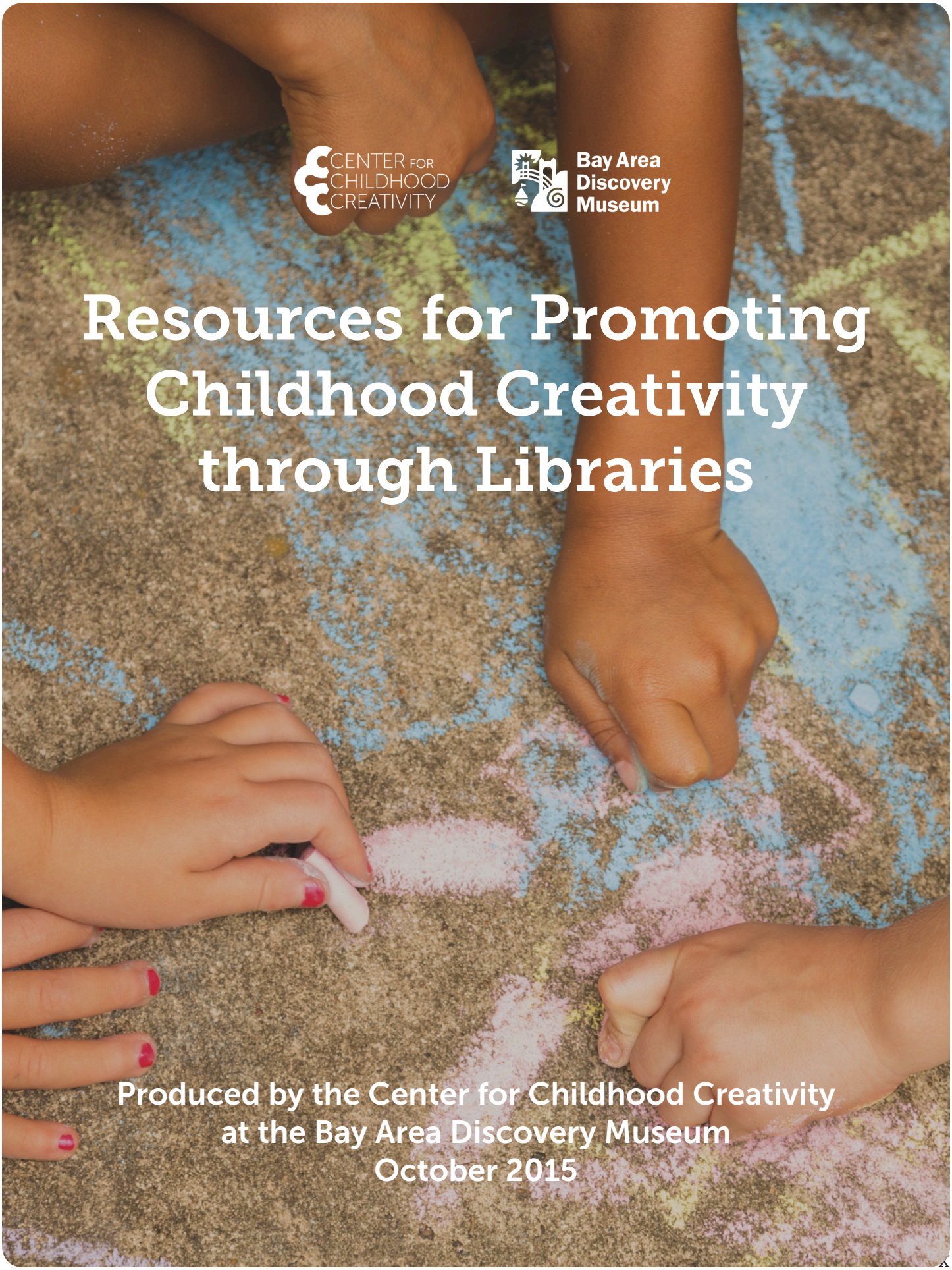

CENTER FOR CHILDHOOD CREATIVITY

Bay Area Discovery Museum

Resources for Promoting Childhood Creativity through Libraries

Produced by the Center for Childhood Creativity
at the Bay Area Discovery Museum
October 2015

Our Mission: To ignite and advance creative thinking for all children

Launched in 2011 as the research and advisory division of the Bay Area Discovery Museum, the Center for Childhood Creativity (CCC) works at a national scale to advocate for the critical importance of creativity development in childhood and to inspire the next generation of innovators, thought leaders and problem-solvers.

The CCC is committed to advancing the research that informs our understanding of childhood creativity and its cultivation. High-quality, empirical research provides the foundation for all of the CCC's work, including advising to schools, museums, libraries and other non-profits, as well as companies that directly influence children's development.

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Thank You

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Suzanne Flint, California State Library
Elizabeth Gray, Yolo County Library
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Promoting Creativity in Library Settings

This resource packet is designed for library educators interested in promoting creativity. It includes:

- a summary of the best research-backed approaches to promoting creativity in children;
- a curated collection of favorite creativity-related activities selected by library educators; and
- links to additional resources for those inspired to do more.

The Case for Creativity as a Focus of Library Programs

Creativity is a foundation of all other milestones in educational development. Harnessing creativity at a young age, when brain development and plasticity is at its peak, not only optimizes academic success, but is critical for social-emotional development, critical thinking and problem solving.

Creative thinking enables original thought and the ability to see solutions where others don't, a fundamental skill for the youngest generation for whom it's estimated 65% of the jobs haven't yet been invented. Creativity skills are essential for preparing children—and society—for future success in a rapidly changing world, and early childhood creativity development is one of the most impactful investments to close the opportunity gap.

Fortunately, research is showing that there is a path to becoming creative. Creativity can indeed be cultivated. The Center for Childhood Creativity (CCC) is honored to partner with libraries that reach millions of children and their adult caregivers each year. We produced this resource collection in partnership with our library advisors to ensure that library educators receive useful tools to support their critical work of offering rich learning experiences, information and resources that will transform today's children into tomorrow's innovators.

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Voices from the Field

Libraries are places where groups gather, information is sought and the public is engaged. Many great thoughts, realizations and new ideas are spurred by what our communities find in libraries. To bring creative activities into the library only enhances what is already in motion. Creativity comes from communal work and independent work inspired by the ideas and creations of others, all found in public libraries. It is only natural for libraries to include activities that promote creative thoughts in the minds of our youth. With this, we gain future generations of innovators.

- **Rebecca Alcalá-Veraflor,** *Early Literacy Coordinator,* San Francisco Public Library

The library has always been a place to get your creative juices flowing, and in the last decade—with the boom of the maker culture—youths and families are seeing the library more and more as a place to learn and come into contact with the maker experience.

- **Anne Lennon,** *Children's Programs/Outreach Librarian,* Oakland Public Library

We're all creative, but sometimes it can be hard to find the time to put your creative thoughts into action! The Center for Childhood Creativity's resources help librarians implement programs that allow children to be creative, while understanding that staff time and materials are often limited.

- **Stephanie Saba,** *Senior Librarian,* San Mateo County Library

I went into library work for the opportunity to be creative and to help other people be creative. A lot of us are in libraries because we want to foster creativity. It is affirming to see that libraries are already doing a lot to provide creative activities and to give kids the chance to explore. It's always a good reminder for us to strive for more open-ended outcomes; we don't need a bunch of perfect but identical pictures on display on our walls.

- **Elizabeth Gray,** *Library Central Services Manager,* Yolo County Library

Creativity in libraries is not only essential to the success of libraries, but to the success of the communities they serve. Without creativity and innovation, where would we be? By providing creative and innovative programming, we can educate and inspire others to do more and be more. Libraries are safe spaces where people can go to learn, create and take risks. Every aspect of a library lends itself to inspire creativity—from the programs we offer, to the books we lend and the computers we provide access to.

