

Name _____

Distance Learning

Mr. EJ's Distance Learning 4/20-4/24

Monday

- ☐ Morning Meeting Question
- ☐ Math: Finding Mode and Median
- ☐ Reading & Writing: 10 Year Old Boy Invents Winning Game Characterization Quotes
- ☐ Read for 20 minutes or more in a book of your choice
- ☐ Social Studies: Building the Thirteen Colonies + Quiz

Tuesday

- ☐ Morning Meeting Question
- ☐ Math: Find the Mean with a Calculator
- ☐ Reading & Writing: 10 Year Old Boy Invents Winning Game Quiz
- ☐ Read for 20 minutes or more in a book of your choice
- ☐ Social Studies: 13 Colonies Research and Graphic Organizer

Wednesday

- ☐ Morning Meeting Question
- ☐ Math: Know the mean but need to find one missing number
- ☐ Reading & Writing: Granville T. Woods Chronological Order
- ☐ Read for 20 minutes or more in a book of your choice
- ☐ Science: Presentation/Reflection Questions

Thursday

- ☐ Morning Meeting Question
- ☐ Math: Mean, Median, Mode of Shoe Sizes
- ☐ Reading & Writing: Granville T. Woods Quiz
- ☐ Read for 20 minutes or more in a book of your choice
- ☐ Science: What is a patent? Complete Google Form Applocation

Friday

- ☐ Morning Meeting Question
- ☐ Math: Find Mean, Median, and Mode of Class Show Sizes
- ☐ Reading & Writing: How are inventions invented? + On Being A Scientist AT Any Age
- ☐ Read for 20 minutes or more in a book of your choice
- ☐ Science: Submit Final Invention Photos for Invention Parade



Find the mode of each set of numbers.

Answers

51, 52, 60

34, 35

21

81

34, 37, 41

48

65

47, 48

52

25, 37

14

69, 70

6, 13

91

15, 21

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

11. _____

12. _____

13. _____

14. _____

15. _____

1) 6, 6, 8, 9, 12, 13, 13, 15, 16, 17, 18, 21

2) 34, 34, 35, 35, 38, 39, 40, 48, 51

3) 69, 69, 70, 70, 71, 78, 80, 81, 82, 84, 87

4) 52, 52, 52, 53, 53, 56, 57, 60, 65, 67

5) 75, 77, 79, 80, 83, 85, 87, 91, 91, 91

6) 40, 41, 42, 45, 47, 47, 48, 48, 57

7) 43, 48, 48, 49, 50, 51, 52, 58, 59

8) 9, 13, 14, 15, 15, 17, 20, 21, 21, 22, 24

9) 67, 72, 73, 81, 81, 81, 82, 82, 83, 84

10) 25, 25, 25, 30, 30, 31, 35, 37, 37, 37, 39

11) 21, 21, 21, 23, 26, 27, 27, 30, 33, 36, 37, 41

12) 32, 34, 34, 37, 37, 41, 41, 43, 44, 47

13) 51, 51, 52, 52, 53, 54, 58, 60, 60, 66

14) 53, 55, 56, 56, 59, 60, 61, 61, 65, 65, 65, 70

15) 12, 13, 14, 14, 14, 17, 29, 29, 31



Finding Median

Name: _____

Find the median of each set of numbers.

Answers

14

16

7

8

8

13.5

9

10.5

11

7.5

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

1) 19, 6, 5, 6, 9, 2, 10, 15

2) 16, 14, 14, 13, 17

3) 18, 6, 19, 9, 11, 18, 1, 10

4) 6, 20, 9, 6, 2, 4, 10, 15, 8

5) 13, 10, 8, 16, 16, 17, 20, 20

6) 19, 10, 6, 1, 6, 8, 8, 20, 19

7) 1, 16, 3, 14, 14, 16, 11, 13

8) 15, 3, 6, 8, 3, 16, 7

9) 10, 3, 19, 5, 8, 11

10) 1, 10, 17, 12, 12, 4, 20, 3, 11

10-year-old boy invents winning game inspired by sister with autism

By Hannah Covington, Star Tribune, adapted by Newsela staff on 02.20.18

Word Count **1,077**

Level **MAX**



Image 1. Kusa Xiong is the inventor of a new game called Aeropong. His older sister Pahnuly was the inspiration for the game. Photo from: Leila Navidi/Minneapolis Star Tribune/TNS.

Ten-year-old Kusa Xiong has looked out for his big sister for as long as he can remember.

At school, he helps her unpack her things at her locker. At home, the siblings read together, make up games and practice counting.

