# Literacy

(the Power of Learning Lesson 2.5: Physical Science – Compounds & Solutions

Weekly Focus: Summarizing Information Weekly Skill: Comprehension

**Lesson Summary:** This week students will review some material from last week's lesson on compounds. Then, students will move on to presenting information to class groups on solutions. As with last week's lesson, there is a considerable amount of reading for comprehension to gain foundational knowledge to assist in more complex questions students may encounter on GED 2014. Finally, students will culminate their knowledge on solutions by conducting a small experiment and write a short response on it.

### Materials Needed:

- Warm up Activity (Chart) Unit 2.5 Handout 1
- Reading for Comprehension to Present to Groups <u>Unit 2.5 Handout 2</u>
- Experiment handout Unit 2.5 Handout 3
  - Items needed for Experiment (if not possible to do experiment, use <u>Unit 2.5 Handout 4</u> in class and not as homework/extra work)
  - Sugar cubes (a box should be enough)
  - Clear drinking glasses hard plastic or glass (enough for 2 glasses for each work group)
  - Spoons (enough for one per glass)
  - Hot and cold water (enough for each glass to be filled halfway)

### Objectives: Students will be able to...

- Read for comprehension with a multi-paragraph passage in physical science.
- Conduct a simple solution experiment
- Write a short response about the experiment

### College and Career Readiness Standards: RI, RST, WHST, SL

### ACES Skills Addressed: EC, LS, ALS, CT, SM, N

**Notes:** Please review and be familiar with classroom routine notes for: reading for fluency strategies (**Routine 2**) and summarizing techniques (**Routine 4**). The classroom routine notes will help with making a smooth transition to each activity

### GED 2014 Science Test Overview – For Teachers and Students

The GED Science Test will be 90 minutes long and include approximately 34 questions with a total score value of 40. The questions will have focus on three content areas: life science (~40%), physical science (~40%), and Earth and space science (~20%). Students may be asked to read, analyze, understand, and extract information from a scientific reading, a news brief, a diagram, graph, table, or other material with scientific data and concepts or ideas.

The online test may consist of multiple choice, drop down menu, and fill-in-the-blank questions. There will also be a short answer portion (suggested 10 minutes) where students may have to summarize, find evidence (supporting details), and reason or make a conclusion from the information (data) presented.

The work students are doing in class will help them with the GED Science Test. They are also learning skills that will help in many other areas of their lives.

#### Activities:

Warm-Up: Fill in Chart Independently (Unit 2.5 Handout 1) Time: 5 - 10 minutes

1) Distribute <u>Unit 2.5 Handout 1</u> to students as they come into class. Ask students to work on filling in the chart with information learned over the last two lessons. Ask students to read the instructions and the examples to see if they can work on the material independently.

2) Circulate to see if students are stuck. Remind them to look back at their notes or materials from the other lessons to help.

3) If there are new students, or students who were absent during the last units, ask them to try and interpret the material by reading the instructions and looking at the examples.

4) Review as a whole class and answer questions appropriately. Point out to the students how they can determine the number by looking closely at the drawings. Ask students if they have ever heard any of the examples listed. You may want to have students self-assess if they could do this activity or something similar on a GED 2014 test. Ask students if they could do a similar activity if it were on a test.

### Activity 1: Reading for Comprehension Jigsaw (Unit 2.5 Handout 2)

Time: 40 - 50 minutes

1) Put students into 5 groups labeled A, B, C, D, E.

2) Distribute the reading (Unit 2.5 Handout 2) to all students.

**3)** Ask each group of students to read their assigned sections from the reading (A = Mixtures, B = Solutions, C = Compounds, D = How Solutions Are Formed, E = Concentration) silently and then summarize and share their findings within their group. Explain that they are reading to become experts of the material and, after discussing it in their groups, they will then share their knowledge from their section with the other groups. The other groups will take notes on the information presented.

4) Tell students when they are done reading silently, they should turn their papers over and discuss and summarize what their section is about to others in their group. They should also discuss how they would like to present the material to the other groups. Explain that the other groups will have



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to take notes, or summarize the information presented in order to understand it fully. Students should be reminded they need to present the information and not read from it directly **5)** After groups have read and discussed their section in groups, each group will present their section of the reading to the class. The other groups will take notes of the material presented on last page of <u>Unit 2.5 Handout 2</u>.

