SoCalGas™

Introduction to Cooking with Gas

Lesson 3: Deep Frying

Beyond the Blue flame

BEGINNER

Introduction

Welcome to Introduction to Cooking with Gas. Today's topic is understanding fats and oils and how to deep fry safely. Once you learn about fats and oils, you will learn how to cook with gas to make your own delicious deep-fried dish.

This lesson can be completed in a classroom or at home. Your teacher will provide instructions for completing the assignment from home.

Opening Assessment

1. How can you tell the difference between a fat and or an oil?
   a. whether it is used or not used for cooking food
   b. whether it is flammable or not flammable
   c. whether it is flavored or flavorless
   d. whether it is a solid or liquid at room temperature

2. What occurs when a fat or oil is heated to its smoke point?
   a. It breaks down.
   b. It melts.
   c. It boils.
   d. It condenses.

3. Why is deep frying dangerous?
   a. The fat or oil can cause an electrical fire.
   b. The fat or oil can aid the growth of bacteria.
   c. The fat or oil can reach a very high temperature.
   d. The fat or oil is poisonous.

4. What type of equipment could you use for deep fat frying?
   a. a shallow pan and spatula
   b. a baking sheet and parchment paper
   c. a mixer and deep mixing bowl
   d. a deep covered heavy pot and tongs

5. What is the best way to know if your French fries are perfectly cooked?
   a. They lose their color.
   b. They break apart.
   c. The fat or oil is at the correct temperature.
   d. They float to the surface.

What Are Fats and Oils?

Butter, olive oil and corn oil are just a few of the many fats and oils found in people's diets. Many common foods have fat or oil as the main ingredient, such as mayonnaise and salad dressing. Fats and oils are also used in cooking.

Image credit Bill Branson

Living organisms need fats and oils for healthy functioning. In people, oils and fats provide energy, are used by the body to make essential components, and help the body absorb vitamins such as A, D, E and K.

Butter is a fat that is produced from milk by separation. Oils are produced by pressing and extraction from grains, seeds and nuts.

Fats and oils are **triglycerides**, a chemical structure. The triglyceride structure is composed of a glycerol connected to three **fatty acids**. The composition and length of the fatty acids is different in different fats and oils.

The image shows a triglyceride molecule. The glycerol is on the left and the three chains on the right are the fatty acids.

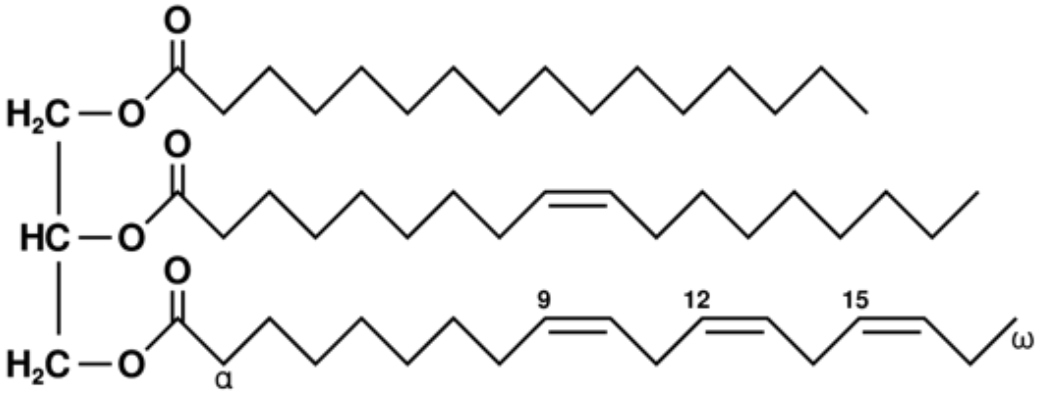


Image credit Wolfgang Schaefer

The fatty acids determine the melting point of the fat or oil. A **fat** is a solid at **room temperature** (70°F), and an **oil** is a liquid at room temperature. When heated, fats melt and become a liquid.

You cannot mix water with fats or oils because they do not dissolve in each other. In general, some substances **dissolve** in water and some substances dissolve in fats or oils. These differences in solubility are related to the chemical structures of water and of fats and oils.

As shown in the image, fats and oils are made up of large complex molecules. Because of the complexity of the molecules in fats and oils, they remain a liquid even when heated to high temperatures.

Fats and oils do not boil. Instead, at a certain temperature, a fat or oil begins to burn and smoke. The temperature at which this occurs is called the **smoke point**. Different fats and oils have different smoke points.

