Order of Magnitude How-To Guide: Steps for Teachers

When working with students ask or do:

1. What do numbers mean? (Measurements, precision, and rounding)

2. Quick methods of estimation (e.g. bracketing with factors of ten)

3. When is estimating appropriate, necessary, or valuable (cost/return)?

4. Small example where OoM *doesn't* work or *isn't* appropriate

5. A small example (small jar, shoebox, single person, etc.)
    a. Something you can do in your head without much computation
    b. Something you can do w/ paper and pencil
    c. Incorporate visual thinking (sketches, etc.)
    d. Break down the dimensionality
    e. Verifying that the method works (gives an answer that you "know")

6. Extrapolate (room or building size, larger populations)

7. The main exercise (maybe discipline dependent)

8. Discussion of assumptions/uncertainties
    a. What are the assumptions that were made?
    b. How do different approaches impact the result?
    c. Is there general convergence?

9. Give reinforcement of ideas in other lessons

10. Review

Order of Magnitude Problem Development How-To