Summer Brain Gain

Activity Guide Week 4 - 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 information technology. We hope you enjoy your activity guide for week 4.

Kent ISD

In partnership with

Kent District Library

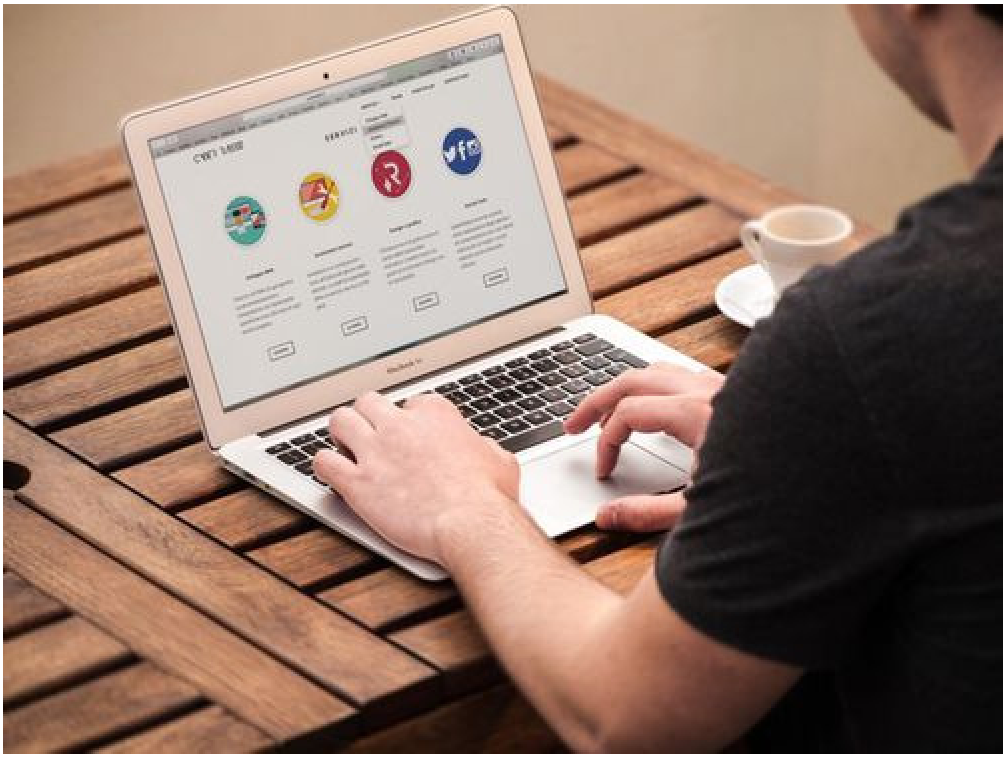
Grand Rapids Public Library

Literacy Center of West Michigan

Grades 6-8
Week 4: INFORMATION TECHNOLOGY

STEM: Design a futuristic phone Create a blueprint of a phone from the future. What can your phone do? Why are these functions important to you? *a *blueprint* is a drawing with labels	**READ:** **Choose 1:** - A real book about a way people communicate (computer, phone, talking, code) - A fiction book about a way people communicate (computer, phone, talking, code) - One of the stories in this packet	**VOCABULARY:** Review the list of words and definitions related to information technology, then draw a picture next to each vocab word. The picture must describe the word.
WRITE: Write a note to someone using a code. Make a key for your codes, so your reader can crack it!	**FREE SPACE**	**WEEKLY CHALLENGE:** **Choose 1:** -Attempt the Leo the Rabbit Activity! Can you solve it? -Crack the secret code!
MATH: Explore patterns and build their understanding of variables! You will need help from a parent/guardian/older sibling for this activity!	**SCIENCE:** What do you do with your old or unused technology? Think of your parent's old phones, or old Ipods, or electronic toys. What might be ways to reuse or repurpose this technology? Develop a plan to reduce your impact on the environment with your unwanted tech!	**LANGUAGE:** The way we talk to others is a code! Learn a new way to say "I love you" and tell it to someone you love.

News Debate: Virtual Ed



Do cyber schools make the grade?

Students in Caldwell, Idaho, can attend class in their pajamas! At Vallivue Virtual Academy, courses are taught online. Students work at home with parents, who serve as learning coaches. A certified teacher oversees the students' progress.