The smoke point is an important factor to consider when choosing a cooking oil. In deep frying, you want to attain a high temperature without any decomposition of the fat or oil. Use the oil type that is recommended by the manufacturer based on the type of foods to be fried in the fryer.

Deep frying requires caution due to the high heat of the fat or oil, which can cause severe burns. Fats and oils are also **flammable** (can catch fire when heated).

Never add water to hot fat or oil. Water is more dense than fats and oils and will not mix with them. The expanding vapor causes the hot fat or oil to splatter, which can lead to burns and/or fire.

Cooking with Natural Gas

Natural gas is an affordable and efficient source of heat. The ability to control the amount of heat on a gas range is important in deep frying because the temperature determines the quality of the food. The ability to quickly turn off the flame on a gas range can help control a fire in fat or oil.

If frying at home, the method will most likely be done on the gas range top, where the burner can be easily adjusted, and quickly turned down or off if the oil or fat gets too hot. When frying in a commercial kitchen, the fryer is equipped with a thermostat to set the frying temperature or electronic digital controls to select the temperature. The fryer can be quickly shut off and the temperature can also be adjusted. The recommended temperature for a commercial fryer is 350˚F.

When deep frying on top of a range, follow these safety precautions in addition to following general kitchen safety precautions:

- Use a quality oil recommended for frying.
- Use a food thermometer to check the temperature of the fat or oil. The temperature should reach 350 degrees F.
- Use a heavy pot that is large, deep and wide.
- Never fill the pot more than two-thirds full of oil.
- Add food slowly to hot fat or oil because bubbling can occur.
- Leave frozen items in the freezer until ready to fry to avoid thawing.
- Stay near the hot fat or oil, as it can easily catch on fire.
- Remove the fried food with a basket, large slotted spoon or tongs and allow the fat or oil to drain before lifting out.
- Never place hot fats or oils in a trash receptacle.
- If the fat or oil starts to smoke, turn off the heat.
- If the hot fat or oil catches on fire, turn off the flame and use a lid to smother the flames, baking soda or a Class B fire extinguisher to put out the flame. Do **NOT** use water because the fat or oil will splatter and spread the fire. If you cannot put out the fire safely, evacuate immediately and call 911.

After frying, cool the fat or oil and strain through a paper filter or cheesecloth into the original container, bottle or jar. Depending on the food that was fried, the oil may be used again. Store in a cool place.

Dispose of the used-up fat or oil at a recycling location if available, as the fat or oil can be converted to biofuels. Never pour fat or oil down the drain.

When using a deep fryer, follow these safety precautions in addition to following general kitchen safety precautions:

- Use a quality oil recommended for frying.
- Preheat the fryer to 350□ . Most electronically controlled deep fryers are pre-set to a preheat temp and will automatically heat to that temp.
- Fill the deep fryer frypot to the fill line marked in the frypot.
- Fill the fryer baskets but do not overcrowd them and slowly lower into the frypot. Bubbling may occur.
- Leave frozen items in the freezer until ready to fry to avoid thawing. Many restaurants will place a freezer near the cook line and frying area so that frozen items are close by.
- Stay near the fryer while food is frying.
- Lift the baskets out of the frypot when the food has reached the doneness preferred and place them on the basket holders. Use a thermometer to check the internal temperature to verify doneness. Allow the food to rest in the baskets for a few seconds to drain the excess oil. Remove the fried food with tongs or dump into a holding pan.
- If the fat or oil starts to smoke, turn the fryer off or lower the temp.
- If the hot fat or oil catches on fire, turn off the fryer. Use a lid and/or baking soda to smother the flames. Keep a Class B fire extinguisher near the cook line; commercial kitchens are also equipped with fire suppression or ANSUL systems to emit a flame retardant. Do **NOT** use water because the fat or oil will splatter and spread the fire. If you cannot put out the fire safely, evacuate immediately and call 911.
- Commercial deep fryers are equipped with safety features, alarms and automatic programming, such as basket lifts, timers for multiple foods and oil filtering that are recommended when considering a new or replacement fryer in a commercial kitchen. Built-in filtration systems and timers prompt the operator when to filter them out, when to remove crumbs from the oil and when to clean. This feature extends the usage and lifecycle of the frying oil.

Cooking Methods

There are three types of cooking methods that utilize natural gas:

1. **Moist cooking** involves cooking with moisture in either liquid or steam form.
2. **Dry cooking** involves cooking without any moisture.
3. **Combination cooking** combines moist and dry heat cooking.

