originality, and engaged in risk taking	Student had a positive attitude but copied ideas from others or showed no signs of taking risks	Student may have had difficulty with the task but maintained a positive attitude	Student was not engaged in the activity
Application of Theme to Product	Product shows connection to theme in an original way	Product shows conventional interpretation of theme	Product only distantly related to theme	Product not related to theme

Creative Strengths Shown by Artists' Work Using the "Under Water" Theme



Figure 1. Real versus Social Self: Drowning or Treading Water?

The following characteristics were creative strengths shown by Figure 1.

Fluency: The artist here generated many ideas for the "Under Water" theme and then chose this unusual and abstract idea of drowning or treading water as the social self fights with the real self.

Abstract ideas: The symbolism of real and social self and the key in the envelope represented an answer to the problem.

Play on Words: This scene applied the phrase or term "treading water" and "drowning" to a situation that really does not involve water.

Originality: The idea of making a model of the real and social selves was unique.

Resistance to Premature Closure: The penguins were used as a divider between the two selves rather than as penguins.



Figure 2. The Colors of Coral

The following characteristics were creative strengths shown by Figure 2.

Originality: The penguins (black item) were used as something other than penguins. In this case, the penguins have become the black base of the coral.

Unusual Visualization: The height of the coral scene evoked a feeling of the underwater depth of the coral.

Movement: The swirling red lines on the light-colored wooden dinosaur cut-out and the white coffee filter showed a lot of motion.

Resistance to Premature Closure: The artist was able to use the wooden dinosaur in a unique way as part of the coral.

Elaboration: The marker lines showed many details of the coral.



Figure 3. Underwater Scene of the Ocean

The following characteristics were creative strengths shown by Figure 3.

Elaboration: There was a lot of detail in the seaweed fronds and all of the additional creatures in this underwater scene.

Emotional Expressiveness: The fish faces displayed contentment.

Motion: The direction the fish were facing and the seaweed frond positions showed motion and undersea currents.

Flexibility: The variety of objects depicted in the scene were from different categories: sand and rocks, fish, seabirds, and seaweeds.

Three-Dimensionality: The bottom blue base and the top canopy of greenery framed a three-dimensional scene.



Figure 4. Portal to the Deep

The following characteristics were creative strengths shown by Figure 4.

Internal Visualization: Notice the “glass” panel in the back. This was a view through the side of a fish tank.

Motion: The flowing greenery of the scene implied the underwater currents.

Originality: The idea of making the wooden dinosaur into a segmented fossil skeleton was unique.

Elaboration: The many stalks of seaweed and the broken parts of the dinosaur fossil evidenced elaboration.

Three-Dimensionality: The usually flat yellow envelope had been stuffed, molded, and twisted to form an undersea coral head.



Figure 5. View into the Ocean

The following characteristics were creative strengths shown by Figure 5.

Internal Visualization: This glass bottom boat revealed the internal view of the ocean floor and dinosaur fossil remained buried in the sand.

Story-telling Articulatness: The story told what people who ride in the boat saw and the dinosaur remains implied that the dinosaur once lived there.

Motion: The glittery sand panels were shifting sands that partly cover the dinosaur and showed motion.

Elaboration: The sign told the price of the boat ride, adding details.

Unusual Visualization: The penguin faces were sideways, looking out through the window.



Figure 6. Penguin's Hideaway under the Ice

The following characteristics were creative strengths shown by Figure 6.

Internal View: This scene represented the inside of an octopus cave below an ice shelf.

Elaboration: There were many characters in this scene and the blue marker lines added details.

Richness of Imagery: The octopus, goldfish, and turtle were very charming and artistically appealing.

Humor: The gold bow ties on the penguins were humorous.

Abstract Ideas: The "hideaway" aspect of this scene's title showed the mystery and secretiveness of the underwater place.



a. Top View



b. Opened View of Pop-up
Figure 7 a and b. Sink or Swim

The following characteristics were creative strengths shown by Figure 7.

Unusual Visualization: The top view of this clever pop-up depicted things that had sunk to the ocean bottom; the open pop-up view displayed penguins swimming (“Sink or Swim”). This work showed motion and an unusual perspective as the pop-up opens.

Originality: The pop-up construction was unique to this creation- no other creations utilized this type of construction.

Motion: The blue chenille stick represented motion as did the Styrofoam clouds.

Play on Words: The title, “Sink or swim” was a common phrase that was exemplified by the sinking items in the top view and the swimming penguins in the opened pop-up.

Richness of Imagery: The opened pop-up had a very pleasing white and blue pattern to it that generated artistic appeal.



