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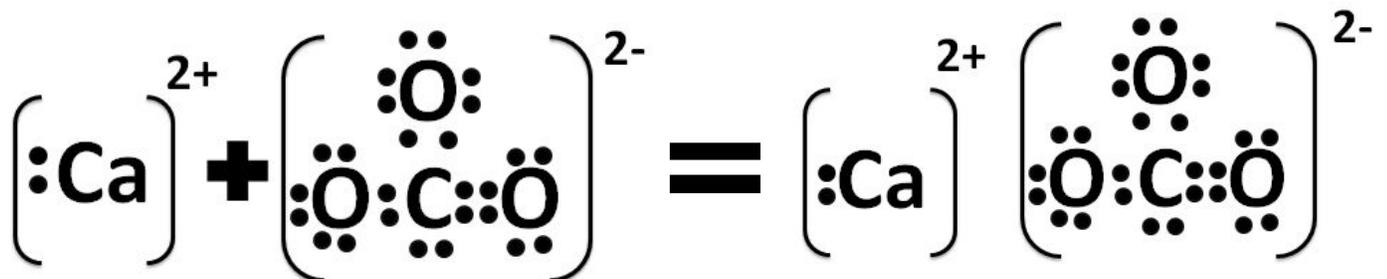
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H.C.3A.2, H.C.3A.3, H.C.3A.4

Read the following passage. Using your understanding and reading comprehension, answer the following questions at the end of the passage.

### The Chemistry of Algae

➤ Each element has unique traits and the ability to form unique bonds with other elements. For example, **calcium** is an essential element for growth and can be found in a variety of forms in almost every living species. When calcium is bonded with the polyatomic ion **carbonate**, it creates **calcium carbonate**. Calcium carbonate makes algae less palatable, making it difficult for herbivores to eat. Calcium carbonate can play multiple roles in an ecosystem. For example, calcium carbonate in Coralline algae cements pieces of loose coral together that leads to the formation of larger solid areas of reef. <sup>1</sup>



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<sup>1</sup> Sophie J. McCoy, Nicholas A. Kamenos, "Coralline Algae (Rhodophyta) in a changing world: Integrating ecological, physiological, and geochemical responses to global change", Journal of Phycology Volume 51 (2014) Pg.9.



Calcium is not the only element that can affect palatability in algae. **Nitrogen** can alter the taste of algae, making it less appealing to hungry herbivores. Dr. Sotka and his lab have been researching the palatability of algae and the aquatic herbivores that consume them. Studies have shown that algae with higher levels of nitrogen are consumed more than algae that do not. Algae and other plants usually have low levels of nitrogen compared to the tissues of herbivores. Therefore, herbivores must consume large amounts of plant material to maintain sufficient life. <sup>2</sup>

- 1) List and contrast the two main types of bonds.
  
- 2) Based on the Lewis dot structure, what kind of bond does calcium and carbonate form?
  
- 3) Based on the Lewis dot structure, what is the chemical formula for calcium carbonate?
  
- 4) How is calcium carbonate important to algae that grows along reefs?
  
- 5) Is the charge for calcium carbonate neutral? Why or why not?

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<sup>2</sup> E.E., Sotka, H.B. Giddens, "Are tropical herbivores more tolerant of chemically rich seaweeds than are temperate herbivores? A test of seaweed herbivore coevolution". 2010.

**Critical Thinking Question:** Would an herbivore rather eat algae with higher levels of nitrogen or higher levels of calcium carbonate? Explain your answer.