Public Communication FOR Researchers

Storytelling Techniques in Radiolab

Radiolab is a free podcast on NPR and one of the best storytellers in science. We identified techniques that make these examples clear and vivid:

- The Haber process, from a segment on Fritz Haber.
- Viral invasion of phytoplankton, from A War We Need.

1. Start with motivation

One construction to establish tension is [Goal], *but* [impediment].

> Everybody wanted to feed the world, *but* our plants needed more nitrogen. We had all the nitrogen we could ever need right here in the air, *but* not in a usable form. It's not usable because nitrogen clings tightly to itself, *but* Haber figured out how to separate it. That process allowed the world to have 7 billion people.

Notice the consistent construction of moving from old to new information.

2. Model thinking like a scientist

- Show curiosity and marvel
  - "wow!" "no way!"
- Ask for information to follow along
  - "Tell me what they look like"
- Test your own understanding, find out what you don't know
  - "At war? With who? Each other?"
  - "So they're building up inside, and coming out…like a steady stream?"
  - Jad sounds out new words: "cocco.. coccolithophores." He models pushing through confusion.

The net effect of all of this is to guide the audience through the discovery process. This models how scientists think about the world and demonstrates comfort with not knowing something and with being wrong – an uncomfortable feeling for most people.

3. Make the story clear and vivid

Introduce a few important terms

> Pause before saying it the first time, slowly and with emphasis to flag it as something new and important
>
> Repeat terms to build familiarity: "They needed more of an element called...nitrogen. Nitrogen? Nitrogen. Nitrogen..."

Use specific examples

> Nitrogen can be found in poop, and it's so important that nations literally went to war over bat poop.

Use metaphors

> "The virus hijacks the cellular machinery that usually makes coccolithophore stuff, and it starts making more viruses."

Use visual imagery

> "Shields of chalk" and
> "a chink in the armor."

Use dramatic language

"The phytoplankton are at war... they're fighting for their lives."

Use strong action verbs

Nitrogen atoms CLING, and FIERCELY hold together.

Leave out some technical detail

"He figures out a way to force nitrogen to bond with hydrogen."

Two speakers allow for banter

Switching voices is the audio equivalent of animation: it adds excitement and holds attention.

Sound effects help visualize

Nitrogen atoms "cling!" "You get a *drip drip drip* ...of ammonia."

Sound effects can even visualize more abstract concepts: "He put in hydrogen… (*get in there!*)"

Classical music can set a tone of wonder, excitement, and reflection

4. End with significance

"This was arguably the most significant scientific breakthrough of them all…this has allowed the world to have 7 billion people."

Even though it's a funny and entertaining story, think how many concepts are introduced: amino acids contain nitrogen and are necessary for life, 4 out of 5 molecules in the air we breath are nitrogen, nitrogen forms strong trivalent bonds, nitrogen can exist as a gas bonded to itself, or as a liquid, ammonia, when bonded to hydrogen, the process of making ammonia is named after Fritz Haber. Science is full of amazing stories. Stories are memorable – stories have the power to captivate and inspire high school students, busy parents, and members of Congress.