

All About Natural Gas

A Children's Educational & Activity Book



By Hosanna Terrell-Causey



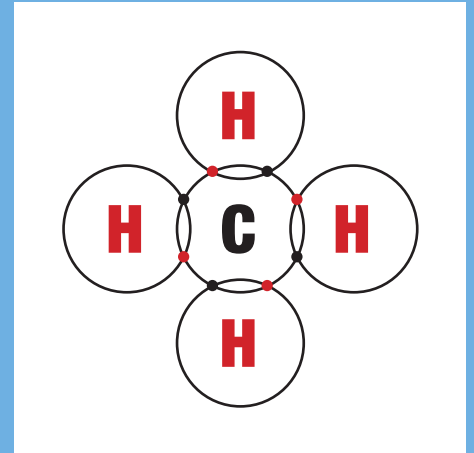
Introduction

**Do you know what natural gas is?
Did you know that it is used to make your life
better, cleaner, healthier and more efficient,
every single day? Natural gas serves as a
transportation fuel and also generates
electricity, as well as many other benefits.**

What is Natural Gas?

What is natural gas made out of?

Natural gas is a fossil fuel that is made from the elements hydrogen and carbon, which together form hydrocarbons. The lightest hydrocarbon is methane and it makes up about 70-90 percent of natural gas.

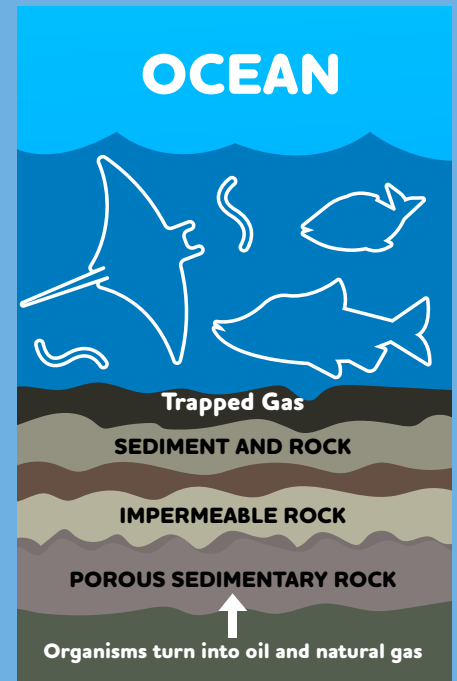


How does natural gas form?

Natural gas is a fossil fuel that forms deep beneath earth's surface. It was created millions of years ago by plant, land, and marine animal remains, which built thick layers on land and ocean floors.

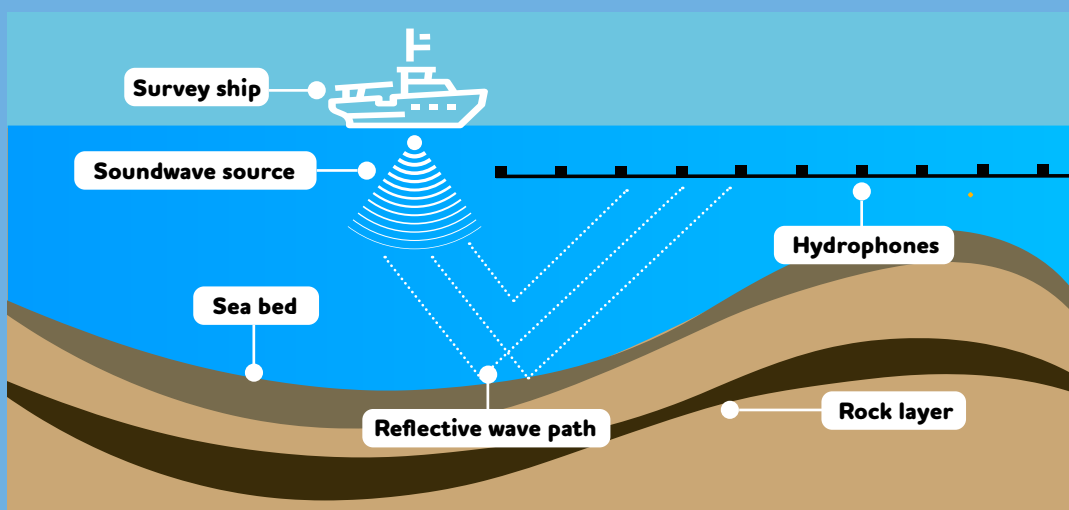
How does natural gas form?