- **Kristen Bodvin,** *Programming Specialist, Outreach Services,* Carroll County Public Library

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What *Skills* Contribute to Children's Creativity?

7 Components of Creativity

COGNITIVE	**Imagination & Originality**	Imagine & explore original ideas	Creativity involves producing original ideas that are unusual or novel, and it sometimes involves combining two or more different concepts to create a new, synthesized idea. Children express their imagination and original ideas through pretend play and the creation of imaginary companions and make-believe worlds.
COGNITIVE	**Flexibility**	Maintain openness to unique and novel experiences	The interaction of intelligence and creativity often begins with the flexible combination and modification of prior concepts or strategies to produce new representations. Children can experience flexibility by seeing from different perspectives, remaining open to new and challenging experiences or (especially as they become older) gaining awareness of how only seeing from a single perspective can limit their creativity.
COGNITIVE	**Decision Making**	Make thoughtful choices that support creative efforts	Discretion, judgment and decision making play an important role in the development and expression of creativity for children. Decision-making skills require convergent thinking, which is critical to creativity because it allows individuals to refine ideas and to select the best possible answer from the ideas generated to solve a problem.
SOCIAL & EMOTIONAL	**Communication & Self-Expression**	Communicate ideas and true self with confidence	Communicating one's unique perspective plays a vital role in creativity by allowing individuals to express their feelings, ideas and desires through language, art and physical movement. A sense of confidence and connection to authentic feelings allows children to express their unique insights and thoughts with others.
SOCIAL & EMOTIONAL	**Motivation**	Demonstrate internal motivation to achieve a meaningful goal	Motivation is at the core of the developmental experience and inspires children to explore and satisfy their curiosity. When individuals are internally motivated, acting without the promise of a reward, they are more creative.
SOCIAL & EMOTIONAL	**Collaboration**	Develop social skills that foster creative teamwork	Collaboration allows for the exchange of ideas among children as they work to find a solution for a problem or project. Working together towards a shared goal fosters perspective-taking and provides a chance for children to explain and expand their thinking in new ways.
PHYSICAL	**Action & Movement**	Boost creative potential through physical activity	Exercise and physical activity are associated with better focus, enhanced memory and greater ability to learn. Action and movement stimulate the building blocks of learning in the brain, and regular exercise can act as a cognitive enhancer to promote creativity.

The 7 Components of Creativity framework represents a summary of more than 100 empirical studies. It incorporates key findings from the top academics in the fields of cognitive and developmental psychology, neuroscience, education and business management to identify the pathways to boosting creativity in children. A full discussion of the academic literature can be found in the paper "Inspiring a Generation to Create: Critical Components of Creativity in Children" available at **www.CenterforChildhoodCreativity.org/7components.** This research was made possible by the support of Disney Citizenship.

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What *Environments* Promote Children's Creativity?

C³REATE Framework for Designing Learning Environments to Promote Creativity

C³ — CHILD DIRECTED

Research shows: When children initiate learning, they engage more deeply and create connections between the material and their previous knowledge and experiences.

How to apply it: Providing time for children to take ownership of their learning and make decisions promotes creative exploration and the development of higher level thinking skills.

R — RISK FRIENDLY

Research shows: When children understand that their effort matters more than any single outcome, they seek out challenging new experiences and show resilience.

How to apply it: Praising children's efforts ("You worked hard") rather than their inherent abilities ("You're so smart") helps them develop a learning mindset and encourages them to take risks and express their creativity without fear of failure.

E — EMOTIONALLY ATTUNED

Research shows: Positive emotions, such as joy and interest, are correlated with creative thought patterns and decreased stress, which aids the transfer of information into long-term memory.

How to apply it: Showing children both verbal and nonverbal support creates feelings of safety and acceptance, which promote confidence and creative thought.

A — ACTIVE

Research shows: Physical activity strengthens memory and performance because it engages different parts of the brain and provides a break before refocusing.

How to apply it: Creating short, structured breaks for children to be physically active helps direct more oxygen to their brains, which enhances concentration and perseverance.

T — TIME FLEXIBLE

Research shows: When children are fully immersed in an activity and have entered a state of flow, they learn in a deep and joyful way by imagining and testing new ideas.

How to apply it: Leaving time for children to complete tasks and games at their own pace allows them to experience learning in an ongoing, internally motivated way while their brains form new connections.

E — EXPLORATORY

Research shows: Open-ended questions and prompts support the development of divergent thinking (exploring many possible solutions), a critical component of creativity.

How to apply it: Asking questions like "Why do you think that happened?" and using statements like "Tell me more" encourage children to engage deeply with a subject and form multiple conclusions, rather than being limited only to finding the right answer.

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Applying the Research

Children are used to teachers, parents and even librarians probing them with questions to which there is only one acceptable answer. When children get so focused on providing that right answer, they can miss out on the important thinking processes of imagining many different ideas or solutions to a problem.

This process—known as divergent thinking—is key for creative problem solving, which involves coming up with novel solutions to problems and thoughtfully elaborating on those ideas.

One simple, yet powerful way to promote creativity when interacting with children is to shift our language. Research shows that when adults ask open-ended questions, for which there are many possible answers, they invite deeper thinking and personal expression.

The Power of Open-Ended Questions

I wonder...

When you say "I wonder...," you model what it is to be curious about the world. You show that it is okay to not always know the answer. You demonstrate being open to discovery.

I notice...

When you say "I notice...," you remind children to notice new and interesting things in the world. For example, you might say "I notice that the yellow flowers are sticky when you touch them." When you say, "I notice you used a lot of purple and blue in your drawing," you are connecting with a child, showing that you are paying attention and that you care, but without the praise or evaluation and judgement that comes out when we say, "I love your drawing. You are a great artist!" or "What a pretty picture!"

Tell me more...

When you say, "Tell me more..." and then pause—giving enough time for a young mind to process the question, formulate an answer and respond—you are inviting a child to practice expressing ideas and elaborate upon them.

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LIBRARY FAVORITE

Selections from the CCC Activities Library

Since 2014, the CCC has partnered with an esteemed group of authors and innovative organizations to collect and curate fun activities for children aged 2-14 years that use research-backed strategies to promote one or more of the seven components of creativity.

Here are nine top-rated activities selected by our library education advisors. These activities emerged as favorites for use in library settings because they:

- are fun and different;
- use inexpensive supplies;
- can be used with varied ages, families and group sizes; and
- work if participants arrive at different times.

A-maze-ing Design *Build a cardboard ping-pong maze.*	**Animal Remix** *What mythical creature will you create?*	**Cardboard Challenge** *Join the Global Cardboard Challenge!*
Finish the Drawing *What will your squiggle become?*	**How Slow Can You Go?** *Compete in a slow race.*	**Ice Exploration** *Excavate frozen objects!*
Towel Transformations *Bring a towel to life.*	**What If? Animals** *Build a nature creature with clay.*	**Popsicle Stick Puzzles** *Make your own puzzle!*

