



ACTIVITY GUIDE WEEK 1 - EXPLORE, DESIGN, CREATE

GRADES: 6-8

Hello Parent/Guardian,

We hope you are doing well. Here is a guide full of fun activities for your child to try out this week at home! This educational guide is meant to be engaging and fun for your child. Complete the tic-tac-toe board with them on the front sheet, or challenge them to complete each of the activity squares. Included you will find: stories to read; letter, and sound activities; science and art activities; and some great math graphing practice. This week's theme is weather. We hope you enjoy your activity guide for week 1.

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6-8

Week 1: WEATHER

<p>STEM:</p> <p>Build a kite, start by first sketching out a model of your design.</p> <p>Use materials that you have at home to design a kite. Does your kite fly?</p>	<p>READ:</p> <p>Choose 1:</p> <ul style="list-style-type: none"> - A story about the weather - A book about the weather - The weather app or newspaper - One of the stories in this packet 	<p>VOCABULARY:</p> <p>Review the list of words and definitions related to weather, then draw a picture next to each vocab word. The picture must describe the word.</p>
<p>WRITE:</p> <p>Choose 1:</p> <p>-What do you think the weather will be like next week? What are your plans for next week based on your weather predictions? Draw your ideas for your predictions or construct a poem based on your favorite type of weather.</p> <p>-Create a comic strip about a time you experienced harsh weather conditions (like a snowstorm or tornado)!</p>	<p>FREE SPACE</p>	<p>WEEKLY CHALLENGE:</p> <p>Create an optical illusion. Can you make your optical illusion weather themed?</p> <div style="text-align: center;">  </div>
<p>MATH:</p> <p>Do the dot card number talk and understand math in a different and creative way! You will need help from a parent/guardian/older sibling for this activity!</p>	<p>SCIENCE:</p> <p>What kind of container would keep your coffee the hottest for the longest period of time? What about ice water the coldest? Conduct an investigation using different kinds of containers in your home. Draw a model to explain your thinking.</p>	<p>LANGUAGE:</p> <p>Talk with someone at home. Ask them if they trust the news forecast. Which weather forecast is the most accurate? How often do they get it right?</p>

Climate vs. Weather

This text is from the U.S. National Oceanic and Atmospheric Administration: National Weather Service.

Time is the basic difference between climate and weather. When one averages the weather (maximum temperature, minimum temperature, wind speed and direction, rainfall, etc.) for any place, for any day, over a fixed number of years, that determines the average weather experienced, for that day, at that location.

Those averaged weather values then become to represent the *climatic normal* weather for that day. From the National Centers for Environmental Information (NCEI, formally NCDC), "the *climatic normal* is simply the arithmetic average of the values over a 30-year period (generally, three consecutive decades)."

The current set of climate normals is based upon observed weather in the years of 1981 to 2010. [I]n 2021, a new set of climate normals will be generated based upon the observed weather between 1991 and 2020.

Climatic normals (or averages) are most commonly seen on local weather broadcasts. The daily observed maximum and minimum temperatures is often compared to the "normal" temperatures based upon the 30-year average.

Also, these climatic normals help provide context if you hear something like "this winter will be wetter (or drier, or colder, or warmer, etc.) than normal." Other phrases such as "unseasonably warm (or cool)" weather is a comparison of the current weather conditions as related to the "climatic normal" for that time.

It has been said, "Climate is what you expect. Weather is what you get." In part, that is true, but for the vast majority of time, the observed weather [is] rarely "normal."

A good example is the all-time record rainfall for the Dallas/Fort Worth Airport in 2015. Climate normal for rainfall is 36.14" (918 mm). The actual rainfall for the year was 62.61" (1,590 mm). In only three months (May, October, and November) nearly a "normal" year's worth of rain fell.

The annual rainfall for 2015 broke the old all-time record by over 9" (229 mm). This was truly an extraordinary rain record that will stand for tens of decades, if not centuries.

2015 was a "roller coaster" year for the *occurrence* of rainfall in the DFW area as well. That same year, there was a stretch of 41 consecutive days with **NO** precipitation, which was the third-longest number of rain-free days on record.



2015 was an extraordinary year for rainfall in North Texas. This view is looking north into Oklahoma, from Texas, across the Red River in a "normal" year (bottom) and after very heavy rains that was part of the phenomenally wet year weather-wise.

Even individual days can have a wide variety of weather yet appear to be near climatologically normal. Again at the Dallas/Fort Worth Airport on November 27, 2015, the average of the maximum and minimum temperature was 55°F (13°C). The normal for that day is 52°F (11°C). So at first glance it would have appeared to be a "near normal" day temperature-wise.

The maximum temperature was 70°F (21°C), but [it] occurred around 3 AM in the morning. . . . [A] strong cold front moved past Fort Worth and Dallas early that morning, and the temperature began to fall.

