

**EMPLOYEE ACTIVITY**

# Piecing Together Petroleum in Our Lives

**OBJECTIVE**

Students will participate in jigsaw stations as they learn and share some of the different ways that petroleum is used in our daily lives.

**MATERIALS**

- Piecing Together Petroleum Capture Sheet, one per student
- Stations materials, enough of the following for one-quarter of the class:
  - Art & Petroleum Station
    - Art & Petroleum Station Directions
    - Ballpoint Pens
    - Acrylic Paint, several colors to share
    - Paper plates (to be used as a paint palette)
    - Paint brushes
    - Copy paper or cardstock
    - Crayons, at least one box to share
  - Clothing & Petroleum Station
    - Clothing & Petroleum Station Directions
    - Devices with Internet access
  - Energy & Petroleum Station
    - Energy & Petroleum Station Directions
    - Copy paper
    - Variety of art supplies, such as markers, crayons, colored pencils, rulers, etc.
  - Convenience Goods & Petroleum Station
    - Convenience Goods & Petroleum Station Directions
    - Products Made from Petroleum List handout

**INSTRUCTOR PREP**

Before the class session begins, place the Station Materials in four separate work areas around the classroom.

## ENGAGE

- Begin with a class-wide word web
  - Write “Petroleum” in the center of the board or piece of chart paper and circle it.
  - Set a timer for five minutes and challenge students to beat the clock as they share as much as they know about this word before time is up. As students share, write each new idea in its own bubble coming out of the center.
- Once you have recorded everything the class has to share **or** once five minutes have passed, take a moment to review the web.
- If needed, add to the class's brainstorming by explaining that:
  - Petroleum is a fossil fuel.
  - It is called a fossil fuel because it forms deep underground from the remains of ancient marine organisms like algae and plants.
  - Humans can get petroleum by using drilling machines that go deep into the Earth.
  - Once petroleum is removed from the ground, it is sent to a refinery or industrial plant where it is cleaned and separated into different useable parts.

## EXPLORE

- Tell students that today they will investigate some of the different ways that petroleum is used every day.
- Divide the class into groups of four.\* Explain that each group member will be responsible for visiting a different station around the classroom. It will be their responsibility to become an expert on the station's content, so they can teach their group members what they have learned.
  - \*If there are extra students, create one group with more than four students or assign the extra students to work in pairs rather than individually.
- In order to prepare the class for their station work:
  - Pass out one Piecing Together Petroleum Capture Sheet to each student.
  - Bring the class's attention to the handout's first box, and assign one student in each group to Station 1, 2, 3, and 4. Instruct each student to place a star next to their assigned station.
  - Show the class where to find Stations 1, 2, 3, and 4 around the classroom.
  - Explain:
    - There are directions at each station. Once students are at their assigned station, they should work with another student at the station to follow the instructions and complete the activity.
    - After about 15 minutes, these groups will reconvene and share what they have learned with each other.
  - Answer questions as needed.
- Then instruct students, one station at a time, to quietly move to their assigned station and begin!

## APPLY

- Once about 15 minutes have passed, instruct the original groups to reconvene with their Piecing Together Petroleum Capture Sheets in hand.
- Tell the class that:
  - It is now their responsibility to use their Capture Sheet to help them share what they learned at their station, as well as what they found most interesting or surprising.
  - As each group member shares, the others should listen and record at least one thing they learned about petroleum in the “My Jigsaw Group” box.
  - Once all group members have shared, each student should respond to the final reflection question.
- After about 10 minutes have passed, or it looks like groups have finished sharing, bring the class back together.
- Conclude the activity with a discussion around the final reflection question: What impact does petroleum have on our lives today?

### Topics Covered

(Place a star next to the topic you will become an expert on!)

- 1. Art & Petroleum
- 2. Clothing & Petroleum
- 3. Energy & Petroleum
- 4. Convenience Goods & Petroleum

#### My Expert Group

Two facts I learned at my station that I want to share with my group are:

- 1. \_\_\_\_\_  
\_\_\_\_\_
- 2. \_\_\_\_\_  
\_\_\_\_\_

One thing I learned that I found most interesting or surprising is:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

#### My Jigsaw Group

At least one fact I learned about petroleum from each of my peers is:

- 1. \_\_\_\_\_  
\_\_\_\_\_
- 2. \_\_\_\_\_  
\_\_\_\_\_
- 3. \_\_\_\_\_  
\_\_\_\_\_

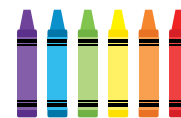
Reflection: What impact does petroleum have on our lives today?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## Learn

Did you know there are several different art products that have petroleum as an ingredient? Ink, crayons, and acrylic paint are all examples.

- Crayons are made out of paraffin and pigments of color. Paraffin, which is a colorless wax, is made from refined petroleum. The amount and quality of the crayon's paraffin and how much color pigment is used affects how well a crayon draws!
- Ink can be made out of petroleum-based products, too. While there are also other types of inks on the market, some inks use petroleum solvents to hold their color. Today, many ballpoint pens use petroleum-based ink!
- Acrylic paint is another popular example of how petroleum is used in art. This type of paint, which is like a mix between watercolor and oil paint, was developed in the 1940s. It began when a German chemist invented acrylic resin, which is a material that can be added to other substances to increase its glossiness. It was soon added to paints, and its properties began to attract famous painters. Artists like that acrylic paint is versatile (it can be applied in layers or as a gloss, for example), and that it is fast-drying. It also doesn't crack, and it doesn't fade.



## Do

Use the ballpoint pen, crayons, and acrylic paint to create a piece of art. As you do, think about the color and texture of each art medium. How are they similar? How are they different? What do you like and dislike about each one?

