**In-Class Activity**

Basicity of Oxo Anions

1. Fill in the table below for the listed oxo anions.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **oxo anion** | **charge** | **# of oxo groups** | **charge to oxo group ratio** |  |  |
| AlO45- |  |  |  |  |  |
| CrO42- |  |  |  |  |  |
| ClO2- |  |  |  |  |  |
| MnO4- |  |  |  |  |  |
| CO32- |  |  |  |  |  |
| BrO3- |  |  |  |  |  |
| SiO44- |  |  |  |  |  |
| OsO64- |  |  |  |  |  |

1. Calculate the pKb for each of the above oxo anions using following formula:

pKb = 10 + 5.7x - 10.2y, where x = # of oxo groups and y = magnitude of charge. Fill these values into the table.

1. Classify each anion as (1) nonbasic, (2) feebly basic, or (3) moderately/strongly basic using your pKb values and Table 2.6 (page 37) in the Wulfsberg textbook. Fill these classifications into the remaining column in the table.

1. Looking at the charge to oxo group ratios and the basicity classifications, what trends do you observe?
2. Based on your response to question 4, how might you be able to classify the ions as nonbasic, feebly basic, and basic (moderately or strongly) without actually doing the pKb calculation or having access to the table in the textbook?
3. Why does your method from question 5 work?