Figure 8. Seafood Platter to Go

The following characteristics were creative strengths shown by Figure 8.

Unusual Viewpoint: Predators viewed penguins as a seafood platter.

Humor: The cute penguins with hats being put on a platter were funny.

Emotional Expressiveness: The predator’s face included a jagged mouth implying teeth and the tongue was coming out to signify the predator’s hunger and intentions of eating the penguins.

Story-telling Articulateness: The scene illustrated the story of penguins having fun unaware of the predator who was about to eat them.

Richness of imagery: The scene was symmetrical and compact, evidencing artistic arrangement of components.



Figure 9. Underwater World of Iowa

The following characteristics were creative strengths shown by Figure 9.

Breaking Boundaries: The artist here broke the rule of not using the bag and added the bag to represent the covering of water on this flooded Iowa town.

Original: This was also a new interpretation of “under water” as this was under flood waters rather than under the sea.

Speech: The sign said, “Welcome to Hamburg.”

Elaboration: The shingles for the roof were shown with detailed marker lines.

Resistance to Premature Closure: The dinosaur cutout was made into a chimney for the house.



Figure 10. Penguin Vacation

The following characteristics were creative strengths shown by Figure 10.

Story-telling articulateness. The artist described the work: The penguins went on a vacation via the boat on the right to a warmer spot in Scotland. They took a glass-bottom boat tour of Loch Ness. Then they noticed the Irish potato famine and followed the Yellow Lemon Road to the pot of gold at the end of the rainbow.

Elaboration: The story had many parts and details.

Parody: The “Yellow Lemon Road” was a parody of the Yellow Brick Road from the Wizard of Oz where Dorothy traveled over the rainbow.

Fantasy: The pot of gold was a folklore idea from Ireland.

Resistance to Premature Closure: The wooden dinosaur cutout was used as the outline of Loch Ness.



Figure 11. Buried Treasure

The following characteristics were creative strengths shown by Figure 11.

Movement /Action: The dangling octopus showed motion as it swung back and forth in this scene.

Internal Visualization: The treasure was hidden beneath the blue ocean wave Styrofoam container.

Richness of Imagery: The arrangement of the items with one dangling and others sticking out was very pleasing and artistic.

Three-Dimensionality: The scene extended far in all directions because of the dangling octopus and angled seaweed.

Original: the stuffed octopus was made from a flat coffee filter.



Figure 12. Limousine for Penguin Rock Stars

The following characteristics were creative strengths shown by Figure 12.

Motion: This inventive work sported a seaweed-fueled jet-propelled limousine for penguin rock stars and their manager. The green seaweed strands implied motion.

Originality: The limousine and rock star ideas were unique.

Fantasy: The rock star in an underwater limousine was an enchanting fantasy.

Parody: The idea of sea creatures wanting to have green energy was parallel to current human campaigns.

Story-telling Articulateness: The penguin rock star was riding in a limousine to promote environmentally-friendly transportation.



Figure 13. Starry Waters

The following characteristics were creative strengths shown by Figure 13.

Fantasy: This underwater fantasy scene featured a mermaid and other sea life showing movement.

Richness of Imagery: The scene was very artistically balanced and appealing.

Movement: the swimming mermaid, line of starfish, and the swaying seaweed indicated motion.

Resistance to Premature Closure: The penguins were turned into a coral and seaweed tower by being covered with the green cloth that was tied with a blue piece of yarn. Most people used the penguins as penguins, but this person was able to resist that temptation.

Elaboration: Many of the items were detailed.



Figure 14. Penguin Paradise

The following characteristics were creative strengths shown by Figure 14.

Fantasy: This creation envisioned what penguins would want in their paradise.

Word Play: The alliteration of the “p” in the title was effective.

Richness of Imagery: The archway and the coffee filter made into a large scallop shell were appealing and artistic.

Humor: The idea of penguins having a paradise was funny.

Originality: Cutting the blue Styrofoam tray into small pieces to represent a pool was a unique idea.



Figure 15. Penguin Adventure

The following characteristics were creative strengths shown by Figure 15.

Fantasy: This work showcased a penguin in a fantasy vehicle about to embark on an adventure.

Internal Visualization: The glass-bottom boat allowed a view of what was below the water.

Storytelling Articulatness: The penguins were going on an adventure on a glass-bottom boat and one could see the items they will be discovering.

Humor: The idea of penguins having a vehicle with green jet exhaust tubes in the back was humorous.

Originality: The Construction of this vehicle used the chenille stick as an interpenetrating wire in a unique way.



