



Virtual CLASSROOM

Petroleum By-Products Lesson Guide

Lesson Guide | Description

Instructor: April Hutson

Grade Level: K-12

Subject: Science

Students will investigate what crude oil is and how it is separated and made into items we use everyday.

Wonder Why:

Have you ever wondered where all the things we use everyday come from? Have you ever wondered what they're made of?

Goal:

Students will model crude oil being separated into its fractions by separating black ink into its different colors or fractions. At the end of the lesson, students will be able to identify their favorite Petroleum By-Product.

Lesson Guide Agenda:

- ❖ Vocabulary
- ❖ Materials List
- ❖ Activity Instructions
- ❖ Thinking and Discussion Questions
- ❖ Tower of Power
- ❖ Uses of Crude Oil and Natural Gas
- ❖ US Primary Energy Consumption
- ❖ Challenge Yourself!
- ❖ Additional Resources
- ❖ Oklahoma Academic Standards

Lesson Guide | Vocabulary

Crude Oil – Oil in its natural state (a mixture of gases, oil, and water) as it comes out of the ground.

Petroleum – Known as rock oil: is a naturally occurring liquid found beneath the earth's surface, a liquid mixture of hydrocarbons that is present in certain rock strata that can be extracted and refined to produce fuels to power vehicles, heating units, and machines, as well as converted into plastics and other materials.

Hydrocarbons – A compound of hydrogen and carbon. Hydrocarbons are the chief components of petroleum and natural gas.

Petroleum By-Products – Products produced from petroleum. It is estimated that currently more than 6,000 products are made from oil and gas.

Refinery – A facility where raw materials are converted into some valuable substance. At an oil refinery, crude oil is treated and made into gasoline and other petroleum by-products.

Boiling Point – The temperature at which a liquid boils and turns to vapor.

Watch the “Petroleum By-Products” video before continuing to the challenge!

Get Ready to Have Some Fun!

If you have any questions throughout this lesson,
please email teachers@oerb.com.
We would love to hear from you!

Petroleum By-Products Experiment

Materials Needed:

- 4 or 5 Black markers (water based)
- Coffee filters or white paper towels
- Paper plates, tray, or baking tin
- Medicine dropper, pipette, or straw
- Cup of water
- Tape for labeling markers
- Pencil/Crayons
- Notebook Paper

NOTE: This activity should be done on a table or a surface that can be wiped down. The markers could stain carpet.

Lesson Guide | Activity Instructions

Activity Instructions:

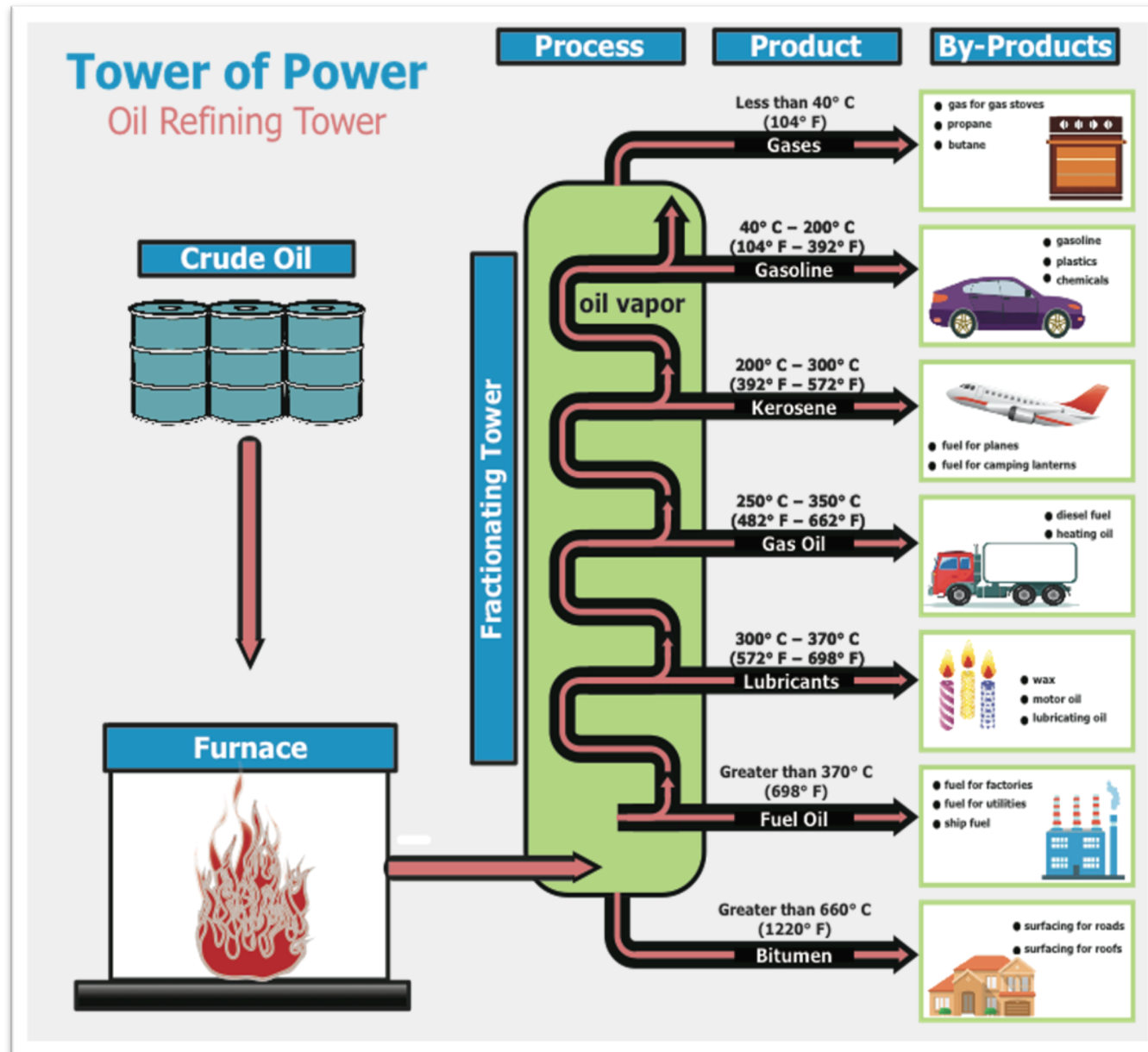
1. Place one of the coffee filters or paper towel squares flat on each paper plate or spread each of the coffee filters or paper towel squares evenly on a tray or baking tin.
2. Label each marker with the appropriate number (1, 2, 3, 4, 5) with a piece of tape. Wrap the tape around the end of the marker.
3. Label each coffee filter or paper towel square with the number that matches or corresponds with the number on the markers.
4. Matching the marker number with the paper number, draw and color a quarter sized dot on the center of each paper. Color it in completely.
5. Make a prediction! Using the pencil/crayon and paper, write/draw what colors, or fractions, you think each black marker will have.
6. Using the dropper, carefully put 10 drops of water in the center of each dot.
7. Wait until your dots dry and record your results on your paper next to your predictions.

