

3. Human activities generate large amounts of solid waste, including organic waste. The decomposition of organic waste in landfills can result in the release of methane into the atmosphere.

(a) **Describe** one environmental problem associated with the release of methane into the atmosphere.

There are biological and physical factors that can affect the decomposition of the solid waste in a landfill and the release of methane in the atmosphere.

(b) **Describe** one factor that could affect the decomposition of the solid waste in a landfill.

(c) **Propose** a solution to decrease the amount of methane released from landfills into the atmosphere.

(d) **Justify** the solution proposed in part (c) by describing an additional advantage, other than decreasing the amount of methane released from landfills.

Another anthropogenic activity that releases methane is raising beef cattle. In 2021, 31.2 million beef cattle were raised in the United States.

(e) The average cow releases 150 liters of methane per day. **Calculate** the amount of methane that was released by all beef cattle raised in the United States in 2021. **Show** your work.

Another environmental concern with raising beef cattle for food is that it is not as efficient as growing crops for food.

(f) A typical beef cow needs 11.8 kilograms of food per day, and each hectare of cattle pasture produces 26.2 kilograms of grasses. **Calculate** the number of hectares of pasture that would be needed to support all beef cattle raised in the United States for one day. **Show** your work.

(g) The average American consumes 2,250 kilocalories of food per day. Beef cattle can produce 2.7 million kilocalories per hectare of land. Corn can produce 30.4 million kilocalories per hectare of land. **Calculate** how many more American people could be fed if 150 hectares of land was used to grow corn instead of raising beef cattle. **Show** your work.

Begin your response to this question at the top of a new page in the separate Free Response booklet and fill in the appropriate circle at the top of each page to indicate the question number.

STOP

END OF EXAM