



# CHEMISTRY

## MATTER AND CHANGE

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### STANDARDS

### PAGE REFERENCES

**Content Standard 1—Students design, conduct, evaluate, and communicate processes and results of scientific investigations, and demonstrate thinking skills associated with this procedural knowledge.**

1. generate a question, identify dependent and independent variables, formulate testable, multiple hypotheses, plan an investigation, predict its outcome, safely conduct the scientific investigations, and collect and analyze data.
2. select and accurately use appropriate tools including technology to make measurements (in metric units), gather, process and analyze data from scientific investigations using appropriate mathematical analysis, error analysis, and graphical representation.

**Student Edition:**

10-13, 36-42  
*ChemLab* 18-19, 202-203, 300-301, 550-551, 728-729, 862-863  
*Math Handbook* 900-908  
*Problem-Solving Lab* 372

**Teacher Wraparound Edition:**

A 392, 533; E 11, 400; P 614

**Student Edition:**

25-30, 31-35, 36-42, 43-45  
*ChemLab* 46-47, 142-143, 268-269, 480-481, 626-627, 688-689  
*Math Handbook* 893-909  
*MiniLAB* 539  
*Problem-Solving Lab* 390, 830, 860

**Teacher Wraparound Edition:**

A 517; CU 819; MC 167, 192

STANDARDS	PAGE REFERENCES
<p>3. critically review evidence, communicate and defend results, and recognize that the results of a scientific investigation are always open to revision by further investigations.</p>	<p><b>Student Edition:</b>            92-97, 127-134, 151-154, 806  <i>ChemLab</i> 46-47, 480-481, 832-833  <i>Everyday Chemistry</i> 739  <i>Problem-Solving Lab</i> 130, 583, 757, 860  <b>Teacher Wraparound Edition:</b>            CJ 94; E 93; P 133, 325</p>
<p>4. compare observations of the real world to a mental model resulting from hypothetical, unobservable entities. (e.g., atom, expanding universe)</p>	<p><b>Student Edition:</b>            87-91, 94-97, 117-126, 129-134, 151-158, 699  <i>ChemLab</i> 142-143, 300-301, 862-863  <i>MiniLab</i> 102, 848  <i>Problem-Solving Lab</i> 8, 533  <b>Teacher Wraparound Edition:</b>            A 91; CU 13; DI 153; P 325</p>
<p>5. identify strengths, weaknesses, and assess the validity of the experimental design of an investigation through analysis and evaluation.</p>	<p><b>Student Edition:</b>  <i>ChemLab</i> 46-47, 108-109, 268-269, 300-301, 342-343, 374-375, 480-481, 728-729, 832-833  <i>MiniLAB</i> 102, 125, 164  <b>Teacher Wraparound Edition:</b>            A 504; DE 536-537, 622-623</p>
<p><b>Content Standard 2—Students demonstrate knowledge of properties, forms, changes and interactions of physical and chemical systems, and demonstrate thinking skills associated with this knowledge.</b></p>	
<p>1. describe experimental evidence that matter consists of molecules in motion and explain physical interactions of matter using conceptual models. (e.g., the conservation of matter, kinetic molecular theory)</p>	<p><b>Student Edition:</b>            385-389, 396-400, 402-403, 404-408, 419-427, 430-432, 455-458, 478, 514-516  <i>ChemLab</i> 108-109, 410-411  <b>Teacher Wraparound Edition:</b>            A 391; BM 435; CD 458; DI 387; E 514; IM 426</p>
<p>2. explain the states of matter using a conceptual model consistent with kinetic molecular theory and intermolecular forces. (e.g., transition from solids to liquids to gases)</p>	<p><b>Student Edition:</b>            58-62, 385-392, 393-395, 396-403, 404-409, 419-427, 428-433, 434-439, 502-505  <i>Chemistry and Technology</i> 446  <i>ChemLab</i> 410-411, 444-445  <b>Teacher Wraparound Edition:</b>            CB 389; CJ 404; CU 391; E 387; IM 426; R 395, 406</p>

STANDARDS	PAGE REFERENCES
<p>3. recognize that energy is conserved and can be changed into different forms within a variety of practical and technological applications.</p>	<p><b>Student Edition:</b>            489-491, 498-500, 502-504, 516-519, 673-679, 684-687  <i>Chemistry and Technology</i> 690  <i>ChemLab</i> 520-521, 688-689  <i>Earth Science Connection</i> 517  <i>How It Works</i> 522  <i>MiniLAB</i> 505  <b>Teacher Wraparound Edition:</b>            DI 680; E 491, 514, 516; R 497</p>
<p>4. identify, measure, calculate, and analyze quantitative and qualitative relationships associated with matter and energy transfer or transformations, and the associated conservation laws using words, symbolic equations, and particulate representations.</p>	<p><b>Student Edition:</b>            61-65, 122-126, 354-357, 358-363  <i>ChemLab</i> 18-19, 108-109, 520-521, 688-689, 862-863  <i>Discovery Lab</i> 489  <i>How It Works</i> 204  <i>Problem-Solving Lab</i> 503  <b>Teacher Wraparound Edition:</b>            BM 123; CJ 64; E 63; QD 490</p>
<p>5. recognize and describe how forces interact with matter. (e.g., gravitation, electromagnetic, laws of motion)</p>	<p><b>Student Edition:</b>            94-97, 122-124, 199, 683-687, 720-721, 810, 843  <i>Chemistry and Technology</i> 446  <i>ChemLab</i> 142-143, 480-481  <i>Discovery Lab</i> 179  <i>Everyday Chemistry</i> 412  <i>How It Works</i> 48, 204, 270  <i>Problem-Solving Lab</i> 267  <b>Teacher Wraparound Edition:</b>            ITQ 720; QD 199, 685</p>
<p>6. utilize thinking skills in multiple scientific contexts of increasing complexity. (e.g., mass ∝ moles ∝ number of particles)</p>	<p><b>Student Edition:</b>            92-97, 135-141, 178-185, 210-214, 228-231, 241-247, 252-258, 259-267, 309-319, 322-327  <i>ChemLab</i> 232-233  <b>Teacher Wraparound Edition:</b>            A 139, 326; CD 180; R 253</p>

