



2020 Cub Scout Backyard Challenge



Communicate Without Sound

Category: Just For Fun

Difficulty: Advanced

Description:

In the vacuum of space, no one can hear you talk because there are no gas molecules to transmit the vibrations created by your voice. On our planet we have an atmosphere comprised of a mixture of gasses. These gasses help us communicate by carrying our vocal vibrations long distances. Funny thing is, these gasses are invisible to the human eye, so how can we show that they really exist?

You will need: safety glasses, a small bowl, matches, small birthday candle, something sticky to help the candle stand up, a small canning jar, water, food coloring. Printed copy of Sign Language Braille Alphabet (below).

1. Take a deep breath and hold it. Did your lungs expand and fill with something? What happens if we don't breathe? Discuss...
"Your lungs fill with atmospheric air = 21% Oxygen, 78% Nitrogen, 1% of many other gasses."
2. Fire takes three factors to happen; fuel, heat, and oxygen (a gas in our atmosphere). Take any one of these three away and the fire will go out. We can see the fuel (candle) and feel the heat created when the candle is lit, but is the oxygen really there? In the experiments below, we will use a lighted candle to test if oxygen is available.

EXPERIMENT #1: We are going to light a candle secured in a bowl and then place a glass canning jar over the candle, sealing the flame inside from the outside atmosphere. Can you predict what is

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going to happen? Have your Scout predict what they think will happen to the flame, then have them help you carry out the experiment. What really happened?

Prediction:

Results:

Conclusion:

Discuss what you think is going on... "After the flame on the candle was covered, the fire went out because the flame used up all the available **oxygen** in the jar. Oxygen is not **flammable**, but it is a high-energy gas that very readily oxidizes other materials. For something to burn, the reaction requires a fuel, heat and an oxidizer like oxygen. This flame cannot burn without oxygen. No oxygen = No fire!"

Experiment #2: We are going to use the same method as experiment #1, except we will place some colored water in the bowl. Repeat experiment #1, but place about one centimeter of water into the bowl before you light the candle. (Do not get the candle wick

Prediction:

Results:

Conclusion:

Discuss what you think is going on... "The oxygen molecules in the jar take up space and as they

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are used in the combustion reaction caused by the flame, the oxygen molecules are broken down, taking up less space. This creates a lower atmospheric pressure within the jar, causing the colored water to rise inside the jar. The water is being pushed into the empty jar space by the greater pressure of the atmosphere outside the jar. The water only rises high enough in the jar to equalize the pressures.”

3. The point of the two experiments was to help show that the space all around us is not empty but filled with gasses from our Earth’s atmosphere. You cannot see the gasses, but they are there. These gasses help transmit soundwaves from our mouths to oth

Spell your name with sign language.

Use the chart below to spell your name in sign language. Try some other names or words...

Aa 	Bb 	Cc 	Dd 	Ee 	Ff 	Gg
Hh 	Ii 	Jj 	Kk 	Ll 	Mm 	Nn
Oo 	Pp 	Qq 	Rr 	Ss 	Tt 	Uu
Vv 	Ww 	Xx 	Yy 	Zz 		





Spell your name in braille.

Use the guide below to write your name. What is your phone number?

BRaille Alphabet

A	B	C	D	E	F	G	H	I
J	K	L	M	N	O	P	Q	R
S	T	U	V	W	X	Y	Z	
.	,	?	!	'	-	CAPITAL	#	0
1	2	3	4	5	6	7	8	9





BRaille WRITING

Write your name in braille.

○ ○	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○
○ ○	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○
○ ○	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○

Write another word you know in braille.

○ ○	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○
○ ○	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○
○ ○	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○

4. Sometimes when you communicate a message, you don't want other people to know what you are writing. Your job, if you accept it, is to create a secret code and send a short message to your adult partner.

How can the other person read the message if they don't know the code? **"You need a code key"**