The animal remains mix with layers of sand, clay and rock to form many fossils. For millions of years they were buried deeper and deeper, which caused the pressure and heat to change these fossils into oil and natural gas. This is why it is called fossil fuel.



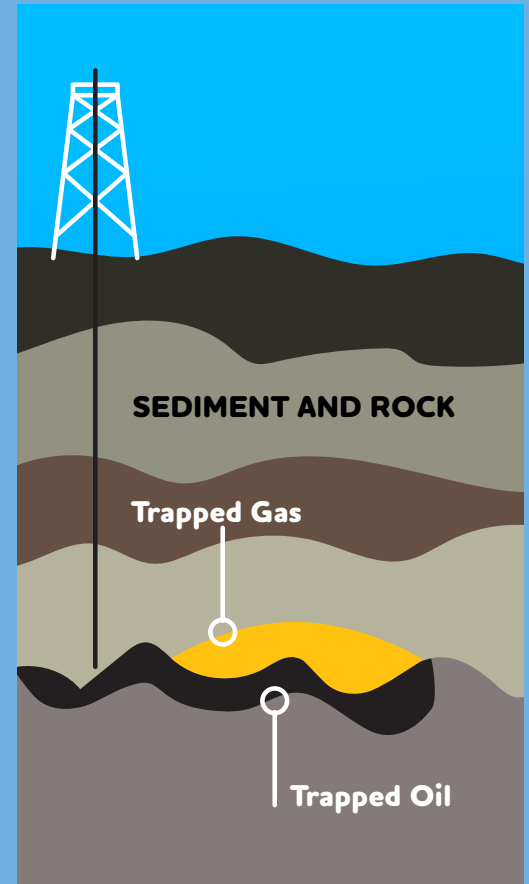
Where is natural gas found?

Natural gas is found with deposits of oil. It can be found between large cracks of overlying rock layers or within tiny holes of rock formations. It can also be found underwater using seismic surveys, which explore and see if natural gas is available on the ocean floor. Geologists use seismic surveys either on land or underwater to find where to drill natural gas from oil wells.



Natural Gas Production

Natural gas is drilled through layers of sand, clay, and rock to reach oil and natural gas deposits. Natural gas deposits are drilled vertically and horizontally by forcing water, chemicals, and sand up through wells. This is called fracking, the breaking of rock formations which release and allow natural gas to flow up from the wells. Natural gas is also drilled underwater, more than 10,000 feet deep.



Then, natural gas is put into factories to be cleaned, where unwanted toxins and impurities are separated and removed. After that, it is sent through gas pipelines to storage fields underground.

Lastly, the pipes carry the gas to companies which help buildings, homes, and people like you and me function every day.

Where Is Natural Gas Used?

Natural gas is used as a fuel to make chemicals and materials. Most of the gas used in the world is natural gas. Residential uses of natural gas are to heat buildings and water, cool the air, do laundry and cook meals. In American homes, natural gas is used the most for hot water and heating.



Where Is Natural Gas Used?

Commercial uses of natural gas are in offices, hotels, stores, hospitals, schools and restaurants.

In these buildings, gas is used the most for heating and cooling because larger buildings are air conditioned by gas powered equipment.

The equipment is similar to residential appliances, only larger. Restaurants cook with natural gas and use its heat. Along with restaurants, laundromats and beauty salons use large amounts of hot water.

Gas is the most popular cooking fuel because it costs less than other resources.



Natural Gas and the Environment

Gas is the most important fuel that is used by millions of people and businesses, because it produces little air pollution when burned.

Countries around the world are reducing harmful emissions of carbon dioxide, because it creates air pollution, increases the earth's temperatures, and impacts the earth's climate. These rising temperatures also melt ice glaciers, raise ocean levels, cause extreme weather events and so much more. This is called global warming.



Natural Gas and the Environment

Global warming's major environmental issue is from air pollution, especially in urban areas. Carbon dioxide is a greenhouse gas of growing concern. These pollutants cause many lung and health problems and also damage crop growth.

One way to help reduce these problems is by switching to natural gas.

Natural gas has environmental benefits because it is the cleanest burning fossil fuel. The Earth's atmosphere would be cleaner if natural gas was used instead of more carbon-intensive fuels like coal or oil, because it releases fewer emissions.





Williams is an American energy company that handles 30% of the natural gas in the United States. This company, based in Tulsa, Oklahoma, helps us heat homes, cook food and generate electricity.