The minimum temperature . . . was 39°F (4°C), and [it] occurred just prior to midnight. So the average temperature was near normal *climate*-wise, when that day was quite different weather-wise.

So large swings in day-to-day, month-to month, and even year-to year weather does not necessarily imply large, rapid changes in climate. Weather, over time, will become part of the 30-year normal.

Weather or Not

by Paula Hunt

What's happening outside can affect your mood.

When it comes to her favorite kind of weather, eleven-year-old Elena W. knows exactly what she likes.

"The sun is out, and there's a cool breeze," says the fifth grader from San Antonio, Texas.

Patrick J., also eleven, likes cold weather the best. That's because some of his favorite outdoor activities, such as ice fishing, take place when it's cold out. But he doesn't mind other types of weather too much—the Bristol, Connecticut, fifth grader says he just finds ways to stay busy and happy indoors.



Larry Williams/Getty Images

Everyone has their favorite kind of days. But can the weather actually make you feel a certain way?

"Absolutely!" says Marti Erickson, founding board member of the Children & Nature Network.

"Weather really does affect us. It affects our energy, and it can affect our mood."

Weather or Not

Scientists say it's not surprising that weather affects the way we feel. Spending at least thirty minutes a day in warm, sunny weather could improve people's moods, one recent study found. Another study says that when heat and humidity go up, a person's good mood can go down.

Fifteen-year-old Sean F., of Olney, Maryland, knows what that's like. "When it's hot and humid and sticky, it makes me feel exhausted," he says. And what about his mood? "I'm grumpy."

But for Pete S., of San Antonio, Texas, it's cold, overcast days he can do without. Long days spent

indoors make the sixteen-year-old uneasy. "It makes me feel kind of *claustrophobic*," he says. That's when people feel uncomfortable about being in a closed space.

But being bummed out about the weather is different for some people. Those who have psychiatric disorders, such as schizophrenia, depression, or attention-deficit hyperactivity disorder (ADHD), can be more sensitive to the weather's effects.

If you're bothered by dark winter days, there are treatments to help you feel better. Some people use light therapy boxes, which have bright lights that mimic sunlight. But for most people, things don't need to get that complicated.

"One way to increase your light exposure is to just go outside," says Jennifer Veitch, an environmental psychologist and senior research officer at the National Research Council Canada in Ottawa. "Even when it's overcast or in winter, the amount of light exposure you can get could be enough."

Cure the Blues with Some Green

Going outside has other benefits too. "Take a hike" takes on a whole new meaning when you know that nature can actually help put you in a better mood. Some researchers have found that the outdoors can help people relax and cope with stress, Veitch says.

One study showed that kids with ADHD were able to focus better after taking walks through green areas. Another found that kids who attended schools that had playgrounds with more natural elements such as grass and trees were better behaved.

Just what is it about seeing grass or a tree that lifts your mood? "Some scientists believe living things like plants and animals are so important for human survival that we are specially adapted to pay attention to them," explains Johanna Weber, a researcher at the Landscape and Human Health Laboratory at the University of Illinois at Urbana-Champaign. "They signal a place is a good place to live, so we are put in a good mood just by seeing them."

Weather and nature alone can't make you feel happy or sad. But understanding that they do have an effect on your mood means you won't be surprised by your feelings. Or, like Elena's thirteen-year-old sister Olivia W., you'll know what to do when you need a boost.

"When I come back from a walk in the park, I feel nice, I feel good, I feel sort of energized," she says. "Even if the entire rest of your day totally stinks, one walk in the park for me is a perfect cure for it."

A Garden a Day Keeps the Blues Away

When you can't bring people to nature, what do you do? Bring the nature to them! More and more nursing homes, hospitals, and schools are doing just that by creating gardens and green spaces on their grounds.

Going green has healthy benefits. People who live in nursing homes feel less depressed if there is a garden, studies have found. Even people in hospitals who can't get outside feel better when they can see gardens from their windows.

Kids in schools that have natural playgrounds with grass and trees focus better and are less aggressive than those who don't have such areas. Schools are turning to nature for teaching too. "Gardens and other outdoor spaces can be turned into places to study science, math, and language," says Marti Erickson, founding board member of the Children & Nature Network.



Angie Beaulieu

*Walden Project student Julia W. reads to her classmates from the Dr. Seuss book *The Lorax*.*

For learning from nature and in nature, it's hard to beat the Walden Project, a school in Vermont that was named after the book *Walden* by Henry David Thoreau. Thoreau said he did some of his best thinking outdoors. Teachers hold classes outside every day of the year, in all kinds of weather, with just a makeshift tent for shelter and a wood burning stove for warmth.

