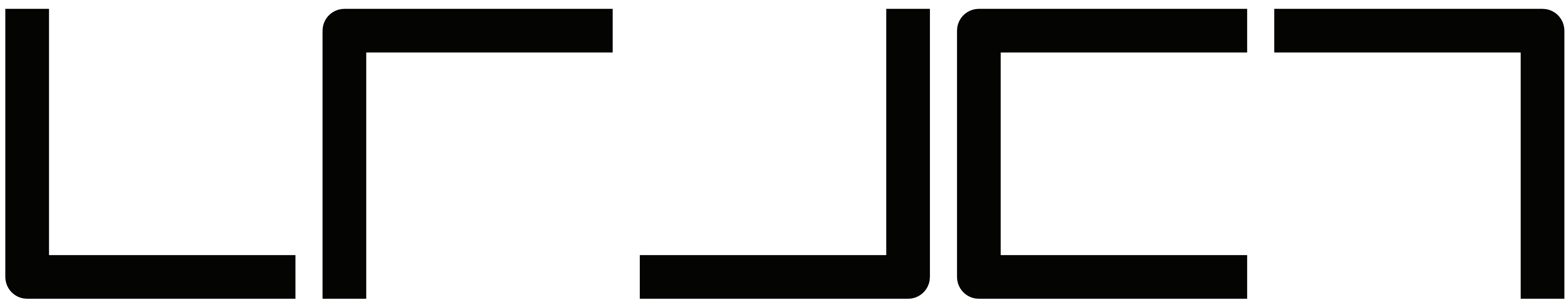

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SCIENCE OFFICER'S EYES ONLY:
CODED MESSAGE, SPECIAL ORDER 937

PAGE #9, WORD #42

PAGE #15, WORD #20

PAGE #1, WORD #4

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TRANSMISSION TERMINATED_

The Blue Flame Power Play

Coded Page Transmission Clue

Answer Key

Page 9, Word #42 = LOOK

Page 15, Word #20 = BENEATH

Page 1, Word #4 = THE

Page 6, Word #8 = SATURN

Page 6, Word #9 = SNACK

Page 6, Word #10 = CAKES

Page 5, Word #30 = TO

Page 12, Word #10 = FIND

Page 7, Word #6 = THE

Page 21 = {Picture of the key}

History of Natural Gas

200 B.C.	The Chinese used natural gas to extract salt from salt water in gas-fired evaporators.
1816	Natural gas was used in Baltimore, Maryland to fuel street lamps.
1821	In Fredonia, New York, William Hart dug the first successful natural gas well. The Fredonia Gas Light Company was eventually formed, becoming the first American natural gas company.
1885	Robert Bunsen invented the Bunsen burner. The Bunsen burner produced a flame that could safely be used for cooking and heating by mixing the right proportion of natural gas and air.
1890s	Electricity began to replace natural gas for lighting purposes.
1891	One of the first lengthy natural gas pipelines was constructed. It was 120 miles long and carried natural gas from central Indiana to the city of Chicago.
1925	The first all-welded pipeline, over 200 miles in length, was built from Louisiana to Texas.
1937	Natural gas distributors began adding mercaptan, with its rotten-egg smell, to the otherwise odorless natural gas so that leaks could be easily detected.
1906–1970	U.S. residential demand for natural gas grew by fifty times.
1940s–1960s	The nation began a massive expansion of its pipeline network. Today, the U.S. interstate pipeline network, laid end-to-end, would stretch almost 12 times around the earth.
1973	U.S. natural gas production reached a record-high of 21.7 trillion cubic feet before starting a long period of decline.
1983	The cost of natural gas for residential users set a record high of $10.06 per thousand cubic feet (measured in constant 2004 dollars).
1986–present	Consumption of natural gas began to grow faster than production.
1990	The Clean Air Act Amendments required many changes to fossil fuels to make them pollute less. Natural gas was promoted as a cleaner-burning fuel in power generation and transportation, increasing usage.
1998	About 5.1 billion cubic feet of natural gas were reported as being used for vehicles.
2000	Natural gas consumption peaked at 23.3 trillion cubic feet.
2004	Over one-fourth of U.S. production of natural gas came from Texas.
2005	The record-setting hurricane season of 2005 caused massive damage to the U.S. natural gas and petroleum infrastructure.
2012	The EPA issues first-ever clean air rules for natural gas produced by fracking.

