











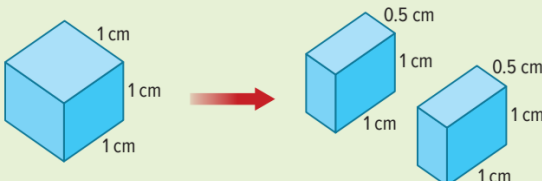



Grade 8 Advanced Science EOT3 Example Questions

|     |   |
|-----|---|
| 1.  |  <b>Get It?</b><br><b>Explain</b> the law of conservation of mass.   |
| 2.  |  <b>Get It?</b><br><b>Summarize</b> Describe the purpose of coefficients in a chemical equation.   |
| 3.  |  <b>Get It?</b><br><b>Summarize</b> How can you tell whether a chemical equation is balanced or not?   |
| 4.  | <b>1. Balance</b> this equation: $\text{MgCl}_2(\text{aq}) + \text{AgNO}_3(\text{aq}) \rightarrow \text{Mg}(\text{NO}_3)_2(\text{aq}) + \text{AgCl}(\text{s})$ .  |
| 5.  | <b>5. Identify</b> the reactants and the products in the following chemical equation.<br>$\text{Cd}(\text{NO}_3)_2(\text{aq}) + \text{H}_2\text{S}(\text{g}) \rightarrow \text{CdS}(\text{s}) + 2\text{HNO}_3(\text{aq})$   |
| 6.  | How many molecules are in 1 mol of $\text{H}_2\text{O}$ ?   |
| 7.  | <b>EXAMPLE Problem 1</b><br><b>BALANCE EQUATIONS</b> A sample of barium sulfate ( $\text{BaSO}_4$ ) is placed on a piece of paper, which is then ignited. Barium sulfate reacts with the carbon (C) from the burned paper, producing barium sulfide (BaS) and carbon monoxide (CO). Write a balanced equation for this reaction.  |
| 8.  |  <b>Get It?</b><br><b>Summarize</b> Describe what happens in a single-displacement reaction.   |
| 9.  |  <b>Get It?</b><br><b>Classify</b> What kind of reaction produces a precipitate?   |
| 10. | <b>12. Characterize</b> each reaction by determining its reaction type.<br>a. $\text{CaO}(\text{s}) + \text{H}_2\text{O}(\text{l}) \rightarrow \text{Ca}(\text{OH})_2(\text{aq})$<br>b. $\text{Fe}(\text{s}) + \text{CuSO}_4(\text{aq}) \rightarrow \text{FeSO}_4(\text{aq}) + \text{Cu}(\text{s})$<br>c. $\text{C}_{10}\text{H}_8(\text{l}) + 12\text{O}_2(\text{g}) \rightarrow 10\text{CO}_2(\text{g}) + 4\text{H}_2\text{O}(\text{g})$<br>d. $\text{NaCl}(\text{aq}) + \text{AgNO}_3(\text{aq}) \rightarrow \text{NaNO}_3(\text{aq}) + \text{AgCl}(\text{s})$<br>e. $\text{NH}_4\text{NO}_3(\text{s}) \rightarrow \text{N}_2\text{O}(\text{g}) + 2\text{H}_2\text{O}(\text{g})$ |

|     |  |
|-----|--|
| 11. | 13. <b>Describe</b> what happens in a combustion reaction.   |
| 12. |  <b>Get It?</b><br><b>Infer</b> Why is a log fire considered to be an exothermic reaction?  |
| 13. | 19. <b>Classify</b> the chemical reaction photosynthesis as endergonic or exergonic. Explain.  |
| 14. | 23. <b>Apply</b> To develop a product that warms people's hands, would you use an exothermic or endothermic reaction? Why?   |
| 15. |  <b>Get It?</b><br><b>Use</b> the collision model to explain the effect of increased temperature on reaction rates.   |
| 16. |  <b>Get It?</b><br><b>Compare and contrast</b> the effects of increased concentration of liquid reactants and decreased volume of gaseous reactants.  |
| 17. |  <b>Get It?</b><br><b>Compare and contrast</b> catalysts and inhibitors in terms of how they affect reaction rates.   |
| 18. |  <b>Get It?</b><br><b>Contrast</b> the forward and reverse reactions in a reversible reaction.  |
| 19. | 26. <b>List</b> four ways to change the rate of a chemical reaction.   |
| 20. | 27. <b>Describe</b> two ways in which you might state the rate of a chemical reaction.   |
| 21. | 30. <b>Apply</b> Describe two ways you could influence the following equilibrium to produce more ethanal (CH <sub>3</sub> CHO). Use Le Châtelier's principle to explain why each of your methods would produce the desired result.<br>$\text{C}_2\text{H}_2(\text{g}) + \text{H}_2\text{O}(\text{g}) \rightleftharpoons \text{CH}_3\text{CHO}(\text{g}) + \text{energy}$ |

