

Checkpoint: People, Populations and Protecting Ecosystems

Learning target: I can recall and apply the chapter's key ideas about population patterns, per capita resource use, human pressures on ecosystems and the evaluation of competing solutions.

Retrieval and mastery check

About 35 min

Individual

MS-LS2-5 · assesses

MS-ETS1-2 · practice

MS-ETS1-1 · practice

MS-ESS3-4 · supports

independent practice

writing

Name _____

Date _____

Period _____

Directions

Answer every item on your own. Show your work on calculations and include units. For short answers, two or three clear sentences are enough. The last item asks you to pull the whole chapter together; plan it before you write.

You will need: This worksheet, Pencil, Calculator

Part A: Retrieval practice

- In 2025, the United Nations estimated that the world's population was about:
☐ A. 6.2 billion
☐ B. 7.0 billion
☐ C. 8.2 billion
☐ D. 10.3 billion
- In the fur-trade records of snowshoe hares and Canada lynx, lynx peaks usually come:
☐ A. A year or two before hare peaks
☐ B. A year or two after hare peaks
☐ C. In the same year as hare peaks
☐ D. At random times with no pattern
- Explain why the lag between hare and lynx peaks does not, by itself, prove that lynx cause hare crashes. Name the other factor that field experiments showed also matters.

4. A city of 250,000 people uses 40,000,000 liters of water a day. (a) What is its per capita water use? (b) If the city grows to 300,000 people and per capita use stays the same, how much water will it use each day?

5. True or false: The world population's growth rate, measured as a percentage per year, is higher today than it was in the 1960s. Explain.

☐ True ☐ False Explain your thinking:

6. For each solution, name the human pressure it addresses and one part of biodiversity or one ecosystem service it protects.

Pressure it addresses	Biodiversity or ecosystem service it protects
Electric barriers in a canal	
Shade-grown coffee	
Larger-mesh fishing nets	
Removing nitrogen at sewage plants	

7. A town is designing a new shrimp net. 'Each net must cost less than \$400' is a _____. 'Fewer than 2 sea turtles caught per 100 trawls' is a _____.

8. Which is the strongest evidence that a nitrogen-reduction plan is helping Long Island Sound?

- ☐ A. The water near the beach looks clearer in photos
- ☐ B. Bottom-water oxygen measured over many summers is higher, and the low-oxygen area is smaller than before the plan
- ☐ C. Most residents say they like the plan
- ☐ D. The plan cost less than expected

9. A town scores two designs from 1 to 5. Weights: protects wildlife $\times 3$, low cost $\times 2$, residents accept it $\times 1$. Design X scores 4, 2 and 5. Design Y scores 3, 5 and 3. Calculate both weighted totals. Which design wins, and why might such a small difference not settle the decision?

10. Draw the cause-and-effect chain by which Nipah virus reached farmworkers in Malaysia (start with fruit bats). Then draw a thick line across the arrow where keeping pigs away from bat feeding trees breaks the chain.



11. Name one thing science **can** do and one thing science **cannot** do when a community chooses how to protect an ecosystem.

Part B: Synthesis

- 12.** Hare and lynx numbers rise and fall, but the human population has kept rising. Use this contrast and the idea of per capita use to explain why people need engineered solutions to protect ecosystems. Then evaluate **one** solution from this chapter using a scientific, an economic and a social criterion, and name its main tradeoff.

A plan for the synthesis

Before writing q12, jot three notes: (1) why hares cycle and people have not; (2) what happens to total demand when population and per capita use both rise; (3) one solution with a plus or minus for scientific, economic and social criteria. Turn each note into one or two sentences.

Write a test item

Write one multiple-choice item that tests whether a classmate can tell biodiversity from an ecosystem service. Include four options with one correct answer and three believable wrong answers, and write a one-sentence explanation of why each wrong answer is wrong.