Kusa said 12-year-old Pahnuly, who has autism, inspires him to think differently. It was because of her, after all, that inspiration struck the kid inventor one day at home in Brooklyn Park, Minnesota. The family was playing ping-pong — a sport Pahnuly struggled with. Kusa wanted to find a way to make ping-pong more suited to his sister's needs.

Before long, the fifth-grader had dreamed up a winning idea that's attracting national attention and is now being manufactured for sale by a toy company.

The new game hangs a ping-pong ball from a vertical frame. The players volley the ball back and forth. It's modified table tennis without the fuss of errant ball chasing.

The family said Kusa's creation — dubbed "Aeropong" because the ball seems to float on air —has bolstered Pahnuly's hand-eye coordination and given the pair a new activity to bond over. Kusa said the game is meant to make people smile, especially his big sister.

"When she scores," he said, "she dances."

Play can be an especially powerful tool for kids with autism and their siblings, said Jennifer Reinke. She is a therapist at the Autism Society of Minnesota.

It provides a natural setting, Reinke said, for building skills like cooperation, turn-taking and empathy: "The social interactions make play very important."

Families of children with autism often get creative, modifying existing games or toys so they can be used in a way that works best, Reinke said. That may be as simple as adding a timer to a game to help with turn-taking or simplifying a toy by ditching the batteries if features like sounds become too distracting. About one in 68 children has been identified with autism spectrum disorder, according to estimates from the Centers for Disease Control and Prevention.

For Kusa, an unassuming plan to give Pahnuly a chance to enjoy ping-pong has led to unexpected accolades. Kusa's idea recently won a national toy contest, complete with a \$2,500 scholarship and future royalties on every unit sold. Kusa also won a trip to New York City this month to see his game promoted at a big-league toy fair.

"We never planned for this," said Long Xiong, Kusa's dad. "My son just wants my daughter to have fun, too."

"Simple Genius"

The idea came to Kusa in the summer of 2016 as he took stock of Pahnuly's frustrations with ping-pong. He wanted to help her practice hitting. So Kusa asked his dad to help him hang a ping-pong ball from a door frame in the house.

At first, Pahnuly didn't show much interest. But soon, Kusa heard a sound coming from the front room. Clack. Clack. Clack.

Pahnuly had picked up a paddle and was tapping the suspended ball. Then, she started hitting it back and forth with Kusa and their dad.

Eventually, the family took a trip to Menards to buy some PVC pipe. They fashioned a portable, vertical frame for the ball to hang from. They devised rules and ways to score points. If a player fails to return the ball through the vertical bars, the other person scores.

Word soon spread at school about Kusa's creation during a science unit last school year on inventors and inventions. Kristin Stasica, who has taught Kusa for two years at Champlin-Brooklyn Park Academy for Math and Environmental Sciences, asked him to share about Aeropong.



The topic helped quiet Kusa find his voice, Stasica said. He can rattle off the game's rules and perks by heart.

"He lit up because it's completely his passion and his family's passion," she said. "It was probably the most he had talked consecutively."

Kusa's concept has what Mark Carson, co-founder of Fat Brain Toys, calls "simple genius." Carson's Nebraska-based educational toy and game company put on the contest that Kusa entered. His winning idea was chosen from among 160 entries.

"It's very easy for us to get, and we think kids could very easily understand why that would be fun," Carson said.

On his upcoming trip to the toy fair in New York City, Kusa will see his invention demonstrated and pitched to major toy stores from around the country. The hope is that the game will be available for purchase in time for the holiday season, Carson said.

Family Bonds

Aeropong has become nothing short of a family affair in Kusa's house. Mom, Dad and kids all sport matching T-shirts emblazoned with the game's name.

They've come to savor an evening ritual of picking up paddles to play. Pahnuly thrives on routine, her parents said. Her paddle is cat-themed, an ode to her favorite animal.



On a recent evening, Pahnuly padded around the hardwood floor at home, wearing socks with cats on them. She carried her stuffed Siamese toy, a feline she named "Obama."

When the time came to play Aeropong, Kusa gently helped Pahnuly get in position. "Don't stand too far away," he reminded her.

Pahnuly's face, framed by thick bangs, was serious. She kept her feet planted, flicking her paddle to strike the ball each time that her brother swatted it her way.

The family has made YouTube videos to capture these kinds of moments and kindle broader interest in the game. Pahnuly watches the online clips nearly every day. On this night, she clutched her toy cat as a video played on a computer screen in the living room. The clip ends with Pahnuly jumping up and down, celebrating an Aeropong victory against her dad. She waves her pink cat paddle in the air.