The cyber school was launched as a free option for students in kindergarten through grade 8 who have trouble succeeding in the district's traditional public school. Supporters of the program say that virtual schools help students avoid the social pressures that can interfere with learning. In addition, supporters argue, online courses provide kids with more focused instruction and course options than they can get in a typical school.

Not everyone gives cyber schools a passing grade, however. Some educators argue that online learning makes it hard for students to make friends. Many parents also feel that cyber schools put unrealistic time demands on them because they have to oversee their kids' daily work.

Are virtual schools a valid option? *Current Events* student reporters Sophia Platcow and Peter Brosnan each log in on a side.

Crash Course to Failure

Technology can benefit education, but it shouldn't take over education. Students who go to virtual schools will miss many of the benefits of being in a real school.

If kids attend school online, they will miss out on important social interactions. Payton Mcdonough, 13, a seventh grader from Glencoe, Ill., agrees. "I don't know how I could sit at a computer all day without actually interacting with my peers and teachers," he says.

In addition, virtual schools don't have enough structure. Students who take online courses can set their own schedules, which will cause problems for students who have trouble staying motivated.

Furthermore, online schooling puts stress on parents because they have to supervise what their kids do at home. Many parents have full-time jobs. How are they going to run their children's education, excel in their jobs, and take care of their other responsibilities at home?

Virtual schools will make it harder for students to learn and will put too much pressure on parents.

It's Time for Tech

In this ever-changing age of technology, it is important for students to learn to work in the virtual world.

Virtual learning does not need to replace classroom learning entirely, but it can help students work at their own pace. If students struggle with subjects, they can take those courses online and spend more time on them. Valerie VanSelous, a teacher from Hopewell Township, N.J., agrees. "Teachers, students, and parents need to embrace new technology and not be afraid of it. Offering different teaching aids just might be the key to unlocking a student's potential."

Virtual schools can also offer students much more flexible schedules. Students often juggle extracurricular activities, sports, and schoolwork, and cyber schools could help them manage everything.

Finally, attending virtual school can prepare students for college and for work after graduation. "We need to be responsible for working on our own," says Angela Goscilo, a senior from Pound Ridge, N.Y. "We need to develop technology skills that will help us in whatever we do. Getting an early start is a good idea."

Name: ________________________________ **Date:** ______________

1. What is Vallivue Virtual Academy?

A. a private school in Glencoe, Illinois

B. a charter school in Hopewell Township, New Jersey

C. a traditional public school in Caldwell, Idaho

D. a cyber school where courses are taught online

2. What argument is presented in this text?

A. an argument about prayer in schools

B. an argument about virtual schools

C. an argument about whether school should be year-round

D. an argument about what classes students should be required to take

3. Virtual schools are bad for kids.

What evidence in the text supports this conclusion?

A. Virtual schools provide kids with more focused instruction than they get in a typical school.

B. Virtual schools provide kids with more course options than they get in a typical school.

C. Students who attend virtual schools can set their own schedules, which will cause problems for students who have trouble staying motivated.

D. Attending virtual schools can prepare students for college and work after graduation by training them to work independently.

4. Virtual schools are good for kids.

What evidence in the text supports this conclusion?

A. Virtual schools help students avoid the social pressures that can interfere with learning.

B. If kids attend virtual schools, they will miss out on important social interactions.

C. Virtual schooling puts stress on parents because they have to supervise what their kids do at home.

D. A cyber school for students in kindergarten through eighth grade was launched in Caldwell, Idaho.

7. Read these sentences from the text.

"If kids attend school online, they will miss out on important social interactions. Payton Mcdonough, 13, a seventh grader from Glencoe, Ill., agrees. 'I don't know how I could sit at a computer all day without actually interacting with my peers and teachers,' he says.

In addition, virtual schools don't have enough structure. Students who take online courses can set their own schedules, which will cause problems for students who have trouble staying motivated."

What word or phrase could best replace "in addition" at the beginning of the second paragraph?

A. First

B. Also

C. Instead

D. In contrast

8. Why does virtual schooling put stress on parents?

____

____

____

9. What is different about the number of course options kids get in virtual schools compared to typical schools?

____

____

____

10. Using evidence from the text, make an argument for or against virtual schools.

____

____

____

Samuel F. B. Morse (1791-1872)

This text is provided courtesy of the New-York Historical Society.

Louis-Jacques-Mandé Daguerre (1787-1851), Portrait of Samuel F. B. Morse (1791-1872), 1840.

