Matter Review

1. Two broad categories of matter: 1. Mixtures 2. Substances

2. Mixtures are physical combinations; can be separated physically; have variable composition

3. Homogeneous mixtures have uniform composition. Ex. air, aqueous solutions (aq), metal alloys

4. Heterogeneous mixtures have parts with visible differences.

5. Substances are either elements or compounds. All substances are homogeneous.

6. Elements can’t be decomposed chemically.

7. Compounds are chemical combinations of at least two different elements in specific ratios. Can be decomposed chemically.

8. Exothermic processes release energy. In a chemical equation energy is a product.

9. Endothermic processes absorb energy. In a chemical equation energy is a reactant.

10. Fixed points on a thermometer are 0 degrees Celsius and 100 degrees Celsius.

11. K = C + 273

12. Phases of matter are solid, liquid, gas.

13. Solid → liquid → gas is an endothermic process.

14. Gas → liquid → solid is an exothermic process.

15. Sublimation is solid → gas; deposition is gas → solid; I\(_2\)(s) and CO\(_2\)(s) (dry ice) sublime.

16. Gas particles are very far apart, have no definite molecular pattern, fill/take the volume of whatever container they are given.

17. Liquids have definite volume but not shape; are not compressible.

18. Solids have a crystal structure. Definite shape and volume.

19. Melting point: Temperature at which a solid becomes a liquid. Melting point and freezing point of a substance are the same. Boiling point: Temperature at
which the vapor pressure of the liquid is equal to the atmospheric pressure. These are physical properties.

20. Physical changes do not affect the composition of the substance/ no new substances are formed: phase changes, dissolving, crushing,…

21. Chemical changes result in the formation of new substances. Key words: corrosion, reacts, rusts, …

22. Naturally occurring diatomic elements – BrINClHOF.

23. Know which elements are gases and liquids at room temperature. The rest are solids.

24. Be able to draw the 3 phases of matter:
25. Here is a heating curve for water. This curve can be reversed to make it a cooling curve. This curve is endothermic. Phase changes (equilibrium) are the flat lines. The slanted segments show an increase in Kinetic Energy because there is an increase in temperature. The flat segments have an increase in potential energy but no increase in Kinetic Energy because there is no temperature change.

26. Distillation is a laboratory process to separate a mixture of liquids with different boiling points.

27. Allotropes are forms of the same element with different chemical and physical properties due to different structures. Oxygen and ozone; charcoal and graphite and diamond; red, white and black phosphorus; forms of sulfur; etc.