Figure 16. Ships Pass but Pollution Does not

The following characteristics were creative strengths shown by Figure 16.

Richness of Imagery: This work had compactness, balance and general artistic appeal. The artist described the work, “A ship passing over the coral reef glides by a shark. Beneath the water hides a crab and several starfish. However, they are also joined by containers of toxic waste. Ships pass but damage never does.”

Word Play: The word “pass” had two meanings in the title – to move by each other or to change because of time.

Resistance to Premature Closure: The dinosaur figure was transformed into waves instead of being made into a dinosaur.

Storytelling Articulatness: The artist wrote, “A ship passing over a coral reef glides by a shark. Beneath the water hides a crab and several starfish. However, they are also joined by containers of toxic waste. Ships pass, but damage done never does.”

Elaboration: The yarn edging glued along the perimeter of the white coffee filter shell was detailed.



Figure 17. Commoner's Hope

The following characteristics were creative strengths shown by Figure 17.

Word Play: Penguins were figuratively and literally “head over heels” in love.

Humor: According to the artist, “Commoner penguins in love with the seahorse queen are waiting for a royal proclamation to see if they can marry royalty.”

Storytelling Articulatness: The scene told the story of the penguin's hopes for the future.

Fantasy: The idea of there being royalty in the sea life and penguins wanting to marry was fantasy.

Speech: The Royal proclamation was shown in gold at the bottom.



Figure 18. Taking a Dip

The following characteristics were creative strengths shown by Figure 18.

Effectiveness of Title: The title applied a common phrase to a new situation.

Internal Visualization: The bottom of the blue Styrofoam container had been cut away to reveal the blue water below.

Richness of Imagery: The scene was symmetrical, making it appealing.



Figure 19. Under Water? Depends on your Point of View.

The following characteristics were creative strengths shown by Figure 19.

Breaking Boundaries: The artist took an upside-down perspective as this scene showed a yellow submarine in an upside-down world.

Humor: The penguins had glittered beaks added to them.

Unusual Perspective: The upside-down perspective was unusual.

Creative Strengths Shown by Artists' Work Using the "Cool Space" Theme

Fluency

There was a wide variety of interpretations of what "cool space" might represent. Some participants interpreted the word "cool" to mean cold in temperature, while others saw "cool" as meaning popular, desirable, or as a relaxed state. The word "space" also had several interpretations such as outer space, a defined area, or one's own domain- sometimes a mental state and sometimes one's room.



Figure 20. A Vessel to a Cool Place

The following characteristics were creative strengths shown by Figure 20.

Elaboration: This ship had many features including a crow's nest, mast, sail, oars, cabin, and figurehead.

Richness of Imagery: The ship was quite realistic, balanced, and compact, showing artistic ability.

Three-Dimensionality: The ship's parts extended in various directions, increasing awareness of its height, length, and breadth.

Motion or Action: The oar put through the side of the ship at an angle indicated motion, as did the sail billowing behind the vessel.

Fantasy: The figurehead on the front of the vessel symbolized the spirit of the ship.



Figure 21. Spring Break Dream

The following characteristics were creative strengths shown by Figure 21.

Internal Visualization: This creation depicted the inside of a tent with its occupant enjoying a cool spring break experience.

Emotional Expressiveness: The camper's face revealed his happy mood.

Richness of Imagery: The compact nature of the scene and the charming character made it very appealing.

Storytelling Articulatness: The title told us that this was a student who was dreaming of going camping over his spring break.

Abstractness: The idea of portraying an intangible event such as a dream was abstract.



Figure 22. Robot in Space

The following characteristics were creative strengths shown by Figure 22.

Movement: The poised arms of the robot showed that it was about to move the satellite for repair.

Emotional Expressiveness: The robot's eyes and mouth depicted the flat affect of a robot.

Storytelling Articulatness: This scene told the story of a robot capturing a satellite, repairing it, and then reinstating it into orbit.

Humor: The robot with its interesting-shaped feet, fuzzy arms, and happy-faced apple on its belly was charming and funny.

Fantasy: The humanoid robot was an interesting fantasy figure.



Figure 23. Brrr! Fall Camping

The following characteristics were creative strengths shown by Figure 23.

Movement or Action: The spiraling flames and heat of the campfire implied motion.

Internal Visualization: One could see the inside area of the fire pit.

Speech: The title contained an interjection – “Brrr.”

Colorfulness of Imagery: The word “Brrr” in the title and the spiraling flames of the fire evoked the sense of touch and temperature.

Three-Dimensionality: The peach paper and the flat envelope had been unfolded or spindled to create three-dimensional components.