SATURN SNACK CAKES

One very common use of natural gas is for cooking. Cooking with natural gas costs about half as much it does to cook with a similar electric range. It's important to make sure that any natural gas equipment in your home is kept in good repair to prevent gas leaks.

INGREDIENTS

1 cup white sugar
½ cup butter or margarine
2 eggs
2 teaspoons vanilla extract
1 ½ cups all-purpose flour
1 ¾ teaspoons baking powder
½ cup milk
White frosting
Colored topping sprinkles

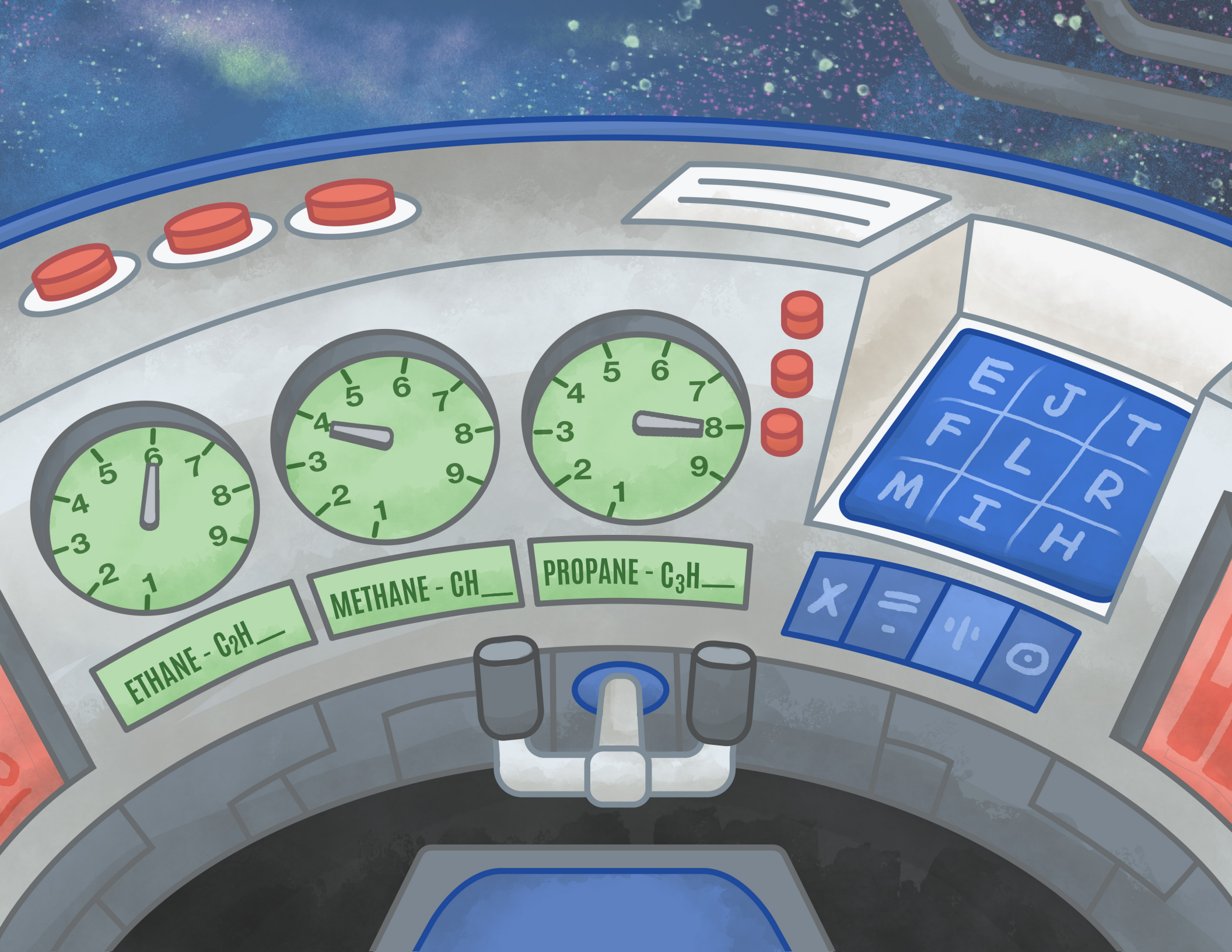
DIRECTIONS

1. Preheat oven to 350 degrees F
2. Line a 12-muffin pan with paper liners
3. In a medium bowl, cream together the sugar and butter/margarine
4. Beat in the eggs, one at a time, then stir in the vanilla