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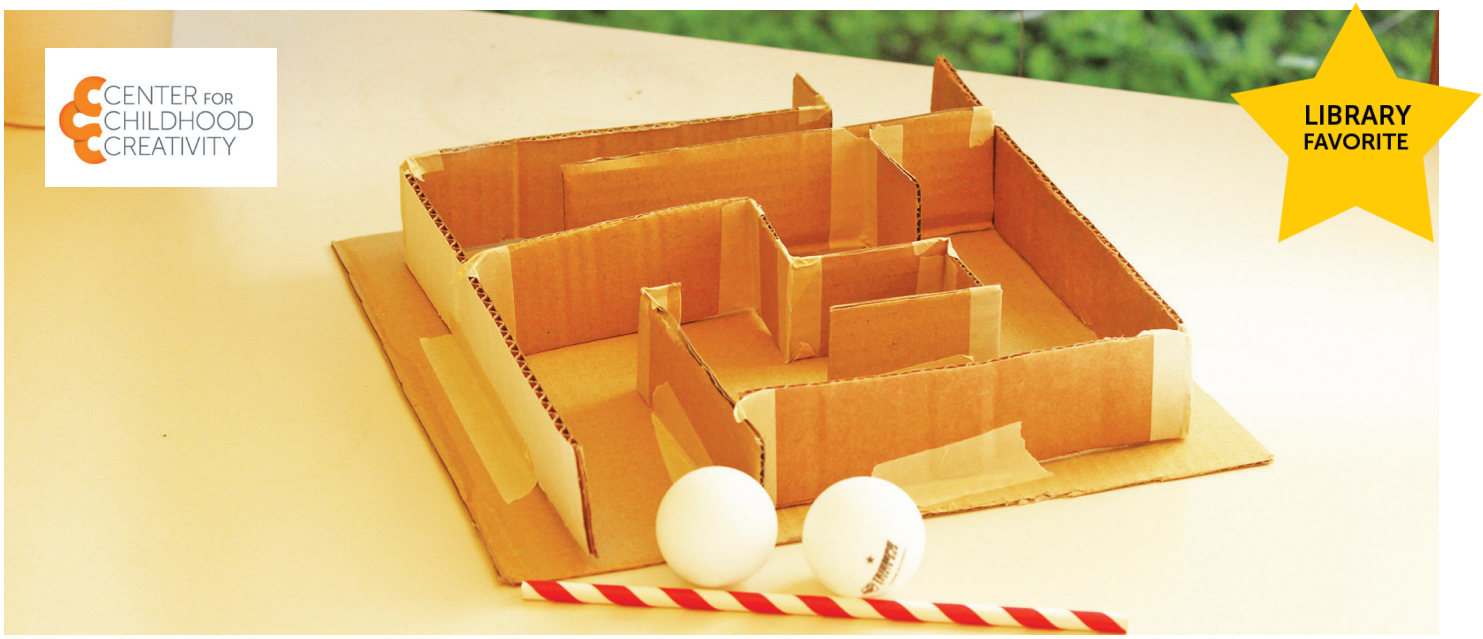


A-maze-ing Design

Build a cardboard ping-pong maze.

Creativity Skills Developed					
Imagination & Originality	Flexibility	Decision Making	Collaboration		
Topic	**Age**	**Participants**	**Complexity**	**Duration**	**Cost & Resources**
• Making, Building & Tinkering • Sports & Games	• 6-9 yrs. • 10-14 yrs. • 14+ yrs. • Can be adapted for fun at all ages	• Individuals • Small groups (2-4 participants)	**Moderate** *Guidance needed from an expert peer or adult*	• **Extended** *(15 min. - 2 hrs.)* • **Multi-day**	**Medium** *Need to collect some everyday household objects or easy to find purchase of $10 or less*

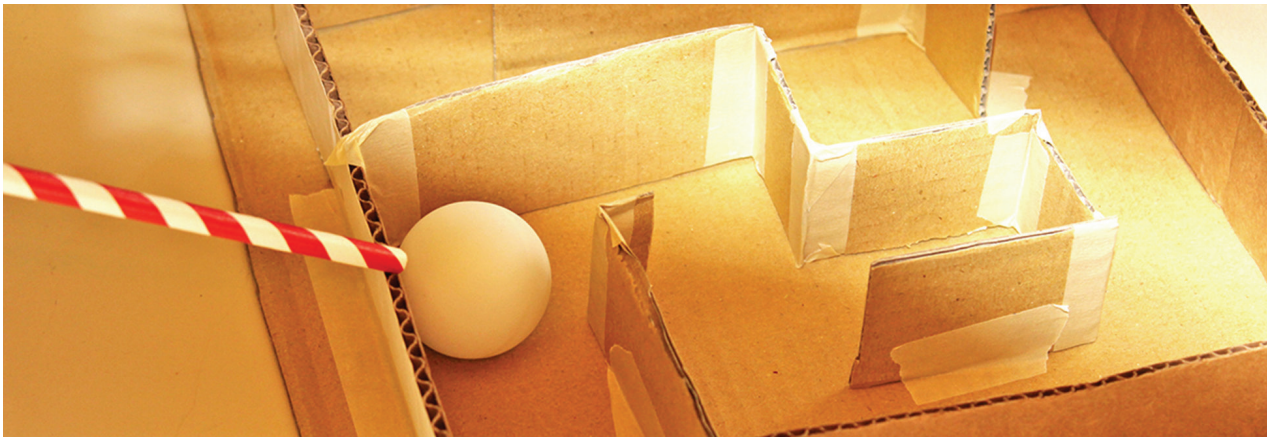
Get Ready...

Design a tabletop maze using materials from your household recycling bin. The maze will be grounds for a ping-pong ball race. The movement of the ping-pong balls will be powered by air blown through straws!

Get Set...

Gather these materials:

- Drinking straws (enough for each participant to have one)
- 2 ping-pong balls
- Large base for your maze to be built on (a large flat piece of cardboard or foam core are good choices)
- Materials to repurpose such as coffee cup sleeves, cardboard, cereal boxes or paper tubes
- Paper-backed tape such as masking tape, artist's tape or painter's tape
- Scissors or an X-Acto knife
- Aluminum foil and pipe cleaners (optional)



Go!

1. It's time to start planning your maze. Will you sketch it out in advance or dive right in and start adding materials to your base? That's up to you and your design team.
    - Make sure to choose a start and a finish. The start and finish must be on the base of your maze.
    - Use as many different materials as you can to create as many twists, turns and obstacles as you can in your ping-pong ball maze.
    - Be sure to make your paths wide enough for a ping-pong ball to travel through!
    - There's no height limit for the paths in your maze.
2. Test the maze! Push your ball along by blowing air through a straw to make the ball move.
3. Blow your ball from start to finish.

We're Finished! What Now?

- Time yourself or a friend as you race against the clock to move your ball from start to finish.
- Have one participant begin at the start and the other begin at the finish line. Choose a mutually agreed upon mid-point and race to be the first to reach that point. Careful not to crack a smile! Blowing through a straw is nearly impossible when smiling or laughing.
- Make changes and improvements to your maze.
- Take your maze apart and build another one!

Links to Creativity Research

Designing your own game is a good way to use beginner's mind (Richards, 2007) by taking used materials and looking at them with new eyes to create something original. Putting the game together takes a lot of creative problem solving to make it work—and that's before you even get to play it! Playing with these cool materials shows that they can do a lot more than just what they were made for. Working your way through a maze requires decisions too. If you don't make it through the first time, you'll need to know what the problem is and how to solve it (for a summary of problem-finding and -solving, see Runco, 1994).

Richards, R. (2007). Everyday creativity: Our hidden potential. In R. Richards (Ed.), Everyday creativity and new views of human nature (pp. 25-54). Washington, DC: American Psychological Association.

Runco, M. A. (Ed.). (1994). Problem finding, problem solving, and creativity. Norwood, NJ: Greenwood Publishing Group.

Source

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Animal Remix

What mythical creature will you create?

Creativity Skills Developed					
Imagination & Originality	Flexibility	Decision Making	Collaboration		
Topic	**Age**	**Participants**	**Complexity**	**Duration**	**Cost & Resources**
• Language & Word Games • Science • Nature	• 2-5 yrs. • 6-9 yrs. • 10-14 yrs.	• Individuals • Small groups (2-4 participants)	**Low** *Children can complete without support from an expert peer or adult*	• **Extended** *(15 min. - 2 hrs.)*	**Low** *Minimal supplies needed, such as paper/pencil*

Get Ready...

Use your knowledge of the animal kingdom and your imagination to design your very own mythical animal.

