

Introduction

Building models to explain natural phenomena is a core activity of science. Models can be made to explain things that can be *seen*. Sometimes, though, models can be made that explain to us what is *unseen*.

Today, you will investigate¹ the unseen to accurately predict the mystery contents of a sealed black film canister by building and testing models and assessing the results using CEW (Claim, Evidence, Warrant).

Directions

1. Take a sealed canister and an empty canister back to your desk.
2. Determine what three items are in the sealed canister without opening the empty canister.
 - a. What tests can you perform to help determine its contents?

 - b. What behaviors of the canister might help reveal the contents?

 - c. What additional equipment might you need in order to determine the content?
(No, x-ray is not an option!)
3. Use your empty canister and the extra small items your instructor has made available to create your own experimental canister to test what may be in your sealed canister.

Compare the results made by your experimental canister to those of your sealed canister. Note similarities and differences on a data and observation chart like this one:

DATA AND OBSERVATION CHART

| When I . . . <i>(describe your interactions with sealed canister)</i> | I observe . . . <i>(describe what you observe)</i> |
|---|--|
| | Sealed Canister: |
| | Experimental Canister (attempt 1): |
| | Experimental Canister (attempt 2): |
| | Experimental Canister (attempt 3): |
| | Experimental Canister (attempt 4): |

- Continue testing by varying the combination of items in your experimental canister until you are able to determine the contents of your sealed canister.

Discussion

Use CEW (Claim, Evidence, Warrant) to explain how you determined the three items in your sealed canister.

Claim (*What are you trying to prove?* For example, you're trying to prove that Canister A contains a particular combination of items.):

Evidence/Data (*What is the evidence/data that proves your claim?* For example, what is the evidence/data that supports your theory of the contents in Canister A?):

Warrant (*Why does this evidence/data prove your claim?* For example, what is it about the evidence/data for Canister A that makes you believe it contains what you claim it to contain?):

¹This activity is adapted with permission from *REAL Science Challenge*, www.realsciencechallenge.com.