Natural Gas Word Search

i	l	b	d	e	p	o	s	i	t	s	n	w	d
p	o	a	i	z	f	r	a	c	k	i	n	g	e
i	o	q	u	t	b	t	x	k	h	l	z	c	v
h	d	l	k	n	s	d	d	w	a	f	f	o	e
e	y	u	l	g	d	n	f	h	m	z	a	m	g
m	g	d	e	u	m	r	f	j	o	k	q	m	f
i	e	e	r	b	t	y	o	g	c	y	e	e	o
s	n	l	y	o	x	a	w	m	d	p	j	r	s
s	e	e	p	d	c	m	n	b	a	r	n	c	s
i	r	m	d	w	p	a	j	t	t	t	l	i	i
o	a	e	e	w	e	h	r	o	s	j	s	a	l
n	t	n	w	i	q	f	j	b	b	d	k	l	s
s	e	t	d	a	k	k	l	b	o	x	e	a	v
b	s	s	h	u	r	b	a	n	l	n	l	r	i
c	y	j	r	e	s	i	d	e	n	t	i	a	l

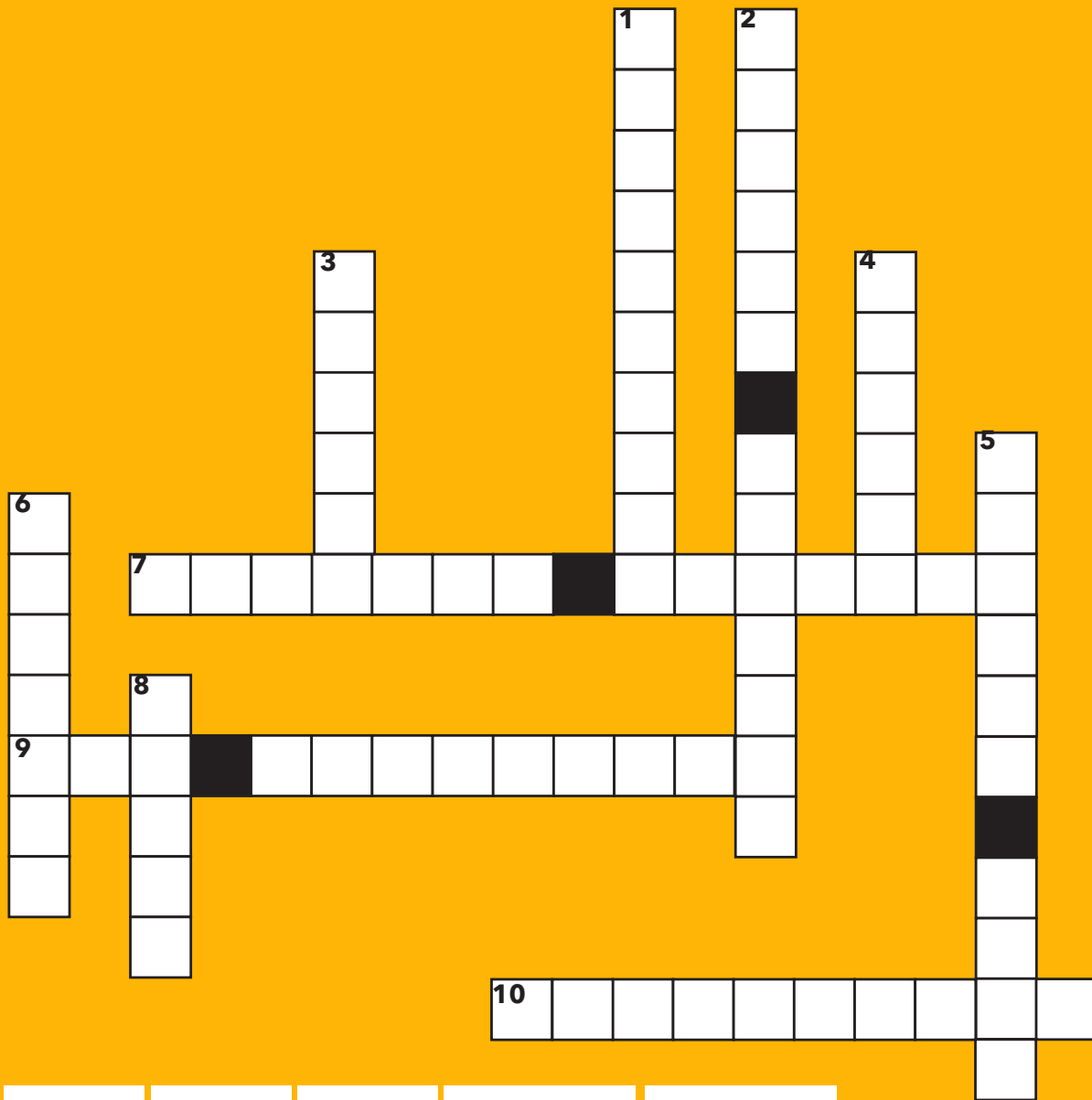
residential
pollutants
fossils
hydrocarbon