Get Set...

Gather these materials:

- Paper
- Color copies of the animal pictures included here (optional)
- Something to write and illustrate with
- Animal books and magazines full of photos and illustrations (optional)

Go!

Part One: Getting Started
There are two ways to get started. Read both descriptions and pick whether you want to start by building a collage or by using your imagination.

Collage Method:

1. Either alone or with a partner, make an Animal Remix by pasting together the front of one animal with the back of a different animal to invent a new, imaginary animal. Use pictures from magazines or photocopies of the animal handouts included here.

Imagination Method:

1. Take a moment to think about the coolest and most amazing animals that you've seen and learned about.
2. Write down the most exciting parts, the best adaptations and the aspects you find most interesting or most beautiful. Need some help to get started? Here are some possible habitats and extra-special animal characteristics that you can use to jump-start your creation. You can use our suggestions or make a list of your own!
3. Decide where your animal will live, what it will eat and how it will move. These decisions will help you choose which creature features your animal will need! For example, an animal that lives in the Arctic might need very thick fur or the ability to blow fire to create warmth! Your animal's creature features do not need to be realistic.
4. Now draw a picture of an imaginary animal with some of these interesting characteristics or abilities in it's habitat.

Characteristics & Abilities (Some real, others imagined)	**Habitats** (Some real, others imagined)
Tough, armor-like skin covering	Rocky seashore
Extendable toes	Polar ice cap
Sharp teeth	Redwood forest
Unbreakable shell	Storm cloud
Lightning-fast color change	Desert cactus flower
Suction cup feet	Rainforest floor

Part Two: Adding the Details

1. Describe your creature's special features and why they are cool or important to its survival.
2. Finally, create a name for your animal!

We're Finished! What Now?

- Invent a myth or a fable that tells the story of your animal.
- Imagine what your creature's life is like. What adventures might it have while in its natural habitat? Who or what does it eat? Who eats your animal? Where does it sleep? How does it play? Does it live alone or in a group?
- If you chose the Imagination Method, gather animal magazines that you can cut up, or print out photos from the web that you can use to make a creature feature collage in order to create a picture of your animal.
- Build a three-dimensional sculpture of your animal with blocks, papier-mâché, glue and fabric...the sky's the limit!

Links to Creativity Research

Creativity often involves combining things in new ways. In fact, the more different things appear in the beginning, the more creativity it takes for us to combine them into something that makes sense. We use associations—a fancy way of describing how we find similarities between things—to create new ideas. Mednick (1968) developed a cool test called the Remote Associates Test (RAT) to measure how far apart ideas were by seeing how easy it is for people to connect them (for some cool neuroscience on this test, see Kounios & Beeman, 2009). For example, what is one word that connects to each of these three words: falling, actor and dust. If you guessed star, then you guessed correctly.

Kounios, J., & Beeman, M. (2009). The aha! moment: The cognitive neuroscience of insight. Current Directions in Psychological Science, 18(4), 210-216.

Mednick, S. A. (1968). The Remote Associates Test. The Journal of Creative Behavior, 2(3), 213-214.

Source

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Animal Remix

Instructions

1. Cut each of these images along the dotted line.
2. Combine half of one animal with the half of another to come up with a new, combined animal.
3. Use what you know about each animal to describe it's new combined features.

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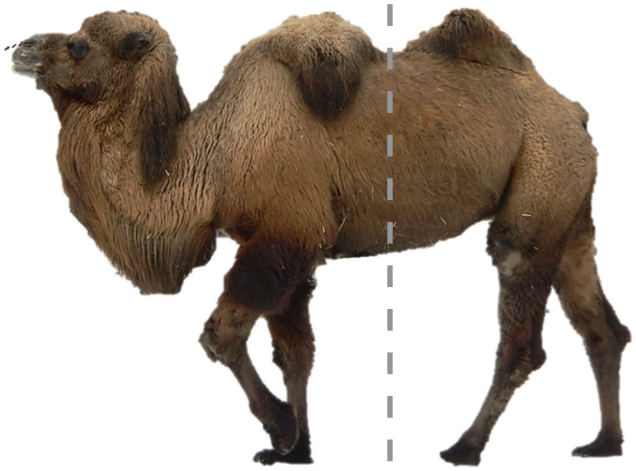

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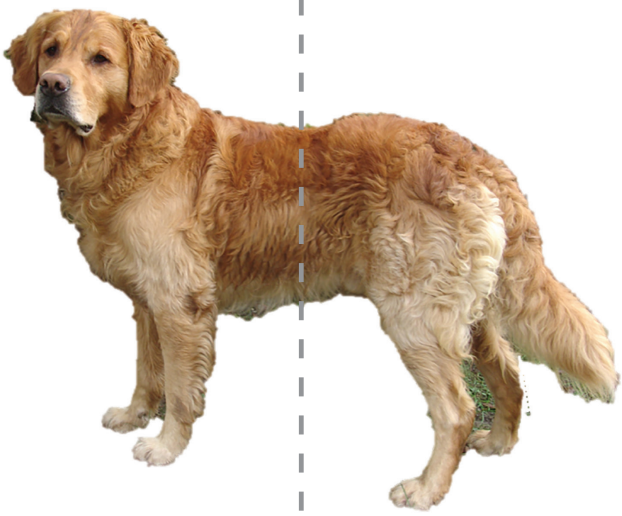

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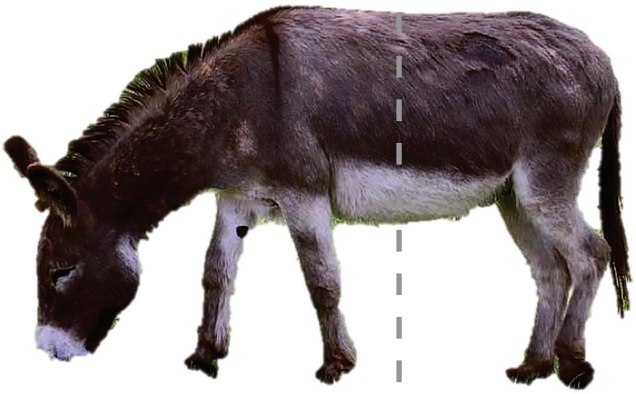

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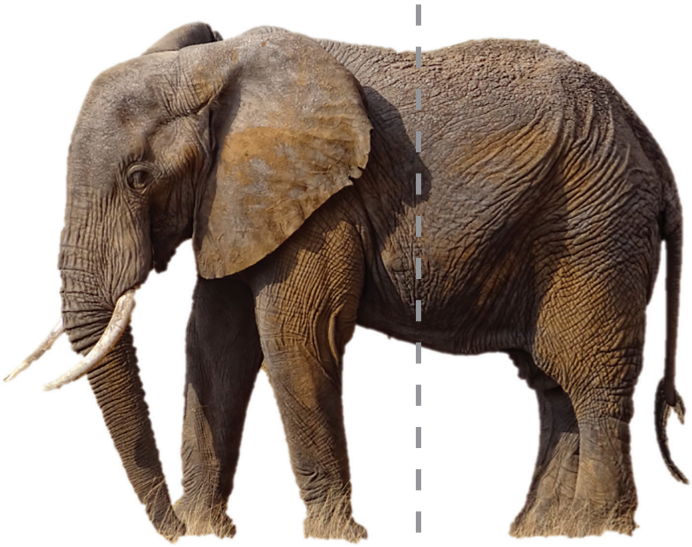

