

Directions: Complete this worksheet prior to coming to the next class.

Inasmuch as there are some of you who are having a difficult time balancing simple redox reactions, I decided to help you with an additional worksheet that is due completed in the beginning of your next class.

Remember that when balancing redox reactions they MUST be redox – they can NOT be red-red and they can NOT be ox-ox – if they are, then the proper response is “NR” for no reaction.

To assist you with this exercise, below, is an example of what you need to think about whilst balancing simple redox reactions – the more complicated redox balancing is coming about the 12th week or so.

$\text{Ca} + \text{Au}^{3+} \rightarrow \text{Ca}^{2+} + \text{Au}$

1. Re-write as half reactions

electron gain

$3 e^{-} + \text{Au}^{3+} \rightarrow \text{Au}$

electron loss

$\text{Ca} \rightarrow \text{Ca}^{2+} + 2 e^{-}$

2. Does electron gain = electron loss? No. So balance Gain with Loss. What's common between 2 and 3? 6 -- hence, triple the first half reaction and double the second half reaction:

$3(\text{Ca} \rightarrow \text{Ca}^{2+} + 2 e^{-})$

$2(3 e^{-} + \text{Au}^{3+} \rightarrow \text{Au})$

3. Do the algebra:

$3 \text{Ca} \rightarrow 3 \text{Ca}^{2+} + 6 e^{-}$

$6 e^{-} + 2 \text{Au}^{3+} \rightarrow 2 \text{Au}$

4. Cancel what's common to both sides of both reactions:

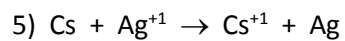
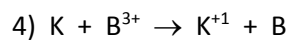
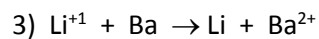
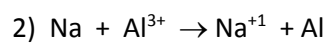
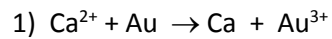
$3 \text{Ca} \rightarrow 3 \text{Ca}^{2+} + \cancel{6 e^{-}}$

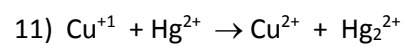
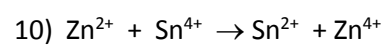
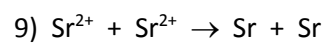
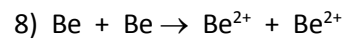
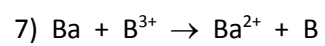
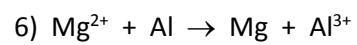
$\cancel{6 e^{-}} + 2 \text{Au}^{3+} \rightarrow 2 \text{Au}$

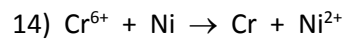
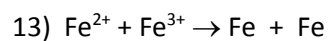
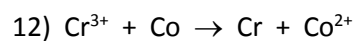
5. Add up both sides of the half reactions just like an arithmetic problem and it's balanced:

$3 \text{Ca} + 2 \text{Au}^{3+} \rightarrow 3 \text{Ca}^{2+} + 2 \text{Au}$

Balance the following reactions per the example above, per the lecture notes/text, per the free Open Stax textbook linked in/to the course snapshot and/or per any textbook of college chemistry in WNC's library:







15) The chemicals on the left side of the reaction arrow are called:

16) The chemicals on the right side of the reaction arrow are called:

17-30) List the reactant from questions 1-14 that is oxidized in each reaction in order.

31-44) List the reactant from questions 1-14 that is reduced in each reaction in order.

45) List which reactions in questions 1-14 are "NR" and explain why.