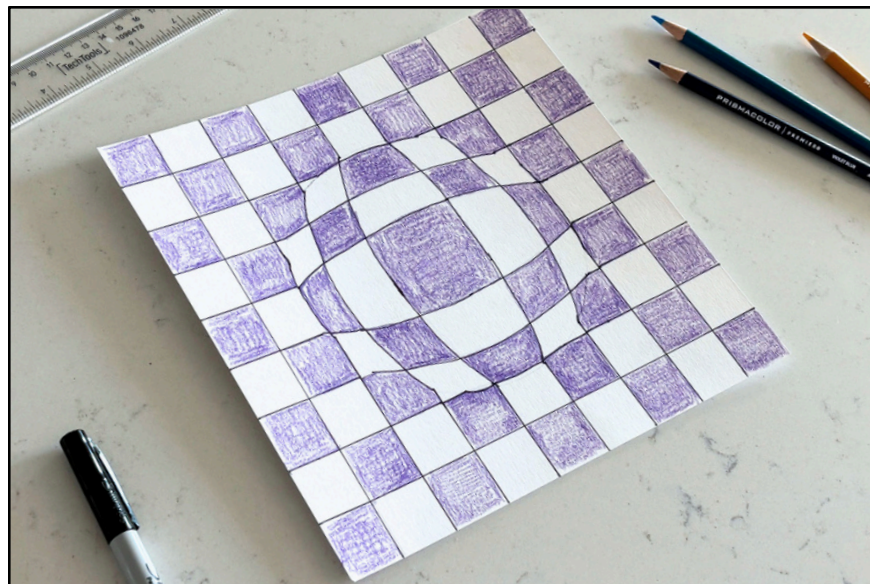




The Math and Art Connection



LINE ILLUSIONS



Welcome to The Math and Art Connection!

Did you know that math and art are like best friends who love to work together? It's true! Artists use math to create amazing artworks, and you're going to learn how to do the same.

Math helps artists make sure everything looks just right. Whether it's drawing shapes that are symmetrical, figuring out proportions to make things look just right, or using patterns to make their artwork pop. Math is everywhere in art!

In Art Makes Me Smart – The Math and Art Connection, we are going to be doing some art together that will spark curiosity about mathematics. At the same time we will see that math is a powerful tool to help our art skills grow. As we explore the connection between art and math, we will see that math is truly full of beauty and beauty is full of math!

Through this project, you'll see first hand the math and art connection while creating a beautiful piece of artwork to enjoy.

One last thing! You are invited to [join the Art Makes Me Smart private Facebook group](#) where we share what we're making and learning. Don't be shy! It would mean so much to have you join in and share what you are doing.

Remember, **Art Makes You SMART!**

Your friends,



Hannah Stevenson
Founder



Alyson Harwood
Teacher



Scan the QR code with your phone

A Note for Parents

Welcome, parents! We are excited to share with you our latest course in Art Makes Me Smart. This packet is designed to make learning about the math both fun and engaging through a variety of activities and resources.

We hope this packet serves as a springboard for exciting explorations, thoughtful conversations, and cherished bonding moments between you and your children.

Each packet includes the following:

- **Project Supply Lists** - This list includes all the materials your child will need to complete our special art project.
- **Step-by-Step video lessons** are in our [digital course here](#)
- **Keywords and Definitions** - To reinforce learning, we've provided a glossary of key terms and definitions from the lesson.
- **Educational facts** to deepen the connection between math and art
- **Video Resources** - To extend your child's learning, we have compiled a list of video resources that explain the mathematical concepts in various engaging formats.
- **Additional Activities** - For further practice, we have included additional activities. These activities range from simple calculations to more complex projects, ensuring that your child can continue to build their skills at home.
- **Discussion Questions** - To help you engage with your child's learning, we have prepared a list of discussion questions you can use to spark meaningful conversations. These questions will encourage your child to think critically and explain their understanding in their own words.

We recommend starting with the supply list to ensure you have everything needed for the project. You'll find the video step-by-step lessons in the digital course as well as activities provided for younger children that pairs with the same mathematical concept.

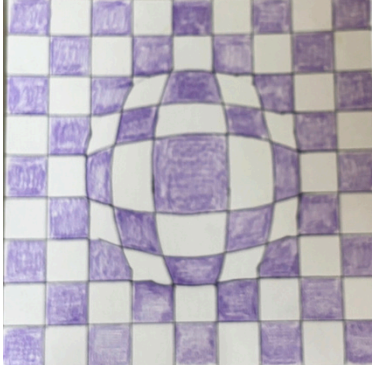
Explore the additional educational facts and keywords, video resources, additional interactive learning activities, and discussion questions to spark curiosity in your child.