6) If there is extra time or to challenge students, they can write a 3 – 5 sentence summary of all of the material presented, use <u>Routine 4 Summarizing Techniques Handout.</u>

7) While students are reading, circulate to the groups and discuss with students that when reading for comprehension, there are many strategies to use: <u>read the title</u> to predict what the reading is about; look at the <u>words in bold</u> and their definitions on the left side of page; if there are <u>images</u>, look at them to get a better understanding; while reading remember to ask "<u>What is this all about</u>?" Circulate class while they are reading to make sure they understand the information presented and see if there are any questions.

8) If there is extra time, have students read the passage in pairs to promote reading fluency.

#### Break: 10 minutes (you may have to take a break while doing Activity 1)

#### Activity 2: Solution Experiment (Unit 2.5 Handout 3)

Time: 45 - 55 minutes

1) Hand out Unit 2.1 Handout 3 to students.

2) Discuss with students that they are going to do a simple experiment with solutions.

3) Ask students to read the instructions. Ask for clarification on the instructions or directions.
4) Ask students to make a prediction about the number of sugar cubes (solute) that will dissolve in each of the water glasses (solutions). Ask students "What is the solute? What is the solution?" to make sure they understood the previous reading passage and can apply it to the experiment.

**5)** Student groups of 2 or 4 (depending on the quantity of materials) can work to do the experiment. Assign roles if needed: timekeeper, recorder of experiment's data, reader (of instructions), scientist (conductor of experiment).

6) Circulate while students are conducting the experiment. Make sure they are counting the number of sugar cubes that are dissolved in each solution.

7) As groups finish their experiments and clean up, ask them to write up a short response to the work they just completed. If there is time, have students share their writing with experiment groups or with the whole class.

#### Wrap-Up: Summarize

Time: 5 minutes

Have students turn to a partner (or write in their journals) about what they have learned today about solutions. Ask them to tell a partner about solutions in one or two sentences. Note: Use Routine 4 Handout: Summarizing

Extra Work/Homework: Unit 2.5 handout 4	Time: 30 minutes outside of class	
Students can follow up on today's work with solutions and mixtures with three pages of extra work.		
Students should read the instructions and look carefully at any examples.		

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Differentiated Instruction/ELL Accommodation Suggestions	Activity
If some students finish early, they can turn their paper over and summarize the entire	Handout 2
reading passage, or write a statement for the main idea of the passage. These are	
excellent opportunities to practice skills they may need for GED 2014.	
If you are in a site where conducting a simple experiment is not possible, you may want	Handout 3
to discuss the experiment with students. You could have them try to write up the	
experiment to practice the short response portion of the GED Science Module.	

#### **Online Resources:**

Chem4kids.com <u>http://www.chem4kids.com/files/matter\_mixture.html</u>

http://www.chem4kids.com/files/matter\_solution.html

#### Suggested Teacher Readings:

• GED Testing Service – GED Science Item Sample (to get an idea of what the test may be like)

http://www.gedtestingservice.com/itemsamplerscience/

 Assessment Guide for Educators: A guide to the 2014 assessment content from GED Testing Service:

http://www.riaepdc.org/Documents/ALALBAASSESSMENT%20GUIDE%20CHAPTER%203.pdf

• Minnesota is getting ready for the 2014 GED test! – website with updated information on the professional development in Minnesota regarding the 2014 GED.

http://abe.mpls.k12.mn.us/ged\_2014\_2

• Essential Education's 2014 GED Test Curriculum Blueprint (PDF)

http://www.passged.com/media/pdf/educators/curriculum-blueprint.pdf



Name	Date	DateBmsM
	ebno@Wri	ting in Code
Chemists use a type from the periodic t many atoms of the atom. Use the exar	e of shorthand when t able followed by a su element are present nple to figure out how	they write chemical names. These "codes" use the symbols bscript number to the right of the symbol that tells how in a molecule. If no number is present, there is only one w many atoms are present in each molecule.
Exa	mple	Aspirin: a pain-killing molecule
		C₅H₅O₄ C = carbon, H = hydrogen, O = oxygen _9_ carbon atoms <u>8</u> hydrogen atoms _4_ oxygen atoms
	Bond:	Nicotine: a poisonous molecule
		C10H14N2 carbon atoms hydrogen atoms nitrogen atoms
0		Trimethylamine: a rotten smell molecule
g		C₃H₃N carbon atoms hydrogen atoms nitrogen atoms
3		Aspartame: an artificial sweetener
		C₁₄H₃O₅N₂ carbon atoms hydrogen atoms oxygen atoms nitrogen atoms
6		Serotonin: a brain chemical
6		C10H12ON2 carbon atoms hydrogen atoms