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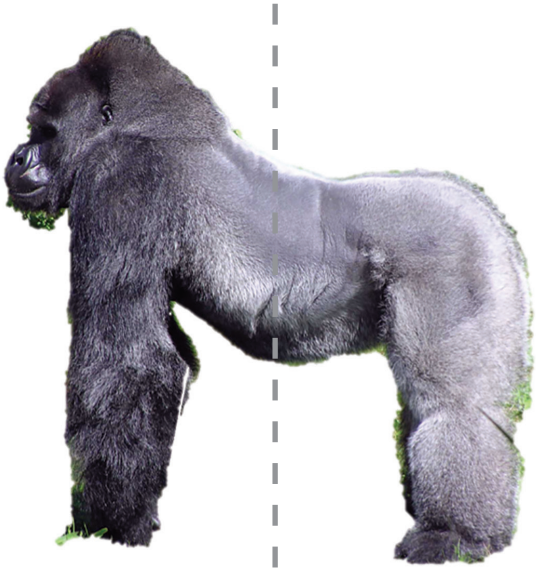

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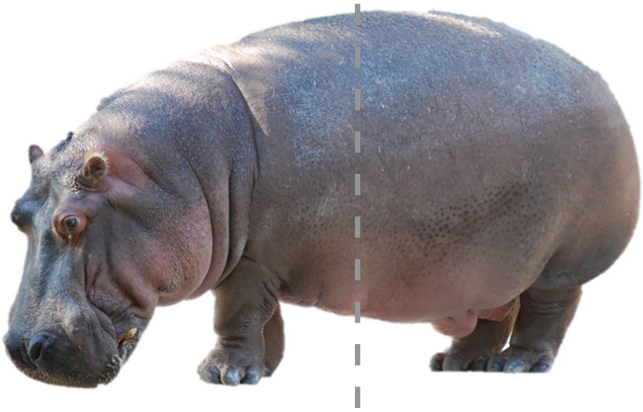
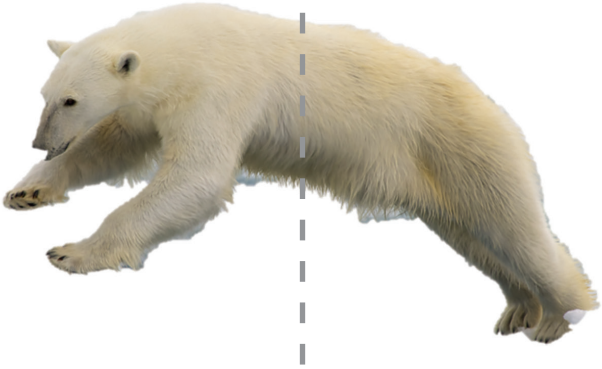


POLAR BEAR



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Cardboard Challenge

Join the Global Cardboard Challenge!

Creativity Skills Developed					
Imagination & Originality	Flexibility	Decision Making	Communication & Self-Expression	Collaboration	Motivation
Topic	**Age**	**Participants**	**Complexity**	**Duration**	**Cost & Resources**
• Making, Building & Tinkering • Visual Arts • Sports & Games	• 2-5 yrs. • 6-9 yrs. • 10-14 yrs. • 14+ yrs. • Can be adapted for fun at all ages	• Individuals • Small groups (2-4 participants) • Large groups (5+ participants)	**High** *Significant adult or expert peer guidance required*	• **Extended** *(15 min. - 2 hrs.)* • **Multi-day project**	**Medium** *Need to collect some everyday household objects or easy to find purchase of $10 or less*

Get Ready...

Join the Global Cardboard Challenge! With cardboard boxes of different sizes and shapes, use your creativity to construct different uses for the cardboard and create narratives to go along with your creation. This challenge was launched in 2012 by the Imagination Foundation, which provides information, videos, and tips on the Cardboard Challenge website. To register your participation in the Global Cardboard Challenge, visit www.cardboardchallenge.com. For inspiration before you get started, try watching the short films Caine's Arcade and Caine's Arcade 2, and looking on the internet for other inventions by searching #cardboardchallenge.

Get Set...

Gather these materials:

- Cardboard boxes of different sizes and shapes
- Scissors
- Masking tape or painter's tape which can be removed easily
- Household recycling items (cardboard tubes, egg cartons, plastic containers, etc.)
- Craft supplies for decorating (markers, pipe cleaners, buttons, pom poms, glitter, bells, paper, aluminum foil, etc.)

Go!

1. Come up with a creation using cardboard boxes of different sizes and shapes, household recycling items and crafts supplies for decorating. Make something you can play with.
2. Create a narrative to go along with your creation.
3. Share your creations with others, either by participating in a group challenge day, organizing a showcase or posting images of what you produced.

Tips for Activity Leaders

- If a participant has trouble getting started, try asking open-ended questions to help generate ideas and then narrowing questions to make a first step feel manageable. For example, you could ask, "What are you thinking of making?" or "Wow, tell me more about what that might look like..." or "Which part of your idea do you feel like starting with?"

We're Finished! What Now?

- Have someone put mystery items into a basket. Use only these items to build your cardboard creation.
- Create a theme for what you will build, such as something that uses electricity or something you find on a playground.

Links to Creativity Research

We don't need to have a lot of stuff in order to be creative. In fact, having limited resources can actually make us behave more creatively (for more on constraints and novelty, see Stokes, 2007, 2009). Since this activity relies on cardboard so much, we will certainly discover new ways to use it. A few extra cuts or folds and we won't need to use glue to hold pieces of cardboard together!

Stokes, P. D. (2007). Using constraints to generate and sustain novelty. Psychology of Aesthetics, Creativity, and the Arts, 1(2), 107-113.

Stokes, P. D. (2009). Using constraints to create novelty: A case study. Psychology of Aesthetics, Creativity, and the Arts, 3(3), 174-180.

Source

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Finish the Drawing

What will your crazy squiggle become?

Creativity Skills Developed					
Imagination & Originality			Flexibility		
Topic	**Age**	**Participants**	**Complexity**	**Duration**	**Cost & Resources**
• Making, Building & Tinkering • Visual Arts	• 2-5 yrs. • 6-9 yrs. • 10-14 yrs. • 14+ yrs. • Can be adapted for fun at all ages	• Individuals • Small groups (2-4 participants)	**Low** *Children can complete without support from an expert peer or adult*	• **Quick** *(15 min. or less)*	**Low** *Minimal supplies needed, such as paper/pencil*

Get Ready...

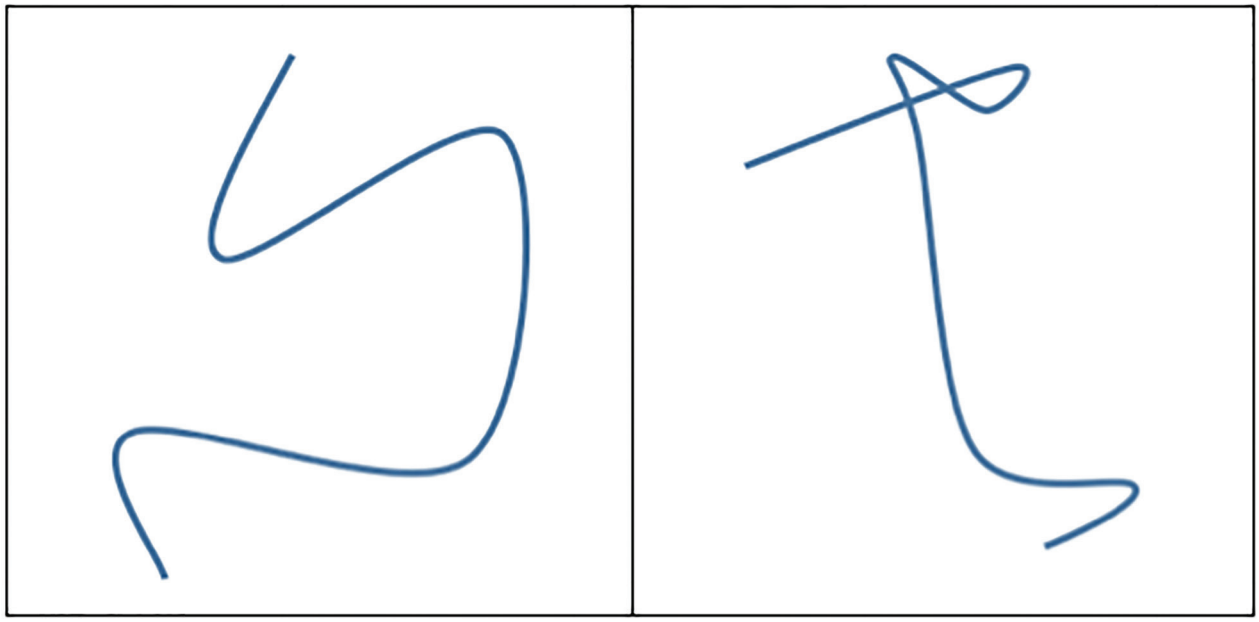
Use your visual imaginations and practice thinking in pictures by looking at a crazy shape and adding to it.

