PETERS TOWNSHIP HIGH SCHOOL

CORE BODY OF KNOWLEDGE (CBK)

MOLECULAR GASTRONOMY

GRADES 9-12

For each of the sections that follow, students may be required to understand, apply, analyze, evaluate or create the particular concepts being taught.

COURSE DESCRIPTION:

Molecular gastronomy is the science of food, but it is not just "food science" in the traditional sense. In this course students will learn about the structures and interactions of the atoms and molecules that make up all matter, including our foods. Students will also study the chemistry and physics of water, fats, carbohydrates, and proteins, the four basic structures of our food. Students will take test and quizzes to gauge the comprehension of their new knowledge. They will also perform numerous experiments that are designed to demonstrate the concepts they have learned. Students will be required to continually update their PROJECT BASED LEARNING assignment with lab reports and blog posts which describe the hands-on components of the class.

STUDY SKILLS

- Students will be given hands-on assignments for each module and will be required, after completing, to describe, compare and contrast their experience in their online portfolio.
- Students are required to read from the text, and outside sources, and relate to our experiments.
- Students are encouraged to work in study groups to prepare for exams so that they can self-reflect on their true level of understanding of the course material.

MAJOR UNIT THEMES

- 1. FLAVOR:
- Explain how temperature and texture are related to flavor detection.
- Recognize the latest flavor to be defined.
- Discriminate between the senses that are involved in flavor detection.
- Describe how are artificial flavors were developed.
- Explain how the senses contribute the most to flavor perception.
- Classify the four traditional flavors.

2. SWEETENERS

- Recognize why SUGAR is considered a generic term.
- Identify which chemical families sugars belong to.
- Distinguish between the different types of food sugars, based on their chemical composition.
- Differentiate between the six recognized sugar substitutes, how where they developed and how are they used.

3. SALT

- Relate salt to the human diet.
- Explain why the human body craves salt.
- Identify the sources of salt.
- Describe, other than for seasoning, what uses are there for salt.
- Describe how salt affects the body.

4. HISTORY

- Categorize the main contributors to the early development of molecular gastronomy.
- Explain how the term MOLECULAR GASTRONOMY was developed.
- Describe the main criticisms of molecular gastronomy.
- Compare the chefs and restaurants who initially utilized molecular gastronomy techniques.
- Describe the main personalities in the field of molecular gastronomy.
- Explain how molecular gastronomy is different than food science.
- Predict if molecular gastronomy has any other purpose than providing taste novelties.

5. NUTRITION

- Define Calories.
- Recognize how Calories affect the human body.
- Recognize how cooking and freezing affect nutrients.
- Describe how water is defined as a required food source.
- Classify different types of nutrients.
- Describe how nutrients related to health.

6. BROWNING

- Explain the difference between enzymatic and non-enzymatic browning .
- Explain the benefits and detriments of enzymatic browning.
- Relate enzymatic and non-enzymatic browning to flavor.
- Explain the chemical reactions involved in enzymatic and non-enzymatic browning.
- Describe the Maillard reaction and what is its history.

7. CHEMICALS

- Describe the main chemicals that compose food.
- Name the harmful chemicals may be found in food.
- Explain how sugar substitutes, enzymes, lecithin, hydrocolloids such as starch, gelatin, and pectin, affect the foods we eat.
- Describe non-food chemicals can be used for cooking and what are their affects.
- Compare and contrast vitamins and minerals.

8. TOOLS AND EQUIPMENT

- Explain the role of fire and how does it affects chemical changes in food.
- Describe the role of freezing in food preparation and storage.
- Relate how salt and drying affect food preparation and storage.

- Compare air to water in relation to heat transfer and cooking.
- Explain how pressure affects cooking.
- Describe some of the newest tools used in molecular gastronomy.

• MATERIALS (and Supplemental materials used in course):

What Einstein Told His Cook: Kitchen Science Explained Hardcover by Robert L. Wolke (Author) **Publisher:** W. W. Norton & Company; 1 edition (May 17, 2002) **ISBN-10:** 0393011836 **ISBN-13:** 978-0393011838

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