emissions
generates
laundromats
fracking

elements
commercial
deposits
urban

Natural Gas Word Crossword

To test your knowledge of natural gas, complete this crossword by filling in the vocabulary words that fit each clue.



urban

marine

fossil fuel

air pollution

geologists

seismic surveys

global warming

climate

toxins

impurities

Across

- 7. a process for measuring waves
- 9. harmful substances released in the air
- 10. something unclean

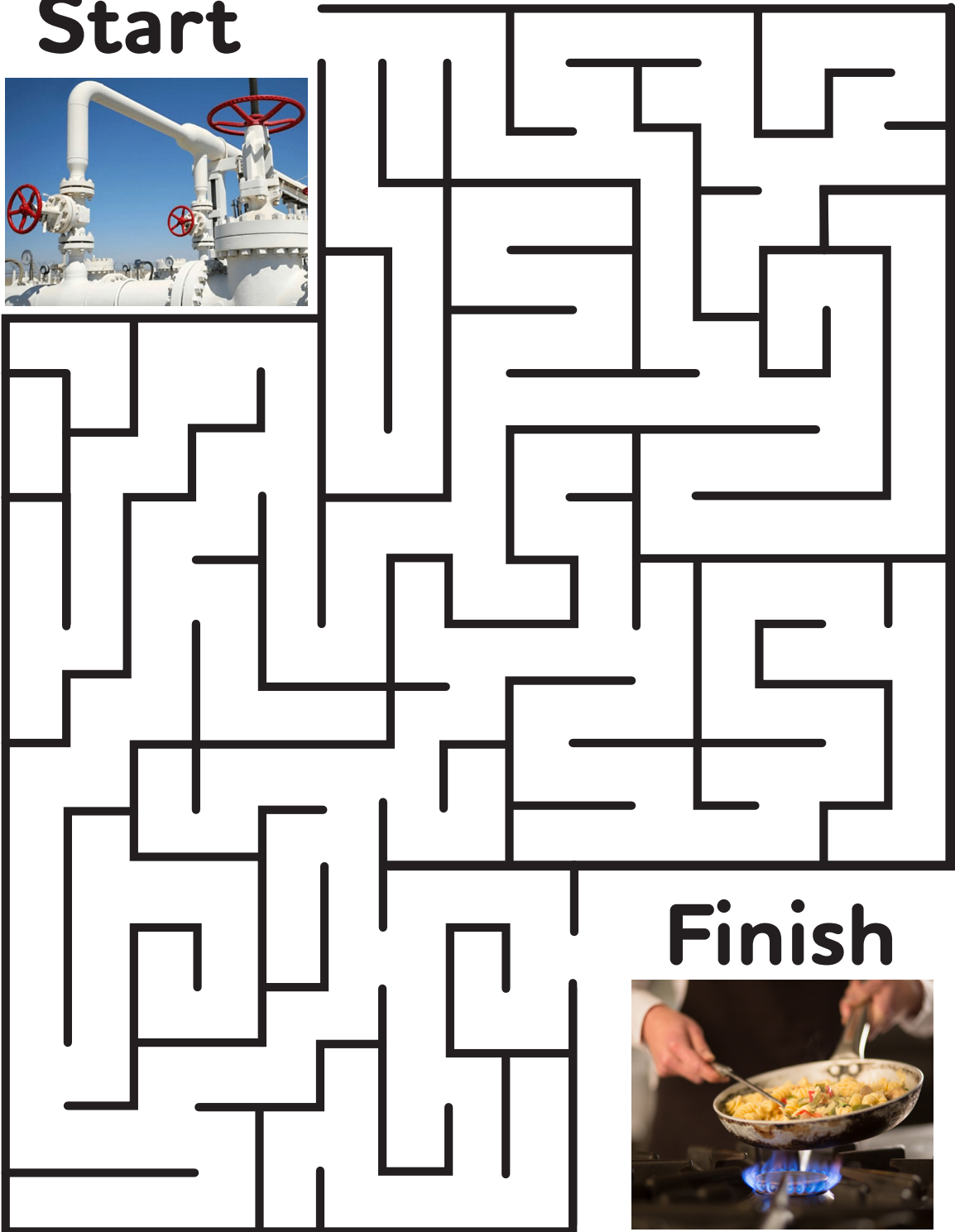
Down

- 1. Earth specialists
- 2. warming of the Earth
- 3. poisons
- 4. oceanic
- 5. a natural fuel like gas
- 6. weather conditions in an area
- 8. related to cities

Natural Gas Maze

Help the gas move through pipelines from processing plants to consumers.

