Lesson 5: Molecular compounds and their properties

Objective: Students will be able to compare and contrast the properties of individual elements and the properties of compounds that those elements form.

Learning Goal: Compounds are made of elements with their own individual properties that are different from the properties of the compounds they make up.

Vocabulary: Compounds, physical properties, chemical properties, density, melting point, boiling point (other properties as needed), reactivity

Engage: (Students introduced to final project: design of self-warming glove)
1. Students are given elements that will be used in the exo/endothermic reactions in later lesson (Teacher can have students look at pictures of elements, actual samples, or use Internet to research)
2. Students are asked “How are these elements different? How can we tell them apart?”
3. In pairs, students are asked to research and record the individual element’s properties (density, melting point, boiling point, solubility, color, magnetism, flammability, hardness/brittleness, etc.) that make up the compounds. Each pair gets 2-4 elements, and told that they will share findings with other groups to have a complete list of the properties of the elements in the compounds.
4. Students fill out a table recording the properties of their elements.

Explore:
5. Students are given the chemical compounds that will be used and formed in the exo/endothermic reactions used in designing their self-warming/cooling device.
6. Students will then be assigned to research the properties of 2-3 compounds that they will use in their final project.
7. Students record the properties of the compounds, and compare them with the properties of the elements that make up the compounds.

Explain:
8. Students share their results with the class.
9. Students conclude about the relationship between individual elements’ properties and the properties of the compounds they make.
10. Teacher ensures that the connection is made: When elements combine to form compounds, the compounds have their own properties that are different from the individual atoms that make up the compounds.

Elaborate:
11. Students are given the actual chemicals to analyze and observe with magnifying glass (students can compare observational data with research), other tools to observe chemicals can be given if available (boiling point of liquids can be compared, density can be calculated, etc.)
12. Students continue recording observable properties on data sheet

Evaluate:
13. Student handout used as evaluation
14. Optional: Students asked to write a one sentence summary comparing the properties of individual elements and the compounds that they make.