|     |  |
|-----|--|
| 22. |  <b>Get It?</b><br><b>Explain</b> How do you know which substance is the solute in a solution?  |
| 23. |  <b>Get It?</b><br><b>Identify</b> where a solid actually dissolves when placed in a liquid.  |
| 24. | <p><b>EXAMPLE Problem 1</b></p> <p><b>CALCULATE SURFACE AREA</b> Suppose the length, height, and width of a cube are each 1 cm. If the cube is cut in half to form two rectangular pieces, what is the total surface area of the new pieces?</p>  |
| 25. | <p>1. The length, height, and width of a cube are each 3 cm. If the cube is cut in half to form two rectangular pieces, what is the total surface area of the new pieces?</p>  |
| 26. | <p>4. <b>Summarize</b> possible ways in which phases of matter could combine to form a solution.</p>   |
| 27. | <p>5. <b>Draw</b> a diagram that shows how a solid dissolves in a liquid.</p>  |
| 28. | <p>6. <b>Describe</b> how stirring, surface area, and temperature affect the rate of dissolving.</p>   |
| 29. |  <b>Get It?</b><br><b>Explain</b> What is solubility?   |

30.

**Get It?**

**Rank** the solubilities of salt, washing soda, and table sugar in water at 20°C from most soluble to least soluble using the information in **Table 1**.

Table 1 Solubility in Water at 20°C and Normal Atmospheric Pressure

| State of Substance | Substance                        | Solubility in g/100 g of Water |
|--------------------|----------------------------------|--------------------------------|
| Solid              | salt (sodium chloride)           | 35.9                           |
|                    | baking soda (sodium bicarbonate) | 9.6                            |
|                    | washing soda (sodium carbonate)  | 21.4                           |
|                    | lye (sodium hydroxide)           | 109.0                          |
|                    | table sugar (sucrose)            | 203.9                          |
| Gaseous            | hydrogen                         | 0.00017                        |
|                    | oxygen                           | 0.005                          |
|                    | carbon dioxide                   | 0.16                           |

31.

**Get It?**

**Explain** how the temperature of a liquid solvent affects the solubility of a compound.

32.

**Get It?**

**Explain** why the term *unsaturated* is not precise.

33.

10. **Contrast** What is the difference between solubility and concentration?

34.

11. **Compare and contrast** the difference between relative and precise concentrations. Give examples.

35.

12. **Explain** Do all solutes dissolve to the same extent in the same solvent? How do you know?

36.

14. **Explain** why keeping a carbonated beverage capped and refrigerated helps keep it from going flat.

37.

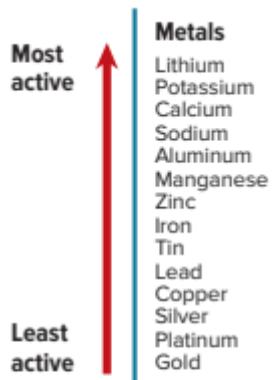
**Get It?**

**Compare and Contrast** What are the differences and similarities between dissociation and ionization?

38.

**Get It?****Summarize** Why is soap required to clean oily dirt?

39.



**Figure 10** An activity series is a useful tool for determining whether a chemical reaction will occur and for determining the result of a single-replacement reaction.

**15. Determine,** using **Figure 10**, if zinc will displace gold in a chemical reaction and explain why or why not.

40.

**20. Explain** why the total amount of energy does not decrease in an exergonic chemical reaction.

41.

**21. Explain** how a reaction could be endergonic but not endothermic.

42.

**22. Classify** the reaction that makes a firefly glow in terms of energy input and output.

43.



**Figure 17** Baking involves endothermic reactions such as the decomposition of baking soda. The graph shows how energy is absorbed during these chemical reactions.

**Compare** How did the cookies change when they were baked?