Photos on the wall nearby preserve memories of the siblings together. Long Xiong said he often reminds Kusa that he always needs to be there for his sister. "I told him that's one of the biggest jobs he can do," he said.

For now, Kusa dreams of becoming a "creator and businessman." He said his big sister has already sparked ideas for other inventions.

"Most products are created by accident," Kusa said. "But there has to be a reason Aeropong came to us."



Finding Mean

Name: _____

Find the mean (average) of each set of numbers. Round your answer to the nearest tenth.

Answers

7.5	11	13	10	9
9.7	14	9	13.1	9.8
6.8	7	7.1	10.1	14.8

- 1) 3, 9, 13, 8, 10, 2
- 2) 3, 6, 10, 5, 16, 3, 6
- 3) 10, 9, 10, 11, 13, 13, 5
- 4) 9, 15, 1, 19, 4, 6
- 5) 2, 19, 4, 1, 8
- 6) 10, 12, 6, 1, 9, 16, 20, 17, 8
- 7) 2, 11, 5, 6, 13, 4, 9
- 8) 9, 12, 20, 16, 7, 20
- 9) 7, 14, 10, 19, 9, 17, 16
- 10) 12, 3, 14, 18, 2, 5, 9
- 11) 10, 13, 11, 10, 5, 9
- 12) 18, 11, 10, 8, 9, 5, 9, 10
- 13) 19, 1, 18, 17, 9, 7, 6, 10, 1
- 14) 11, 17, 4, 13, 20, 10, 16
- 15) 18, 19, 11, 17, 5, 19

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____

Quiz

- 1 Read the section "Simple Genius."
- Select the paragraph from the section that suggests Aeropong might be available for the public to buy by the end of this year.
- (A) The idea came to Kusa in the summer of 2016 as he took stock of Pahnuly's frustrations with ping-pong. He wanted to help her practice hitting. So Kusa asked his dad to help him hang a ping-pong ball from a door frame in the house.
 - (B) Eventually, the family took a trip to Menards to buy some PVC pipe. They fashioned a portable, vertical frame for the ball to hang from. They devised rules and ways to score points. If a player fails to return the ball through the vertical bars, the other person scores.
 - (C) Word soon spread at school about Kusa's creation during a science unit last school year on inventors and inventions. Kristin Stasica, who has taught Kusa for two years at Champlin-Brooklyn Park Academy for Math and Environmental Sciences, asked him to share about Aeropong.
 - (D) On his upcoming trip to the toy fair in New York City, Kusa will see his invention demonstrated and pitched to major toy stores from around the country. The hope is that the game will be available for purchase in time for the holiday season, Carson said.
- 2 Which sentence in the section "Family Bonds" supports the conclusion that Kusa's family is very supportive of his invention of Aeropong?
- (A) Mom, Dad and kids all sport matching T-shirts emblazoned with the game's name.
 - (B) On a recent evening, Pahnuly padded around the hardwood floor at home, wearing socks with cats on them.
 - (C) She kept her feet planted, flicking her paddle to strike the ball each time that her brother swatted it her way.
 - (D) The clip ends with Pahnuly jumping up and down, celebrating an Aeropong victory against her dad.
- 3 What is MOST LIKELY the reason the author included the specific descriptive information about Pahnuly?
- (A) to persuade the reader to learn how to play Aeropong like her
 - (B) to allow the reader to understand how autism affects her
 - (C) to explain to the reader why she did not like playing Aeropong at first
 - (D) to teach the reader about why she wanted Aeropong to be invented
- 4 Read the following passage introducing Kusa and Pahnuly.

Kusa said 12-year-old Pahnuly, who has autism, inspires him to think differently. It was because of her, after all, that inspiration struck the kid inventor one day at home in Brooklyn Park, Minnesota. The family was playing ping-pong — a sport Pahnuly struggled with. Kusa wanted to find a way to make ping-pong more suited to his sister's needs.

Based on this introductory passage, what kind of person does Kusa seem like?

- (A) He seems like an intelligent child who will someday be a scientist.
- (B) He seems like a compassionate child who has worked with many children with needs.
- (C) He seems like a good brother who wants to be inclusive of his sister.
- (D) He seems like someone who is capable of helping people although he does not know how.

Name:

Date:

13 Colonies Graphic Organizer



Colony Name	
Date Founded	
Region (Southern, New England, Middle)	
Who was the colony founded by? (Person or Group of People)	
Reason for Settlement	
Settlers (Who moved to the colony.)	