Today, you will be learning about and preparing food using a dry cooking method.

Dry Cooking: Deep Frying

Dry cooking methods include broiling, grilling, griddling, roasting, baking, sautéing and deep frying. Each method utilizes dry, hot air or hot fat in order to cook the food. This lesson will utilize a deep fat fryer and the dry cooking method. Most foods can be deep fried if prepared properly to reduce any excess water. Deep frying with hot fat or oil at high temperature **dehydrates** food (dehydrates means to remove water). Deep frying affects the taste and texture of food due to chemical and physical changes and the absorption of some oil by the food.

You will learn how to utilize deep frying, as well as other forms of dry heat, to cook various proteins, vegetables and starches throughout your lessons on dry cooking. Using natural gas enables the cook to quickly control the amount of heat transferred to the pan or by increasing or decreasing the flames. The hot fat or oil can be kept at the correct temperature needed to produce quality food.

Instructor Demonstration

Watch the instructor demonstration on deep frying safety and on how to make French fries, which are deep fried potatoes. Answer the following questions as you watch the demonstration.

- What safety tips did the instructor give during the demonstration?
- How much oil did the instructor put into the pot?
- How high did the instructor have the flame underneath the pot?
- How did the instructor determine when the French fries were done?
- What cooking tips did the instructor give during the demonstration?

Selecting and Preparing a Recipe

The following section can be completed at home if the preparing and cooking can be performed safely. Residential and commercial cooking equipment vary; while the information focuses on natural gas equipment, electric ranges and stoves may also be used to complete the cooking assignment.

You will need to exercise caution when deep frying. As a result, this lesson will suggest use pre-cooked French fries. You will also create a seasoning mix to toss your fries in.

Your teacher will review your recipe and dish based on the criteria listed below. If you are learning remotely, your teacher will provide you with instructions on how to submit your recipe and images or video of your completed dish.

Criteria	Excellent 3	Proficient 2	Emerging 1
Procedure	clearly followed given instructions and the example provided in the demonstration	somewhat followed given instructions and/or the example provided in the demonstration	did not follow given instructions and/ or the example provided in the demonstration
Content (submitted photos, procedure, videos, etc.)	content and explanations were thorough and well detailed	included content and explanation but included few specific details	included little to no additional content or explanations and/or no specific details
Organization	organized when preparing and making their recipe	somewhat organized when preparing and/or making their recipe	not organized when preparing and/or making their recipe

Create Your Recipe

While you will not be making French fries, you will choose which type of pre-cooked French fry you prefer – shoestring or krinkle cut – and create the seasoning mix you want to toss with the French fries. Choose seasonings based on the available ingredients and your dietary preferences, restrictions or allergies. Before starting to fry, it is important to have all of your ingredients, tools and equipment prepared ahead of time, which chefs call "mise en place" or "everything in its place."

Have available:

pre-cooked
French fries

Select optional ingredients:

cayenne
celery salt
cumin
garlic powder
garlic salt
paprika
parsley (dried)
pepper
salt
carrot slices
cheese (grated)
edamame, cooked
green onions
roasted garlic
bacon crumbles
barbecue sauce
beef gravy
chicken gravy
buffalo sauce
guacamole
ketchup
mayonnaise
ranch dressing
sour cream
spicy mustard
siracha
vinegar

Safety first:

- Always keep a Class ABC fire extinguisher nearby.
- Transfer the French fries with tongs.

Equipment:

- tongs
- large deep bowl
- small bowl (optional, for making a dressing)
- whisk (optional, for making a dipping sauce)

Ingredients:

- pre-cooked French fries
- any other optional ingredients of your choice

Procedure:

1. Use tongs to transfer the French fries and optional toppings into the large bowl.
2. Sprinkle optional seasonings on the mixture and gently shake the bowl to mix the ingredients.
3. If creating a dipping sauce for the French fries, use the small bowl and the whisk to mix the sauce ingredients.
4. Serve the French fries with the dipping sauce.