If you ever need assistance, you can reach out to us at support@lilyandthistle.com. We are here to help!

And as always, remember Art Makes You Smart!
-Hannah and Team Lily & Thistle

Line Illusions Project

Supplies Needed for Project



Line Illusions

- Drawing Paper
- Colored Pencils/ Markers
- T - Square
- Compass
- Ruler
- Drawing Pencil
- Fine Tip Sharpie

Tips and Tricks

- Watch the video through one time to see what you'll be doing. As you complete the project, pause the video to allow more time on a certain area.
- Lightly color in the squares at first to give yourself a sense of the overall pattern. Then go back and fill the squares in completely.

Tips for Younger Artists

- Print any outlines directly on card stock paper instead of watercolor paper (size 8.5 x 11)
- Use a tray (or cookie sheet) to keep art in one place
- Wear an art smock or clothes you don't mind getting dirty

Scan the QR code or click [here](#) to view the exact supplies we used.

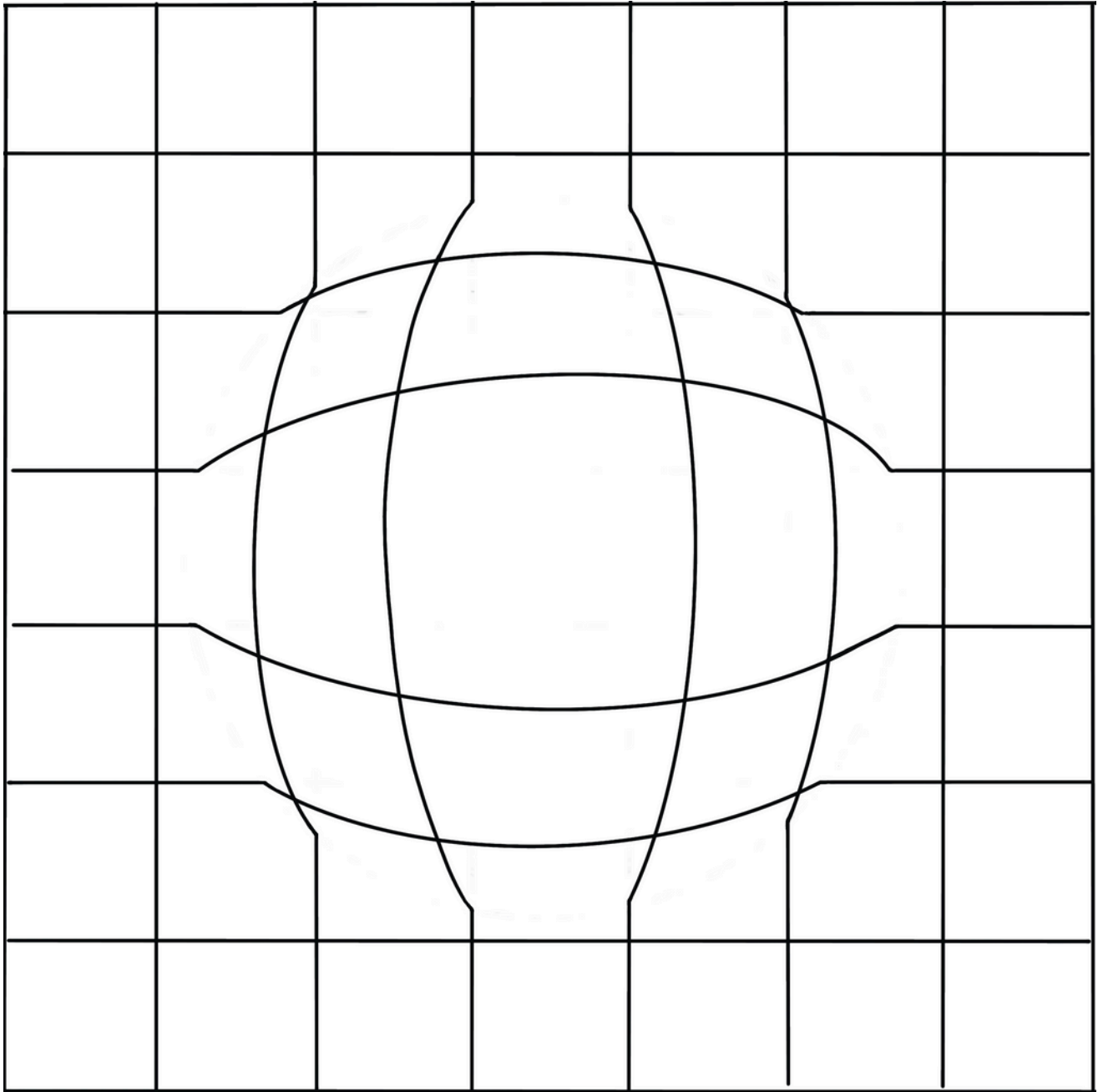
Line Illusions Resources



Scan the QR code with your phone

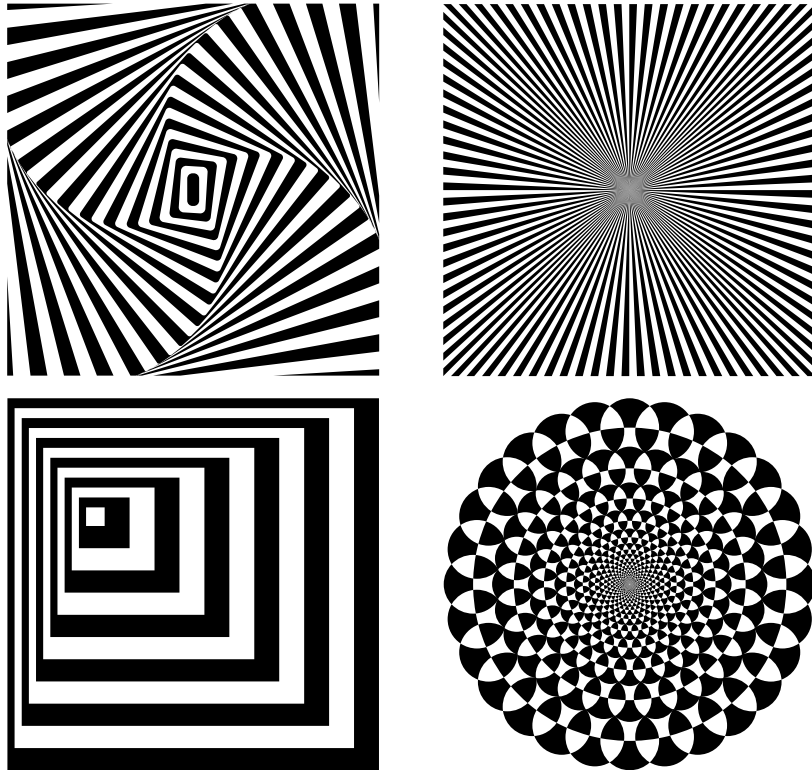
Adaptations for Little Artists and Mathematicians

Print on cardstock and paint or color with markers or colored pencils.



