

Name: _____

RedOx Review

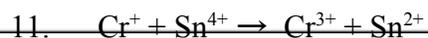
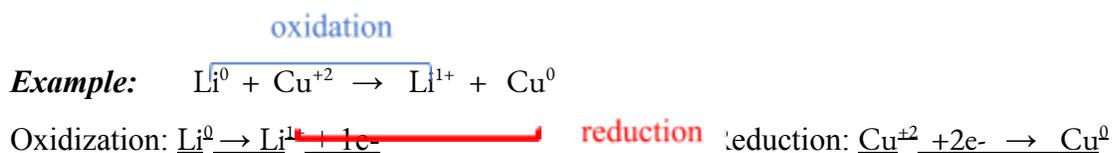
Oxidation Number Rules:

1. Elements not in a compound (including diatomic elements e.g. H_2) have an oxidation number of 0 because they have no lost or gained electrons yet so they are neutral.
2. Assign the oxidation number to the last element in the compound first (this is negative). Then assign an oxidation number to the first element (this is positive). Remember that the sum of the oxidation numbers of all the elements in a compound equals 0 because (like elements) compounds are neutral.

Directions Questions 1-8: Provide the oxidation number of the indicated atoms.

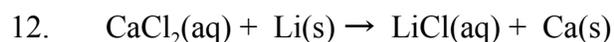
1. Na
2. Na in NaCl
3. H in H_2O
4. Ba in $BaBr_2$
5. S in Al_2S_3
6. N in Na_3N
7. Mn in MnO_2
8. Br_2
9. Explain why sodium is not charged when it is a pure metal but becomes charged when it is in a compound like table salt.
10. Explain the difference between pure silver, in clean jewelry or silverware utensils, versus tarnished silver when jewelry and utensils are reacted with oxygen in the air in terms of charges and electrons.

Directions Questions 11- 14: Assign oxidation states to each species below. Identify which species is being oxidized and which is being reduced. In the space below each reaction write the oxidation and reduction half reactions and add in electrons to balance the charge.



Oxidation: _____

Reduction: _____



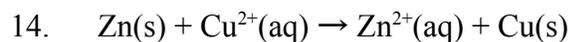
Oxidized:

Reduced: _____



Oxidized:

Reduced: _____



Oxidized:

Reduced: _____

15. Explain how Zn(s) is physically and chemically different than the $\text{Zn}^{+2}\text{(aq)}$.

Model 1: Recall that atoms and compounds are neutral (positive charges = # of negative charges). If element X has 4 negative charges it would also have a positive charge equal in strength to the electrons as shown below.



16. Element X is a metal so it loses electrons (oxidation) to form a cation (positive ion). Draw a model of the atom showing a loss of 2 negative charges (electrons).

17. How strong is the positive charge in the ion (how many electrons is it equal to)?

18. How many negative charges does the ion have?

19. What is the overall charge of the ion?

Model 2: Recall that atoms and compounds are neutral (positive charge = # of negative charges). If element Z has 8 negative charges it would also have a positive charge equal in strength to the negative charges as shown below.



20. Compare Model 1 atom of element X to Model 2 atom of element Z.
- Which has more electrons?
 - If both atoms are neutral, what can be said about the strength of the positive charge in element Z versus X?
 - How is the strength of the positive charge of element Z in Model 2 shown differently than Model 1 of element X?
21. Element Z is a nonmetal so it gains electrons (reduction) to form an anion (negative ion). Draw a model of the atom showing a gain of 2 negative charges (electrons).
22. How strong is the positive charge in the ion (how many electrons is it equal to)?
23. How many negative charges does the ion have?
24. What is the overall charge of the ion?
25. In terms of oxidation state, why is this called reduction when it is gaining electrons?