

Section 15.5 Questions

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Understanding Concepts

1. It is hard to apply the equation for carrying capacity to an ever-changing ecosystem, because it is always undergoing natural change and is being modified by human action. Urban carrying capacities are difficult to predict. Building higher buildings, filling in wetlands, or terracing slopes can increase building space. Food, water, and energy resources can be imported over considerable distances, so the carrying capacity based on the resources in the city is not the real carrying capacity; new resources are always entering the city in nonnatural ways.
 2. Bioremediation involves the use of living organisms to remove waste materials and reclaim polluted areas.
 3. This bacteria completely breaks down a toxin, PCE, into a nontoxic compound, ethane.
 4. (a) $4.9 \text{ kg} + 4.9 \text{ kg} = 9.8 \text{ kg/person}$
 $150\,000 \text{ people} \times 9.8 \text{ kg/person} \times 52 \text{ weeks/year} \times 20 \text{ years} = 1.5 \times 10^9 \text{ kg}$
(b) $1.5 \times 10^9 \text{ kg} \times 12\% = 1.8 \times 10^8 \text{ kg}$
- (c) Student answers will vary but should include recycling facilities. The volume of soil that is used to cover the layers of garbage also needs to be included in the total size of the landfill site. Students should also consider the fact that there are few areas large enough to contain this volume of garbage close to well-populated areas. This is one reason that governments look to ship their garbage elsewhere.

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