Including Uncertainty in Scientific Argumentation

Michael Hubenthal, Steth Stein, Mike Gallagher

Tools for students – Italian Flag Analysis

Green – Evidence for	White – Uncertainty and unknowns	Red – Evidence against

Assessment - Scoring Rubric*

Level	Description	Response characteristics
0	Nonscientific or irrelevant claim	Students can't make scientific claims
1	Scientific claim	Students make scientific claim without support or evidence
2	Scientific claim coordinated with evidence	Students recognize that evidence is needed to support a claim
3	Scientific claim coordinated with evidence according to existing knowledge.	Students use existing theories or models to justify adequate evidence to support a claim.
4	Scientific claim coordinated with evidence according to existing knowledge while acknowledging uncertainty.	Students use existing theories or models to justify adequate evidence to support a claim while acknowledging uncertainty by analyzing limitations related to measurements, current theory or model.
5	Conditional scientific claim coordinated with evidence according to existing knowledge	Students use existing theories or models to justify adequate evidence to support a conditionalized claim that recognizes conductions in which the current claim may not hold.

*Adapted from Pallant, A., Pryputniewicz, S. & Lee, H. (2012). Exploring the Unknown. *The Science Teacher* 60–65.