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Unit 2.5 Handout 1 (Warm-up)

# TEACHER ANSWER KEY

- 1. 10 carbon atoms, 14 hydrogen atoms, 2 nitrogen atoms
- 2. 3 carbon atoms, 9 hydrogen atoms, 1 nitrogen atom
- 3. 14 carbon atoms, 8 hydrogen atoms, 5 oxygen atoms, 2 nitrogen atoms
- 4. 10 carbon atoms, 12 hydrogen atoms, 1 oxygen atom, 2 nitrogen atoms

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#### Unit 2.5 Handout 2 (4 pages total - page 4 is to take notes & summarize information from group presentations)





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### Matter

### Brief #3: Compounds, Mixtures, and Solutions

Focus Atoms from different elements join together to form new substances. Elements are pure substances that are formed from the same types of atoms. But the Earth is full of many other kinds of material that are combinations of more than one type of atom.

For example, when hydrogen and oxygen atoms come together in just the right quantities, water is produced. Water is not an element. Water is a compound.

#### Vocabulary

- 1. compound
- 2. chemical formula
- 3. mixtures
- 4. solutions
- 5. solute
- 6. solvent
- 7. concentration
- 8. solubility
- 9. pH scale

### Compounds

A compound is a substance that is produced from the bonding of two or more elements. In any chemical compound, every tiny particle of the substance has the exact ratio of elements as every other tiny particle in the substance.

Water is produced when two hydrogen atoms and one oxygen atom bond. That means that every drop of water, no matter where it is, has a ratio of 2 hydrogen atoms to 1 oxygen atom.

Every compound that is formed has a certain chemical formula. A chemical formula tells how many atoms of each element make up the compound.

Baking soda is a compound whose chemical formula is NaHCO<sub>3</sub>. This means that baking soda is made of 1 sodium atom (Na), 1 hydrogen atom (H), 1 carbon atom (C), and 3 oxygen atoms  $(O_3)$ .

**Zinc sulfide is a compound whose formula is ZnS.** This means that zinc sulfide is made from 1 zinc atom (Zn) and 1 sulfur atom (S).

In a chemical formula, the small numbers (for example, the "3" in " $O_3$ ") tell how many atoms are present for the element just before it. If no numbers appear, it means that only single atoms are present in the formula.

ron can describe solutions by talking alreat the two parts that make up solutions. The solution is the colution





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MINNESOTA Literacy Sharing the Power of Learning Lesson 2.5: Physical Science – Compounds & Solutions

Summarize Information f	rom Group Pro	esentations:
What are mixtures?		
What are solutions?		
What are compounds?		
what are compounds:		
How are solutions formed?		
What is solution concentration?		

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# the Power of Learning Lesson 2.5: Physical Science – Compounds & Solutions

#### Unit 2.5 Handout 3 (2 pages)

### Experiment: Dissolving Sugar at Different Temperatures

Learn about solutions as you add more and more sugar cubes to different temperature water. Hypothesis: You can only dissolve a certain amount of sugar and the amount that dissolves changes as the water temperatures changes.

#### What you'll need:

- Sugar cubes
- Cold water in a clear glass
- Hot water in a clear glass (be careful with the hot water)
- Spoon for stirring

#### Instructions:

- 1. Make sure the glasses have an equal amount of water.
- 2. Put a sugar cube into the cold water and stir with the spoon until the sugar disappears. Repeat this process (remembering to count the amount of sugar cubes you put into the water) until the sugar stops dissolving. You are at this point when sugar starts to gather on the bottom of the glass rather than dissolving.
- 3. Write down how many sugar cubes you could dissolve in the cold water.
- 4. Repeat the same process for the hot water; then, compare the number of sugar cubes dissolved in each liquid. Which dissolved more?

# of sugar cubes dissolved:	Cold water	Hot water		
1. Is the hypothesis correct? Why or Why not?				
2. Why do you think this happens?				

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### Short Response Writing Practice

For the GED 2014 Science Module you may be asked to type a short response (up to 10 minutes). A possible topic for the short response is to write a clear description of the experiment, its process, and its expected outcome.