In the 1740s, a French clergyman and physicist named Jean-Antoine Nollet discovered that an electrical current moved along a wire so fast, it was almost instantaneous. For the next decades, scientists and inventors looked for a way to use this finding to send electrical messages along a wire, almost instantaneously. No one succeeded. The French finally gave up, and in 1794, built the French State Telegraph, which involved observers with telescopes standing in towers and relaying visual signals from one to the next. It was faster than a messenger on a swift horse, and it introduced the word "telegraph," but it was not the electrical system many inventors still pursued in Europe and the United States. And it only worked in clear daylight.

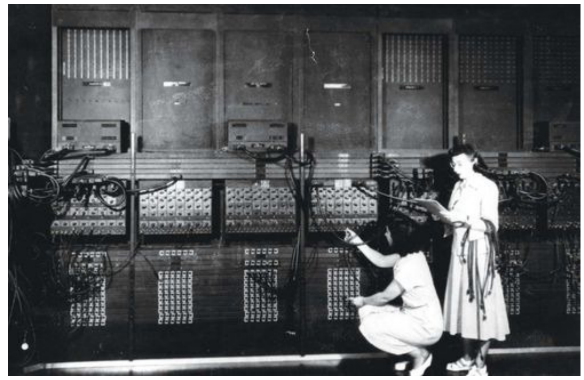
Samuel F. B. Morse was a painter and inventor who grew up in New England and moved to New York City in the 1820s. Like many others, he was fascinated by the idea of an electrical telegraph. He began sketching designs in 1832, around the time he returned to New York after a trip to Europe. He worked alone at first, then with two important partners. One was NYU chemistry professor Leonard Gale, who suggested Morse replace the single large battery in his design with several small ones spaced out along the wire. This was crucial for sending a signal over a long distance, because electricity weakens as it travels, a problem Morse and his competitors all faced. And Morse's business partner, Alfred Vail, helped create the Morse code, which converted letters and numbers into long and short electrical pulses, also known as dashes and dots.

In addition to the code, Morse designed the equipment that sent, transmitted, and received the signal. In 1838, he and his team sent a message across two miles near Morristown, New Jersey. In 1844, Morse was able to transmit his famous phrase, "What hath God wrought," from Washington, D.C., to Baltimore. And by 1850, twenty different companies ran some 12,000 miles of telegraph lines in the U.S. The days of sending a messenger on a galloping horse were mostly over.

In England, William Fothergill Cooke and Charles Wheatstone designed their own workable telegraph, with its own language. But Morse code dominated and became the accepted international language of telegraphy. It was the ancestor of modern computer code, using dots and dashes the way computer software uses 1s and 0s to transmit data.

Women Programmers of ENIAC

This text has been provided courtesy of the New-York Historical Society.



Marlyn Wescoff Meltzer (1922-2008) and Ruth Lichterman Teitelbaum (1924-1986) Wiring the Right Side of ENIAC, ca. 1946.

Rosie the Riveter was a World War II nickname for women who worked in factories and shipyards all across the country. The two women in this photo were not like Rosie. They, and four others, were working on a machine at the University of Pennsylvania, called ENIAC (**E**lectronic **N**umerical **I**ntegrator and **C**omputer). It was designed to do complex calculations related to ballistics and the correct aiming of a weapon, but the war ended before ENIAC was functional.

Work on it continued, however. This photo, taken around 1946, shows only a portion of the room-sized computer. It was completely electronic, so it should have been far faster than the other big war-time calculator, the Mark I, developed by IBM and programmed at Harvard by Grace Hopper and others. The Mark I was electromechanical, which means it was driven by electricity but had mechanical moving parts that slowed it down. The Mark I's instructions could be stored on a paper tape, however, which gave it a big advantage. In ENIAC, by contrast, every calculation involved plugging cables into a board, as Marlyn Melzer (crouching) is doing here. Ruth Lichterman (standing) is holding a diagram of the machine's wiring.

To program ENIAC, the women had to first analyze the hundreds of differential equations involved in a particular calculation. Then, they used the diagrams and blueprints to determine which cables should go to which plugs, so the machine would do the right steps in the right sequence. They understood both the mathematics and the machine. One of the programmers said later: "The biggest advantage of learning the ENIAC from the diagrams was that we began to understand what it could and could not do. As a result we could diagnose troubles almost down to the individual vacuum tube." There were 18,000 of those tubes, so this was no small feat.