Name: _____ Date: _____

1. What is Elena W.'s favorite kind of weather?

- A. sunny with a cool breeze
- B. humid, sticky weather
- C. wet, rainy weather
- D. cold and overcast

2. The text describes the effects different types of weather can have on your mood.

What effect could spending at least thirty minutes a day in warm, sunny weather have on your mood?

- A. It could improve your mood.
- B. It could make you feel exhausted.
- C. It could put you in a bad mood.
- D. It could make you feel lonely.

3. Different people prefer different types of weather.

What evidence from the text supports this conclusion?

- A. Some of Patrick J.'s favorite outdoor activities, such as ice fishing, take place when it's cold out.
- B. One study says that when heat and humidity go up, a person's good mood can go down.
- C. Patrick J. likes cold weather the best, but Pete S. can do without cold, overcast days.
- D. Long days spent indoors make Pete S. feel claustrophobic, or uncomfortable about being in a closed space.

4. Why might someone who usually enjoys the outdoors not find it relaxing every time?

- A. A person might not enjoy certain types of weather, which would make his or her experience outdoors less relaxing.
- B. The outdoors is only enjoyable the first time a person experiences it.
- C. The outdoors is only enjoyable during the summer.
- D. Most people prefer being indoors to being outdoors.

5. What is the main idea of this text?

- A. Some people use light therapy boxes to help them feel better.
- B. People should stay indoors on dark winter days.
- C. Henry David Thoreau did some of his best thinking outdoors.
- D. The weather and the outdoors can affect a person's mood.

6. Read these sentences from the text.

"Going green has healthy benefits. People who live in nursing homes feel less depressed if there is a garden, studies have found."

What does the phrase "going green" mean here?

- A. to recycle plastic bottles and cans
- B. to be around nature
- C. to save the environment
- D. to spend a lot of money

7. Choose the answer that best completes the sentence.

_____ weather and nature alone can't make you feel happy or sad, understanding that they do have an effect on your mood means you won't be surprised by your feelings.

- A. If
- B. Since
- C. Because
- D. Although

8. How does Olivia W. feel after a walk in the park?

9. Why is a person's mood lifted when he or she sees grass or a tree?

Support your answer with evidence from the text.

10. Explain how where a person lives might affect his or her mood.

Support your answer with evidence from the text.

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8. How does Olivia W. feel after a walk in the park?

Answers should be pulled from the following quote: "When I come back from a walk in the park, I feel nice, I feel good, I feel sort of energized.... Even if the entire rest of your day totally stinks, one walk in the park for me is a perfect cure for it."

9. Why is a person's mood lifted when he or she sees grass or a tree?

Support your answer with evidence from the text.

Answers may vary slightly but should be supported by the text. Students should reference the following quote from Johanna Weber: "Some scientists believe living things like plants and animals are so important for human survival that we are specially adapted to pay attention to them.... [Plants and animals] signal a place is a good place to live, so we are put in a good mood just by seeing them."

10. Explain how where a person lives might affect his or her mood.

Support your answer with evidence from the text.

Answers may vary but should be supported by the text. Students should note that the weather and outdoors can affect a person's mood. For example, Olivia W. feels energized after a walk in the park. Since plants and animals signal a place is a good place to live, a person is put in a good mood just by seeing them. However, not all places have access to a park or grass or trees, so depending on where a person lives, he or she may not be able to take advantage of these opportunities to improve one's mood.

STEM

Sketch your design for your kite before you build it here. Make sure to include dimensions and list the materials you plan to use:

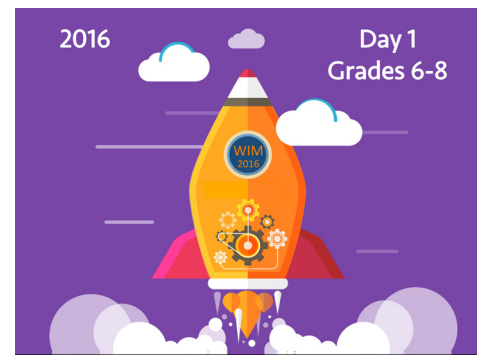


I will use the following materials from my home:

-
-
-
-
-
-
-

WRITING and LANGUAGE

Create a comic strip about a time you experienced harsh weather conditions (like a snowstorm or tornado)!

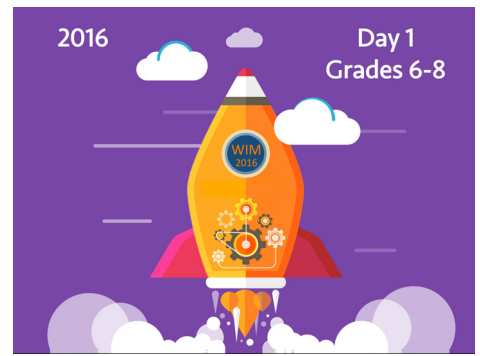


Introduction:

In this lesson students will be helped to see numbers through a dot card number talk, which helps students understand that mathematics can always be seen in many different and creative ways. Students will also investigate squares inside a rectangle, a lovely low floor, high ceiling task.

