Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Science Challenge - Film Canister Mystery**

**Introduction**

Building models to explain natural phenomena is part of being a scientist. Models can be made to explain things that can be seen. However, sometimes models are made to explain what is unseen.

In the 1940s and early 1950s, Linus Pauling (chemist), Francis Crick (biologist), and James D. Watson (biologist) were all on a quest to determine the structure and shape of deoxyribonucleic acid - otherwise known as DNA, the genetic material that makes up each organism. DNA is found in the nucleus of cells and, due to its tiny size, DNA's shape is impossible to see with a microscope. At the time, scientists knew what DNA was made of, but they did not know how it was all arranged. In early 1953, Linus Pauling - who, years earlier, had published the alpha helix structure of proteins - published an incorrect triple helix model of DNA. Later in 1953, using X-ray data collected from other scientists studying DNA at the time, Watson and Crick published an article that described the discovery of the double helix structure of DNA. Watson and Crick were not the first to publish a model of DNA, but they were the first to connect all the scattered fragments of information gathered from other experiments that were required to produce a successful molecular model of DNA.

**Objective**

Our next unit will be on atomic theory. Scientists have studied the atom and refined the model over time. In this activity, you will predict the contents of a sealed, black film canister by building and testing models of your own.

In the box below, draw what you think the atom looks like. Compare your design with your partner’s and discuss your thoughts.

**Procedure:**

1. Working with your partner, determine what items are in the mystery canisters without opening the film canister. This can be done by, first, shaking, rolling, tilting, and jostling the sealed film canister and observing what sounds are produced. You may also mass the mystery canister to test your predictions. Record your qualitative and quantitative observations below.

2. Then, using the empty film canister and the small, loose items, build and test your own sealed film canisters.

3. Compare the sounds made by your film canisters to the mystery canister. Do they sound the same? If not, test different combinations of the materials until you think you have the correct contents.

4. After you think you have achieved an identical canister, call your teacher over to discuss your findings and comparisons to see if your prediction was correct.

5. **YOU MAY NOT** open the taped canister.

|  |  |
| --- | --- |
| Qualitative Data ( 5 Senses) At least 3. | Quantitative Data (Numbers/ Measurements) Be sure to include units! |
|  |  |

**Claim (Prediction- Which items do you believe are in the canister):**

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

**Reasoning (Why did you make that claim? – Answer in complete sentences.)**

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