## Jot

Use your Capture Sheet to jot two facts you learned from this station that you would like to share with your group members. Try to think about what would be the most important facts for them to know as they learn more about petroleum. Once your facts are recorded, be sure to also jot one thing you learned that you found most interesting or surprising.

## Learn

Did you know that there are two main types of fabric? Natural fabrics are derived from plants and animals. Cotton, for example, is a natural fiber that comes from the cotton plant. Wool is a natural fiber that comes from animal hair. Silk is a natural fiber produced by insects called silkworms. Natural fabric is popular because it is usually durable, absorbent, and eco-friendly.

Synthetic fabrics are made by humans using a chemical process. During this chemical process, one ingredient commonly used is petroleum. Today, synthetic materials like polyester, acrylic, nylon, Spandex, and acetate are all made from petroleum. The textile industry (which designs, produces, and distributes cloth and clothing) began producing synthetic fibers because they are cheaper and more easily mass-produced than many natural fibers.<sup>2</sup>

## Do

1. For more information about synthetic fabrics and petroleum, watch [tinyurl.com/3tnfe762](http://tinyurl.com/3tnfe762). As you do, fill in the following pros and cons chart about synthetic fabrics. It may be helpful to pause the video occasionally!

Pros	Cons

2. Then check out the labels on your own clothing. What materials are your clothing made from? Share with another student at your station.

## Jot

Use your Capture Sheet to jot two facts you learned from this station that you would like to share with your group members. Try to think about what would be the most important facts for them to know as they learn more about petroleum. Once your facts are recorded, be sure to also jot one thing you learned that you found most interesting or surprising.

<sup>2</sup> <https://www.masterclass.com/articles/natural-vs-synthetic-fibers#advantages-of-using-natural-fibers>

## Learn

According to the Energy Information Administration (EIA), petroleum has historically been the largest energy source used in the United States. It is used to power vehicles, heat buildings, and produce electricity.

Out of all the petroleum products in the U.S....

- Gasoline is the most consumed (or used) petroleum product. 44% of petroleum used in 2020 was for gasoline.
- Distillate fuel oil is the second most consumed petroleum product. Distillate fuel oil includes diesel fuel for construction equipment, trucks, buses, tractors, boats, trains, and more. It can also be used to heat homes and buildings. 21% of petroleum used in 2020 was for distillate fuel.
- Hydrocarbon gas liquids (HGLs) is the third most consumed petroleum product. Examples of HGLs include propane, butane, and ethane—which are used for transportation, heating, and more. 18% of petroleum used in 2020 was used for HGLs.
- Jet fuel is the fourth most consumed petroleum product. In 2020, 6% of the country's petroleum consumption was used for jet fuel.
- The remaining 11% was used for a variety of miscellaneous products!<sup>2</sup>

## Do

Use the information above, as well as the art supplies at this station, to create an infographic educating viewers on how petroleum is used for energy in the United States.

**Tip:** The goal of an infographic is to provide an easy-to-understand overview of a topic using more visuals than text!

## Jot

Use your Capture Sheet to jot two facts you learned from this station that you would like to share with your group members. Try to think about what would be the most important facts for them to know as they learn more about petroleum. Once your facts are recorded, be sure to also jot one thing you learned that you found most interesting or surprising.

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<sup>2</sup> <https://www.eia.gov/energyexplained/oil-and-petroleum-products/use-of-oil.php>

# STATION 4: CONVENIENCE GOODS & PETROLEUM DIRECTIONS

## Learn

A consumer good is any product that is bought by an individual or family for personal use. Because there are so many consumer goods, they are often broken into smaller groups.

Convenience products are one group of consumer goods. A convenience product is something that is convenient, or easy, to buy. It is easily available, not expensive, and purchased frequently. When thinking about convenience products, it can be helpful to put them into three different categories:

- Some convenience products are **food-based**. Can you think of food staples that you and your family buy frequently and always have available?
- Other convenience products are **emergency-based**. They are bought by people without much thought because they are needed right away. Two examples are umbrellas and batteries. Why may these two products be emergency-based convenience products?
- There are also convenience products that are **impulse-based**. These are products that the person didn't *plan* on buying. Rather, they decided to buy it when they saw an ad or saw the product on a shelf. Impulse-based convenience products may include candy or magazines that are bought at checkout. Are there any other goods that you or others might buy on impulse, without much thought?

Convenience goods are made from many materials, including petroleum. Although one of the largest uses of petroleum is fuel for energy (such as for gasoline, jet fuel, heating, or electricity generation), there are over *six thousand* different uses for petroleum!

## Do

1. The Products Made from Petroleum Handout lists just a few of the thousands of uses for petroleum. Read through the list provided.
2. Circle those that you think would fall into the category of convenience goods.
3. For those that you circled, record whether you think the convenience product is a Staple Product, an Emergency Product, or an Impulse Product.

## Jot

Use your Capture Sheet to jot two facts you learned from this station that you would like to share with your group members. Try to think about what would be the most important facts for them to know as they learn more about petroleum. Once your facts are recorded, be sure to also jot one thing you learned that you found most interesting or surprising.



# PRODUCTS MADE FROM PETROLEUM LIST

Circle the petroleum products below that could be classified as a convenience good.	For those products that are convenience products: Is it a staple product, an emergency product, or an impulse product?
Bicycle Tire	_____
Curtains	_____
Tennis Racket	_____
Refrigerator	_____
Candles	_____
Toothbrushes	_____
Balloons	_____
Crayons	_____
Golf Balls	_____
Nail Polish	_____
Ballpoint Pens	_____
Deodorant	_____
Purses	_____
Bug Spray	_____
Trash Bags	_____
Umbrella	_____
Toothpaste	_____
Perfumes	_____
Shoes	_____
Soap	_____
Surfboard	_____