Tips:

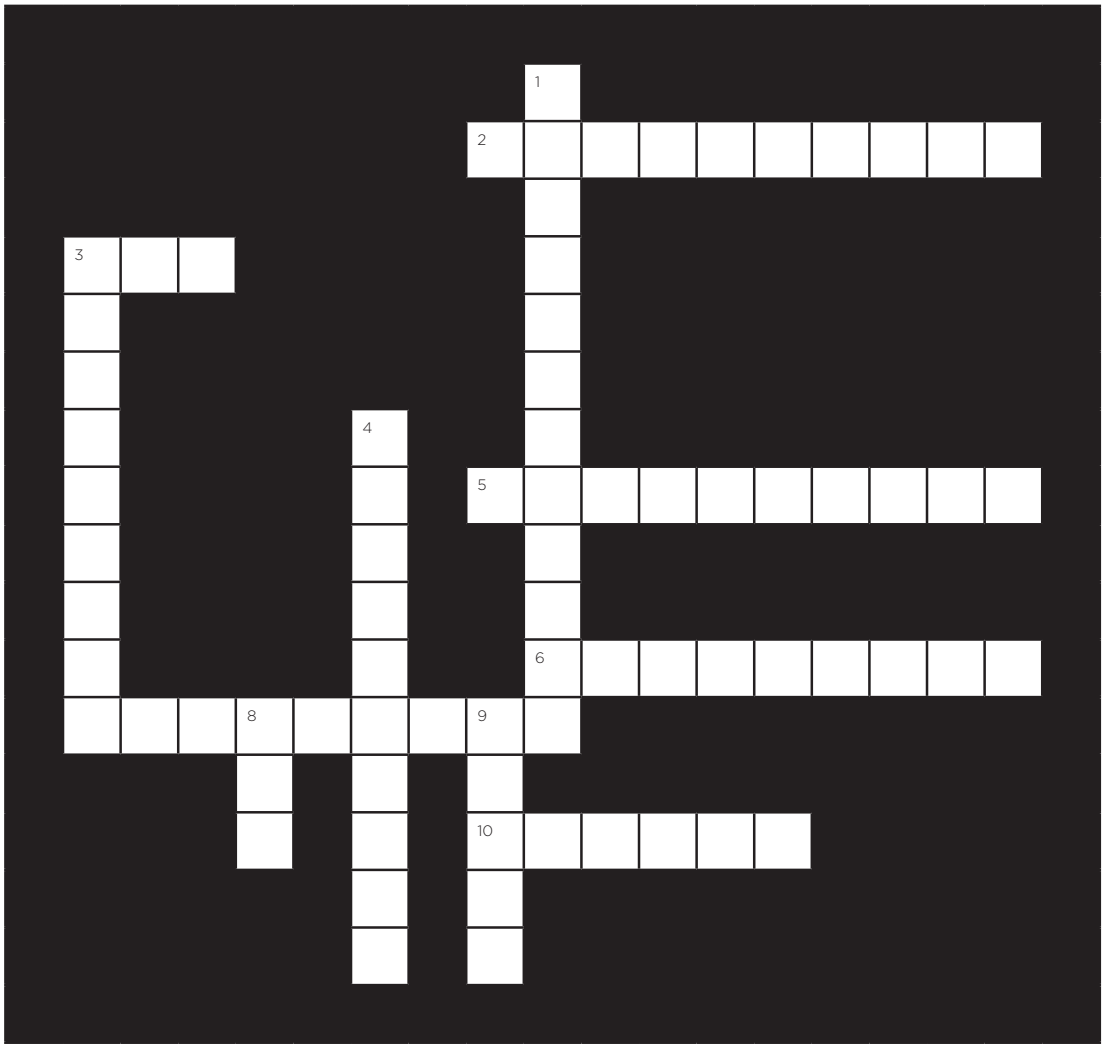
- Do not over season the French fries. Begin with a small amount of seasonings and taste test.

Activity 1

Write a recipe for frying French fries based on the demonstration. Include safety tips.

Activity 2

Fill out the crossword puzzle using the numbered clues. The answers are bolded words from the reading.



Across

2. Name for methods of cooking that utilize dry, hot air or hot fat (2 words)
3. Butter is an example
5. Method of cooking in which food is placed in hot fat or oil (2 words)
6. Remove water
7. Break down
10. Phase of an oil at room temperature

Down

1. Chemical structure found in fats and oils (1 word)
3. Another chemical structure found in fats and oils (2 words)
4. Temperature at which a fat or oil decomposes (2 words)
8. Olive oil is an example
9. Phase of a fat at room temperature

Final Assessment

1. How can you tell the difference between a fat and or an oil?
   a. whether it is used or not used for cooking food
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   d. whether it is a solid or liquid at room temperature

2. What occurs when a fat or oil is heated to its smoke point?
   a. It breaks down.
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   c. It boils.
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3. Why is deep frying dangerous?
   a. The fat or oil can cause an electrical fire.
   b. The fat or oil can aid the growth of bacteria.
   c. The fat or oil can reach a very high temperature.
   d. The fat or oil is poisonous.

