PRACTICE PROBLEM 1: MISSION TO MOON, MARS, AND BEYOND

A spacecraft in orbit? A biosphere on extraterrestrial ground? Private and governmental organizations are already planning missions to set up research stations or even colonies on the Moon and Mars. Many see opportunities to learn more about our solar system, leading to a better understanding of Earth and ourselves; others question whether such missions are even feasible. One private agency is already seeking volunteers for a Mars mission. Space ventures provide an impetus for advancing knowledge and technologies with applications in space, as well as on Earth. Entrepreneurial and scientific opportunities abound to explore, to mine, and to engineer under distinct conditions. Pioneers will need to plan for a sustainable long-term stay, which will require vast investments of people, money, and other resources.

What challenges await these missions: funding, survival in the challenging physical and psychological conditions, law, government and politics? Will they ever return to Earth or will colonies expand and eventually become new civilizations? Will the missions bring humans together toward a common goal or create a global race to establish competing bases? Is this the next giant leap for humankind?

PRACTICE PROBLEM 2: DRONES

Drones are among the most hyped products for aviation enthusiasts in recent years. Although originally developed for military use, drones or Unmanned Aerial Vehicles (UAVs) can be cool gadgets used for recreation. They can also be powerful tools for commerce, scientific research, agriculture, entertainment, photography, transportation, disaster relief, search and rescue, surveillance, and policing. UAVs can carry payloads and can be controlled remotely by a human operator or by an onboard computer. Basic drone models can be operated with little skill or training. Regulations on the use of UAVs are already in place in nations around the world, but technological advancements and expanded applications may outpace their regulation. While UAV use is growing exponentially, concerns are also escalating. Privacy intrusion, airspace violation, criminal use, surreptitious military operations, accidental crashes, terrorist threats, and other issues have raised alarms.

What does the future hold for UAV technological advancements and accessory enhancements? Will access to UAVs be equitable? How will the pending prevalence of drones in our daily lives affect society overall, especially in areas of personal rights and safety?

QUALIFYING PROBLEM: FOOD LOSS & WASTE

Hunger remains a concern in the developing world, and the resources required for food production are limited. About one-third of food produced globally is lost or wasted, leaving millions of people hungry and valuable resources squandered.

Food loss refers to a decrease in food for human consumption during production, post-harvest, and processing stages. Causes include poor harvesting techniques, weak infrastructure (markets, transportation, storage, cooling, packaging), contamination (bacteria, fungus, insects), and corruption. In addition to reduced availability, food loss contributes to higher costs, hurting farmers as well as those who cannot afford to buy their food.

Food losses that occur at retail and consumption stages are called *food waste* and refer to behaviors such as discarding edible food. Quality standards based on perfect appearance, misused "*best-before-dates,*" and careless consumer attitudes contribute to waste. Food waste is more common in the industrialized world, while food loss is a greater concern in developing nations.

Can food loss prevention combat hunger and raise incomes in developing nations? Can food waste be decreased without sacrificing quality or safety? What roles might technology or regulations serve? What are the economic, environmental, psychological, and societal implications? Can we improve global food security while meeting the needs of diverse consumers?

AFFILIATE BOWL PROBLEM: COPING WITH STRESS

With exponential change and fast-paced trends in society comes an increase in stress. Stress can be physical, mental, or emotional. Living conditions, as well as societal and personal expectations, can lead to higher levels of stress-related hormones. In some parts of the world, people find it difficult to cope with longer work hours and less leisure time as they attempt to meet society's perceived expectations. Social media is a constant presence, delivering both subtle and overt pressures.

Most people experience stress, but individuals respond differently. Stress can be a useful motivator in the face of challenges or danger, but negative impacts can result from excessive stress. Medical and psychological problems can emerge or be exacerbated. Scientific data show that physical activity and relaxation techniques are samples of ways to reduce these negative impacts.

What are the personal and societal impacts of stress? Do different countries and cultures deal with stress the same way? How can we promote healthier lifestyles that help people to cope with stress?

Criminal justice systems are composed of law enforcement agencies, court systems, and correctional institutions. These organizations operate together using defined processes and protocols to regulate crime and impose penalties on those who break laws. A one-size fits all system does not exist, as laws and norms are influenced by country, culture, history, and religion. New technology has created both challenges and opportunities for criminal justice systems especially since we now have a variety of online activities that constitute crime and new means of analyzing evidence are in place. Virtually every new technology is likely to be used against the public at some time in the future

As law enforcement agencies develop new ways of identifying criminals and criminal behavior, where should the line be drawn between public safety and civil liberties? How will automated systems, robocops, and crime-predicting software shape the monitoring or detainment of convicted individuals?

What might future courtrooms look like? Under what circumstances or guidelines should legal software programs and predictive coding be used as part of a criminal justice system?