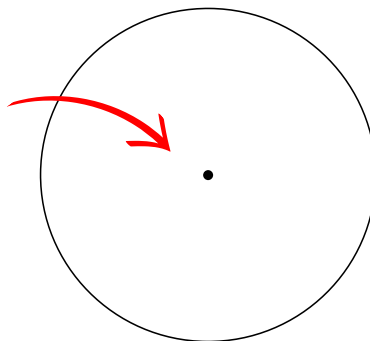
Expand Your Knowledge

- **Optical Illusion** - Something that seems one way but it really isn't that way. It tricks our eyes!



- **Maurits Cornelis Escher** - A dutch graphic artist who created mathematically inspired artwork that was considered mind-bending. He explored concepts of symmetry, perspective, and infinity.
- **Centerpoint** - The exact middle of something, like the center of a circle or the middle point of a line.

Centerpoint



Match It Up

Draw a line to match the word with its corresponding definition.

Optical Illusion

- The exact middle of something, like the center of a circle or the middle point of a line.

Maurits Cornelis

- Something that seems one way but it really isn't that way. It tricks our eyes!

Escher

- A Dutch graphic artist who created mathematically inspired artwork that were considered mind-bending. He explored concepts of symmetry, perspective, and infinity.

Centerpoint

Ruler's Rule!

Use a ruler to complete the challenges!

Draw a line that is five inches long.

Remember to start measuring from the 0 and not the end of the ruler.



Draw a line that is 3 1/2 inches long.