Get Set...

Gather these materials:
- Paper
- Something to write with

Go!

1. Choose one of the crazy shapes on the next page.



2. Finish the drawing by adding to it.
3. Share with others and tell a story about the drawing.

We're Finished! What Now?

- Select the other crazy shape and try the activity again.
- Draw a new crazy shape. Then complete it or pass it to a friend to complete.
- Create a drawing by starting with a number or letter. What can a 7 be turned into? A shark? A skirt? A monster? Try turning the paper to see the number or letter from all angles.

Links to Creativity Research

Figural, or visual, creativity often requires pattern recognition where participants see something in an abstract image. In a way, these figures are a problem (Runco & Okuda, 1988), and participants will seek out ways to "solve" them by turning them into something more familiar and potentially creative (Runco, Dow, & Smith, 2006). These visual divergent thinking tasks (see Wallach & Kogan, 1965) ask participants to come up with as many ideas for what the images could represent, which has been shown to predict creative potential (Torrance, 1972).

Runco, M. A., Dow, G., & Smith, W. R. (2006). Information, experience, and divergent thinking: An empirical test. Creativity Research Journal, 18(3), 269-277.

Runco, M. A., & Okuda, S. M. (1988). Problem discovery, divergent thinking, and the creative process. Journal of Youth and Adolescence, 17(3), 211-220.

Torrance, E. (1972). Predictive Validity of the Torrance Tests of Creative Thinking. The Journal of Creative Behavior, 6(4), 236-262.

Wallach, M. A., & Kogan, N. (1965). Modes of thinking in young children. New York: Holt, Rinehart and Winston.

Source

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How *Slow* Can You Go?

Compete in a *slow* race!

Creativity Skills Developed					
Flexibility	Communication & Self-Expression	Motivation	Action & Movement		
Topic	**Age**	**Participants**	**Complexity**	**Duration**	**Cost & Resources**
• Making, Building & Tinkering • Science • Sports & Games	• 2-5 yrs. • 6-9 yrs.	• Individuals • Small groups (2-4 participants) • Large groups (5+ participants)	**Moderate** *Guidance needed from an expert peer or adult*	• **Quick** *(15 min. or less)* • **Extended** *(15 min. - 2 hrs.)*	**High** *Requires gathering special supplies and possible purchase of items costing more than $10*

Get Ready...

Compete in a slow race and see how slow you can go! Investigate how a toy car moves over different surfaces. Find the texture that creates the most friction and causes the toy car to travel the slowest down a ramp.

Get Set...

Gather these materials:

- Piles of books
- Planks of wood (about 2-3 feet each)
- Glue
- Scissors
- Textured materials to create different surfaces (satiny fabric, sandpaper, Legos, fleece, rubber, part of a towel, etc.)
- Toy cars

Go!

1. Cover planks of wood in materials with different textures to create ramps for the toy cars. Glue the materials onto the planks and let dry. Try using satiny fabric, sandpaper, Legos, fleece, rubber, part of a towel, or any other items with unique textures.
2. Create a pile of books for each ramp. Be sure all the piles are the same height.
3. Lean each ramp against a pile of books, making sure all ramps are at the same angle.
4. Take a toy car and release it down the ramp. Try to just let it go (and not push it) so it will go as slow as possible.
5. As you explore the different ramps, think about the following:
   - Which car traveled farthest? Why do think that happened?
   - What did you notice about what happened to the car that traveled on the sandpaper ramp? What did you notice about the Lego ramp? What about the other ramps?
   - Which surface slowed down the cars the most? Why do you think that is?
   - Which surface causes the most friction? Why?
   - Which surface causes the least friction? Why?
   - What do you think will happen if you apply a little force to your car by pushing it instead of just letting it go?

We're Finished! What Now?

- Instead of using toy cars and wooden planks, try this activity with balls and paper towel rolls (cut in half lengthwise) covered in different textures.

Links to Creativity Research

The concept of a "slow race" is definitely paradoxical. Janusian thinking, or the ability to consider contradictory ideas simultaneously, is essential for this challenge. Bringing together seemingly unrelated ideas is an effective creative thinking strategy, and many eminent creative individuals such as Einstein and Mozart demonstrated this ability (See work by Alex Rothenberg for more information on the relationship between Janusian thinking and creativity). In order to consider the idea of slow race, individuals must remain flexible and open to newness. In short, they must be comfortable with the unfamiliar—such openness to experience is essential for creative thinking (Kaufman, 2013).

Kaufman, S. B. (2013). Opening up Openness to Experience: A Four-Factor Model and Relations to Creative Achievement in the Arts and Sciences. Journal Of Creative Behavior, 47(4), 233-255.

Rothenberg, A. (1971). The process of Janusian thinking in creativity. Archives Of General Psychiatry, 24(3), 195-205.

Source

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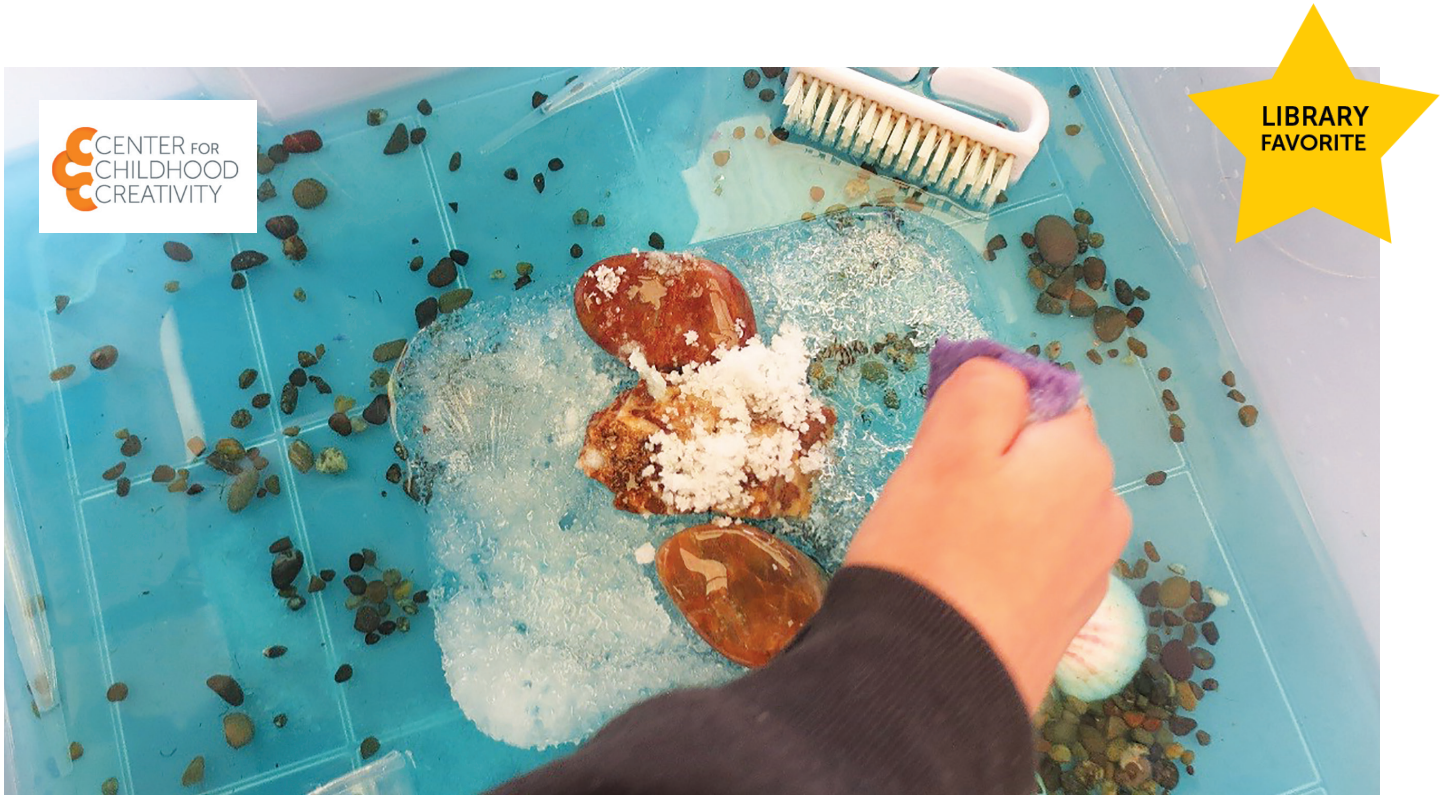

