Unit 4 · Ecology

HARDER PRACTICE QUESTIONS

Full marks 50

Write your answers on separate paper. Use the rule along each link: if a population decreases, its eaters decrease and its food increases; if it increases, the opposite.

1 Follow the ripple [4]

In a rice field, part of the web is the chain: rice → brown planthopper → spider → frog → snake. A farmer's spray kills most of the spiders. Assume the planthoppers survive it.

i. Say what happens at first to each of the other four, and why.

ii. Which two changes are "two steps away" from the spiders? Do they come out the same way round as the spiders' change?

2 Two effects, one bird [3]

In a field, frogs eat grasshoppers, and egrets eat both frogs and grasshoppers. Almost all the frogs are caught and sold.

i. Name the two effects on the egrets, and say which way each pulls.

ii. Pabitra says the rule proves that the egrets will decrease. What is wrong with her reasoning?

iii. How could she find out what really happens?

3 Litter bags [5]

Bishal fills four net bags with 50.0 g of dried leaves each and weighs the dried leaves after 12 weeks.

Bag	Leaves	Place	Mass left (g)
A	sal	moist soil	32.0
B	bean	moist soil	12.0
C	sal	dry, sunny ground	46.0
D	sal	waterlogged mud	41.0

i. Find the percentage of mass lost in each bag.

ii. Which two bags test the kind of dead matter? Which two test moisture? Which two test oxygen?

iii. Explain the result of each of those three comparisons.

4 Spot the error [3]

A pond had 400 frogs. In one year there were 90 births and 60 deaths; 15 frogs moved in and 35 moved out. Ishwori wrote:

"Births and emigration add; deaths and immigration take away. $400 + 90 + 35 - 60 - 15 = 450$, so the population grew by 50."

5 Tigers by the numbers [4]

Nepal's wild tigers rose from 121 in 2009 to 429 in the count of 2026.

i. How many times as many tigers were there in 2026?

ii. What was the average rise per year, to the nearest whole tiger?

iii. Name one population that the rule says should decrease because of this rise, and one plant community that should gain.

iv. Give one reason why the rise brings trouble for villages near the parks.

6 Which is it? [4]

For each observation, name what is at work, and give one reason.

i. A fallen branch in a dry pine forest has gone pale and soft.
ii. The mud at the bottom of a pond smells of rotten eggs when it is stirred.
iii. Water draining from under a pile of whole leaves carries dissolved sugars and salts.
iv. A dark, crumbly substance lies under old leaf litter, with no trace of any leaf's shape.

7 Correct the misconceptions [4]

The paragraph has four mistakes. Write each mistake and correct it.

Milan wrote: "All the frogs and toads of a field, of every kind, are a population. Energy goes round and round in an ecosystem, while materials are lost as heat. A habitat is an animal's whole way of life. An ecosystem with few species is usually more stable, because there are fewer links to break."

8 Design a fair test [4]

Januka thinks that chopping leaves makes them rot faster.

i. What will she change, and what will she measure?
ii. Name three things she must keep the same.
iii. Which step of decomposition is she imitating?
iv. What result do you predict, and why?

9 Predict, then explain [3]

Lalit's flooded paddy field is drained for a week, so that air reaches the mud. Predict what happens to the methane coming from the field that week. Explain from the kind of decomposition, and name the gas that the mud's decay now gives out most.

10 Is it a wetland? [3]

By the Ramsar definition, which of these are wetlands? Give a reason for each.

a. a reservoir; b. a fish pond; c. the sea, 4 m deep at low tide; d. the sea, 20 m deep at low tide; e. a paddy field; f. a dry grassland.

11 Estimate it [3]

A paddy field has 12 frogs in every 100 m^2. Suppose each eats 10 insects a day (made up).

i. How many frogs are there in a field of 10,000 m^2?
ii. About how many insects do they eat in 30 days?
iii. What does this suggest about catching frogs, and why is it only a suggestion?

12 Put the chain in order [3]

Write these events in the order they happen, then say which living things use up the oxygen. Fish suffocate. / Fertilizer washes into a lake. / Algae and weeds die and decay. / Algae and weeds grow out of control. / The water's oxygen is used up.

13 Think [4]

A bottle garden, sealed for years, is still alive. What happens to it, and why, in each case?

i. It is moved to a dark cupboard.
ii. Its soil had no bacteria or fungi at all when sealed, and leaves die and fall.

14 Make your own [3]

Write two food chains from a sal forest, a pond or an alpine meadow that share one living thing. Pick a change in one population, and say what happens to two others, through which link.