Agenda for the day:

Activity	Time	Description/Prompt	Materials
Mindset Video	5 min	Play the mindset video, <i>Brains Grow and Change</i> https://www.youcubed.org/wim2-day-1/	Mindset Video day 1, <i>Brains Grow and Change</i>
Dot Card	15 min	1. Show the dot card visual to students. Put it away before they have time to count and ask them how many dots they saw and how they saw them. See this video for more detail. https://www.youcubed.org/jo-dot-card-number-talk/ 2. Draw as many examples of student representations as possible.	1 copy of the dot card visual for display, page 5
Good Group-work	15 min	1. Reflect on the things you do not like people to say and do when you are working on math in a group. 2. Reflect on the things you do like people to say and do when you are working on math in a group.	<ul style="list-style-type: none"> • Paper, pencil/pen • 2-4 pieces of large poster paper to collect the students' ideas
Fewest Squares	15 min	If you have time this is a great activity! 1. Have students draw an 11x13 rectangle. 2. Ask them to figure out what is the fewest number of squares they can draw in the rectangle.	<ul style="list-style-type: none"> • Graph/grid paper • Pencil/pen • Colored pencil/markers
Closing	5 min	As the lesson closes remind students of the video messages they heard – that there is no such thing as a math brain or a math person and anyone can learn any level of math with hard work and effort.	

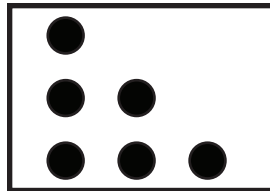


Activity: Dot Card

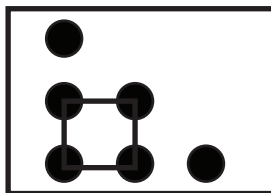
A dot card number talk is a really nice activity that people of all ages enjoy. It is a short but powerful teaching activity and it shows students:

- the creativity in math
- the visual nature of math and
- the many different ways people see math.

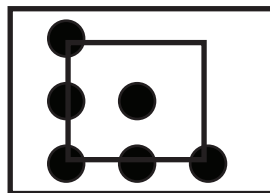
This lesson is based around this dot card:



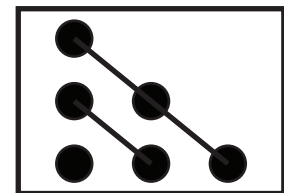
First show the dot card to students - but show it for a very short amount of time. The goal is for students to work out how many dots there are without counting. I usually hold the card or show it on a screen for a few seconds only, to stop students counting one by one. Ask students to tell you how many there are without counting one by one. This grouping of dots involves an important brain area. After they have seen the dots ask the whole class: "Does anyone want to tell me how many dots there are?" Then record the number of dots people saw on the board. Usually most students will see there are 6 dots. Then tell students the interesting part is how they see 6 dots, and ask individuals to tell you how they saw the 6. Record each way of seeing with the students name, as I do in this example from WiM 1 with a different dot card: - <https://www.youcubed.org/jo-dot-card-number-talk/> . I have also used dot cards with kindergarten students, high school students and undergraduates. When you record the different ways students see the collection of dots you can record visually, or also add numbers, For example:



$$4 + 2$$



$$9 - 3$$

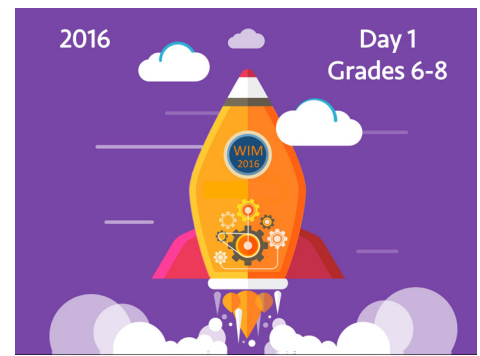


$$3 + 2 + 1$$

For more detail on teaching a dot card number talk or a regular number talk, see <https://www.youcubed.org/category/teaching-ideas/number-sense/>, Humphreys and Parker (2015), Parrish (2014).

References:

- Boaler, J. & Humphreys, C. (2005) Connecting Mathematical Ideas: Middle School Cases of Teaching & Learning. Heineman: Portsmouth.
- Humphreys, C. & Parker, R. (2015). Making Number Talks Matter: Developing Mathematical Practices and Deepening Understanding, Grades 4-10. Portland, ME: Stenhouse.
- Parish, S. (2014). Number Talks: Helping Children Build Mental Math and Computation Strategies, Grades K-5, Updated with Common Core Connections. Math Solutions.



