Names of team members: **Trisia Baltazar, Adrian Boone, Savanah Kennedy, Ryan Smith**

Logistics

A. Get into your regular team

B. Discuss and complete the assignment together. Don’t just assign different problems to each teammate! That defeats the purpose of team-based learning.

C. Choose a recorder to prepare the final copy to submit to instructor in Blackboard.

**Problem 1**

Name and describe the four categories of locks based on triggering process (discussed in your text on pp. 508-509). In what situations is each type of lock preferred? (8 pts.)

* Manual - These are well understood locks that are commonplace. Padlocks and combination locks are examples of these. The key or combination can unlock the lock. The manufacturer often presets these kinds of locks and only trained locksmiths can change them. These locks are prefered if you would like a simple lock. For example, a padlock to lock a tool chest is an example of a manual lock use.
* Programmable - These locks can be changed after they are put in service. A combination or key can be changed without a locksmith and the owner is allowed to change to another access method to upgrade security, if they choose to. Mechanical push-button locks are preferred for securing computer rooms and wiring closets. This is because they have a resettable code and do not require electricity.
* Electronic - These locks are electronically powered. Electromechanical locks are ideal for alarm systems and combined with other building management systems. They can also be integrated with sensors to create various combinations of locking behavior. An example of an electronic lock is a lock that requires people to announce themselves before they are “buzzed” through a locked door. This type of lock is commonly seen in apartment buildings. There are many more examples of electronic locks, such as electric locks with keycard readers that require smart cards to unlock and locks that unlock during fires, but usually have access restrictions.
* Biometric - These locks use biometrics, body measurements or calculations, to unlock. Fingerprint readers, hand readers, iris and retina scanners, and voice and signature readers are all examples of biometric locks. These locks are preferred for high security facilities that want to implement strong actions to ensure they control who has access to their facilities and objects of value.

**Problem 2**

Your text describes three elements that must be present for a fire to ignite and continue to burn. Newer research suggests a fourth element is required, too. See:

<https://www.firesafe.org.uk/information-about-the-fire-triangletetrahedron-and-combustion/>

Name and describe the four elements of the “fire tetrahedron”. How do fire suppression systems manipulate the four elements to quell fires? (9 pts.)

* **Heat** - sufficient heat is required in order to raise combustible material to its ignition point; without sufficient heat, the material will not ignite, and as such will not begin to burn. Water-based fire suppression systems lower the temperature below the ignition point, which extinguishes them by removing that factor.
* **Fuel** - fuel is combustible material that is consumed by the fire. Fuel is what ignites when sufficiently heated by the “heat” side of the tetrahedron, and what primarily allows the fire to continue burning. Fire suppression systems that act on fuel typically tend to be chemical-based; they apply a barrier to the fuel that prevents the fuel from pre-heating, as well as cutting off its supply of oxygen.
* **Oxygen** - oxygen serves as the oxidizer of a fire, serving as the catalyst that helps start the chemical reaction as well as the one that allows it to continue burning. Fire suppression systems that act on oxygen typically do so by smothering the fire with a substance such as dense foam that prevents the fire from reaching ambient air, snuffing it out through oxygen deprivation.
* **Chemical reaction** - the exothermic chemical reaction of the three previous elements is what serves as the base of the fire tetrahedron; it could be seen as the combined result of the previous three elements that ultimately leads to a burning fire. Fire suppression systems that attack the chemical reaction directly do so through BCF/halon-based gases, as well as halocarbon-based agents, creating an inert gas barrier.

**Problem 3**

Name and describe the five classes of fire described in the text. Does the class of a fire dictate how to control the fire? How so? (8 pts.)

* **Portable extinguishers are rated by the type of fire they can combat, so yes the class of a fire dictate how to control the fire.**
* **Class A: Common fire. These fires involve ordinary combustible fuels such as wood, paper, textiles, rubber, cloth, and trash.**
  + **They are extinguished by agents that interrupt the ability of the fuel to be ignited. Water and multipurpose dry chemical fire extinguisher are ideal for these types of fires.**
* **Class B: Combustible liquids or gases, such as solvents, gasoline, paint, lacquer, and oil.** 
  + **They are extinguished by agents that remove oxygen from the fire. Carbon dioxide, multipurpose dry chemical, and Halon fire extinguishers are ideal.**
* **Class C: Caused by energized electrical equipment or appliances.**
  + **They are extinguished with non conducting agents only. Carbon dioxide, multipurpose dry chemical, and Halon fire extinguishers are ideal for these types of fires. Never use water.**
* **Class D: Fueled by combustible metals, such as magnesium, lithium, and sodium.**
  + **Require special extinguishing agents and techniques.**
* **Class K: Usually caused in the kitchen. Fueled by combustible cooking oil and fats in commercial kitchens. These fires are classified as Class F in Europe and Australasian environments.**
  + **They require special water mist, dry powder, or CO2 agents to extinguish.**