Start



Finish



Natural Gas Industry Jobs

Our dad is an
Environmental
Specialist.



The Environmental Specialist's job is to get all necessary environmental permit approvals for the construction and operation of natural gas pipelines and plants. They then make sure Williams follows these permits and all other environmental regulations. They also help ensure Williams restores and maintains their project sites in an environmentally friendly way.

My mom is a
Brand Director.



A Brand Director's job is to tell people about the great things Williams does through stories, videos, ads, social media and much more. They, along with the rest of their team, make sure to tell these stories to people like landowners, customers, investors, public officials and communities. The goal is to explain the importance of natural gas in our world, and how Williams provides gas to those who need it. An example is this booklet!

Natural Gas Industry Jobs

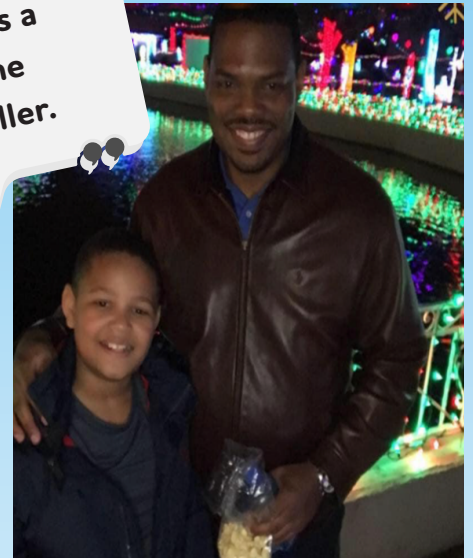
Our dad is a Director of Tactical Projects.



The Director of Tactical Projects works with some of the most talented engineers and project managers on the planet to provide energy through advanced means, while being cautious and careful towards the environment. Their goal is to serve the community and power this country by keeping natural gas pipelines operating reliably and safely.

A Pipeline Controller transports and monitors natural gas in an underground pipeline all over the United States. An interesting part of this job is that one can operate a pipeline in Pennsylvania, 350 miles away from their desk in Tulsa, Ok.

My dad is a Pipeline Controller.



My owner is a Project Analyst.



A Project Analyst helps to determine the value of different companies. This job includes looking at buying, selling and developing projects.

Natural Gas Industry Jobs

Our dad is a Manager of User Productivity.



The User Productivity Department's main job is to select the computers and software that Williams employees use every day. They also teach employees how to use the software, which is a very big but rewarding process.

Our mom is a Director of Finance, Planning & Analysis.



The Director of Finance, Planning & Analysis' responsibility is to estimate future financial information for the company. That includes figuring out what we think the company might make (revenues) or spend (expenses). Then later, at the end of a month or even a year, we compare the financial estimates to what actually happened.

Natural Gas Industry Jobs

Our mom is a VP ERP Implementation.



The Vice President of ERP (Enterprise Resource Planning) Implementation is in charge of a project to put into place new computer software to help with tracking the company's money, ordering materials and services, paying bills and planning new projects.

My mom is an Internal Auditor.



Internal Auditors can be inspectors (to see if things are working okay or not), detectives (to investigate and figure out what went wrong or could go wrong), and coaches (like consultants - that make suggestions about how things could be done better or faster). They “audit” any type of activity, such as processes (like paying employees), reports (to ensure they are accurate) and computer programs (to ensure they work right).

Natural Gas Industry Jobs

The Attorney's job is to write and review contracts, or agreements, to make sure Williams, the contractors (builders) and the supply company do everything agreed to in the contract. Since Williams builds pipelines to move natural gas, they must buy supplies for the pipelines and pay contractors to construct them. But first, Williams must make a contract with both the company they buy supplies from and the builders on how much Williams is willing to pay.














Our mom is an Attorney.

Our mom is VP of Rockies Gathering & Processing.