Activity: Good Groupwork

I always use this activity before students work on maths together as it helps improve group interactions and shape classroom norms for the school year. Teachers who have tried this activity have been pleased by students' thoughtful responses and found the students' thoughts and words helpful in creating a positive and supportive environment. First I ask students to reflect on things they don't like people to say or do in a group when they are working on maths together. Students come up with quite a few really important ideas, such as not liking people to give away the answer, or to rush through the work, or to ignore other people's ideas. After they have thought of a few of the ideas I ask them to think of the converse – what DO they like people to do and say when working in a group. When students have had enough time in groups brainstorming, the teacher then collects the ideas. I usually do this by making a "What we don't like" list/poster and asking each group to contribute one idea, moving around the room until a few good ideas have been shared (usually about 10). Then I do the same for the "what we do like" poster/list. I usually present the final posters to the class as our agreed upon classroom norms that we will refer back to through the year. If any student shares a negative comment, such as "I don't like waiting for slow people" do not put it on the poster, instead use it as a chance to discuss the issue. This rarely or never happens and students are usually very thoughtful and respectful in the ideas they share.

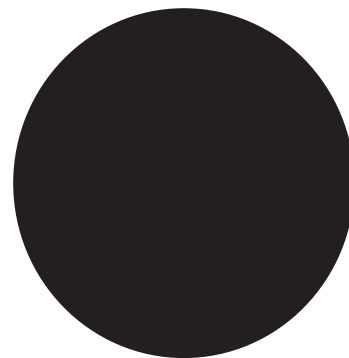
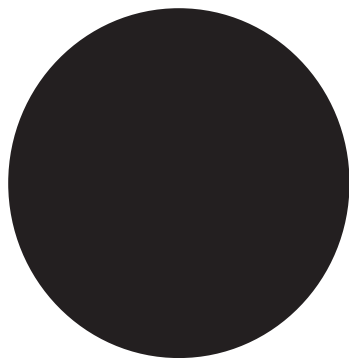
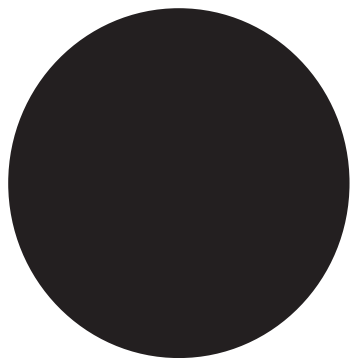
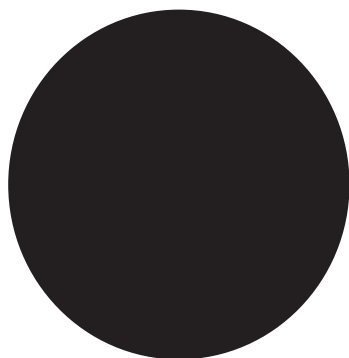
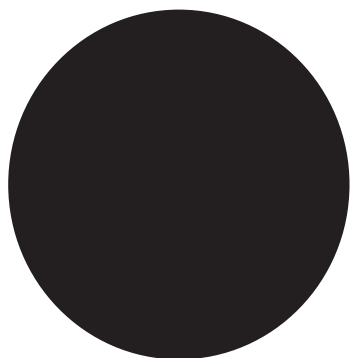
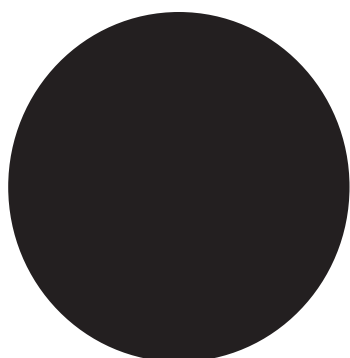
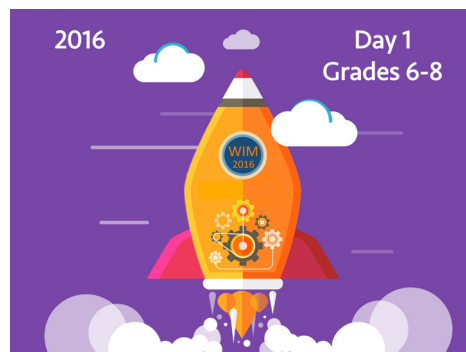
Activity: Fewest Squares

This is a really worthwhile activity that we taught last summer in our youcubed maths camp. It is a mathematical investigation that students may explore together.

