

## ***Microlesson Topics:***

Pick a simple topic – **Not** advanced science. Most of the evaluators will not be scientists. Example topics:

1. Unit conversion (temperature °F to °C and K, lbs to KG, m to in, ft, yards...and so on) – examples and test the skills.
2. Structure of the atom – electrons, protons, neutrons;
  - Atomic mass, mass number;
  - How to calculate the number of particles in the atom – example;
  - Test your skills
3. Isotopes: - definition
  - Symbolic notation;
  - Examples;
  - How to calculate the number of particles in the isotopes (example);
  - test your skills
4. Ions: - definition,
  - cations, anions (definition, examples)
  - Symbolic notation;
  - How to calculate the number of particles in the ions;
  - test your skills
5. Periodic table structure – periods, groups;
  - Metals, nonmetals, metalloids;
  - Groups of elements – representative, transition, inner transition metals;
  - Alkali metals, alkali earth metals, halogen group, noble gases;
  - test your skills
6. Ionic compounds – how do they form;
  - Charges on common ions;
  - Writing the formula of an ionic compound;
  - Naming rules;
  - Test your skills
7. Covalent compounds – how do they form;
  - Writing the formula of a covalent compound;
  - Naming rules;
  - Test your skills
8. Balancing chemical equations – definitions of reactants, products, coefficients, balanced equation;
  - Writing balancing equations (show examples);
  - Test your skills
9. The Mole – definition of a mole;
  - Avogadro's number;

- Converting moles to atoms;
  - Calculate molar mass;
  - Converting moles to mass;
  - Test your skills
10. How to calculate mass percentage from a formula (show an example) and test your skills.
11. Periodic table: structure and trends: - Atomic radii: definition and trends;
- Ionic radii: definition and trends;
  - Ionization energy: definition and trends;
  - Test your skills
12. Solutions of acids and bases: - Definitions of Arrhenius acids and bases (show an example);
- Definitions of Bronsted-Lowry acids and bases (show an example);
  - Definition of conjugate acid-base pairs (show an example)
  - Identify conjugate acid-base pairs;
  - Test the skills learned
13. pH and pOH – definitions, formulas, examples;
- strong acids, strong bases, weak acids, weak bases (definitions and examples);
  - test the skills of pH and pOH calculations for strong acids and bases

### ***Other Microlesson Topics***

Boiling point/distillation

\*How to prepare for a class e.g. taking notes

Intramolecular distances and sizes

Phase changes – solid to liquid to gas, intermolecular forces and kinetic energy

Colligative properties – boiling point of water with salt, freezing point of water with salt

Solubility and polarity (why water and oil don't mix)

\*Lab Safety

Calculating % yield of a reaction

Hydrogen bonding – effect on boiling point

Water and air pollution, ozone, global warming

Gas properties (why hot air balloons rise)

Atomic masses, molecular masses, moles

Simple calorimetry

Valence shell electron pair repulsion (molecular geometries)

Lithium batteries, advantages, how they work, uses

\*very good topics