5. Combine flour and baking powder, add to the creamed mixture and mix well
6. Stir in the milk until the batter is smooth.
7. Pour or spoon batter into the paper liners

Bake 20 to 25 minutes. Cake is done when it springs back to the touch.

Allow Saturn Snacks Cakes to cool before topping with white frosting and sprinkles

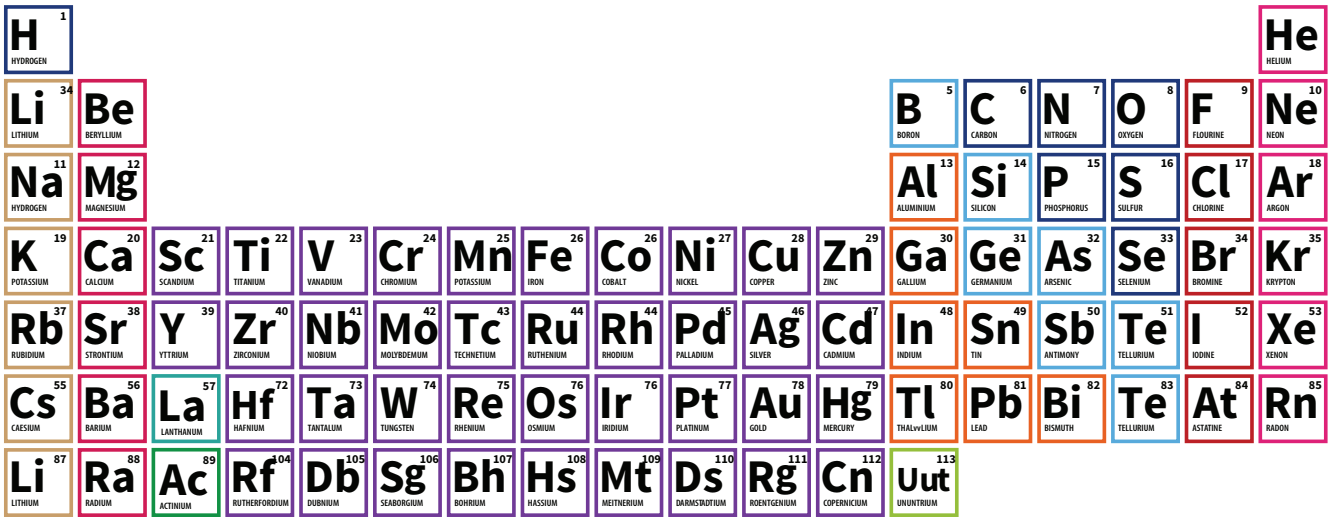
Our Solar System


ETHANE - C_2H__
METHANE - CH__
PROPANE - C_3H__
E J T
F L R
M I H
X = . O

Chemical equations are combinations of letters and numbers. Scientists must understand the meaning behind these numbers and symbols to conduct experiments. These are the letters, the building blocks, chemical elements present in natural gas.