To get students started ask them to draw an 11×13 rectangle on their paper, and then pose the question, *What is the fewest number of squares you can draw inside of your 11×13 rectangle?* Make sure the class has an idea about what the question is asking before they start working. Answer clarifying questions but be careful not to do any of the thinking for them. Encourage students to use their group to ask questions and wonder together about how to draw the fewest number of squares in an 11×13 rectangle. Provide plenty of graph/grid paper so students feel like they can try the activity more than once.

Extensions for the activity:

- Determine the fewest number of squares in a 12×15 rectangle.
- What is the size of the rectangle you can find using 9 squares? Can you find more than one rectangle?



SCIENCE:



What kind of container would keep your coffee the hottest for the longest period of time? What about ice water the coldest? Conduct an investigation using different kinds of containers in your home. Draw a model to explain your thinking.

VOCABULARY:

Review the list of words and definitions related to weather, then draw a picture next to each vocab word. The picture must describe the word:

Vocabulary Word	Definition	Picture
Atmosphere	the envelope of gases surrounding any celestial body	
Cirrus	a wispy white cloud at a high altitude	
Cumulus	a globular cloud	
Dew Point	the temperature at which the water vapor in the air becomes saturated and condensation begins	
Evaporation	the process of becoming a suspension of particles in the air	
Hail	precipitation of ice pellets	

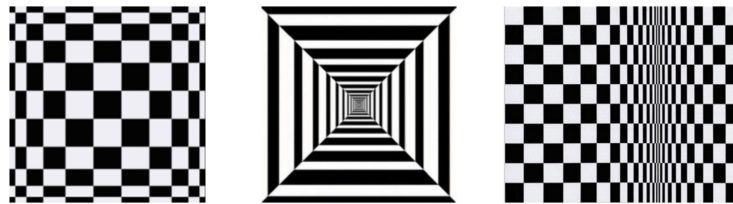
Hurricane	a severe tropical cyclone usually with heavy rains and winds	
Precipitation	the falling to earth of any form of water	
Sleet	precipitation consisting of a mixture of rain and snow	
Stratus	a large dark low cloud	

Optical Art Task

This is a task that combines art, mathematics and design. Students are asked to see and design optical illusions, think about the mathematics inside them and pose mathematical questions for their friends.

Task Instructions:

- Optical art consists of geometric shapes and patterns, and is often coloured in black and white. Look at the three examples, do you see anything about the patterns that cause them to create an optical illusion?



- Using the 100-square grid, create your own interesting pattern. Share your designs with a classmate and find out if they see an illusion when looking at your pattern.
- Did you get any more ideas about the ways to create an optical illusion? Describe your mathematical thinking about ways to do that.
- Can you see any patterns, fractions, or decimals in your artwork? Where are they?
- Think of a mathematical question that you could ask about your artwork.
- If someone else wanted to recreate your artwork, what directions would you give them?

Materials:

- One handout per student
- Copies of the 100-square grid handout
- Ruler
- Colored pencils or markers

Extensions:

It is interesting to think about what creates an illusion in optical art. Do optical illusions have certain mathematical properties? One idea would be for the whole class to display their designs and look together to see if certain designs create particular visual properties. If you want to extend this task into a bigger project Wikipedia has some interesting information about optical art.

https://en.wikipedia.org/wiki/Mathematics_and_art

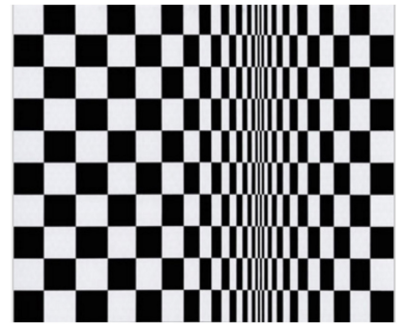
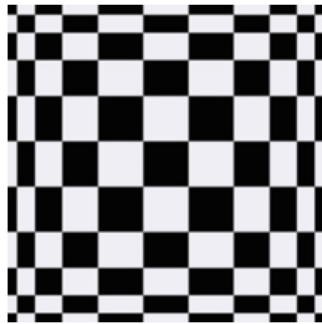
https://en.wikipedia.org/wiki/Op_art

Reference:

