## Group Activity 2

1. Considering the terms of the 5-paramter liquid drop model, which parameter is responsible for the following feature of the nuclear landscape:
a. Location of valley of stability for low A?
b. Bend of valley of stability away from $\mathrm{N}=\mathrm{Z}$ for large A ?
c. Large $\mathrm{A} / \mathrm{Z}$ ratios?
d. Lack of ultra-high A nuclides?
e. Existence of nuclides at all?
2. Where is the proton drip-line for the chlorine isotopes? (You can peak at the NNDC chart) Prove it using proton-separation energy calculations.
3. Qualitatively, how might the functional form of the semi-empirical mass formula have to change if you wanted the model to include compressibility?
4. In 1939, Isidor Rabi's group measured $Q_{\text {deuteron }}=0.002$ ebarns. ( 1 barn $=100 \mathrm{fm}^{2}$.)

Calculate the corresponding ratio of the semimajor to semiminor axes $\mathrm{a} / \mathrm{c}$, given that the mean radius of a spheroid is $\mathrm{R}^{2}=(1 / 2)\left(\mathrm{a}^{2}+\mathrm{c}^{2}\right)$.