Thinking and Discussion Questions

1. What colors did you see in each dot?
2. Did some dots have different colors than others?
3. Was your prediction close?

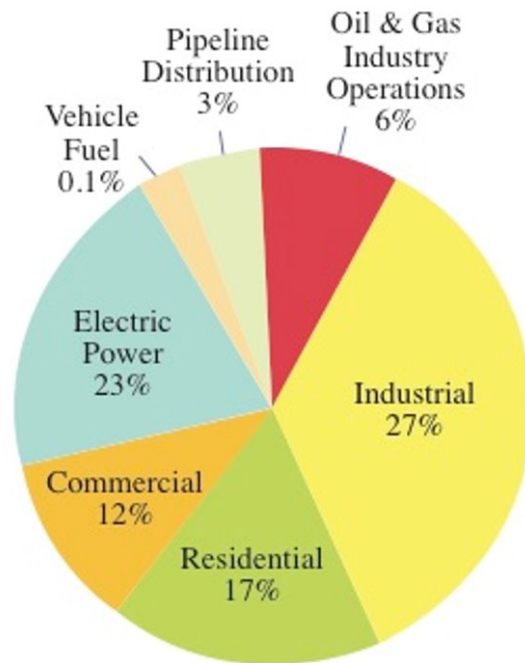


Tower of Power



Uses of Crude Oil and Natural Gas

Uses of Crude Oil and Natural Gas



Natural Gas



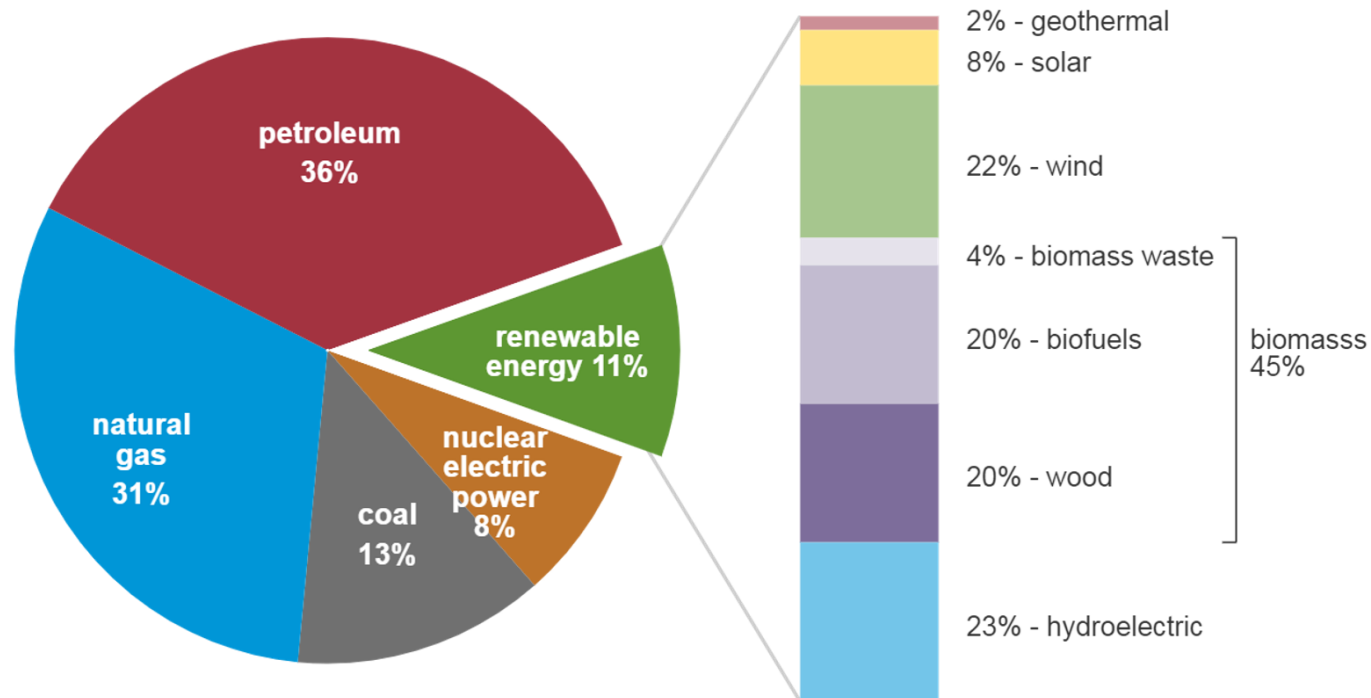
Crude Oil

US Primary Energy Consumption

U.S. primary energy consumption by energy source, 2018

total = 101.3 quadrillion
British thermal units (Btu)

total = 11.5 quadrillion Btu



Note: Sum of components may not equal 100% because of independent rounding.

Source: U.S. Energy Information Administration, *Monthly Energy Review*, Table 1.3 and 10.1, April 2019, preliminary data

SOURCE: <https://www.eia.gov/energyexplained/us-energy-facts/>

Challenge:

What is your favorite Petroleum By-Product?
Create a piece of art representing your favorite
Petroleum By-Product!

Let's Get Creative!

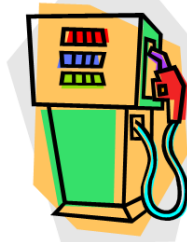
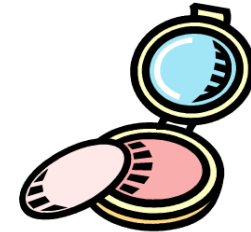
Here are some Examples:

Petroleum Products



iPad
Ink
Crayons
Motorcycle
Helmets
Toothbrushes
Combs
Lipstick
Eyeglasses
Toilet Seats
Golf Balls

Cell Phones
Boats
Nail Polish
Skis
Umbrellas
Balloons
Credit Cards
Clothes
Life Jackets
Trash Bags
Shaving Cream



WANT TO WIN A PRIZE?

Submit your representation of your favorite Petroleum By-Product! Share your artwork with us by emailing teachers@oerb.com and on Facebook/Instagram by tagging us @oerbok.

Be sure to include your name, grade, school, and teachers!

The teacher with the most student submissions will win a \$100 Amazon Gift Card!

Lesson Guide | Additional Resources

Check out these additional resources!