Religions(s) of Settlers	
Type of Government	
Economy/Occupations	
Geography/Climate	
Additional Facts	

Suppose you know the mean, but you are missing one of the numbers.

Examples:

85 = mean

86, 83, 81, ____

Find the missing number.

You have 4 numbers that have a mean of 85. **Multiply** $85 \cdot 4$ to get the total sum needed.

$$85 \cdot 4 = 340 \text{ (total sum)}$$

Add the 3 numbers that you know.

$$86 + 83 + 81 = 250 \text{ (sum you have)}$$

Now **subtract** the sum you have from the total sum to find your missing number.

$$340 - 250 = 90 \text{ (missing number)}$$

73 = mean

75, 94, 32, 75, ____

Find the missing number.

Multiply the mean of 73 by 5 (numbers you have).

$$73 \cdot 5 = 365 \text{ (total sum)}$$

Add the numbers you are given.

$$75 + 94 + 32 + 75 = 276 \text{ (sum you have)}$$

Subtract the sum you have from the total sum to find your missing number.

$$365 - 276 = 89 \text{ (missing number)}$$

Practice:

1) Mean = 37

40, 29, 50, ____

2) Mean = 90

100, 95, 92, 85, ____

3) Mean = 40

50, 30, 75, 15, ____

4) Mean = 75

85, 60, 25, ____

5) Mean = 50

65, 80, 73, 30, ____

6) Mean = 81

70, 93, 69, ____

7) Mean = 25

10, 29, 37, 20, ____

8) Mean = 31

63, 53, 20, 10, ____

9) Mean = 100

300, 75, 100, 10, ____

10) Mean = 130

200, 100, 125, ____

11) Mean = 70

89, 34, 40, 23, ____

12) Mean = 91

100, 140, 60, 75, ____

13) Mean = 39

50, 10, 29, 13, ____

14) Mean = 48

50, 60, 30, 21, ____

15) Mean = 88

90, 80, 75, ____

16) Mean = 45
35, 75, ____

17) Mean = 80
100, 100, 20, ____

18) Mean = 20
50, 10, 5, 4, ____

19) Mean = 35
80, 20, 5, ____

20) Mean = 70
80, 100, 30, ____

21) Mean = 35
29, 36, 47, ____

22) Susan has four 20-point projects for math class. Susan's scores on the first 3 projects is shown below:

Project 1: 18

Project 2: 15

Project 3: 16

Project 4: ??

What does she need to make on Project 4 so that the average for the four projects is 17?

Inventors and Scientists: Granville T. Woods

By Biography.com Editors and A+E Networks, adapted by Newsela staff on 11.16.17

Word Count **727**

Level **1030L**



Granville T. Woods in 1887. Photo from the public domain.

Synopsis: Granville T. Woods was born in Ohio, in 1856. He was the son of free African-Americans during a time when many black people were slaves. Woods held various engineering and industrial jobs before establishing a company to develop electrical devices. He registered nearly 60 patents in his lifetime, including a telephone transmitter, a trolley wheel that captured electricity from power lines and the multiplex telegraph (over which he defeated a lawsuit by inventor Thomas Edison). Woods died in 1910.

Early Life

Granville T. Woods was born in Columbus, Ohio, on April 23, 1856. He received little schooling as a young man and had a variety of jobs. Some of his work was in a railroad machine shop, in a steel mill and on railroads.

From 1876 to 1878, Woods lived in New York City, taking courses in engineering and electricity. He realized early on these were the key to the future.

Back in Ohio in the summer of 1878, Woods was employed for eight months by a railroad company. He worked at the pumping stations and the shifting of railroad cars in the city of Washington Court House, Ohio. He was then employed by another company as an engineer for 13 months.

During this period, Woods began to form ideas for what would later be credited as his most important invention: the inductor telegraph, which sent messages between trains and train stations.

Early Inventing Career

In 1880, Woods moved to Cincinnati, Ohio. There, he eventually set up his own company to develop, manufacture and sell electrical devices. In 1889, he filed his first patent for an improved steam boiler furnace.

A patent is proof that someone invented something, and also stops others from making or selling an inventor's invention for a certain amount of time. When people invent something they send a description of what they invented to the government. Then, the government sends them a paper showing they own the patent.

Woods had other patents that were mainly for electrical devices. This included his second invention, which was an improved telephone transmitter.

In 1885, Woods patented a device that was a combination of a telephone and a telegraph, which he called "telegraphony." It allowed a telegraph station to send voice and telegraph messages over a single wire. Woods later sold the device to Alexander Graham Bell, the inventor of the telephone. The money from the sale allowed Woods to devote himself to his own research.