4. What type of equipment could you use for deep fat frying?
   a. a shallow pan and spatula
   b. a baking sheet and parchment paper
   c. a mixer and deep mixing bowl
   d. a deep covered heavy pot and tongs

5. What is the best way to know if your French fries are perfectly cooked?
   a. They lose their color.
   b. They break apart.
   c. The fat or oil is at the correct temperature.
   d. They float to the surface.

Intermediate Cooking with Gas—Beginner
Lesson 3: Deep Frying
Teacher Guide

(1-2 class sessions depending on setting)

Introduction

This lesson covers a basic understanding of the structure and properties of fats and oils. Then, students will learn how natural gas is used on a range to heat a fat or oil. Because you want to use caution when deep frying, this lesson will only demonstrate the technique. Keep in mind that students may have dietary preferences, restrictions or allergies that you may want to address in discussing deep fried foods.

This lesson could be completed in a classroom or at home. Suggestions and instructions will be given for both scenarios.

Opening Assessment Answer Key (3 minutes)

Use these questions to obtain a baseline for what your students know before beginning the lesson. The correct answers are highlighted.

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   d. They float to the surface.

What Are Fats and Oils? (10 minutes)

Students will read about the importance of fats and oils for living organisms and the structure and properties of fats and oils. The following questions could be used for a class discussion or given to students to complete individually.

- Why is it important to have fats and oils in a diet?
- What is the difference between fats and oils?
- What is the smoke point?
- What chemical structure is found in fats and oils?
- What are three kinds of oils that are often used in deep frying?

Cooking with Natural Gas (3 minutes)

Students will read about using gas to deep fry. The following questions could be used for a class discussion or given to students to complete individually.

- Why is it important to exercise caution when deep frying?
- Why is temperature control important in deep frying?

Cooking Methods (2 minutes)

Students will understand that there are three cooking methods that utilize natural gas: moist cooking, dry cooking and combination cooking.

Dry Cooking: Deep Frying (2 minutes)

Students will read about cooking with dry heat and the deep frying technique. The following questions could be used for a class discussion or given to students to complete individually.

- How is cooking a food with oil different from cooking a food with water?
- How does using a natural gas burner help control the amount of heat transferred to the oil?

Instructor Demonstration (10 minutes)

Use your favorite recipe for making French fries. The demonstration can either be performed in class or recorded for remote use. If the demonstration is done in person, cut up and complete initial preparations for the potatoes ahead of time and start heating the oil for your demonstration while the students complete their readings. Keep one potato whole to illustrate how to slice or julienne it into the correct size in your demonstration. Also have cooked French fries available to demonstrate so that the complete frying process does not have to be demonstrated. Review the steps and ask students to write them down so that they can complete Activity 1.

The demonstration should include:

- a summary of the steps for preparing fresh French fries
- how a gas range works
- safety tips when using a gas range
- how to prepare the potatoes in equal sizes so that they fry to the same doneness
- how to dry the raw potatoes
- why the potatoes are fried twice (NOTE: the first frying is done at a lower temperature, which softens the potato and prepares the starchy surface; the second frying, at a higher temperature, crisps the fries)
- how to use a deep fryer and frying on the range top
- safety tips when using a deep fryer or frying on the range top
- how to determine if the French fries are done
- draining the excess oil from the French fries

Students will use the following questions as a guide to either a class discussion after or note taking during the demonstration:

- What are the steps for preparing French fries?
- What safety tips did the instructor give during the demonstration?
- How much oil did the instructor put into the pot/fryer?
- How high did the instructor have the flame underneath the pot/temperature of the fryer?
- How did the instructor determine when the French fries were done?
- What cooking tips did the instructor give during the demonstration?

Activity 1 (10 minutes or as homework)

Students are given this assignment:

Write a recipe for frying French fries based on the demonstration. Include safety tips.

