CODE OF THE WOLF

ELECTIVE ADVENTURE

SNAPSHOT OF ADVENTURE

You can use math to have fun! The great thing about math is that it can be more than just adding and subtracting numbers. Math is also about patterns and can be used to create messages. In the world of computers, math is used to create a secret code to protect information. Encryption is when you take a message and use a code to change it into something that no one can read unless they have a way to read the code. This is called a key. Making and creating codes is a form of math.

REQUIREMENTS

1. Create a secret code. Send a message to a member of your den or family. Have that person send a message back to you using the same secret code.
2. Build and play a game that requires the use of codes or patterns.
3. Select a single shape. Observe the environment around you. Write down where you see that shape and how it is being used.
4. Using a package that contains a number of different colored items, discover the most common color.

- **Elective Adventure**
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REQUIREMENT 1

Create a secret code. Send a message to a member of your den or family. Have that person send a message back to you using the same secret code.

The first step to creating a secret code is to pick a way to change your message. Four common methods to create a code or encryption are to convert letters to numbers, convert letters to symbols, shift letters of the alphabet, or make a decoder wheel. Once you do this, you can create a key. The key allows you and anyone you share the key with a way to read your message. Changing a code to a message you can read is called deciphering.

Remember that you have to keep your key, or you may forget how to decipher your message.

Change Letters to Numbers

A simple way to create a code is to write out each letter of the alphabet. Next to each letter, place a number. For example: A = 1, B = 2, C = 3, continue all the way to Z = 26. Using this simple code, if you wanted to write CUB SCOUTS, it would look like this 3-21-2 19-3-15-21-20-19.

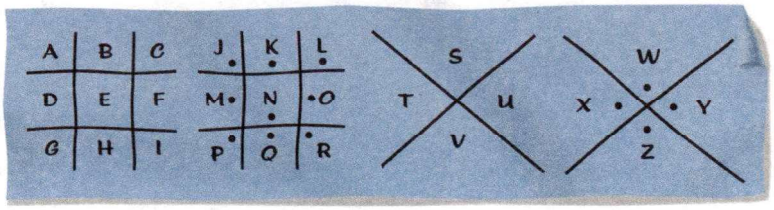
You can make this code even harder for someone to figure out by giving each letter a number in reverse order. You could make A = 26, B = 25, C = 24, all the way to Z = 1.

A	B	C	D	E	F	G	H	I	J
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
K	L	M	N	O	P	Q	R	S	T
11	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
U	V	W	X	Y	Z				
21	**22**	**23**	**24**	**25**	**26**				

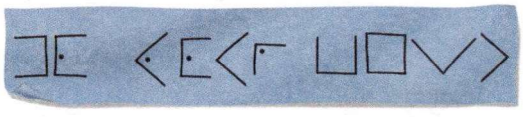
Change Letters to Symbols

You can write out each letter of the alphabet and, next to it, make up a new letter. This can be a fun way to be creative by making a whole new alphabet. Here is an example.

Another way to create a code by changing letters into symbols is called the pig pen code. The alphabet is copied into grids. Then, each part of the "pig pen" is substituted for the letter in that part. For the second grid of each type, dots are added.



Practice with this message:



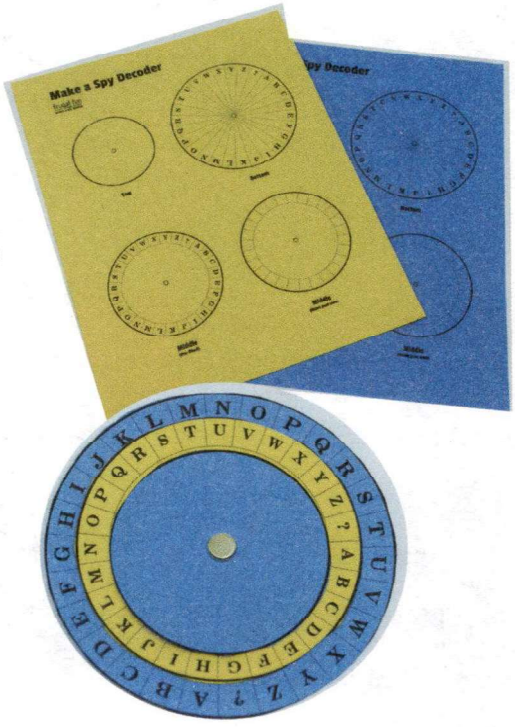
Shifting Letters of the Alphabet

To use this code, all you need is the alphabet. Pick a letter of the alphabet, for example, the letter H. H now becomes the first letter in the alphabet, replacing A. The letter I would then be the second letter in the alphabet, which would replace B. Z would be S, and A would be T.

If you used H as your starting letter when you write your message, you would use H instead of A and I instead of B, and so on. Using this example code, if you wanted to write CUB SCOUTS, it would look like this JBI ZJVBAZ.

Decoder Wheel

A decoder wheel is like a computer. The same decoder wheel can be used to make different codes. When you use a decoder wheel, you still need a key to decode the message.



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REQUIREMENT 2

Build and play a game that requires the use of codes or patterns.

Not all math uses numbers. Logic is one of the oldest forms of math. Logic helps people decide if something is true or false. Computers use logic since the smallest piece of information in a computer, a bit, is either on or off. You can think of on as being true and off as being false.

