**Student Worksheet: A Nuclear-Shmear Campaign**

**Directions**: Answer the first set of questions as instructed by your teacher before reading the article. Then, read the online *Science News* article “[Mayo is weirdly great for understanding nuclear fusion experiments](https://www.sciencenews.org/article/mayonnaise-nuclear-fusion).” Now answer the remaining questions as directed by your teacher.

**Before Reading**1. Do you like mayonnaise? Use specific sensory details to describe what you like or do not like about this condiment.

2. What does it mean to “fuse” two objects, such as two pieces of metal? Now consider the term used to describe fusion energy — the process involving reactions between atomic nuclei. Based on your prior understanding of the word “fuse,” do you think the term nuclear fusion means nuclei of atoms reacting to form a larger nucleus, or a large nucleus splitting apart to form smaller atomic nuclei?

**During Reading**

1. What nuclear reaction do researchers in this article use mayonnaise to study? Is energy consumed or released during this type of reaction?

2. What terms does this story use to describe mayonnaise’s behavior? What are the characteristics of mayonnaise that make it fit into both behaviors of material?

3. This story describes a nuclear physics experiment in which a metal capsule containing fuel is blasted with laser beams. Describe how the temperature and pressure change as a result of those laser beams.

4. Write a cause-effect sentence connecting temperature and pressure to changes in the atoms that make up the fuel inside the capsule.

5. Why is it difficult for researchers to study how materials behave during nuclear fusion experiments?

6. What role did centrifugal force play in the experiment investigating how mayonnaise mixes with air?

7. A model is meant to represent the structure, behavior or function of something else. In science, we use models to help visualize something that might be hard to understand. Or it might be used to study something that might be hard to carry out. Explain how mayo and air acted as a model for a nuclear-fusion experiment. Why is having a model useful?

**After Reading**1. Models can be physical objects, such as a miniature solar system model. They also may be conceptual, such as the early 1900's "plum pudding model" of the atom (you can see a “model” of that [in this short video](https://www.youtube.com/watch?v=JUJPyQtoB5E)). Is the mayonnaise model used described in the story a physical or a conceptual model? What is another example of a model used in science? Is this better described as physical or conceptual? What does this model help us to understand?

2. Think of a substance that has an unusual texture, such as Jell-O or glue. Does the material exhibit elastic behavior, plastic behavior or both? Brainstorm a possible use for the material in a scientific experiment or model.