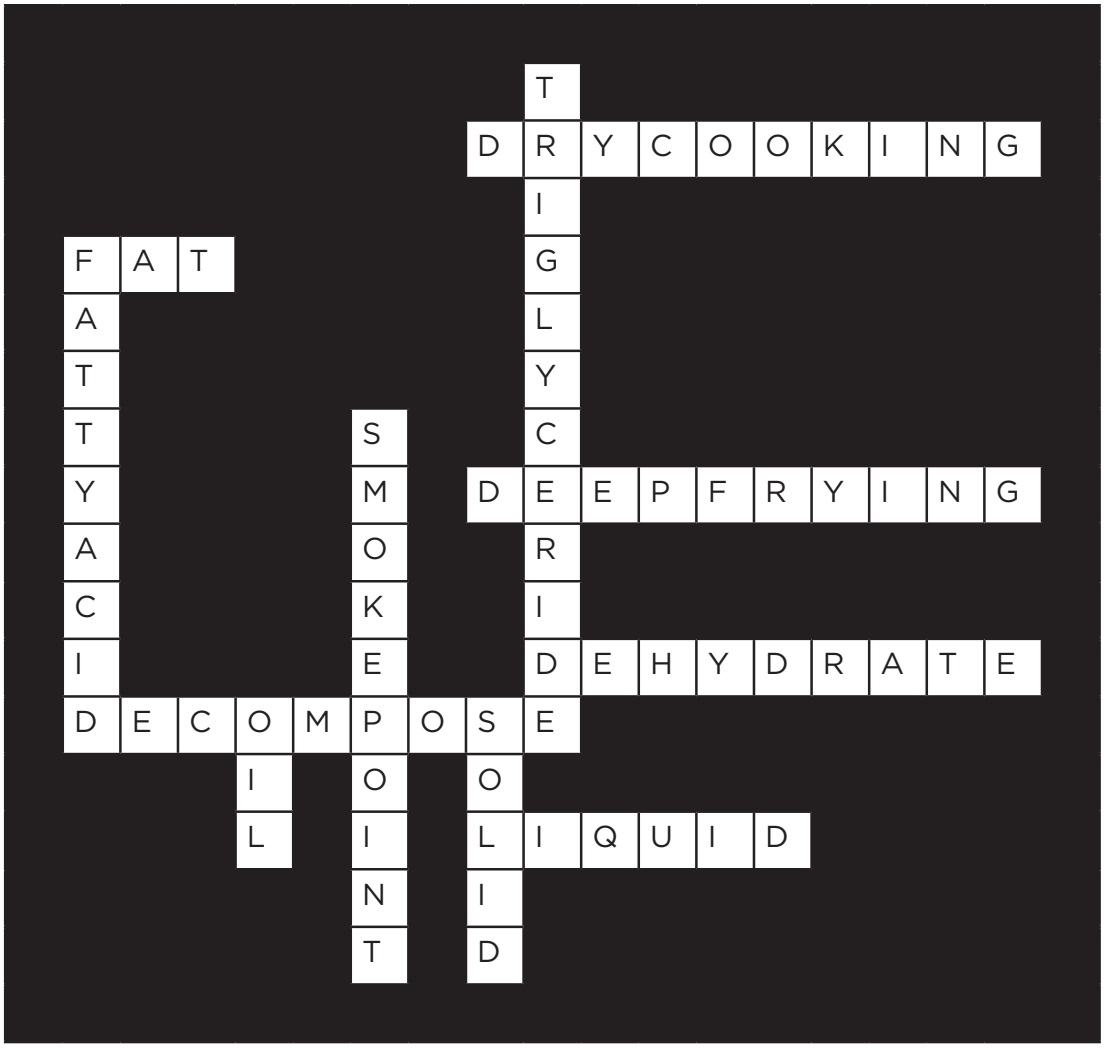
Scoring Rubric:

4	3	2	1
The student response … • fully responds to each part of the writing prompt with relevant, strong details • has logical organization • uses effective language and word choice for purpose and audience • contains no errors in usage or grammar	The student response … • addresses each part of the writing prompt with sufficient details • has sufficient organization • uses mostly effective language and word choice for purpose and audience • contains minor errors in usage or grammar that do not affect meaning	The student response … • addresses some of the writing prompt with weak details • attempts organization • uses some language and word choice for purpose and audience • contains minor errors in usage or grammar that slightly affect meaning	The student response … • does not address a large portion of the writing prompt • lacks organization • rarely uses appropriate language and word choice for purpose and audience • contains major errors in usage or grammar that greatly affect meaning

Activity 2 (4 minutes)

Students complete a crossword puzzle.

Key:



Final Assessment: Answer Key (3 minutes or as homework)

Use these questions in conjunction with the discussion questions in each section to formatively assess student growth over the course of the lesson. Address any student misconceptions that remain at the end of the lesson. Consider having students compare their opening assessment with their final assessment to see how their understanding of cooking with gas improved over the course of the lesson.

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