STANDARDS	PAGE REFERENCES
<b>Content Standard 5—Students understand how scientific knowledge and technological developments impact today’s societies and cultures.</b>	
<p>1. predict how key factors (e.g., technology, competitiveness, world events) affect the development and acceptance of scientific thought.</p>	<p><b>Student Edition:</b>            14, 17, 677-679, 788-791, 822-825  <i>Biology Connection</i> 701  <i>Chemistry and Society</i> 20, 110, 482  <i>Chemistry and Technology</i> 446, 588, 690  <i>Everyday Chemistry</i> 730  <i>History Connection</i> 264  <b>Teacher Wraparound Edition:</b>            B 552; CB 823; CJ 825; E 17, 824</p>
<p>2. give examples of scientific innovation challenging commonly held perceptions.</p>	<p><b>Student Edition:</b>            93-95, 122-124, 131-132  <i>Biology Connection</i> 701  <i>Chemistry and Society</i> 110  <i>Chemistry and Technology</i> 446, 768  <i>Everyday Chemistry</i> 412, 730  <i>Problem-Solving Lab</i> 8  <b>Teacher Wraparound Edition:</b>            AC 397; CD 437</p>
<p>3. evaluate the ongoing, collaborative scientific process by gathering and critiquing information from the popular media.</p>	<p><b>Student Edition:</b>  <i>Chemistry and Society</i> 20, 482  <i>Chemistry and Technology</i> 344, 768  <i>Problem-Solving Lab</i> 191, 390, 679, 860  <b>Teacher Wraparound Edition:</b>            CJ 14, 67; DI 12; E 13, 17; P 57</p>
<p>4. analyze benefits, limitations, costs, consequences, and ethics involved in using scientific and technological innovations. (e.g., biotechnology, environmental issues)</p>	<p><b>Student Edition:</b>            3-6, 824-826  <i>Chemistry and Society</i> 20, 80, 462  <i>Chemistry and Technology</i> 588, 690  <i>Earth Science Connection</i> 457, 847  <i>Everyday Chemistry</i> 730  <i>History Connection</i> 264  <i>How It Works</i> 270  <i>Physics Connection</i> 808  <i>Problem-Solving Lab</i> 583, 860  <b>Teacher Wraparound Edition:</b>            CJ 105, 502; DI 824; E 823; P 675, 859</p>

STANDARDS	PAGE REFERENCES
<b>Content Standard 6—Students understand historical developments in science and technology.</b>	
<p>1. give examples of scientific discoveries and describe the interrelationship between technological advances and scientific understanding.</p>	<p><b>Student Edition:</b>            17, 92-97, 122-126, 815-820  <i>Biology Connection</i> 14  <i>Chemistry and Society</i> 110  <i>Chemistry and Technology</i> 344, 588, 768  <i>Everyday Chemistry</i> 412  <i>How It Works</i> 48, 144, 204  <i>Problem-Solving Lab</i> 130, 314, 647, 860  <b>Teacher Wraparound Edition:</b>            AC 161; E 17, 91</p>
<p>2. analyze and illustrate the historical impact of scientific and technological advances.</p>	<p><b>Student Edition:</b>            91, 230-231, 419-427, 569-574, 788-791, 821-825  <i>Biology Connection</i> 14  <i>Chemistry and Technology</i> 344, 588  <i>Earth Science Connection</i> 726  <i>History Connection</i> 190, 264, 311  <i>How It Works</i> 172, 376, 656  <b>Teacher Wraparound Edition:</b>            A 492, 829; CB 423, 823; CD 197, 651; CJ 161;            E 823</p>
<p>3. describe, explain, and predict science as a human endeavor.</p>	<p><b>Student Edition:</b>            87-91, 92-97, 122-124, 131-132, 846-849, 852-854  <i>Biology Connection</i> 14, 701  <i>Chemistry and Society</i> 20, 80, 482  <i>Chemistry and Technology</i> 344  <i>Everyday Chemistry</i> 730, 798  <i>History Connection</i> 75, 190, 423  <i>Problem-Solving Lab</i> 130, 647, 860  <b>Teacher Wraparound Edition:</b>            CD 138; E 88, 93; P 253</p>