

Teacher Answer Key to the “Survivor” discussion/homework/classwork questions.

1. The number of hoppers reduced as time progressed in the game while the number of runners increased. The runners were out competing the hoppers, surviving at higher rates and consequently producing more offspring as well.
2. The runners will continue to dominate unless the environmental conditions change. Their population will grow unchecked and will appear to be exponential, eventually, however, they will only be competing with themselves and they will reach a balance with the resources available. This will show the carrying capacity and will restrict their population growth. The hoppers will likely be extinct from an area and may, at best, exist in low numbers. This will continue as long as they are directly competing (and losing) for the same resources with the runners.
3. Some hoppers did not try to go out farther to get “blue” (or the higher point value resources) because they knew they would not be successful so they consistently went for the close resources that were worth less but ensured survival. They would bide their time and eventually got to reproduce. Others went for it, risked survival but put more of an emphasis on reproduction and tried to gather enough points to reproduce/recruit more to their population. Runners would go for the big points but had the option of stopping for fewer points at the closest distance for easy success. Life was easier for them!
4. Carrying capacity is defined as the maximum size of a population that a particular environment can support. It is not a fixed number but varies over space and time with the abundance of limiting resources. The carrying capacity of this game would be determined by graphing the runners and finding where the population growth levels off and is being impacted by the abundance of the resources (limiting resources or limiting factors). If the resources are kept constant then that number is pretty much it. Variations of the game that change the resources from season to season would change this.
5. Part 1: A predator would keep populations from growing too large too quickly. Runners would not grow exponentially continuously if predators were increasing in response. Each population (runner to predator) would rise and fall cyclically in phase one after the other. If the predator were targeting both hoppers and runners then the hopper population may or may not be hurt by the predators unequally. Maybe hopping is a good defense that disorients the predator. Maybe it just makes them slower and they get eaten more. Answers can vary here with each argument.
Part 2: Disturbances like floods, drought, fire, etc. in a certain area change the number of resources available and therefore effect the total population that can be carried.

6. The crawlers would be at a disadvantage and would likely not continue to survive unless an environmental change made them more likely to survive or some niche became open to them.

If you are tracking a trait among the same species and the trait was one that was recessive or something similar, then it could still remain in the genome. It would pop up at various times/frequencies but as long as environmental conditions did not change, it would be a disadvantage at least.

If the new “crawler” was a separate species that was reproductively isolated with pre-zygotic barriers (behavioral, mechanical, temporal, gametic or habitat isolation) or post-zygotic barriers (reduced hybrid viability, reduced hybrid fertility, or hybrid breakdown) then it would have to be able to compete to survive as a species.

7. I think the answer must involve a breeding population that is capable of existing on it's own. A new species is distinguished on the basis of reproductive incompatibility to the original species. A new species would have to be reproductively isolated with pre-zygotic barriers (behavioral, mechanical, temporal, gametic or habitat isolation) or post-zygotic barriers (reduced hybrid viability, reduced hybrid fertility, or hybrid breakdown) from the original species.
8. If “runners” did not take over as in the first scenario, then answers should suggest a possible explanation for why they might not take over. Maybe things like the brush on the island made it hard to run but hopping was an actual advantage would explain a reversal in fortunes.
9. Answers vary. Perhaps runners evolved into hoppers during conditions where predators chased them and hopping was more advantageous to avoid being targeted.