Figure 24. Blast off!

The following characteristics were creative strengths shown by Figure 24.

Movement: The title, along with the swaying astronaut, indicated movement.

Emotional Expressiveness: The astronaut's eager smile and the exclamation point in the title embodied excitement.

Sound: The title implied the roaring sounds of blast-off.

Flexibility: Stars were represented in many ways by the silver stars, the paper star, and the star-shaped end of the palm-tree stir-rod.

Three-Dimensionality: The flat peach paper had been folded to form a three-dimensional rocket ship.



Figure 25. Cool Mom

The following characteristics were creative strengths shown by Figure 25.

Sound or Speech: The words written on the tongue told the mother's speech.

Internal Visualization: This creation revealed an inside view of the mouth.

Humor and Emotional Expression: The bulging eyes conveyed lively enthusiasm.

Colorfulness and Sensory Appeal: The curved edges of the mouth and the hinged bend showed the fullness and roundness of the mouth/lips.

Richness of Imagery: The compact face with lolling tongue was charming and appealing.



Figure 26. The Cool Space Feelings of Acupuncture

The following characteristics were creative strengths shown by Figure 26.

Emotional Expressiveness: The smiling face expressed the pain relief that was occurring here.

Colorfulness or Sensory Appeal: The acupuncture needles looked sharp and penetrating.

Abstract Idea: The idea of a cool mental space was interesting and abstract.

Storytelling Articulatness: The patient on the red table and the acupuncturist told the story of how pain relief was obtained for this patient.

Originality: The idea of depicting acupuncture was unique.



Figure 27. Project AWARE – A Cool Experience

The following characteristics were creative strengths shown by Figure 27.

Emotional Expressiveness: The smiling faces of the canoeists showed they were having a good time cleaning junk out of rivers.

Richness of Imagery: The balanced, compact, detailed, realistic design of the canoe scene was very appealing.

Word Play: The caption on the scene read, “Put the canoe in, pick it up, pull it out,” showing alliteration of the letter “p.”

Movement: The arms poised and stretched against the paddles indicated movement.

Originality: The folding of the rectangular cardboard food tray to make a canoe was very clever and unique.



Figure 28. Kitty Cool Space

The following characteristics were creative strengths shown by Figure 28.

Emotional Expressiveness: The smiling cat's face with wide eyes showed the kitty's interest in this exciting cat toy.

Motion: The dangling string of stars and the spiraling chenille stick around the pole conveyed a sense of movement.

Unusual Visualization: The kitten was looking up at an unusual angle.

Richness of Imagery: The cat's pose and face were very appealing and artistic.

Humor: The playfulness of the cat and its cute face were charming.



Figure 29. Antarctica - A Cool Place

The following characteristics were creative strengths shown by Figure 29.

Storytelling Articulatness: This scene told the story of the whale swimming by an iceberg and a floating research station with someone watching through binoculars that were sticking out.

Word Play: The title said, "Antarctica: A Cool Place." The word "cool" had two meanings in this title- a frigid area and a wonderful place.

Motion: The whale's spray showed motion.

Richness of Imagery: The whale's chunky body and, expressive eye, and fountaining spray were very appealing.

Elaboration: The many sea creatures were shown on the bottom of the ocean floor.



Figure 30. Flamingo Pool Party

The following characteristics were creative strengths shown by Figure 30.

Fantasy: The flamingoes were diving into the pool, swimming, and lying in the shade beside puddles of water on the pool deck.

Humor: The flamingoes were fuzzy, attractive, and charming. Their swimming pool of black water was humorous.

Storytelling Articulatness: The scene included all of the enjoyable ways to relax – taking a swim, diving in, or lounging on the deck.

Originality: The flamingoes were a unique idea.

Flexibility: The flamingoes were shown engaged in three different activities.



Figure 31. Cool Space on Vacation – "Sigh"

The following characteristics were creative strengths shown by Figure 31.

Humor: The disproportional bikini top and the "sigh" in the title added humor to this creative work.

Speech: The interjected "sigh" in the title expressed speech.

Motion: The waves drawn in blue marker approaching the boat showed motion.

Emotional Expression: The happy face and the “sigh” showed contentment.

Storytelling Articulatness: The vacationer had a raft, a large tropical drink, a lei, and beautiful starfish to contemplate.



Figure 32. Chilling Out

The following characteristics were creative strengths shown by Figure 32.

Humor and Word Play: This title made a word play on “cool” and “chilling.” The double meanings of “cool” as “chilly” or “relaxed” came together in the meanings of “Chilling out” – being relaxed and appearing un-sweaty.

