Chemical / Physical Properties of Nitrous Oxide
Basics

• The chemical symbol for nitrous oxide is $N_2O$
• $N_2O$ is a colorless, tasteless gas with a slight sweet odor
• Although $N_2O$ is nonflammable, it supports combustion
Pressure

- The gas is stored under pressure
- The pressure is so great, the gas is compressed to a liquid
- The liquid vaporizes immediately upon release.
- Tanks should be handled carefully because of the pressure
Potency

- $\text{N}_2\text{O}$ is the least potent of all anesthetic gases
- It is difficult to produce unconsciousness when the patient is allowed to breathe simultaneously through their mouth (open system)
- A closed system (mask over nose and mouth) can produce unconsciousness
Weight

• N2O is 1.5 times heavier than air.
• Why is this important?
• If you have a gas leak, N2O accumulates at floor level where you are sitting
Atmospheric Pressure

• All gases are influenced by atmospheric pressure.
• At higher altitudes, (Denver) atmospheric pressure is less, underwater it is more
• More nitrous will have to be administered at higher altitudes because there is less pressure to push it into the lungs
Solubility

• N₂O is only slightly soluble in blood so it moves in and out of the blood system quickly
• Like sand in a river, N₂O gets carried along but falls out at the first opportunity.
• It will move out of the bloodstream whenever there is a body cavity (middle ear, cranium, intestines, sinuses, etc) that contains less N₂O than the bloodstream.
Excretion

• $N_2O$ remains unchanged in the body
• It is excreted as $N_2O$, so it does not require metabolism by liver
• It is mainly excreted by the lungs, some through the skin,
• With long procedures, some may be excreted through the intestines (as gas)
Toxicity

• \( \text{N}_2\text{O} \) has no known toxic effects with short term use

• With long term use (usually abuse), \( \text{N}_2\text{O} \) interferes with the body’s ability to metabolize vitamin B12

• B12 is necessary for DNA production and cellular reproduction.
Toxicity

• Other effects of long term use result in blood cell changes resulting in a form of anemia
• The most common affects of long term use are myeloneuropathy resulting in tingling extremities and mental confusion.