Ten Competencies for the Science Misinformation Crisis

*What component concepts and skills are essential to NGSS's SEP #8,
"Obtaining, Evaluating, and Communicating Information"?*

1. Epistemic Dependence
Explain why scientific experts are important and why non-experts depend on them. Provide examples. Distinguish between trust in empirical science and other forms of trust (contractual, moral, loyalty, promises, sincerity).

2. Expertise
Describe several important criteria for identifying scientific experts. Describe at least two factors that are often used to gauge expertise but that are unreliable. Demonstrate these principles in analyzing the level of expertise indicated in some sample authentic cases.

3. Gatekeepers
Describe several important criteria for identifying a responsible spokesperson for the consensus of scientific experts. Describe at least two factors that are often used to gauge their credibility, but that are unreliable. Demonstrate these principles in analyzing the level of trustworthiness indicated in some sample authentic cases.

4. Deceptive Tactics
Name several deceptive tactics used to promote unjustified scientific claims. Analyze several sample authentic claims to establish their level of credibility (honesty).

5. Analytical Posture
Exhibit the skill of "taking one's bearings." Describe the context of sample scientific claims in the media, especially who is making the claim and why (as a basis for assessing the credibility of the source).

6. Internet and Social Media
Describe the special challenges of encountering scientific claims on the internet or on social media, using several examples.

7. Epistemological Beliefs
Describe the circumstances under which competent scientists may justifiably disagree, using a few authentic examples. Describe how they may resolve those disagreements, using at least one concrete historical example.

8. Confirmation Bias
Describe the problem of individual confirmation bias and how to address it, using a few real examples.

9. Cognitive Heuristics and Biases
Identify at least three important cognitive dispositions that may facilitate acceptance of unreliable scientific claims, and provide a historical example of each. Identify and explain the flaws in several sample recent contemporary cases.

10. Consensus / Corroboration
Explain the importance of consensus and of corroboration from independent sources. Describe what makes sources "independent." Identify at least 2 conditions when the "wisdom of the crowd" may be mistaken, and illustrate with authentic examples.

Allchin, D. (2023). Ten competencies for the science misinformation crisis. *Science Education, 107,* 261-274.