Jo Boaler, Michael Jarry-Shore & Cathy Williams

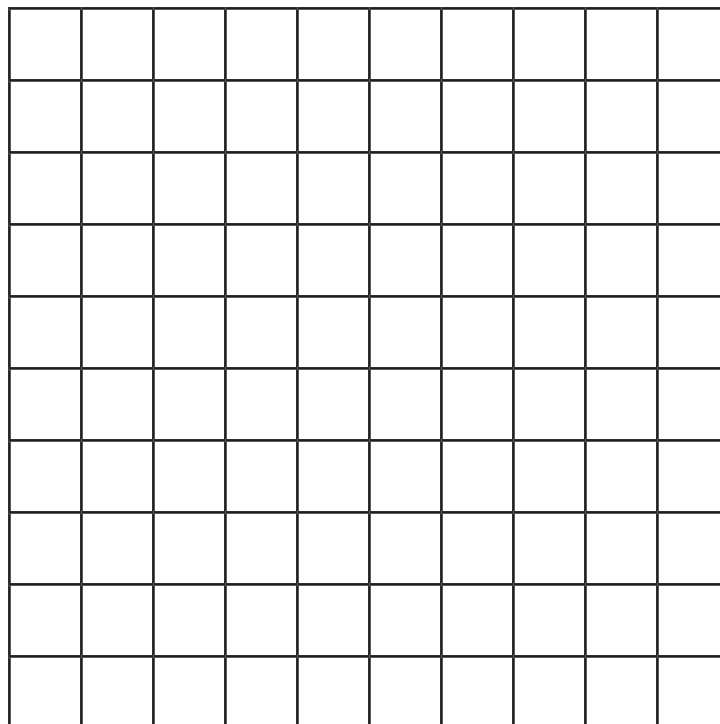
Submitted by Jo Boaler, Michael Jarry-Shore & Cathy Williams

Optical art consists of geometric shapes and patterns, and is often coloured in black and white. This type of art creates illusions, leaving the viewer with the impression that objects are moving, vibrating, pulsating, or warping. Some examples of optical art are given below.



Look at the 3 examples, do you see anything about the patterns that cause them to create an optical illusion?

Using the 100-square grid below, create your own interesting pattern. It may help to use a ruler and it is a good idea to experiment with different designs; doing your best to create a piece of optical art that creates an illusion. Share your designs with a classmate and find out if they see an illusion when looking at your pattern. Experiment with breaking the squares in the grid into triangles, rectangles, and other shapes.