One of Woods' most important inventions was the trolley. This was a grooved metal wheel that allowed street cars, later known as trolleys, to collect electric power from overhead wires.

Induction Telegraph

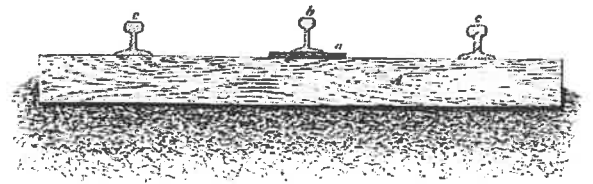
Woods' most important invention was the multiplex telegraph in 1887. The device allowed people to communicate by voice over telegraph wires. This helped speed up important communications, which prevented crucial errors such as train accidents.

Thomas Edison said that he'd already invented a similar telegraph, and that he deserved the patent. But, Woods was able to prove that he had invented his telegraph on his own and defeated Edison's lawsuit that challenged his patent. After, Edison asked Woods if he wanted to work together, but Woods turned down Edison's offer to make him a partner. Thereafter, Woods was often known as "Black Edison."

After receiving the patent for the multiplex telegraph, Woods reorganized his Cincinnati company as the Woods Electric Company.

In 1890, he moved his own research operations to New York City. Woods was joined there by a brother, Lyates Woods, who also had several inventions of his own.

Woods' next most important invention was the power pick-up device in 1901. This was an improvement to the "third rail" system still used by many electric-powered train systems, where a third rail next to the tracks carries the electricity that powers the train. From 1902 to 1905, he received patents for an improved air-brake system for trains.



Death And Legacy

Woods died on January 30, 1910, in New York City. He had invented 15 appliances for electric railways and received nearly 60 patents. Many of his patents were assigned to the major manufacturers of electrical equipment that are a part of daily life today.

Step 3: Submit your script to Matthew by next week for editing

Presentation Day (Week 4):

Step 1: 20 minutes to practice your commercial with your group or prepare your video.

Step 2: Perform or play your commercial.

Step 3: After your commercial, please shortly explain your answers to the following questions to the class.

1. What did you invent?	
2. Who is your target audience? Old, young, teenagers...?	
3. What kind of language do you use in the commercial to make people want to buy it?	
4. What difficulties did you encounter when designing the commercial?	
5. What skills do you think you have learned from this challenging activity?	

Step 4: Submit a final written copy of your script. Put all the names of the group members on the sheet.

Presentation Grading Criteria

- Each member speaks /5
- The presentation is of an original invention/creative /5
- Group is clearly prepared for the presentation /5
- The commercial is 1 minute in length /5
- The commercial uses advertising language (at least 1 adjective, compound noun, and superlative) /5
- Questions after performing the commercial /5
- Grammar /5
- Pronunciation /5

Total: /40

Mean, Median, and Mode

Guided Notes

1. Create a frequency chart for this sample set of shoes sizes: 6, 10, 9, 8, 8, 6, 12, 14, 9, and 8.

Student #	Shoe Size
A	6
B	10
C	9
D	8
E	8
F	6
G	12
H	14
I	9
J	8

Shoe Size

Find:

A. **Mean:** add all shoe sizes and divide by total number of students.

$$\frac{\text{Sum of all shoe sizes}}{\text{Total number of students}} = \boxed{\quad\quad\quad} = \boxed{\quad\quad}$$

B. **Median:** write all shoe sizes in order from least to greatest and find the middle shoe size.

				○	○				
--	--	--	--	---	---	--	--	--	--

If there are two middle shoe sizes, add those two sizes and divide by 2

$$\frac{\quad + \quad}{2} = \boxed{\quad\quad}$$

C. **Mode:** find the shoe size that occurs the most.



2. Second sample: Last week, Jane sent 34 text messages, John sent 25, Sofia sent 41, Priscilla sent 12, Cisco sent 33, Fred sent 24, and Riley sent 25.

Name	# Of messages sent

Total Number of Texts

Find:

A. **Mean:** add all text messages and divide by the number of students.

$$\frac{\text{Total text messages}}{\text{Total number of students}} = \frac{\quad}{\quad} = \boxed{\quad}$$

B. **Median:** write all numbers of messages sent from least amount to greatest and find the middle data point.

				○	○				
--	--	--	--	---	---	--	--	--	--

If there are two data points in the middle, add them and divide by 2.

$$\frac{\quad + \quad}{2} = \boxed{\quad}$$

C. **Mode:** find the amount of messages sent that occurs most frequently.

Quiz

1 Which section of the article highlights the idea that Woods taught himself about electricity and engineering?

- (A) "Early Life"
- (B) "Early Inventing Career"
- (C) "Induction Telegraph"
- (D) "Death And Legacy"

2 The paragraph below from the section "Early Inventing Career" helps to prove the claim that Woods was interested in transportation.