Ice Exploration

Excavate frozen objects!

Creativity Skills Developed					
Imagination & Originality	Flexibility	Decision Making	Motivation		
Topic	**Age**	**Participants**	**Complexity**	**Duration**	**Cost & Resources**
• Making, Building & Tinkering • Science • Nature	• 2-5 yrs. • 6-9 yrs. • 10-14 yrs.	• Individuals • Small groups (2-4 participants) • Large groups (5+ participants)	**Moderate** *Guidance needed from an expert peer or an adult*	• **Extended** *(15 min. - 2 hrs.)*	**Medium** *Need to collect some everyday household objects or easy to find purchase of $10 or less*

Get Ready...

Use your problem solving skills and a variety of tools to get items out of blocks of ice.

Get Set...

Gather these materials:

- Items to freeze (leaves, shells, sticks, rocks, pennies, etc.)
- Plastic containers of different shapes and sizes to freeze the items in
- Large bowls or flat plastic tubs
- Toothbrushes or nail brushes
- Eyedroppers
- Salt
- Towels
- Flashlights
- Water

Go!

1. Freeze items in plastic containers filled with water.
2. Once frozen, pop out the ice into a large bowl or flat plastic tub.
3. Take a look at your tools before you start. How will you use each tool? What do you think will happen when you use each tool?
4. Now use the tools to excavate the ice. How can you get the items out of the ice? What other tools could you use? What other things could you try?

We're Finished! What Now?

- Have an excavation race! Freeze similar items in the same amount of water and see who can get the item out first. Afterwards, have each person talk about what they did to get the item out. What was the fastest method? What was the slowest? What was the most creative?
- Try freezing items in larger plastic containers and excavate even larger pieces of ice. How does this change the activity? Will you use a new method? Will you need new tools?
- Try freezing small items in water balloons instead of plastic containers. Place the item in the balloon, fill it with water and then freeze it. Once it is frozen, cut the balloon off. Excavating objects from a rounded shape is another fun challenge!

Links to Creativity Research

This activity requires both flexibility and persistence, which are cognitive and affective components of creativity. Participants must remain persistent in the task, but also willing to change their problem-solving tactics if necessary (see Nijstad et al.'s work on the Dual Pathway to Creativity). Both divergent and convergent thinking are essential to successfully complete the excavation: divergent thinking produces a multitude of potential excavation methods, while convergent thinking is utilized to decide on the method that is most likely to be successful. The cycle between divergent and convergent thinking gives birth to the creative thinking process (Cropley, 2006).

Cropley, A. (2006). In Praise of Convergent Thinking. Creativity Research Journal, 18(3), 391-404.
Nijstad, B.A., De Dreu, C.K.W., Rietzschel, E.F., & Baas, M. (2010). The dual pathway to creativity model. European Review of Social Psychology, 21, 34 - 77.

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Popsicle Stick Puzzle

Make your own puzzle!

Creativity Skills Developed					
Imagination & Originality	Flexibility	Decision Making	Communication & Self-Expression	Motivation	
Topic	**Age**	**Participants**	**Complexity**	**Duration**	**Cost & Resources**
• Making, Building & Tinkering • Storytelling • Visual Arts • Sports & Games	• 2-5 yrs. • 6-9 yrs.	• Individuals	**Moderate** *Guidance needed from an expert peer or adult*	• **Extended** *(15 min. - 2 hrs.)*	**Medium** *Need to collect some everyday household objects or easy to find purchase of $10 or less*

Get Ready...

In this activity you'll use your creativity to make a handmade puzzle by painting an image on popsicle sticks.

Get Set...

Gather these materials:

- 20 popsicle sticks
- Paint
- Markers
- Paint brushes
- Masking tape

Go!

1. Line up the popsicle sticks on a flat surface so they are touching and the ends are lined up evenly, like a fence.
2. Cut strips of masking tape and lay them across the sticks so they will stay together when you turn them over together.
3. Carefully flip over the group of sticks so you can begin to paint or draw your image.
4. Think about what image you would like to create for your puzzle. Will it be simple like a flower or detailed like a dragon flying over a village? Sketch the image on paper before putting it on the sticks.
5. You will create two puzzles, one on each side of the sticks. To make it easy to tell which sticks go with which puzzle, first paint a solid color on all of the sticks on one side.
6. When the background paint on the sticks is dry, use markers or paint to illustrate the sticks. Let the sticks dry.
7. When they are dry, flip them over and remove the masking tape. You'll put these strips of tape on the other side, so flip the sticks over, line them up like before and add the tape.
8. Repeat the same steps for this second side of the puzzle.

We're Finished! What Now?

- Consider writing a poem on one side and an illustration on the other side.
- Play around with photographing the sticks in an abstract order. Can you make a beautiful arrangement?
- Give your puzzle to someone as a gift. Think about how you could package the puzzle. If you will put your sticks in a box, replicate one of the images on the outside of the box. Or find a different way to package the puzzle, like in a recycled glass jar from the pantry.
- Think of other materials you could use for a puzzle and create a new puzzle.
- Use your puzzle to tell a story. Use the image you've created as a component of your story. Tell your story verbally to friends and family or write it down.

Links to Creativity Research

This activity provides an opportunity to turn a secret pattern into a puzzle. In fact, both the participant who creates the puzzle and whoever solves it are being creative by using pattern recognition and formation (see Root-Bernstein & Root-Bernstein, 1999). Another creative aspect is how the materials (popsicle sticks) are limited, yet the instructions aren't too demanding. This particular combination of constraints and ill-defined instruction helps increase variability (originality) in what participants will create (Stokes, 2009).

Root-Bernstein, R. S., & Root-Bernstein, M. M. (1999). Sparks of genius: The thirteen thinking tools of the world's most creative people. New York: Houghton Mifflin Harcourt.

Stokes, P.D. (2009). Using constraints to create novelty: A case study. Psychology of Aesthetics, Creativity, and the Arts, 3(3), 174-180.

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Towel Transformations

Bring a towel to life.