1. **Lab Time with Professor Leo – “From The Ground To All Around”**
<https://vimeo.com/87093940/ee8bd1b188>
2. **Virtual Field Trip – Oil Refineries and Petroleum By-Products (grade 3 & up)**
<https://vimeo.com/user25257321/review/196436477/7a3849656f>
3. **Virtual Field Trip – Oil Refineries and Petroleum By=Products (grade 7 & up)**
<https://vimeo.com/user25257321/review/196434768/obcac9f59c>

Lesson Guide | Oklahoma Academic Standards

K.1.R.4 Students will follow one and two step directions.

K.3.R.3 Students will tell what is happening in a picture or illustration.

1.1.R.4 Students will restate and follow simple two-step directions.

2.1.R.4 Students will restate and follow multi-step directions.

2.7.W.2 Students will create a simple presentation using audio, visual, and/or multimedia tools to support communication and clarify ideas, thoughts, and feelings.

2-PS—1 Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.

3.7.W.2 Students will create presentations using video, photos, and other multimedia elements to support communication and clarify ideas, thoughts, and feelings.

5-PS1-3 Make observations and measurements to identify materials based on their properties.

5.7.W.1 Students will create multimodal content that effectively communicates an idea using appropriate technology and media.

6.7.W.1 Students will create multimodal content that effectively communicates ideas using appropriate technology and media.

7.7.W.1 Students will select, organize, or produce multimodal content to complement and extend meaning for a selected topic.

If you would like to explore more Oklahoma Academic Standards for Science click [here](#).