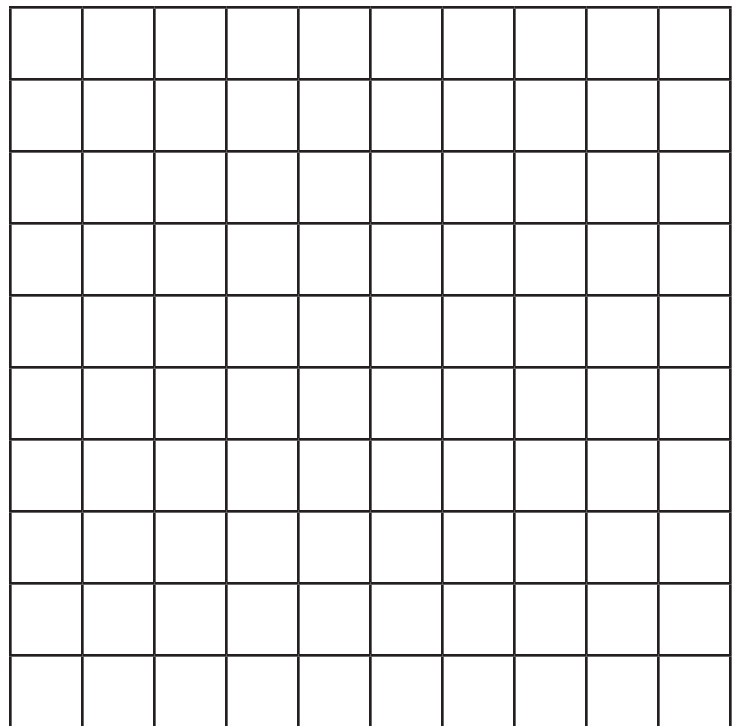
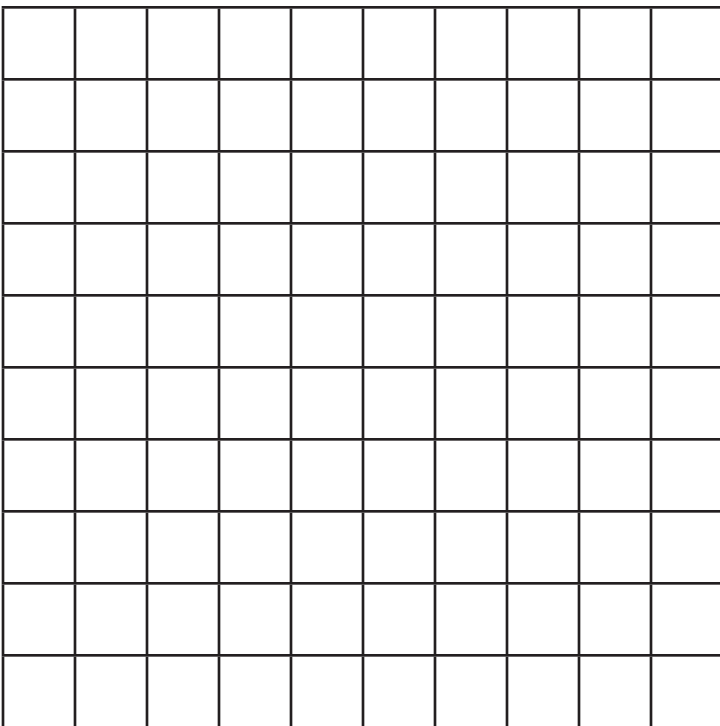
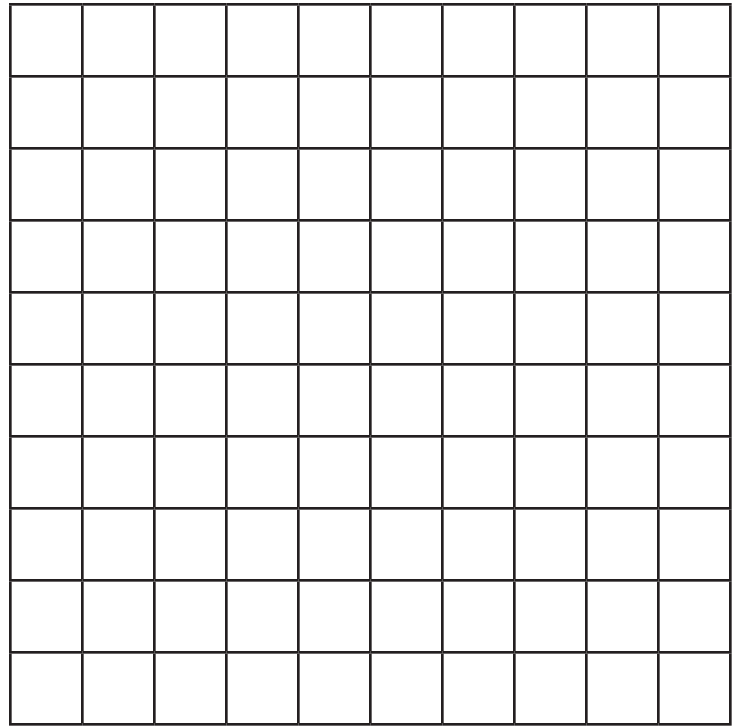
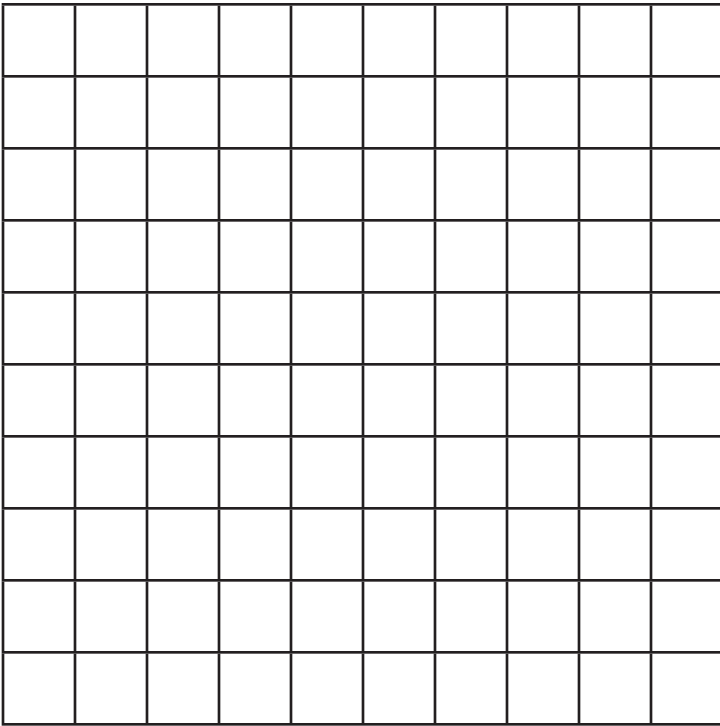


Did you get any more ideas about the ways to create an optical illusion? Describe your mathematical thinking about ways to do that.

Can you see any patterns, fractions, or decimals in your art work? Where are they?

Think of a mathematical question that you could ask about your art work, that you can give to a friend. Ask your friend your question, and ask them to justify their answer – giving clear reasons for the methods and solutions they come up with.

If someone else wanted to recreate your art work, what directions would you give them? Give precise mathematical statements so that someone could recreate your art without looking at it.



Math:

Vocabulary: <https://www.vocabulary.com/lists/11804>

Stories: <https://www.readworks.org/>

STEM: @CarlyandAdam on TeacherspayTeachers

WEEKLY CHALLENGE: <https://www.youcubed.org/>

Science: <https://creativecommons.org/licenses/by/4.0/>