Programming was in its infancy in the 1940s; in fact, the term, "to program," came from the ENIAC team. Women held many of these early jobs. The six ENIAC programmers had been selected from a pool of women with degrees in mathematics who worked on other large-scale calculators during the war. Today, computer jobs are dominated by men. Women's participation in technology has actually decreased in recent years. They hold only a quarter of the tech jobs in the United States, though they account for half the workforce. Only 18 percent of computer science graduates today are women. Often the explanation is that girls don't like math, or don't excel at it, but the experience of these earlier women proves otherwise.

Thomas A. Edison (1847-1931)

This text is provided courtesy of the New-York Historical Society.

Mathew B. Brady (1822-1896), Professor Thomas Edison (1847-1931) and His Speaking Phonograph, 1878.

His teachers said he was a problem-too bouncy, too many questions about how things work. So after only three months of official schooling, Thomas Edison's mother decided to teach him at home. She introduced him to science, which became his passion, though many of his experiments ended badly. Move your lab to the basement, his parents said, after yet another explosion shook his room.

Edison had a lifelong fascination with the telegraph, eventually nicknaming two of his children Dot and Dash, after the signals used in Morse code. As a child, Edison tried to build a telegraph of his own. At 16, he started working as a telegraph operator. He was quite deaf from childhood illnesses, but he could hear the clicks of the receiver. At the same time, he was working on several inventions and applying for patents. The boy who asked too many questions had become a young man who deeply understood how things work. By age 21, he had his own engineering firm and was in charge of all equipment owned by Western Union. This major telegraph company also asked Edison to improve on Alexander Graham Bell's initial design for a telephone, which Bell had invented in his search for a better telegraph.

Edison's headquarters were located in Menlo Park, New Jersey, about thirty miles from New York City. Over time it became a big operation, with laboratory space, a factory, and staff. It was here that Edison invented the phonograph, the incandescent light bulb, and the movie camera, among many other devices. In a golden age of invention, Edison stood out. He helped create and define what we mean by modern life.

Edison's contribution to computer history came not from one of his inventions, but from a scientific discovery. In 1880, while working on his light bulb design, he observed that electrical current could flow through a vacuum, an enclosed space that contains no gas or other matter. In other words, electricity did not need a wire. He used this observation, later dubbed the "Edison effect," to patent a voltage regulator, a device that controls the amount of electric current flowing through a piece of equipment. Some thirty years later, physicist John Fleming realized that if a vacuum could control electrical flow, it could also turn it on and off, like a switch. He invented the vacuum tube, which was used in many early electronics, including radios and televisions. Starting in the 1940s, vacuum tubes were used by the thousands in early computers. They were the on/off switches that allowed computers to function in a language of 1s and 0s.

STEM: Design and Label your futuristic phone!

Sketch out your Invention:

Name of your phone: ______________________

What can your phone do?

____

____

____

____

____

____

____

____

____

____

____

Why are these functions important to you?

____

____

____

____

WRITE:

Directions: Write a note to someone using a code. Make a key for your codes, so your reader can crack it!

____

____

____

____

____

____

____

____

____

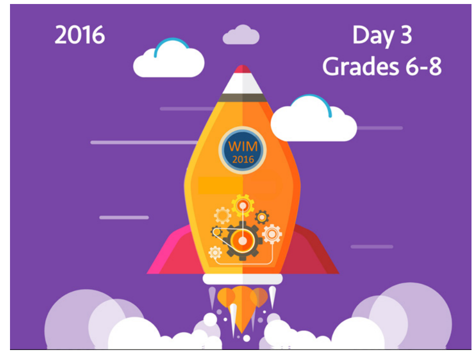
____

____

____

My Key:

youcubed at Stanford University

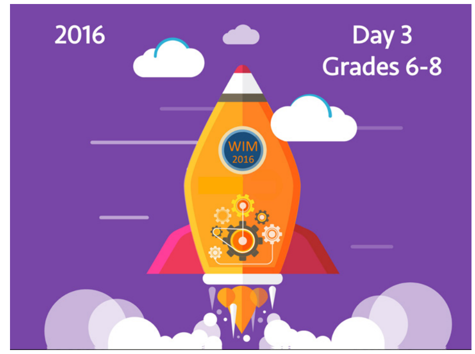


Introduction:

This activity invites students to explore patterns and build their understanding of variables, algebraic expressions, and connections between visual patterns and algebraic representations. The path that students will take is unpredictable and they may struggle and make lots of mistakes. This is part of an important process. Start the activity with the video "Believe in Yourself" so that students hear the message that when they struggle their brain is growing and synapses are firing to create pathways in the brain.

