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Alignment with the NGSS Science and Engineering Practices for K-12 Science Classrooms

Practice	Description	Story Example
Asking questions and defining problems	A basic practice of the scientist is formulating empirically answerable questions about phenomena, establishing what is already known, and determining what questions have yet to be satisfactorily answered.	Synthesizes and tests small organic molecules that act as neurotransmitters and bind and activate specific parts of the body as needed. Drugs that incorporate these materials are more effective in treating a disease with minimum side effects.
Developing and using models	Involves construction of a wide variety of models and simulations to help develop explanations about natural phenomena.	N/A
Planning and carrying out investigations	A major practice of scientists is planning and carrying out a systematic investigation, which requires the identification of what is to be recorded and what are to be treated as the dependent and independent variables. Observations and data are used to test existing theories and explanations or to revise and develop new ones.	Puts different materials into a “cooking pot”, applies heat and motion, checks on it over time and gathers data. Uses a roto evaporator; this helps to dry out a material that might be harmed by heat as. many chemicals and drugs are heat sensitive. Uses an oven dryer to dry solids. Unlike the roto-evaporator which can dry and collect materials in a mixture or solution one by one, the oven dryer is not designed for collection. It simply dries.
Analyzing and interpreting data	Scientists use a range of tools—including tabulation, graphical interpretation, visualization, and statistical analysis—to identify the significant features and patterns in the data.	Conducts coding and analysis of the data collected for each of the different materials.
Using mathematics and computational thinking	Scientists use a range of computational devices for data collection and analysis.	See above.
Constructing explanations and designing solutions	Scientists construct explanations of phenomena that incorporate their current understandings and are of consistent with available evidence.	Identifies materials to incorporate into drugs intended to treat specific diseases.
Engaging in argument from evidence	Scientists defend their explanations, examine their own understandings, examine their own understandings, and collaborate with peers in searching for the best explanation for the phenomenon being investigated.	Shares and discusses findings with other students, professors., and colleagues
Obtaining, evaluating, and communicating information	Scientists read and write texts and communicate orally.	Communicates via online channels, articles in publications, and in person at meetings.