



Osteoporosis of the Sea

A metaphor for some of the effects of ocean acidification



The story you're telling:
Ocean acidification changes the chemistry of the ocean and causes "osteoporosis of the sea," which prevents animals at the bottom of the food chain from building and maintaining the protective shells they need to survive.

Strategic way to redirect thinking away from patterns such as:



Nature Will Fix Itself; Nature Works In Cycles; Ocean Acidification—What's That?; Ocean Is Too Big to Be Harmed; Ocean Problems = Material Pollution

Concepts and ideas included in this frame element:

- **The ocean absorbs the extra carbon dioxide we emit into the atmosphere when we burn fossil fuels, and that changes the chemistry of the ocean. We call this "ocean acidification":** introduces the essential background of the problem through a clear, concise explanatory chain.
- **The change in chemistry is reducing the amount of calcium carbonate in the ocean:** explains how ocean acidification changes the chemistry of the ocean.
- **Just as humans need calcium to build their bones, sea creatures need calcium carbonate to build strong skeletons and shells:** makes the analogy between bone formation on land and shell formation in the sea.

(Continued on reverse)



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Concepts and ideas included in this frame element:

- **As a result of the changing chemistry, we are seeing "osteoporosis of the sea," with sea creatures' skeletons and shells becoming thinner or more brittle:** establishes the topic as a problem in such a way that people can reason their way to a sensible solution.
- **For example, this species is affected in this way which in turn:** illustrates the interdependence of species by showing how direct effects on one creature lead to effects on others.
- **Osteoporosis of the sea disrupts the food chain, undermining the stability of the ocean's ecosystems:** brings the issue into a wider context by clarifying its impacts at a systems level.
- **Now that we know about osteoporosis of the sea, we need to rethink our use of fossil fuels:** communicators can use this language or other preferred solutions, but it's important to close with a suggested course of action that matches the scale of the problem.

Read the original research behind this recommendation at FrameWorksInstitute.org