One of Woods' most important inventions was the troller. This was a grooved metal wheel that allowed street cars, later known as trolleys, to collect electric power from overhead wires.

Which paragraph from the section "Induction Telegraph" provides the BEST evidence to further support the claim?

3 This article is organized using chronological order.

Why do you think the author organized the information this way?

- (A) to highlight the relationship Woods had with other inventors
- (B) to present the events of Woods' life clearly
- (C) to give historical background on the time period in which Woods lived
- (D) to describe the events that led to Woods' fame as an inventor

4 This article is organized using chronological order.

How would the article be different if it were organized using a problem and solution structure?

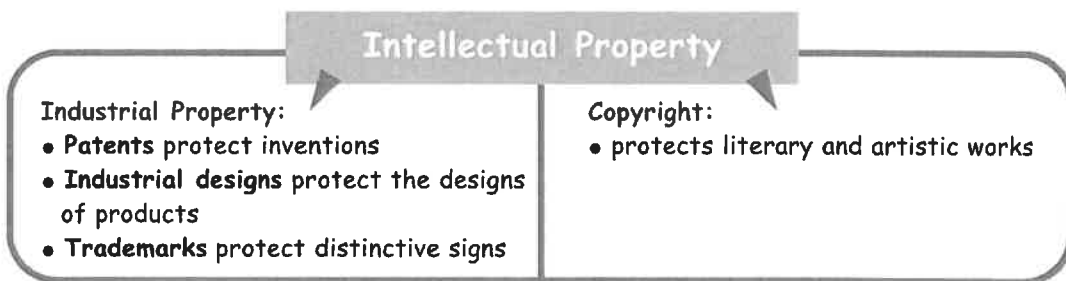
- (A) The article would explain why Woods sold his idea to Bell and what he did with the money he said was for research.
- (B) The article would explain how Woods came up with the idea for the telegraphony.
- (C) The article would provide information about how Woods proved that he invented his induction telegraph.
- (D) The article would focus on the why Woods did not have much education, and then it would explain what he did about it.

PATENTS

What are patents?

A patent is an official document given to an inventor by a government. This document generally gives inventors the right to stop anyone else from copying, using, distributing or selling the invention without their permission.

Patents are a part of Intellectual Property, which is a legal way to protect all creations of the human mind. Intellectual Property is divided into Industrial Property and Copyright.



Why are patents important?

Inventions are the result of hard work. It may only take a moment of inspiration to think of a good idea but it takes a lot of research and experimentation to turn the idea into a useful and working invention.

Inventors deserve a reward for the amount of time they spend developing their ideas. They also need the security of knowing that if they share the invention with the rest of the world, nobody will steal it, use it or copy it without their permission.

Patents provide rewards and protection for inventors but they also benefit society. In return for patent protection, inventors agree to reveal all the technical information about their invention. This information is available to everyone and has enough details so anyone with basic knowledge

of the invention's field can reproduce the invention. In this way, patents help to spread new knowledge. This new knowledge can in turn help others to solve different problems, or to make further advances in science and technology.

Inventor Profile - Leonardo Da Vinci

Leonardo Da Vinci was a famous painter and sculptor but also a great inventor. He had an excellent understanding of how machines worked and invented many things during his lifetime. His inventions included parachutes, flying devices, diving gear and many other machines.

Before patents existed, some inventors kept their inventions secret for fear that they would be stolen or copied. Some historians believe that Da Vinci wrote the notes on his experiments backwards ("mirror writing") to make it harder for other people to read and copy them.

It took hundreds of years for scholars to find and decipher some of Da Vinci's notebooks. Recently, some people have started making models of inventions that Da Vinci described and drew in his notebooks more than 500 years ago. For example, in 2000 Katarina Ollikanen from Sweden built a rigid pyramidal parachute based on Da Vinci's drawings from 1485. She used only tools that would have been available in Da Vinci's day. Her English skydiver boyfriend, Adrian Nicholas, used this parachute to make a successful 3,000 meter descent in South Africa, proving that Da Vinci's parachute invention worked.



The first non-Da Vinci, modern parachute was invented in 1797 by André Jacques Garnerin, more than 300 years after Da Vinci sketched his version in his notebooks. Knowing this, we cannot help but wonder how history might have been different if Da Vinci had shared all his inventions with the rest of the world.