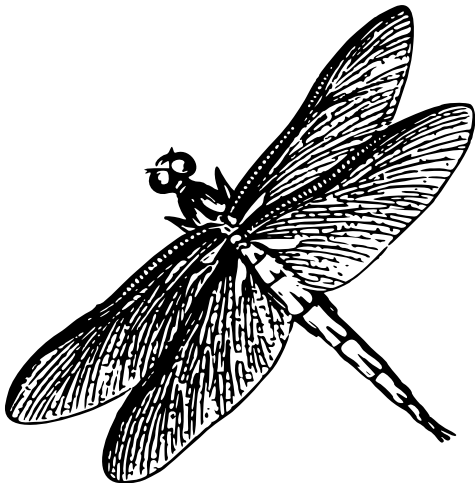
(Hint: look for the longest line half-way between 3 and 4.)

Get Measuring!

How long is the dragonfly's body?

How long is the dragonfly's wingspan?

Now, draw a creature that is three inches tall and two inches wide.



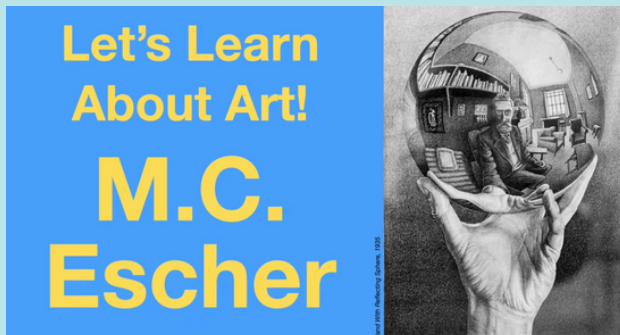
Video Resources

Line Illusions Resources

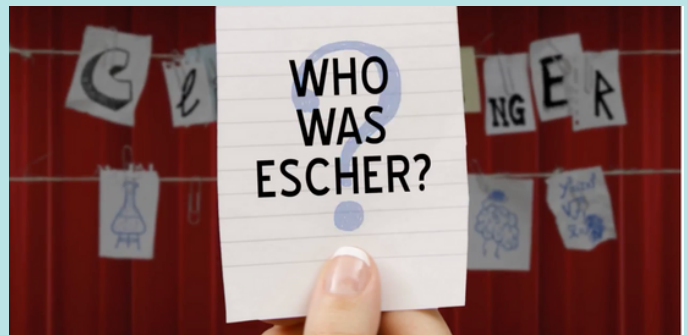


Scan the QR code with your phone

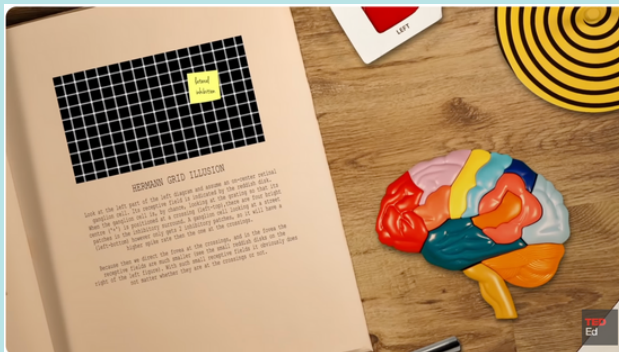
We've created a fun video resource list to help continue your learning. Scan the QR code or click the videos below. Enjoy!



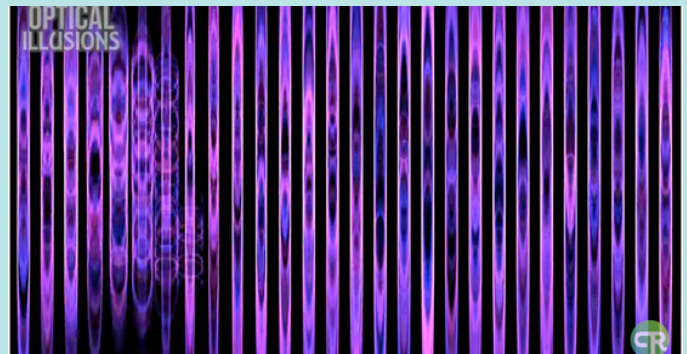
Artist M.C. Escher



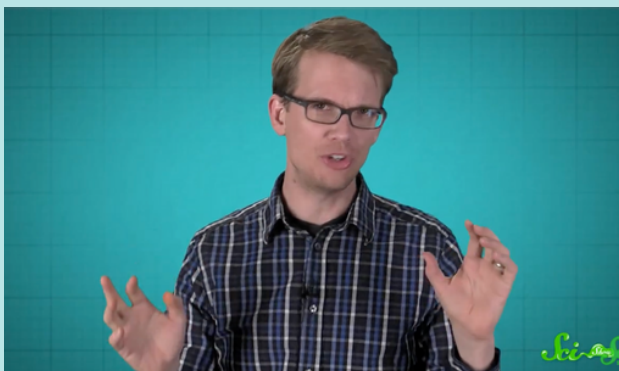
Who Was Escher?



