





## **Atomic Structure**

### **Performance Expectations**

HS-PS1-1: Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.

### **Science and Engineering Practices**

Asking questions and defining problems

Planning and carrying out investigations

Analyzing and Interpreting Data

Constructing Explanations

### **Crosscutting Concepts**

Patterns

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## **Chemical Bonds**

### **Performance Expectations**

HS-PS1-1: Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.

### **Science and Engineering Practices**

Asking questions and defining problems

Planning and carrying out investigations

Analyzing and interpreting data

Using mathematics and computational thinking

### **Crosscutting Concepts**

Cause and Effects

Patterns

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## **Chemical Reactions**

### **Performance Expectations**

HS-PS1-2: Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.

### **Science and Engineering Practices**

Asking questions and defining problems

Planning and carrying out investigations

Analyzing and Interpreting Data

Constructing Explanations

### **Crosscutting Concepts**

Patterns

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## **Stoichiometry**

### **Performance Expectations**

HS-PS1-7: Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.

### **Science and Engineering Practices**

Asking questions and defining problems

Analyzing and interpreting data

Using mathematics and computational thinking

### **Crosscutting Concepts**

Energy and Matter in Systems

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## **Kinetics**

### **Performance Expectations**

HS-PS1-5: Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.

HS-PS1-7: Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.

### **Science and Engineering Practices**

Asking questions and defining problems

Planning and carrying out investigations

Analyzing and interpreting data

Using mathematics and computational thinking

### **Crosscutting Concepts**

Cause and Effects

Systems and System Models

Energy and Matter

Patterns

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## **Chemical Equilibrium**

### **Performance Expectations**

HS-PS1-6: Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium.

### **Science and Engineering Practices**

Analyzing and interpreting data  
Using mathematics and computational thinking  
Constructing Explanations  
Developing Models

### **Crosscutting concepts**

Patterns  
Systems and system models

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## **Acids and Bases**

### **Performance Expectations**

HS-PS1-1: Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.

### **Science and Engineering Practices**

Analyzing and interpreting data  
Engaging in Argument from Evidence  
Constructing Explanations  
Developing Models

### **Crosscutting Concepts**

Patterns  
Scale, proportion, and quantity

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## **Thermodynamics**

### **Performance Expectations**

HS-PS1-4: Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy.

### **Science and Engineering Practices**

Analyzing and interpreting data  
Engaging in Argument from Evidence  
Constructing Explanations  
Developing and Using Models

### **Crosscutting Concepts**

Patterns  
Energy and Matter

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## **Intermolecular Forces**

### **Performance Expectations**

HS-PS1-3: Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles.

### **Science and Engineering Practices**

Analyzing and interpreting data  
Engaging in Argument from Evidence  
Constructing Explanations  
Developing and Using Models

### **Crosscutting Concepts**

Patterns  
Cause and Effect  
Structure and Function

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## **Electrochemistry**

### **Performance Expectations**

HS-PS1-2: Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.

### **Science and Engineering Practices**

Asking questions and defining problems  
Planning Investigations  
Engaging in Argument from Evidence  
Obtaining, Evaluating, and Communicating Information

### **Crosscutting Concepts**

Cause and effect  
Systems and system models