Guided Practice

A. Mean is the sum of all values divided by the number of values in the data set. Another term used for mean is *average*.

C. Mode is the most frequently occurring value data point of the set.

Student	Shoe Size	Gender
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		

Mean (add all shoe sizes / total # of students) = _____

<u>Add all shoe sizes</u> Total # of students	=	_____	
--	---	-------	--

Median (write all shoe sizes in order from least to greatest, find the middle shoe size. If there are two middle shoe sizes, add them up and divide by 2) = _____

[illegible]

Mode (find the shoe size that occurs most frequently) = _____

How are inventions invented?

Necessity is the mother of invention.

-famous proverb

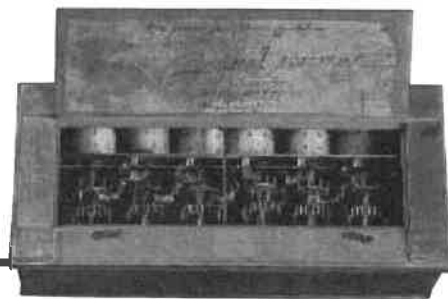
In order to invent, inventors first identify a need or problem. They then think of a creative way to solve the problem, and work hard to make that solution possible.

Here are a few examples of things that have inspired inventors to invent.

1) Needing something that is not available in the market:

Invention Profile: Adding Machine

Blaise Pascal was a well-known French philosopher, mathematician and physicist but he was also a young inventor. His father was a tax collector who spent long hours calculating by hand how much tax he had to collect. In 1642, at the age of 19, Pascal invented a mechanical adding machine which his father could use to calculate the taxes more quickly and accurately. Pascal's machine was called the Pascaline.



2) Wanting to help somebody:

Invention Profile: Stop-motion Device for Textile Looms

In 1850, at the age of 12, Margaret Knight witnessed a serious accident at a textile mill. Concerned for the safety of the mill's workers, she invented a stop-motion device to quickly stop the powered textile looms in case something went wrong. Her invention was put to use at many mills where it increased the safety of all mill workers. This was only the first of Margaret's many inventions. She was granted more than 25 patents in her lifetime, including one for a flat-bottomed paper bag still used in some stores today.



3) Combining two or more products to produce a new and better product:

Think about it:

How many inventions can you uncover by combining two of the items listed below?

Motor

Camera

Book

Wheels

Clock

Computer

Shoes

Bicycle

Telephone

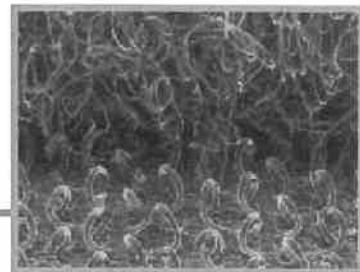
Radio

4) Applying a better understanding of nature:

Invention Profile - VELCRO®

One day in 1941, Swiss engineer George de Maestral took his dog for a walk in the Swiss Mountains. By the time they returned home, his clothes and his dog were covered with cocklebur seeds. Curious about what had made these seeds stick to fabric, George decided to examine them under a microscope. He found that the seeds had tiny hooks that had stuck to the loops of the fabric.

George decided to use the same principle of tiny hooks and loops to develop a new and better fastener than the zippers available at that time. After many experiments he developed two nylon tapes (one covered with tiny loops and the other with tiny hooks) which stuck together when pressed. The VELCRO® brand fastener was patented in 1951 and is now used in many products including shoes, jackets and bags.



Colorized scanning electron micrographic image of joined VELCRO®. © Dee Breger, Drexel University

5) Combining traditional knowledge with modern scientific concepts:

Invention Profile – Pot-in-Pot Cooling System

Northern Nigeria is a hot, semi-desert rural area where many people have no electricity. Most people grow and sell their own crops, yet keeping fruits and vegetables fresh in this type of climate is a real challenge. Without refrigeration, most fresh food rots within a couple of days. Throwing away spoiled crops means lost income for poor families. Eating the rotting crops causes serious health problems.

Local teacher Mohammed Bah Abba was concerned about this problem and decided to find a solution for it. As a boy born into a family of clay pot makers, Mohammed knew that these traditional clay pots retained water even when dry. In 1995 he combined this traditional knowledge with his understanding of biology, chemistry and geology to design a pot-in-pot cooling system that acts as a "desert refrigerator".