Agenda for the day:

Activity	Time	Description/Prompt	Materials
Mindset Video	5 min	Play the mindset video, *Believe in Yourself* https://www.youcubed.org/wim2-day-3/	Mindset Video day 3, *Believe in Yourself*
Squares to Stairs	40 min	1. How do you see the pattern growing? Explore the pattern alone. 2. Share different ways of seeing the pattern growing with the whole class. Record this in the same was as a number talk. 3. Have teams explore what figure 10 and 55 would look like and how many squares they would each have. Encourage the use of visuals, tables, and graphs for justification. 4. Ask teams to make sense of whether or not you can use 190 squares to make a figure for this pattern. Encourage the use of visuals, tables, and graphs for justification.	• Tiles/counters • Student handout • Paper/journals • Pencil/pen • Markers/colored pencils
Whole class discussion	10 min	Ask students to share any patterns or other interesting observations.	• White board • Poster paper
Closing	5 min	You may like to close the lesson by reminding students of the importance of believing in themselves. When they believe in themselves their brains grow more when they struggle or make a mistake.	



Activity: Squares to Stairs

This activity invites students to explore patterns and make sense of how they see a pattern growing and how that gives them information to answer questions about the pattern. During this exploration students may use manipulatives, visual patterns, numeric patterns, and algebraic expressions to make sense of how the pattern is growing.

To get started, display the pattern and ask students to think about how they see the pattern growing.

How do you see the pattern growing?

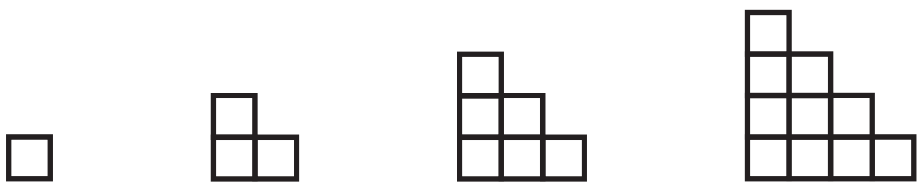


Figure 1 Figure 2 Figure 3 Figure 4

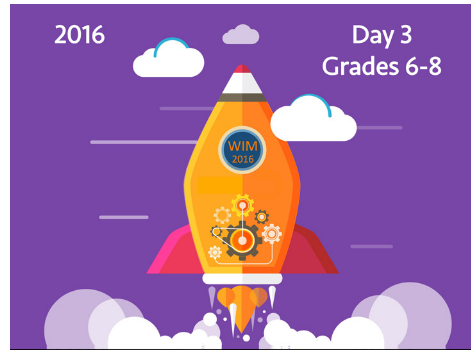
Give the class a couple of minutes just to think alone, then pass out the student handout so they can record using color how they see the pattern growing. When you notice a student waiting, ask them if they can see another way the pattern is growing.

Once every student has a chance to record something, pull the class together for a sharing of the different ways of seeing the pattern grow. Organize and record this sharing like you would a number talk by asking for volunteers to share their way of thinking. Ask for a volunteer to share how they see the pattern growing, record their way of seeing and their name. Ask the class to raise their hand if they saw it the same way, and then ask who saw it differently and select someone new to share. Continue like this until all of the unique ways of seeing the pattern grow have been recorded on the board.

Leaving all of the ways of seeing on the board, move students into working with their teams to answer questions about the pattern. Ask them to make sense of:

1. What does figure 10 look like and how many squares does it have?
2. What does figure 55 look like and how many squares does it have?
3. Can you use 190 squares to make a stair-like structure? Justify your thinking with different representations visually, numerically, algebraically.

youcubed at Stanford University



Depending on your group of students you might also want to ask them to think about how to represent the number of squares in any figure number.

When answering the questions, students may need to start using other representations of the pattern to answer and justify what they get. This is an opportunity to make space for students to make connections between visuals, numbers and expressions to build strong justification. If they first notice the pattern or find an answer using numbers ask them to think about it visually and algebraically and if they first think about it visually ask them to think about it numerically and algebraically.

