Making Connections Using Johnstone's Chemistry Triangle

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**Use the rubric to assess what is demonstrated by the student on the assignment. Look for evidence that allows you to select one performance level vs another.*
***In your assessment include a one-line justification. What is it that the student did or did not demonstrate?*

	Exemplary (4)	Competent (3)	Emerging (2)	Novice (1)
A. Observable Connections *Ability to connect observable phenomena to molecular-level models and/ or symbolic representations.*	Predictions and conclusions correctly connect observable phenomena to IMFs between molecules. Explanations effectively and explicitly use IMFs to connect observable phenomena to molecular-level models and/or symbolic representations without prompting.	Predictions and conclusions correctly connect observable phenomena to IMFs between molecules. Explanations use IMFs to connect molecular-level models and/or symbolic representations when prompted. Explanations may use ineffective language.	Predictions and conclusions often correctly connect observable phenomena to IMFs between molecules. Explanations fail to connect molecular-level models and/or symbolic representations to observable phenomena, even when prompted.	Predictions and conclusions fail to correctly connect observable phenomena to IMFs between molecules. Explanations do not attempt to connect molecular-level models and/or symbolic representations to observable phenomena.
B. Symbolic *Ability to identify and communicate information through symbolic representations of chemical structure. *Questions may require students to draw and/or interpret structures.*	Effectively and correctly communicates all concrete individual IMFs from the molecular structures. Effectively and correctly communicates that IMFs form *between* particles (including partial charges where appropriate)	Correctly identifies all IMFs present (if prompted). Successfully makes sense of structure, able to look at one molecule and determine which IMFs it could potentially engage in. Communicates that IMFs form *between* particles. Representation of IMFs between particles is not completely effective.	May not identify the correct IMFs present (if prompted). Struggles to make sense of chemical structure and using correct conventions. Representations of IMFs are either not between particles or are incomplete.	Does not identify the correct IMFs present. Fails to make sense of chemical structure and correct conventions. Representations of IMFs and molecular structure are incorrect or completely missing. Representations of IMFs may be *within* a single molecule.

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	Exemplary (4)	**Competent (3)**	**Emerging (2)**	**Novice (1)**
C. Molecular Connections *Ability to correctly interpret and/or draw models as well as use intermolecular forces to holistically predict and explain the overall behavior of a particle.* **Evidence of the **thinking** that leads to the symbolic or observable. Recognizing the appropriate **context**.*	Consistently and correctly uses molecular characteristics like predominant IMFs, polarity, charge, and/or size to predict, explain, or draw conclusions. Incorporates an effective recognition of complexity and context into explanations, including identification of interactions between like and different particles. Effectively explains how individual intermolecular forces lead to overall behavior. Explanations make it clear that interactions are *between* particles and not a property of a single particle. Language use is effective: ex. IMFs are overcome vs 'broken'. Thermodynamic considerations are incorporated.	Consistently and correctly uses molecular characteristics like polarity, charge, and/or size to predict, explain, or draw conclusions. Struggles to deal with complexity and context in explanations and inconsistently incorporates predominant IMFs. Able to look at one structure and successfully determine which IMFs it could potentially engage in. No clear evidence the students are specifically thinking about how the molecules behave and how that leads to overall behavior. Explanations may not explicitly link molecular structure to the observable phenomena.	Inconsistently uses molecular characteristics like polarity, charge, and/or size to predict, explain, or draw correct conclusions regarding observable outcomes. May not incorporate predominant IMFs or does so inconsistently. Does not recognize complexity or context. Seems lost in the details of identifying structural features and IMFs. May try to reduce particle behavior to a single rule or mathematical ratio. No evidence the students are thinking about how the molecules must be behaving to bring about what is observed or predicted. Explanations do not explicitly link molecular structure to the observable phenomena.	Often fails to use molecular characteristics like polarity, charge, and/or size to predict, explain, or draw correct conclusions regarding observable outcomes. Does not incorporate predominant IMFs. Does not recognize complexity or context. Lacks a fundamental understanding of structure; often fails to provide correct identification of all structural features and IMFs present between molecules. No evidence the students are thinking about how the molecules must be behaving to bring about what is observed or predicted. Explanations do not explicitly link molecular structure to the observable phenomena.