Mohammed's cooling system is made up of a small pot placed inside a larger pot with wet sand filling the space between the two clay pots. The fruit and vegetables are kept in the smaller pot, covered with a damp cloth and left in a dry, ventilated place. When water from the sand evaporates, it causes the temperature in the pots to go down several degrees so the food in the smaller pot is always cool. With the pot-in-pot system food stays fresh much longer. For example, aubergine can stay fresh for 27 days instead of the usual three days.



Courtesy of The Rolex Awards for Enterprise

Mohammed's system has improved the lives of thousands of people, which is why in 2000 he won the prestigious Rolex Award for Enterprise.



05/26/2017

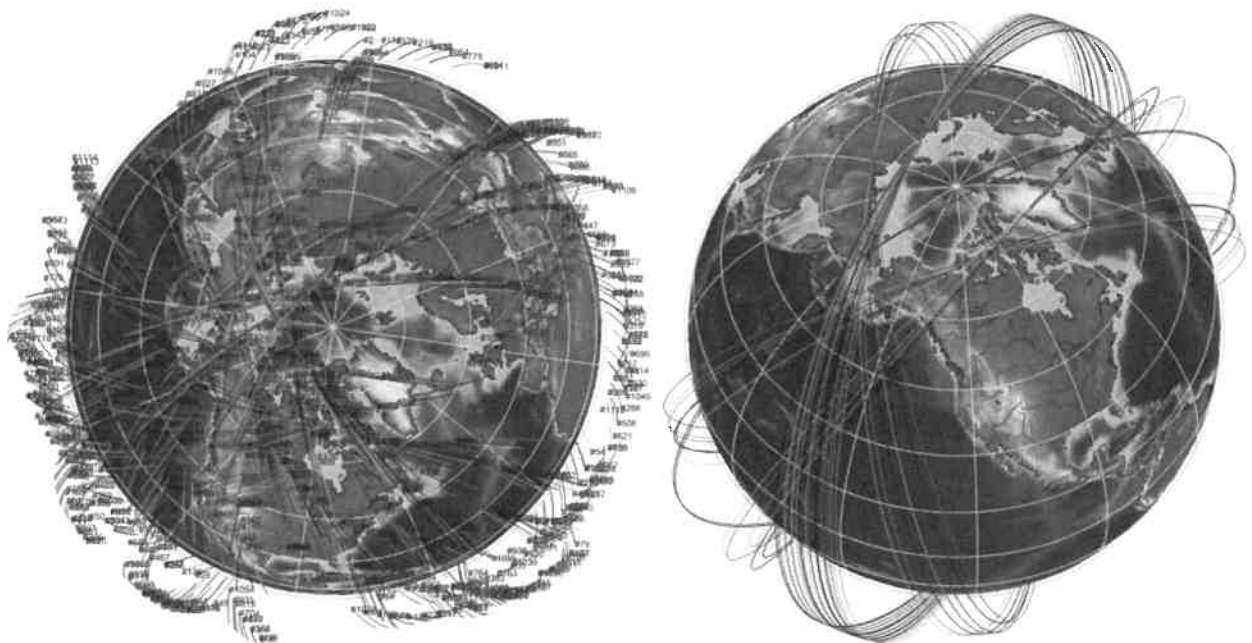
On Being A Scientist (And Patent Holder) At Any Age

🕒 17:15 minutes



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The cloud of space debris that Amber Yang tracked with her artificial neural network system. Credit: Amber Yang

It's estimated that nearly 500,000 pieces of space junk—often debris from broken satellites—pose a threat to spacecraft. Overcrowding in near-Earth orbit is a real problem that scientists are working to solve, and in 2014, high school sophomore Amber Yang set out to help find a solution. That year, debris from an old Chinese satellite collided with an active Russian satellite, and the remains of the collision threatened millions of dollars' worth of U.S. space instruments.

Currently, tracking space junk relies on a statistical mathematical model that is continuously updated. However, a lot of debris travels in a nonlinear orbit, influenced by solar radiation, solar wind, and Earth's gravity, and its path can change in unpredictable ways. Amber decided to develop a better tracking method. Using a computer program in MatLab, and drawing from community forums and open-source data sets, she created a program that relies on an artificial neural network, which, like the human brain, constantly updates itself with new information. By recognizing patterns and learning how space debris orbits are changing, her program can predict the future position of space junk with 98 percent accuracy. Amber joins Ira to discuss her award-winning science project.

[Tech giants gear up for patent battle.]

Plus, can young scientists doing industry-level work keep their ideas from getting stolen? Joyce Ward, the director of education for the United States Patent and Trade Office, explains how students can protect their intellectual property and earn a patent at any age.

The Space Debris Apocalypse | Amber Yang | TE...