You have just completed an experiment; now think back on what was the goal or hypothesis, the materials needed to accomplish the experiment, the steps you completed, and the outcome of the experiment. Try not to look at the instructions and write from your memory of the experiment. If possible, use 10 minutes for your writing to get an idea of how much time you have for a short response. You should take a few minutes before you begin to write to brainstorm an outline.

If you have access to a computer, type up your short response to practice with digital literacy skills needed for the short response portion of the GED 2014 Science Module. This is good practice for you before you go to take the actual GED 2014 Science Module.

### Unit 2.5 Handout 3

# Experiment: Dissolving Sugar at Different Temperatures TEACHER ANSWER KEY

### 1. Is the hypothesis correct? Why or Why not?

### Answers may vary, but the hypothesis is correct.

Suggested answer: The hypothesis was correct. The colder the temperature of the water, the fewer sugar cubes dissolved. When the water was hotter, more sugar cubes dissolved.

### 2. Why do you think this happens?

### Answers may vary, but below is what happened in the experiment:

The cold water isn't able to dissolve as much sugar as the hot water, but why? Another name for the liquids inside the cups is a 'solution', when this solution can no longer dissolve sugar it becomes a 'saturated solution.' This means that sugar starts forming on the bottom of the cup. The reason the hot water dissolves more is because it has faster moving molecules which are spread further apart than the molecules in the cold water. With bigger gaps between the molecules in the hot water, more sugar molecules can fit in between.

### Students' short response: Answers may vary. Check for:

- complete sentences with proper punctuation
- hypothesis
- materials needed
- steps in the experiment
- outcome of experiment



Hol	mogeneous al	nd Heterogeneous nogeneous. Heterogeneous mixtu	ous Mixtures
substand spread e the wor	ces do not spread out evenly. H evenly throughout. Homogeneo d box to complete the chart.	omogeneous mixtures are those ous mixtures can also be solutions	in which substances are or colloids. Use the terms in
C	flat soda pop soil black coffee mayonnaise vegetable soup chocolate chip ice cream	spaghetti sauce sugar sugar water alcohol oil and vinegar salad dres	city air aluminum foil paint beach sand ssing
	Heterogeneous Mixture	es Homoger	neous Mixtures
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0 000	de major co tro troi de la constante i		Be the following mixtures.
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	magnetism	evaporation sifting or filtering
A mixture is hea changes from a water vapor car condensed back remaining subst separated from	ated until the water liquid to a gas. The be collected and into liquid form. The ance has then been the water.	A mixture is passed through a screen that separates large particles from small particles. The smaller particles pass through while the larger particles are collected on the screen.
A special machi spins a mixture with different r substance is for the liquid is sipl	ne called a centrifuge to separate substances nasses. The heavier ced to the bottom and noned off.	A magnet is used to separate magneti materials from those that are not magnetic.
terms from the	e word box above to identifi	• the method that could be used to separate
following mixtu	res.	
	A mixture of oil and	water
	A mixture of salt and	d iron filings

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Unit 2.5 Handout 4 (3 pages)

# TEACHER ANSWER KEY

# Page 1 answers

Solid	Liquid	Gas
Takes up space	Takes up space	Takes up space
Has mass	Has mass	Has mass
Has a shape of its own	Takes shape of container	Takes shape of container
Strong bonds between	Has definite volume	Has no definite volume
molecules		
Hard to deform	Weak bonds between	Virtually no bonds between
	molecules	molecules
Does not expand	Spreads in direction of gravity	Spreads in all directions
Molecule movement is smallest	Does not expand	Expands
Has definite volume		Molecule movement is greatest

### Page 2 answers

- 1. evaporation
- 2. sifting or filtering
- 3. weight
- 4. magnetism
- 5. evaporation or weight

- 6. weight
- 7. magnetism
- 8. sifting or filtering
- 9. evaporation
- 10. weight

### ANSWER KEY – page 3

Heterogeneous Mixtures (can separate parts)	Homogeneous Mixtures (can't be separated)
Spaghetti sauce	Flat soda pop
City air	Sugar
Soil	Aluminum foil
Beach sand	Sugar water
Vegetable soup	Paint
Oil and vinegar salad dressing	Mayonnaise
Chocolate chip ice cream	Alcohol
	Black coffee