Lesson 6: Why Don't Salts Make a One-To-One Ratio?

Unit Question: How should we search for life beyond Earth?

NAME: _____

PERIOD: _____ DATE: _____

Lesson 6: Student Activity Sheet

LOOKING BACK

1. What did we learn about electrolytes in our investigation?

2. What questions do you have now?

SALT MODELS AND ELEMENT CARDS

On each blank element card, write down patterns you find in the salt models that contain that element. After you have completed the element cards, sort the elements into groups based on the properties.

3. In the spaces below, list the elements that you grouped together. In each group, describe the properties or patterns you used to form that group. **Note:** you may have more or less groups than spaces provided.

4. How could these patterns help us with our questions about what makes certain elements essential for life? How could the patterns help us figure out which other elements could be similar to the essential elements for life?

READING: POTASSIUM AND SODIUM IN THE BODY

5. How are sodium and potassium similar to one another? How are they different?

6. Could potassium be used to replace sodium in our body? Use evidence from the text to support your answer.

7. What new questions do you have after reading the article?

CONNECTING MODEL OF ELECTRONS

8. What patterns do you notice in the dot models on the periodic table?

9. What similarities and differences do you notice between the dot models and the Bohr models?

10. What do the Bohr models show us about patterns in the periodic table?

11. How do the Bohr models help us explain why potassium is larger than sodium?

12. What is the highest number of electrons ever shown in the last energy levels according to the dot models?

MAKING SALTS

13. Look back at the patterns you found when analyzing the model of salt at the beginning of this lesson. What charge did the chloride ions always have when in a salt compound?

14. How many valence electrons does a chlorine atom have according to the dot model?

15. Knowing that a chlorine atom has seventeen positive protons and seventeen negative electrons, what must happen in order for the chlorine atom to change into a negatively charged chloride ion?

16. How many valence electrons would the chloride ion have after it makes that change?

17. What charge did the sodium ions always have when in a salt compound?

18. How many valence electrons does the sodium atom have?

19. What change must have happened in order for the sodium atom to change into a positively charged sodium ion?

20. Using your answers to questions 13-19, model or explain what happens when a sodium and chlorine interact to form the salt sodium chloride.

TESTING OUR MODEL BY MAKING PREDICTIONS

21. Use the process you learned to predict the formula for the salt that will form when rubidium (Rb) bonds with fluorine (F).

22. Predict the formula for the salt that will form when rubidium (Rb) bonds with nitrogen (N).

23. Predict the formula for the salt that will form when barium (Ba) bonds with nitrogen (N).

EXPLAINING ELECTROLYTES

24. We noticed different salts have different ratios even though they are all made of positive and negative pieces. Explain what we figured out about why salts have different ratios.

25. We saw in Lesson 5 that all of the salts were made of metals and nonmetals, were solids, and had very high melting points. Can we now explain these patterns? Why do we think salts are made of metals and nonmetals, and why are the ions in a salt held so tightly together, causing the salt to be solid?

26. What ideas do we have about how understanding how salts form may help us in our search for life?

27. What questions do we still have?