

Warm-up Future Scene Invasive Species

(This future scene is for training purposes only. Submit the official practice problem future scene for competitive evaluation.)

1 The most common route for invasive species to enter Virginia has been to hitch a ride on a ship, an
2 aircraft, a maglev train, or a motorized vehicle. Although state agencies have worked vigorously to
3 hinder the introduction of new plant and animal species to existing habitats, the results of their
4 efforts have been largely ineffective. The Virginia Bureau of Game, Fisheries and Wildlife estimates
5 that approximately 8,000 new species were introduced to existing habitats last year (2037) alone.
6 Virginia's most serious crisis involving invasive species, however, was not caused by the chance
7 transport of insect invaders. It has come about through the deliberate introduction of an alien species
8 into one of the state's ecosystems.

9 The problem started four years ago when farmers in the Shenandoah Valley discovered an increase in
10 the number of native aphids, tiny bugs that feeds off the sap from plants. The application of pesticides
11 did little to control the aphid population and, by the fall of 2035, the situation had grown into a full-
12 blown infestation. Damage to corn and leafy vegetables was particularly extensive. Since aphids
13 reproduces rapidly and generally live in large colonies, the possibility of a second year of crop failure
14 seemed likely.

15 Facing economic ruin, member of the local Grange (an organization of farmers), began lobbying the
16 governor and members of the General Assembly to take swift action. The group advocated releasing
17 a massive number of ladybugs on farmlands throughout the Valley. Since ladybugs naturally feed on
18 opposed the action, state leaders gave in to the pressure from farmers and released hundreds of thou-
19 sands of genetically altered Asian ladybugs of the *Harmonia axyridis* species in the spring of 2036.

20 The experiment appeared to go well in the beginning. The aphid population was greatly reduced, and
21 the vegetable crops were saved.

22 One year later circumstances were very different. After effectively exhausted their food supply (the
23 aphids), the ladybugs began feasting on another of the Valley's cash crops: fruit. They consumed
24 apples and clustered on grapes, releasing alkaloids that adversely affect the scent of Virginia wines.
25 During the fall, the adult ladybugs sought warmth in the homes and buildings of nearby towns. They
26 swarmed into attics, wall cavities and around electric porch lights. Although ladybugs do not pose a
27 health danger to humans, they emit an acrid odor and leave stains on surfaces.

28 Now, in 2038, it is the ladybug population that has expanded out of control and the fruit farmer's turn
29 to call for assistance. They propose the introduction of assassin bugs from Utah into all areas where
30 the ladybugs have reproduced out of control. Assassin bugs grow to an inch in length and feed on a
31 variety of insects, including ladybugs. They reproduce slowly and cause fewer problems than other
32 enemies of the ladybug that are being considered for introduction: spiders, toads, and stinkbugs.

33 The economic threat to agriculture from aphids and ladybugs is real. So also is the danger to local
34 biodiversity posed by introducing alien species into an ecosystem. Consider the challenges created
35 by introducing invasive species into the Valley and use your problem solving skills to brainstorm
36 ideas and create an action plan that will address a major component of the issue.