

# How Was Our Mystery Box Investigation Like the Process of Science?

- We made observations, described what we saw, and raised questions

*(Hey, there's a wooden box on legs with a funnel on top and at the bottom. What's inside?)*

- *We didn't* do this (literature review):

*-- Locate and read published, peer-reviewed articles (literature) about the phenomenon, to find out what is already known about it and start from there*

- We thought of ways to try to answer questions

*(What happens if we pour water into the top funnel?)*

*(Note: Direct experiments not always possible in atmospheric science! Accidental exceptions: pour gases & aerosols in the air; or change the character of the earth's surface by cutting, planting, and building. Intentional exception: seed clouds.)*

- We conducted experiments, recorded results
- We collaborated with other(s) to create a conceptual model based on observations so far

*(There's a gremlin inside! No, I think there are some filters with colored dyes in them, connected to tubes to channel the water. It's fuzzy, but this might explain part of what we've seen. This isn't that easy—it takes some imagination!)*
- We shared preliminary model with others, got feedback and maybe more/better ideas

*(Scientists often present initial work at a scientific conference. There they network with colleagues, discussing and sharing ideas.)*

- More experiments & more observations; revised conceptual model more based on results
- *We didn't do this (peer review):*
  - Write detailed account of our investigation (an article or paper)
  - Submit it to a scientific journal for publication
  - Editor of the journal asks several other experts in the subject to review your article and recommend whether or not it should be published, and if so, with what changes
  - Make recommended changes, submit article for review again. Repeat until accepted for publication.
  - (Peer review can catch errors and improve the clarity of the article. It raises the confidence of others that they can build on your work.)
- We didn't open the box to see what's inside
  - (We can't open the natural world to find the "answer"—can only continue testing and refining our models of how the world works, making them stronger, more extensive, & more useful. This is how the process of science helps us create knowledge and understanding about the physical world.*
  - Are there other ways that work as well?)*