

Lesson 9: Modeling atoms in molecular compounds (subscripts and coefficients)

Objective: Students will be able to design models that represent reactants and products from chemical reactions.

Learning Goal: Students visually represent the difference between a subscript and coefficient in a chemical formula to justify the conservation of mass.

Vocabulary: molecular compound, coefficient, subscript, chemical formula, reactant, product, atom, conservation of mass

Engage/Explore:

1. In groups, students are given materials for making models of molecular compounds.
2. Students receive the index cards (from previous lesson) which have chemical formulas (of reactants and products) from the exo/endothermic reactions previously performed and asked to make a model of the molecular compounds from the supplies given.
3. Students label each model with chemical formula.
4. Teacher circulates room guiding students as needed.
5. Students complete a gallery walk evaluating the models built by other groups (students can complete handout listing ideas learned or leave post-it notes with comments on other groups' models).
- Teacher note: Students can research the actual bonding and structure of the compounds (for accuracy).

Explain:

6. Teacher discusses with class the meaning of subscript with students using models to justify their answers.
7. Teacher ensures students understand no subscript is understood to be 1, and each new element is shown by a capital letter
8. (depending on materials) Teacher has students (take apart or leave models) attempt to build models when coefficients are used.
9. Teacher has students analyze other groups' models and evaluate, and redesign theirs.
10. Teacher goes over models and how coefficients affect the model (showing students how the amount of the compound changes, not the actual compound itself)

Elaborate:

11. Students are given chemical formulas to model that represent reactants and products from exo/endothermic reactions.
12. Students use materials to model and show the addition of molecular compounds and the result of changing coefficients.
- Teacher note: Student extension could be done on the actual bonding and structure of the compound.

Evaluate:

13. Teacher circulates room to assess models students have made
14. Teacher asks students to draw models representing molecular compounds with multiple coefficients.