Explanatory Chains

Ensuring that the public understands how an issue works is a cornerstone of an effective science translation initiative. When trying to understand a complex problem, we all seek to identify who or what is responsible, and what the impact of the problem may be. A strategically framed communication doesn't leave these elements to chance. An Explanatory Chain is a clear, concise, well-framed explanation of the causes of a problem, including the mechanism by which the problem is created. By filling in the gaps between expert and public thinking, Explanatory Chains can invite the public into a richer and deeper understanding of a problem, thus empowering people to think through an issue and address it more productively. Effective Explanatory Chains are brief, powerful, reasonable explanations of cause-and-effect that allow the public to understand connections among the complex factors in a problem. Explanatory Chains work especially well when people are struggling to connect conditions to human actions.

Elements of Explanatory Chains

Initial Factor: *What is the original cause of the problem?*
Effective chains start a few steps back from the problem that the communicator wishes to highlight, so that someone new to the topic has access to the appropriate background information.

Mediating Factors: *What is set in motion by the initial factor?* These are the mechanisms that are set in motion by the initial factor (think "domino effect"). There may be many mediating factors that occur as a result of the initial factor. Taken together, these links should give the public a satisfying sense that they grasp how the problem works.

Final Consequence: *What are the effects?* The final consequence is the effect or problem to be explained. An effective Explanatory Chain sets you up to communicate about solutions, so that the public can become engaged once they understand the issue.

Example of an Explanatory Chain:
When we use fossil fuels like coal and petroleum for energy, we pump more and more carbon dioxide into the atmosphere. *(Initial Factor)* The carbon dioxide builds up in the atmosphere and acts like a blanket, trapping in heat. The heat is warming oceans, melting glaciers, and causing the water to expand. Together, these forces are causing sea level to rise, leading to increased flooding in tidal salt marsh areas. The marshes are home to the Saltmarsh Sparrow - a native species in Massachusetts that helps spread the seeds of marsh grasses. *(Mediating Factors)* As the marsh dwindles, the Saltmarsh Sparrow population dwindles; and when there are fewer sparrows, fewer grass seeds are spread, so the marsh dwindles more, creating a downward spiral. If nothing is done, this ecosystem is at risk of collapse, and many waterfront homes and businesses will also be affected. *(Final Consequences)*

Checklist for using Explanatory Chains on climate and ocean change:

- ✓ *Start chains in recent history:* The public thinks in recent time scales. When constructing your initial factor, use a timescale within last 150 years (since the Industrial Revolution).

- ✓ *In your initial factor, explain how energy use is involved:* Without seeing how energy use is involved in the cause, it is difficult for the public to understand how energy use is essential to the solution. Frontload the role of energy use in the initial factor.

- ✓ *Frame the underlying problem strategically:* We want to "connect the dots" for our audiences so they see how humans actions and ecological impacts are related. But locating the cause as 'humans' or 'carbon dioxide' may be unproductive. For symptoms caused by temperature increase, "burning fossil fuels like gas, oil, and coal for energy" is the major underlying cause. There are many other ways to start a chain "in the swamp" – so consider whether your first term will activate unproductive cultural models. Always frame the problem in terms that lead clearly to a reasonable, easy-to-think solution.

- ✓ *Strike a balance between "enough information" and "too much information."* When crafting an Explanatory Chain, take care to include as many links as needed to truly illustrate how one thing leads to another. Avoid "skipping over" important mechanisms involved. Yet also be concise in order to maintain attention. To paraphrase Albert Einstein: "Use as few links as possible, but not fewer." Addressing this tension is a challenge, but one that can be met through careful writing and rewriting.

- ✓ *Frame the final consequence strategically:* Consider the thinking that would be activated by the final consequence. Always describe an impact of climate change, so that you don't leave the impression that the climate/ocean being a "bit warmer" is a good thing. But don't invoke crisis thinking. Use a matter-of-fact tone, so you don't leave the impression that this is a big, scary, depressing crisis that can't be solved.

- ✓ *Allow for consideration of appropriate Solutions:* In either the initial factor or the mediating factors, it is important that you draw attention to parts of the problem that can be influenced by collective action and lead to systemic change. You can segue from the Explanatory Chain to Values of *Protection*, or *Responsible Management,* then discuss community level initiatives that address the problem.

For more information about this frame element,
read FrameWorks' short article, "Strengthening Advocacy By Explaining Casual Sequences" -
http://www.frameworksinstitute.org/assets/files/ezines/causal_sequences_ezine.pdf