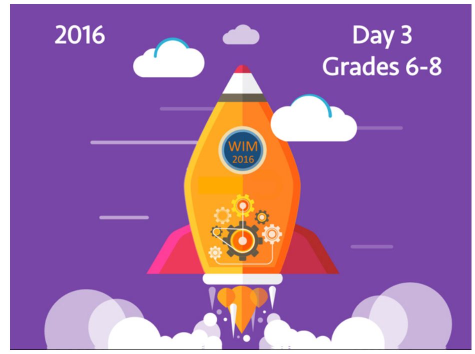
When it seems like it is a good time to pull the teams together, start by asking students to share what patterns they found while working to answer the questions. Then ask teams to share what they got when answering the questions. As different students get a chance to share, ask if there is agreement and encourage students to ask each other how they know until it makes sense. Make space for students to share other strategies for answering the question also, especially if they have used a different representation because this helps students see connections across strategies and representations.

Close by asking students to share what they thought of as the key mistakes they made during this activity and why they were key in their exploration of the pattern.

Extensions for the activity:
- How can you figure out how many total squares are in any figure?
- If you have 1,478 squares, can you make a stair-like structure using all of the squares?
- Here are some nice links to Gauss' proof for the addition of numbers in this activity, which could be explored by students or their teacher!

https://en.wikipedia.org/wiki/1_%2B_2_%2B_3_%2B_4_%2B
https://betterexplained.com/articles/techniques-for-adding-the-numbers-1-to-100/

youcubed at Stanford University



Squares to Stairs

How do you see the pattern growing? Use different colors to show how you and other people see the shape growing.

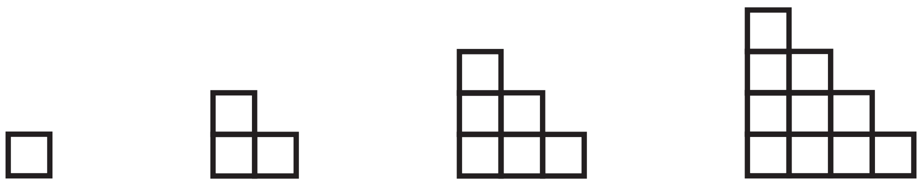


Figure 1 Figure 2 Figure 3 Figure 4

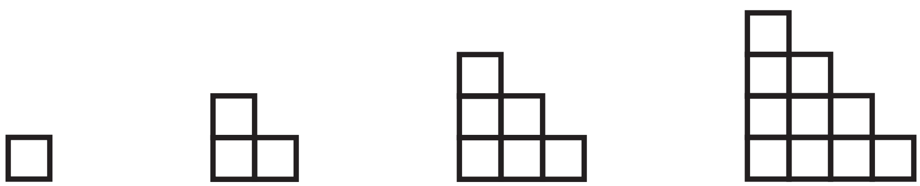


Figure 1 Figure 2 Figure 3 Figure 4

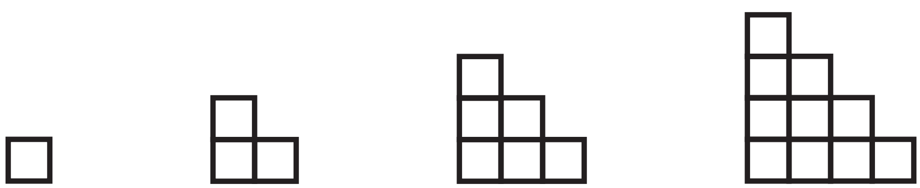


Figure 1 Figure 2 Figure 3 Figure 4

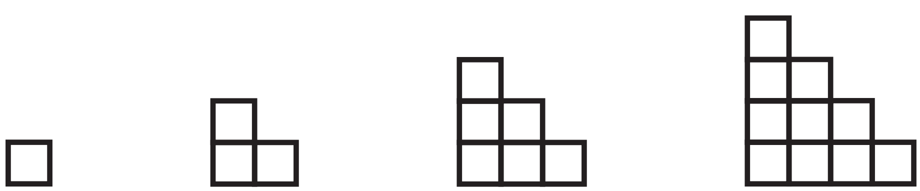
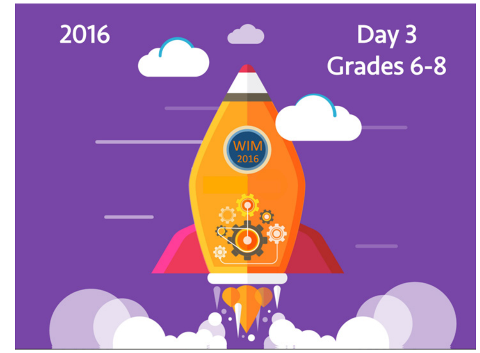


Figure 1 Figure 2 Figure 3 Figure 4

youcubed at Stanford University



Squares to Stairs

How do you see the pattern growing?