The Vice President of Rockies Gathering & Processing manages the people who work on the pipelines and in Williams' facilities that collect natural gas. They are responsible for cleaning (processing) the gas when it comes out of wells and for making it ready to be piped to your home and to businesses. They are also responsible for the people working on the pipeline and for finding customers (producers) who want us to process their gas.

Job Title Word Scramble

	Scrambled Word	Unscramble Word Here
1.	jecprot tlyanas	
2.	ndbra ctorerdi	
3.	elinpepi ollconertr	
4.	pv iemImpeniontat	
5.	taleenvirnmon iapeclisst	
6.	pv of kierocs eringathg & ceprosgsin	
7.	oratnety	
8.	ctdireor fo tictalca ectprojs	
9.	ernintal itoraud	
10.	agmaner of erus uctiprodyvit	
11.	rctdireo fo nfceina, ingnnpla & lysianas	

About the Author



My name is Hosanna, a 14 year old who attends Holland Hall High School.

I created this book as part of my 8th grade school project while attending University School at The University of Tulsa. My curiosity about the Williams Company (a natural gas company) and the natural gas industry runs deep because I have been associated with Williams my entire life. First of all, my mother has worked for Williams ever since I was born. Secondly, I attended many company events such as family picnics, children's Christmas parties, STEM programs and "go-to-work with your parent day."

Thirdly, I participated with Williams employees at community events such as marching in the Martin Luther King Jr. parade, building a Habitat for Humanity house, and volunteering as a math mentor tutor at Sequoyah Elementary. Furthermore, I was involved in other programs that Williams funded such as the Tulsa Youth Opera. In addition, I really appreciate the people working in my mother's department such as Ms. Susan, Ms. Peggy, Ms. Kim, and Ms. Jo. They are always so nice and kind to me.

Once during the MLK parade, I even met and walked alongside Mr. Alan Armstrong, the Williams CEO. We talked for a long time and he gave me lots of encouragement and words of wisdom. These encounters are why I was interested in learning more about what Williams does. Williams has provided many educational and voluntary opportunities for me, whether it was directly with Williams or a Williams-sponsored program in the Tulsa community. During my research project, I learned a lot about natural gas. I hope you gain a better understanding of what natural gas is and how it benefits you, the community and the world.

Works Cited

Book Sources

Adewumi, Michael. "Gas." *The World Book Encyclopedia 2017*, 2017 ed., World Book, a Scott Fetzer Company, 2017.

Busby, Rebecca L. *Natural Gas Electric Power in Nontechnical Language*. Pennwell, 1999.

Chandra, Vivek. *Fundamentals of Natural Gas: an International Perspective*. PennWell, 2017.

Gannadiy, Gayko, and Biletsky Volodymyr. "Development of the Oil Industry in the USA." Ebsco, 2018, pp. 37–40.

"U.S. Energy Information Administration - EIA - Independent Statistics and Analysis." *Natural Gas Explained - U.S. Energy Information Administration (EIA)*, 6 Dec. 2019, www.eia.gov/energyexplained/natural-gas/.

Ward, Richard. "Ally Renewables with Natural Gas." Ebsco, 2011, pp. 49–50.

Glossary

Page #	Vocabulary	Definition
2	Generates	Produces
3	Fossil fuel	A resource like natural gas, formed from the remains of plant and animal species
3	Element	A pure substance that makes up all the matter in the world
3	Hydrocarbon	An organic chemical compound that's made up of the elements hydrogen and carbon
3	Marine	Found in the sea
4	Fossils	The remains or traces of plants and animals that lived long ago
4	(Oil and Gas) Deposits	An area underneath the earth's surface where oil or natural gas is trapped in layers of rock
4	Seismic surveys	A method of gathering information about geological structures beneath the earth's surface
4	Geologists	Scientists who study liquid, solid, and gaseous matter that the earth is made of
5	Fracking	The breaking of rock formations that allows the natural gas trapped inside to flow up through wells
5	Toxins	Poisonous substances

Glossary

Page #	Vocabulary	Definition
5	Impurities	Things that are unclean
6	Residential	Relating to the home
7	Commercial	Relating to a business
7	Laundromats	Public places where you can wash and dry clothes
8	Air pollution	The act when harmful substances are released in the air
8	Emissions	Something that is given off
8	Climate	Weather conditions in an area
8	Global warming	The gradual rise of the earth's temperature
9	Urban	A town or city
9	Pollutants	Something unclean that contaminates the environment

THE END

We hope you now know the importance of natural gas, and how it is used throughout the world.

