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| **What good looks like** |
| **Planning and Conducting - gathering and reporting data**   * What is an accurate vs precise observation? * Clear communication of data, (explicit about what change is happening for what material) * Qualitative observations need to be accurate (using descriptors--precision) * Quantitative observations need to explain the qualitative data accurately and precisely (sig figs, uncertainty, scientific notation). * The observations are true observations and not inferences (no predicting or assuming what happened) * Labs include observations that change over time. * Labs include a variety of different properties observed (human sense, no taste, waft, hear crackling and popping, etc.)   ***The following table summarizes some of the good chemistry 11 observations from yesterday’s video reaction activity and was taken from whiteboards and discussion.***   |  |  | | --- | --- | | **Qualitative** | **Quantitative** | | **Initial:**  Na(s)+HCl  -Na soft, malleable, dull to lustrous when cut, solid.  - Temperature (back of hand if in person)  -HCl transparent, liquid, seemed not viscous (didn’t stick to the container or move “thickly”).  **During**  -white, opaque, vapor, traveling up from reaction beakers immediately upon Na and HCl interaction.  -rapidly shaking, vibrating, moving back and forth around the reaction beaker. White solid-like formation flies out of the beaker from vigorously spinning Na metal.  -HCl bubbles form instantly upon reaction between Na(s) and HCl (aq). Transparent, colourless solution became white, opaque.  -flame produces light, heat, orange, yellow, white, sporadic production, with approximately 1s periodicity. Sparks/flames began after 13s and dissipated after ~30s.  -crackling/popping/searing/sizzling noise  -burning splint - qualitative test for flammable gas. | 12M HCl  In a lab, we could investigate the qualitative properties quantitatively with equipment such as:   * Balance/scale: Mass * Metric ruler: Volume, dimensions * Thermometer: temperature (initial, during, final) * Calculations: density (m/v) * Phone Camera: time, allows to see reaction iteratively, temperature points. * *Ask me if there is anything you may think of wanting to try from the equipment room to make other quantitative observations, I can INQUIRE about getting it.* | |
| **Communicating - clearly written with scientific conventions**   * Use of proper scientific ideas and terminology (units, uncertainty, proper name of equipment, proper use of words e.g., gas versus air). * Communication needs to be specific and clear (there was no change during the time the metal X was in the solution Y versus there was no change in 1). |