Solutions

Marking: **M1** a correct method, **A1** the correct answer, **B1** an independent mark.

Each answer shows the steps, then the **result**.

2.1

zonation: change in communities across space along a gradient; succession: change in the community at one place over time

2.2

pioneers such as lichens and mosses colonize bare rock and start weathering it; dead matter and rock particles form a thin soil, so grasses and small plants can grow; deeper soil allows shrubs, then trees, until a climax community forms

2.3

without burning, succession would continue to woodland (the climax); burning kills young trees and shrubs before they establish; human activity holds the community at an earlier stage

3.1

(a) secondary succession (soil already present)

(b) species rise from 12 to 48 by 50 years, then fall to 40; tall trees shade out smaller plants; a few K-strategist species dominate at climax and out-compete others

3.2

(a) dandelion: r-strategist, many small seeds, matures fast; oak: K-strategist, matures late, few large seeds

(b) they reach new, bare or disturbed land quickly, as many seeds spread widely; they grow and reproduce fast while resources are plentiful and competition is low; later they are out-competed by slower, larger K-strategists

3.3

award up to [6]: useful: gives a target, e.g. the mature forest to protect or restore; helps predict how the forest will recover after a fire; limitations: fire is a normal part of this system, so a patchwork of stages is normal and diverse; some species depend on burned areas; a site may reach different stable states depending on the disturbance; conclusion: manage for a dynamic mosaic (e.g. allow or use controlled burning) rather than one fixed endpoint