Creativity Skills Developed					
Imagination & Originality		Flexibility		Communication & Self-Expression	
Topic	**Age**	**Participants**	**Complexity**	**Duration**	**Cost & Resources**
• Making, Building & Tinkering • Performing Arts • Storytelling • Visual Arts	• 2-5 yrs. • 6-9 yrs. • 10-14 yrs.	• Individuals • Large groups (5+ participants)	**Moderate** *Guidance needed from an expert peer or an adult*	• **Extended** *(15 min. - 2 hrs.)*	**Medium** *Need to collect some everyday household objects or easy to find purchase of $10 or less*

Get Ready...

Challenge yourself to get truly creative with one of the less exciting items found around the house—towels. You'll never look at a washcloth or dishtowel the same way again!

Get Set...

After getting permission from an adult to transform some household linens, gather these materials:

- Washcloth or dishtowel (solid colors are recommended)
- Scissors
- Pipe cleaners
- Twist ties
- Rubber bands
- Aluminum foil
- Chopsticks
- Fabric markers

Go!

1. Play around and use your imagination to turn your old dishtowel into an unusual creature.
2. Now, make your creature a super-creature by picking a secret power for your creature.
3. Give your creature a funny name and imagine three words to best describe the personality of your creature.

We're Finished! What Now?

- Write short bios for each creation, noting each creature's name, special power and essential characteristics. Creatures can be put on display, like in an art gallery, with their bios posted. Crackers and sparkling juice can be served while guests toast to imagination and originality!
- Play around with your creature. Imagine how your creature would move around, given its superpower and also its personality. Does it leap in high, joyful jumps? Or slither in a sneaky way? Now, make a photo flip book to show others this movement in a creative way. A photo flip book is made of a series of pictures that vary gradually from one page to the next, so that when the pages are turned rapidly, the pictures appear to animate by simulating motion. If you are unsure of how to take the photos, participants should ask an adult how to set the camera to "sequential" photo shooting by reading the manual or by exploring your camera's menus.
- Get some friends together to perform a skit using your super-creatures.

Links to Creativity Research

Gradual increases in constraints are helpful in developing creativity (Runco, 2014). In other words, working with common household materials and asking open-ended questions are optimal creativity challenges since they are neither too challenging nor discouraging. While buying elaborate toys can elicit grand ideas, ordinary household objects are not only more accessible, but also provide opportunities to exchange their everyday (and possibly boring) uses for more creative ones.

Runco, M. A. (2014). Creativity: Theories and themes: Research, development, and practice (2nd ed.). San Diego, CA: Elsevier.

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What If? Animals!

Build a nature creature with clay.

Creativity Skills Developed					
Imagination & Originality		Flexibility		Collaboration	
Topic	**Age**	**Participants**	**Complexity**	**Duration**	**Cost & Resources**
• Making, Building & Tinkering • Language & Word Games • Storytelling • Nature • Visual Arts	• 2-5 yrs. • 6-9 yrs.	• Individuals • Small groups (2-4 participants) • Large groups (5+ participants)	**Low** *Children can complete without support from an expert peer or adult*	• **Extended** *(15 min. - 2 hrs.)*	**Medium** *Need to collect some everyday household objects or easy to find purchase of $10 or less*

Get Ready...

In this activity, you will mold, sculpt, squish and shape clay to build unique animals using locally gathered natural materials.

Get Set...

Gather these materials:

- Local natural materials (acorns, flowers, twigs, leaves, pine cones, etc.)
- Clay
- Wooden sculpting tools
- Wooden rolling pin (try one in fun a texture)
- Small cup or pitcher of water
- Wax paper or parchment paper
- Tape

Go!

1. Before you start creating, start imagining. What kind of fantastical creature will you create? What will it look like? What kind of body, arms and feet will your creature have? What kind of habitat does it live in? Does it have special powers? What does it like to do? What does it like to eat? Be creative and come up with many possible ideas.
2. Gather local natural materials that will allow you to create what you imagined for your creature.
3. Set up a clean workspace. Tape the wax or parchment paper (enough so it won't slip) onto the table where you will be working.
4. Lay out all collected materials, tools and clay, and start creating! Small amounts of water can be used as a glue to stick different pieces of clay together or to make clay softer.
5. Clay naturally lends itself to storytelling. As you create, tell the story of your animal to a friend. What is your creature's name? Where does it live? Describe its habitat. What does it like to do? Describe how it uses its features. Share your ideas as you create and ask others questions about their fantastical creatures. Find out how your creatures are similar and how are they different. Don't be afraid to make changes to your creature as you work and tell your story.

We're Finished! What Now?

- Document the story you told while creating your creature by writing it down. Share your story with a friend or family member.
- Draw a picture of your creature. Share your picture with a friend or family member.
- As a small group, create a story that includes all of your creatures. Take turns adding details and ideas to the story.
- Collect new materials and make another animal.
- Make a menagerie of "What If? Animals!"
- Create a habitat for your novel creature.

Links to Creativity Research

Constraints are helpful in developing creativity when they are increased gradually (Runco, 2014). At first, found materials can seem novel and inspiring. Over time, familiarity increases with these materials and our ability to be more creative with less occurs, which helps participants to be more imaginative with what is already around them. In fact, creating imaginary worlds and companions can predict creative potential (Hoff, 2005).

Hoff, E. V. (2005). Imaginary companions, creativity, and self-image in middle childhood. Creativity Research Journal, 17(2-3), 167-180.

Runco, M. A. (2014). Creativity: Theories and themes: Research, development, and practice (2nd ed.). San Diego, CA: Elsevier.

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Additional Resources

Creativity in Children

Center for Childhood Creativity | CenterForChildhoodCreativity.org

The Center for Childhood Creativity (CCC) at the Bay Area Discovery Museum offers a full range of technical assistance, curriculum development and research-backed advising to schools, museums and other non-profits, as well as companies that directly influence children's development. Our research publications synthesize relevant empirical findings from a broad range of disciplines to cull meaningful, practical advice.

Making and Tinkering

Maker Ed | MakerEd.org/resources

Maker Ed is a non-profit organization that supports and empowers educators and communities— particularly those in underserved areas—to facilitate meaningful making and learning experiences with youth. Their valuable resource library includes tools, tutorials, project ideas, material lists and facilitation practices that will help librarians looking to get in on the maker trend.

Exploratorium Tinkering Studio | Tinkering.Exploratorium.edu

This immersive space at the Exploratorium museum allows visitors to become deeply engaged in investigating scientific phenomena and collaborate to create unique projects. Their website offers innovative ideas for experimenting with science, art and technology beyond the museum. Librarians are excited about many of their activities, like Cardboard Automata and Paper Circuits!

Coding and Technology

Code.org Code Studio | Studio.code.org

Code Studio includes fun and inviting coding and computer science courses appropriate for all ages. Kids can visit this site to create their own artwork or games. The website boasts that it contains over seven billion lines of code written by millions of young people.

MIT Media Lab's Scratch | Scratch.MIT.edu

Scratch is a free, easy to use visual programming language and online community where kids can create original interactive stories, games and animations. Librarians who have never programmed before will have no trouble picking up these skills alongside kids using Scratch!

Books on Creativity

First Book Creativity Kits | FBMarketplace.org

First Book is a non-profit social enterprise that provides access to new books for children in need. The CCC is partnering with First Book to offer Creativity Kits available online starting in November 2015. Each affordable kit includes a backpack filled with two age-appropriate books related to creativity, a journal and a pack of colored pencils. They also come with a reading guide that includes creative questions to ponder while reading, as well as activity ideas for kids and caregivers. The kits are part of an entire creativity section on the site, which includes additional resource on everyday creativity, creativity in STEM and creativity in the arts. The First Book Marketplace has more than 6,000 titles available for kids birth to 18 to ignite curiosity and creativity! If you are serving kids in need, you can sign up for First Book to access these resources.

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