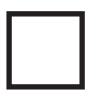


Figure 1

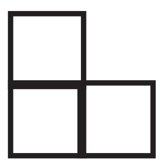


Figure 2

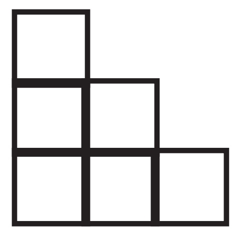


Figure 3

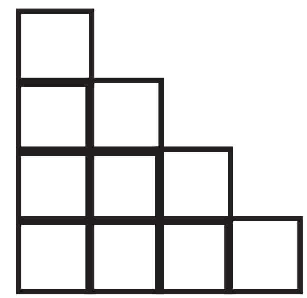


Figure 4

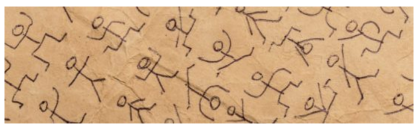
VOCABULARY:

Vocabulary Word	Definition	Picture
Application	a program that gives a computer instructions	
Backup	a copy of a file or directory on a separate storage device	
Blog	an online journal where people post about their experiences	
Browser	a program used to view HTML documents	
Bug	a fault or defect in a computer program, system, or machine	
Code	the symbolic arrangement of data in a computer program	

Cybercrime	crime committed using a computer and the internet	
Delete	wipe out digitally or magnetically recorded information	
Download	transfer a file or program to a smaller computer	
FAQ	a list of questions that are frequently asked (about a given topic) along with their answers	
Hacker	a programmer who breaks into computer systems	
Podcast	distribute (multimedia files) over the internet for playback on a mobile device or a personal computer	
Simulation	representing the real world by a computer program	

LANGUAGE:

SAY I love you IN DIFFERENT LANGUAGES:
FRENCH "Je t'aime" PRONOUNCED: JUH-TEM
ITALIAN "Ti Amo" PRONOUNCED: TEA-AHMO
SPANISH "Te Amo" PRONOUNCED: TAY-AHMO
CHINESE "Wo Ie Ni" PRONOUNCED: WOAH-EYE-NIGH
GERMAN "Ich liebe Dich" PRONOUNCED: ICK-LEE-BAH-DIK
JAPANESE "Aishiteru" PRONOUNCED: AYE-SHEE-TER-U



Topics:
Number Sense

Grades:
6, 7, 8

What's the Secret Code?

This task helps students build number sense as they practice calculating. The task has more than one solution which is nice. At the end it asks students to write a clue that gives the task only one solution.

Task Instructions

1. Use the clues to find the code number:
    1. It is between 8,500 and 8,800.
    2. When multiplied by 8, the result is a whole number.
    3. The digit in the hundreds place is ¾ the digit in the thousands place.
    4. The sum of all digits in the number is 26.
    5. The digit in the hundredths place is 200% of the digit in the tenths place.
    6. There are no zeros in the decimal places.
2. What code numbers fit these clues?
3. Explain how you used all of these clues to find these possibilities.
4. Write one more clue so that there is only one possible code number.

Materials

Paper and Pencils

Reference

From Math for All: Differentiating Instruction, Grades 6-8 by Linda Dacey & Karen Gartland (Sausalito, CA: Math Solutions), pp. 257.

SCIENCE

One example of unused or old technology in my home is: ______________________________

Some ways I could reuse or repurpose this piece of technology are...

____

____

____

____

____

____

____

____

My plan to reduce my impact on the environment of my unwanted technology is...

____

____

____

____

____

____

____

____

____

____

____

Leo the Rabbit

Leo the Rabbit is climbing up a flight of 10 steps. Leo can only hop up 1 or 2 steps each time he hops. He never hops down, only up. How many different ways can Leo hop up the flight of 10 steps? Provide evidence to justify your thinking.

Credits

Math: https://www.youcubed.org/

Vocabulary: https://www.vocabulary.com/lists/1509634

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

STEM: @CarlyandAdam on TeacherspayTeachers

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

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