Hydrogen = H	**Carbon = C**	**Oxygen = O**	**Nitrogen = N**	**Sulfur = S**
Helium = He	**Neon = Ne**	**Xenon = Xe**	**Argon = Ar**	**Radon = Rn**

Periodic Table of the Elements



Chemical equations are combinations of letters and numbers. Scientists must understand the meaning behind these numbers and symbols to conduct experiments. These are the letters, the building blocks, chemical elements present in natural gas.

Remember that a chemical symbol is a shorthand way of writing an element's name. Symbols have one or two letters. The first letter is always capitalized and, if present, the second is always lowercase. Ex: H. Li, 0, Ga.

One element listed by itself represents one atom. However, in nature, most atoms are found bonded to other atoms. When two or more atoms are bonded together, they are called compounds. One unit of that compound is called a molecule.

Ex: Two Hydrogen atoms and one oxygen atom combine to make H_2O. This combination of symbols is called a chemical formula. H_20 is the chemical formula for water.

Typical Composition of Natural Gas

Methane	**CH_4**	**70-90%**
Ethane	**C_2H_6**	**0-20%**
Propane	**C_3H_8**	
Butane	**C_4H_{10}**	
Carbon Dioxide	**CO_2**	**0-8%**
Oxygen	**O_2**	**0-0.2%**
Nitrogen	**N_2**	**0-5%**

To determine how many hydrogen atoms are needed to make methane, ethane and propane, look at the composition of natural gas above. Notice that in CH_4, there is a 4 after the H. This is called a subscript. The subscript applies to the element listed just before it and tells how many atoms of that element are in the compound. If there is not a subscript, it is assumed to be 1. So, CH_4 means that each methane molecule is made up of 4 hydrogen atoms bonded to 1 carbon.

Now check the spaceship's fuel gauges and find the missing hydrogen number to solve a lock!

Blue Flame Power Play

QR Code & Tiny URL

Teachers: Cut out the QR code and tiny URL below and then tape to the bottom of the large lock box. Either scan the QR code on a mobile device or tablet or enter the web address URL to open up ***The Blue Flame*** graphic novel as an online flipbook. Your students will need to access this to break the page-coded transmission message.

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https://tinyurl.com/yxpmm7en

Navigator's Log: Stardate 43

I never get tired of seeing the blue planet when we return home from a long journey. I also like that TV show The Blue Planet, but it's too expensive to get cable so I hardly ever get to watch it. :(

Navigator's Log: Stardate 112

Tungsten REALLY wanted to play Red Rover today, but he wanted to play it with an actual rover vehicle, so we took a detour to the fourth planet. Unrelated: I think my hat might smell like feet.

Navigator's Log: Stardate 7

I should have paid attention to the calendar. Captain Argon gave me instructions this morning to take us to the planet furthest from the Sun. After hours and hours of travel, we arrived. That's when he reminded me that the purple rock we landed on isn't technically a planet anymore. April Fool's!

Navigator's Log: Stardate 23

Boy, is half my face red! Got as close as we could to the center of the solar system today, but unfortunately we had a close encounter with a solar flare. Now the side of my head that was facing the window looks like I was laying on my side on the beach for two hours. I look like a 50/50 bar... or Creamsicle... or Dreamsicle... or whatever they're called. My mom was right - always wear sunscreen! Also, a dog licking your face is not a cure for sunburn.

Navigator's Log: Stardate 555

Today, we landed on just about the same spot where Neil Armstrong and crew landed in 1969. Even though I warned Tungsten that the place was NOT made of cheese, he tasted it anyway. That dog is out of control. He's also lactose intolerant, so it would have been a disaster either way!

Navigator's Log: Stardate 1876

Not to be gross, but I am still barfing. We were checking out the largest planet in the solar system today (although, since it isn't really solid, I'm not sure why we call it a planet) and it spins SOOOOO fast. I totally got dizzy and lost my lunch. On the upside, I usually lose my lunch because our dog/mechanic eats it before I can get to it, so I should just feel lucky I had lunch in the first place.

Navigator's Log: Stardate 8691.5

We haven't been there yet, but this week we're taking a trip to Uranus. I'm not even going to comment.