Story-telling Articulatness: The various sub scenes told the story of two people relaxing in their own ways.

Motion: The waves rolling against the boat implied motion.

Emotional Expressiveness: The two characters were smiling as if they were enjoying the fun.

Elaboration: The designs on the side of the pool showed creative details.



Figure 33. The Fisherman

The following characteristics were creative strengths shown by Figure 33.

Storytelling Articulatness: This scene showed all of the things the fisherman had been doing through the fishing line, the bucket of fish, the net, and the oar.

Motion: The oar and fishing lines implied movement.

Elaboration: Many details like the boat, net, fishing line, oar, and the bucket of fish added information to the scene.

Conclusion

Summary of Analysis of Creative Products

Although the time allowed for this activity at the conference was quite short, participants were able to make very creative scenes and objects that as a group showed all of Torrance's Creative Strengths.

A total of 33 creative products were made within the allowed timeframe by participants who gave permission for their work to be included in this document. The creative strengths from Table 1 were identified for each product. Participants' descriptions of their own creations were considered during this process.

The most frequently occurring strengths were the following that were identified in at least a third of the products: movement or action (18 instances), storytelling articulateness (15), richness of imagery (14), elaboration (13), humor (12), originality (12), and emotional expressiveness (11). This means that the most common approach to making a creative product was to tell an original story involving some motion that was detailed, artistically appealing, or humorous, and contained characters with emotional expressions.

Fairly uncommon strengths (those occurring in less than a third of the creative products) included the following: fluency (1), breaking boundaries (2), parody (2), flexibility shown by different multiple representations of the same idea (3), colorfulness of sensory imagery (3), representation of abstract ideas (4), speech or sound (6), unusual visualization (6), three-dimensionality (6), resistance to premature closure (6), word play (8), internal visualization (9), and fantasy (9). This means that participants found it more difficult to have multiple representations of the same thing, to break unspoken conventions or rules, to include highly sensory stimuli, and to represent speech or sound. They also found visualizing the object or scene spatially was somewhat of a challenge (internal, unusual, or three-dimensional visualization), as was word play and fantasy.

Resistance to Premature Closure

Some of the items that were shaped distinctively, like the joined penguins that were originally sold as a decoration on a child's green drinking straw, presented a real challenge to those making the creations to envision them as something else or, in other words, to resist closing off new ideas and to continue with the obvious idea that they represent penguins. The penguins were used as penguins in 11 of the 19 "Under Water" creations. However, many

participants were able to resist premature closure and used the penguins to represent something different. In these products, the penguins became a black divider between one's real and social selves, a black base for a coral head, a covered sign post support, part of a ship's mast, a fabric-covered seaweed mass, a ship's hull, and a fantasy rock star.

The wooden dinosaur cutout was another item from the Under Water set of given items that had a unique shape. Many participants were able to resist premature closure and use the dinosaur to represent something else. It was cleverly made into an aspect of one's real self, a coral head, part of the body of a sea predator, the chimney of a house, a door of a limousine, the outline of a lake, rocks in a scene, the back of a vehicle, waves, and a royal seahorse. Only two participants used the dinosaur to represent the fossil remains of a dinosaur. The remaining six people used this item as a hidden part of the base or roof of the scene.

In the "Cool Space" set, the string of three silver stars was another difficult item to make into something new. Nevertheless, some participants were able to envision them as something else: equipment on board a ship, a tool for a robot, an earring, acupuncture equipment, metal junk in a river, a dangling cat toy, and lights on a buoy. Only three people used the stars as stars in the sky, while two others used them as starfish. A couple of participants wrapped or covered the stars, using them generically as part of the support for the scene.

The green palm tree drink stir-rod was another distinctively-shaped item from the Cool Space set. Participants used this object in a variety of ways: a ship's mast, a walking stick, a satellite antenna, a shooting star (two scenes), a hairpin, an acupuncture tool, a cat toy, an oar, and a research station pole. Only four people used the palm tree as a tree in their scenes.

Recommendations

The conference session was 45 minutes long, but the activity needed to be introduced and Torrance's creative strengths had to be explained, leaving only about 30 minutes for the activity. Participants suggested having a longer time to work- perhaps 15 more minutes.

We recommend that this game be used in many different settings because the two groups who engaged in this at the conference enjoyed the activity and were able to practice and evidence many creative strengths. This is a good activity for classrooms, but might also be interesting for children in after-school clubs, scouts or even birthday parties. Older adults may enjoy creating with a set of given materials as occupational therapy. If materials are in short supply, or if more collaboration is desired, participants may work in small groups to make creations.

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