



# Storytelling techniques in Radiolab

Radiolab is a free podcast on NPR and one of the best storytellers in science. We listened to two audio examples and identified techniques that make them clear and vivid.

The Haber process, from a segment on Fritz Haber.

Viral invasion of phytoplankton, from a war we need.

## Start with motivation

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Establish tension with the construction: [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 putting old information first, then new information.

## Model thinking like a scientist

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Show curiosity and marvel

“wow” “no way” “I want to tell you about the most incredible experiment”

Ask for the information you need to follow along

“Tell me what they look like”

Test your own understanding, find what you don't know

- “At war? With who? With 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.

# Make the story clear and vivid

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## Make a point of introducing 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 FIERCLY 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 with visualization

- 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

## End with significance

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“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.

# Storytelling techniques in journalism

Our brains are wired to respond to stories about other human beings, whether it is people affected by a certain technology or medical procedure, or the personal stories of scientists involved in research. Using those stories can enhance people's interest in and understanding of a scientific topic.

A chronological approach often works best, whether you are describing the experiences of a person affected by science, or those of the person doing the research.

Whether you are writing an article or doing a podcast for a general audience, direct quotes from the people in the piece are effective. Learning how to gather these quotes through good note-taking or digital recording is a good skill to acquire.

## Five types of leads

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Whether it's an article, blog, podcast or speech, you need a strong beginning to capture people's attention, and an anecdotal story can often be a vivid entryway into a subject. In writing, these "leads" can take different forms.

### Straight news lead

The woman accused of killing an FBI agent more than two years ago pleaded guilty this morning to voluntary manslaughter and discharging a firearm during the commission of a crime of violence.

Under a negotiated sentence, U.S. District Judge Terrence F. McVerry sentenced Christina Korbe, 42, to 190 months.

### Quote lead

"I was furious that that disreputable young man had the audacity to sit in my antique rosewood chair."

That's how tiny, 82-year-old Louise Freeland described her encounter with an escaped convict whom she talked into surrendering to sheriff's officers.

### Descriptive lead

At first, it looks like a photograph.

The man's face is beaded with water. As he shuts his eyes against the deluge, the water bounces off his cheek, runs in rivulets down his nose, pools on his lower lip.

But a closer look shows that his shoulders and neck are strangely blurred -- just one small sign that we are actually looking at an incredibly detailed self-portrait by German pencil-and-charcoal artist Dirk Dzimirsky.

### Grabber lead

Susan Hogan can't be sure, but it wouldn't surprise her if she turned out to be a tetrachromat.

A tetrachromat is a woman who can see four distinct ranges of color, instead of the three that most of us live with.

## (Grabber lead)

A genetic test would be needed to verify whether Mrs. Hogan truly fits that description, but it could help explain why the interior decorator can hold up three samples of beige wall paint, “and I can see gold in one and gray in another and green in another, but my clients can't tell the difference.”

It may be impossible for us trichromats to imagine what a four-color world would look like. But mathematics alone suggests the difference would be astounding, said Jay Neitz, a renowned color vision researcher at the Medical College of Wisconsin.

## Anecdotal lead

Nicholas Volker is a short, blue-eyed 4-year-old who loves Batman and squirt gun fights and steak - on the rare occasions when he's not restricted to a feeding tube.

Food has become his dream – and his curse. Severely underweight, he arrived at Children's Hospital of Wisconsin in 2007 with the bony arms and distended belly of a famine victim. Yet when he ate, unusual holes would open between his intestine and skin, causing feces to leak into a large wound in his abdomen.

For two years he has suffered from this mysterious illness. He has survived more than 100 trips to the operating room. He has endured gut pains so severe he asked his mother to pray for him. Surgeons have removed his colon, its pink hue discolored by an enormous yellow ulcer.

## Four types of endings

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In both writing and verbal storytelling, a strong ending is almost as important as a strong beginning. There are various ways to conclude a presentation effectively.

### Bookend or circular ending

#### Lead

Four years ago, when her mother took her out of a dilapidated home in Oakland, two garbage bags of clothes in hand, Keiona became a homeless child, bouncing from homeless shelter to shelter to a house of a family friend.

Her mother, Virgie, would scream at the little girl to get away so she could smoke crack. The girl's behavior vacillated from rebellious to clingy, and her grades suffered.

#### Ending

On a recent day, Virgie was happily playing a race car computer game with her daughter – a big switch from the days when she would scream for her daughter to get away and when she lived in fear of going to jail, losing her four children. Keiona is the youngest, and bore the brunt of her homelessness. Clean for almost four years, Virgie is trying to make up for lost time with her daughter.

The sight of Keiona playing in the educational center with the other children makes her feel good.

“It's a stable environment,” Virgie said. “It's all about them playing and forgetting the past.”

## Quote ending

### Lead

“Here's something we couldn't do before,” said Josh Maloney, thrusting his right arm out for a handshake.

His grip was quick and firm, which was all the more remarkable, considering that just over a year ago, the hand had belonged to someone else.

Mr. Maloney, 25, lost his right hand in an explosion during a Marine training exercise in 2007. A year ago last Sunday, he became the first person at UPMC to receive a hand transplant ...

### Ending

Both Mr. Maloney and Mr. Scott said the moment they could move their fingers, they felt the hands belonged to them.

After his hand transplant, Mr. Scott said, “it was kind of a replay from 14 years earlier when I had lost my hand. That day, there was just a stump with bandages and Betadine [antiseptic], and this time I woke up and it was bandages and Betadine and there were fingers peeking out. I made the fingers move, and from that time on, I knew it was my hand.

“I know what a gift my donor gave me, but he gave it to me to take care of and it is mine and it will always be mine.”

## Conclusory ending

### Lead

Up until 20 years ago, scientists believed that the human brain was largely mature by puberty. Apparently, they had failed to notice the irrational behavior and flaky thinking of teenagers. Now, of course, we know that the human brain continues to undergo serious restructuring well into the 20s...

### Ending

These bursts of brain changes seem to be connected to developmentally sensitive periods, says Giedd. Understanding them better just might unlock some of the enduring puzzles of adolescent behavior.

## Forward-looking ending

### Lead

Apple's iPad was introduced Wednesday as an Internet sensation.

But it created an Internet sensation of a different sort – though not necessarily about a subject discussed in polite company.

Since Steve Jobs unveiled his latest gadget – the, um, iPad – the feminine hygiene jokes have been flying fast and furious for the past two days on Twitter, the blogosphere and on cable...

### Ending

In six months, it's pretty likely that the iPad's awkward debut will be forgotten, Mr. Frankel predicted. “There aren't many names that tank a product. A bad product will pretty much do that by itself.”