Here is a fun and simple game of logic.

Cows and Bulls

This is a two-player game. The goal of the game is to figure out the four-letter word that the other player picked by guessing and getting clues as to what letters are in the word. In this game, you figure out secret words by knowing what letters are and what letters are not part of the word.

Player one thinks of a four-letter word that does not repeat any letters. For example, HEAT has four different letters that are in the word only once. Player one should write the word down in a place where player two cannot see it.

H E A T

Player two will try to figure out the word by first guessing a word containing the same number of letters that does not repeat any letters. Chances are, you are not going to guess the word on your first try. For example, your first guess may be COIN. Write down your guess to help you keep track.

The host responds with the number of cows and bulls for each guessed word. "**Cow**" means a letter in the wrong position, and "**bull**" means a letter in the right position. For example, if the secret word is HEAT, a guess of COIN would result in "0 bulls, 0 cows" (none of the guessed letters are present); a guess of EATS would result in "0 bulls, 3 cows" (since E, A, T are all present, but all three letters are in the wrong positions from the guess), and a guess of TEAL would result in "2 bulls, 1 cow" (since E and A are in the right positions, while T is in the wrong position).

The game continues until player two scores "4 bulls" for guessing the word that player one picked.

You can make this game harder by making the word you are guessing longer. Make sure that all the letters to spell the word are used only once.

Another way to change this game is to use numbers. Player one picks four different single-digit numbers 0 through 9. For example, 3851 has four single-digit numbers, and none of them repeat.

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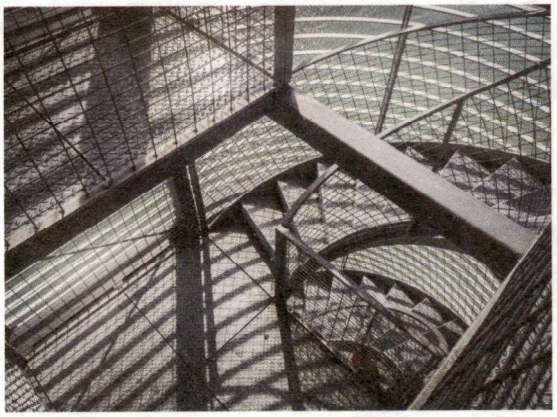
REQUIREMENT 3

Select a single shape. Observe the environment around you. Write down where you see that shape and how it is being used.

When artists look at scenes they would like to paint, they see the pictures in different shapes they draw. Circles, squares, and triangles are common shapes that we see all around us.



Sometimes we may see a perfect circle; other times, we may see something that is round but not exactly a circle.

Squares and rectangles are easy, and you'll see them all around your house. But you might also see squares in squares (windows) or circles in circles (basketballs through a hoop). Do you see more square, rectangular, or circular clocks? What shape is a bird's beak or the point of your pencil?

Pick a single shape that you like and write down each time you see it for a week. Share with your den leader or a parent or legal guardian where you found this shape and how it was used. Now you can look at the world around you the way an artist does.

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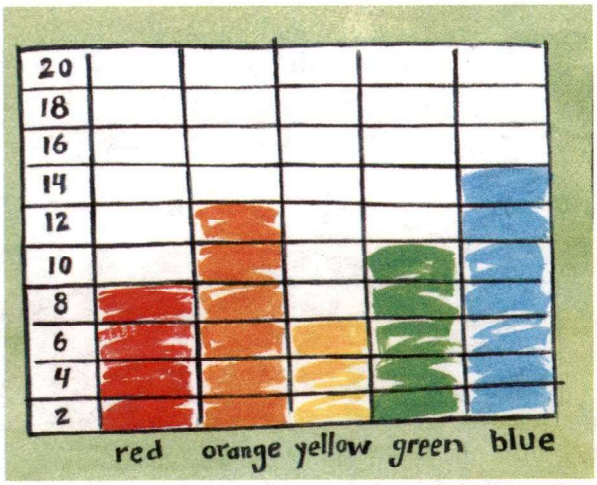
REQUIREMENT 4

Using a package that contains a number of different colored items, discover the most common color.

Did you know that there are about 200,000,000,000 (200 billion) stars in the universe? How do we know this? Did someone count each star?

You don't need to count every star in the universe to figure out how many there are. You don't need to count every tree in a forest to know how many trees there are.

If you want to know how many M&M's® are in a party-size bag (36 ounces), you can either count every single M&M, or you can take some of them, called a sample, and make a prediction of how many are in the whole bag based on the sample you took. You could make a prediction on how many red M&M's are in the bag based on the sample you took.



For example, if we were to use a party-size bag (36 ounces) of M&M's and wanted to find out the most common color, we can do this by taking a sample. Using a scale, pour out 6 ounces of M&M's. Now count the number of M&M's for each color in your sample. Then create a graph to show what color you believe is the most common in the entire bag. This is called probability.

In this example, it wouldn't be hard to check to see if our prediction of the most common color was correct. It wouldn't take too long to count and sort every M&M in the bag. There are times when we cannot check our prediction by counting everything, and we have to trust in the math.

Math tells us that the larger the sample you use, the better your prediction will be. Math tells us that we need a sample to be at a certain size in order to make a prediction. You cannot look at one or two things and make a prediction about hundreds or thousands of things.

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