

# Educational Resources from *Phenomenon Science Education*

## Student Proficiency Goals for **NGSS MS-PS1-1**



### Information about MS-PS1-1

#### **NGSS Performance Expectation MS-PS1-1.**

Develop models to describe the atomic composition of simple molecules and extended structures.

#### **Clarification Statement.**

*Emphasis is on developing models of molecules that vary in complexity. Examples of simple molecules could include ammonia and methanol. Examples of extended structures could include sodium chloride or diamonds. Examples of molecular-level models could include drawings, 3D ball and stick structures, or computer representations showing different molecules with different types of atoms.*

#### **Assessment Limits.**

*Assessment does not include valence electrons and bonding energy, discussing the ionic nature of subunits of complex structures, or a complete description of all individual atoms in a complex molecule or extended structure is not required.*

#### **Science and Engineering Practice (Developing and Using Models)**

- Develop a model to predict and/or describe phenomena.

#### **Disciplinary Core Idea (PS1.A: Structure and Properties of Matter)**

- Substances are made from different types of atoms, which combine with one another in various ways. Atoms form molecules that range in size from two to thousands of atoms.
- Solids may be formed from molecules, or they may be extended structures with repeating subunits (e.g., crystals).

#### **Crosscutting Concept (Scale Proportion and Quantity)**

- Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small.

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**Student Proficiency Goals**

**SEP (Developing and Using Models):**

- Students develop models to describe phenomena related to the atomic composition of simple molecules and/or extended structures.
- Students use their models to predict the structure of molecules and extended structures at the atomic level.
- Students use their models to represent and describe relationships between individual atoms in molecules.
- Students use their models to represent and describe relationships among individual atoms or molecules in extended structures.

**DCI (PS1.A Structure and Properties of Matter):**

- Students know that substances are made of atoms.
- Students know that atoms combine with each other in various ways to form molecules and extended structures.
- Students know that molecules range in size from two to many atoms.
- Students know that solids can be formed by molecules or can be extended structures with repeating subunits, such as crystals.

**CCC (Scale Proportion and Quantity):**

- Students consider how their models can represent structures that are too small to be directly seen, such as the arrangement of atoms within molecules.
- Students consider how varying the arrangement of components in their models allows those models to represent different atoms, molecules, and extended structures.