How Optical Illusions Trick Your Brain



How and Why do Optical Illusions Work?



8 Mind-Blowing Optical Illusions



Is Reality an Illusion?

Exploring Line Illusions

Instructions:

Continue exploring illusions and create your own variety of illusion drawings.

Use the prompts below to guide you to create other optical illusions in your art.

Materials Needed:

- Paper, Pencil, Eraser
- Watercolors & brushes
- Colored pencils or markers
- Ultra-fine tip Sharpie

Creating a Müller-Lyer Illusion:

Step 1: Using a ruler, draw two parallel horizontal lines of the same length (about 4-6 inches) on the paper, spaced a few inches apart.

Step 2: On one line, draw inward-facing arrowheads at both ends. On the other line, draw outward-facing arrowheads.

Step 3: Guess which line appears longer.

Step 4: Measure both lines to confirm they are the same length.

Creating a Hering Illusion:

Step 1: Draw two vertical parallel lines about 3 inches apart.

Step 2: Using the ruler, draw several diagonal lines (like a fan) from a point on one side of the page to the other, intersecting the two vertical lines.

Step 3: Observe how the vertical lines appear to bend outward.

Step 4: Measure the distance between the two vertical lines at several points to confirm they are parallel.

Creating a Zollner Illusion:

Step 1: Draw several parallel lines at a slight angle (about 45 degrees) to the horizontal.

Step 2: Draw short lines across these at a steep angle (about 30 degrees) alternating directions

Step 3: Observe how the parallel lines appear to diverge or converge.

Step 4: Measure the angles and distances to confirm the lines are indeed parallel.

Continue the Discussion

Discussion Prompts

- **What is a line illusion?**
 - Talking Point: A line illusion tricks our eyes into seeing something different from reality, often altering the perceived length, angle, or direction of lines.
- **Where might we see line illusions in everyday life?**
 - Talking Point: Examples include architectural designs, road markings, and art. Discuss how these illusions can be used creatively or to guide behavior.
- **Why do you think our brain is tricked by these illusions?**
 - Talking Point: Our brain uses context and surrounding cues to interpret visual information. Illusions exploit these cues to create misleading perceptions.

Activities

Measuring Perception:

Materials: Ruler, pencil, paper

Create various line illusions (e.g., Hering and Zollner illusions). Have your child guess the lengths or angles and then measure to see how perception differs from reality.

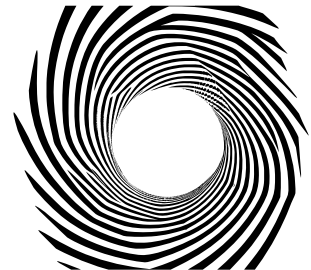
Designing Personal Illusions:

Materials: Ruler, pencil, paper, colored pencils.

Encourage your child to design their own line illusion using different shapes and patterns. Discuss how their illusion tricks the eye and why.

Interactive Online Tools:

Use online resources or apps that feature interactive line illusions. Explore how changing different elements affects perception.



Continue the Discussion

Discussion Questions After Activities

What did you notice about the illusions we created?

Discuss how the appearance of length or angle changed and what elements of the design caused the illusion.

How did it feel to realize your eyes were being tricked?

Discuss the surprise and curiosity that illusions provoke, emphasizing the fun in exploring how our brains work.

How do you think artists and designers use illusions in their work?

Explore how understanding illusions can help in creating engaging and thought-provoking art, as well as practical designs in architecture and signage.

Suggested Books to Continue Your Learning

- M.C. Escher: 29 Master Prints by Maurits Cornelis Escher
- M.C. Escher: 1898-1972: The Graphic Work by Taschen
- The Magic Mirror of M. C. Escher by Bruno Ernst

View the books above plus our entire book list with [links to Amazon here](#).

