STUDY MATERIAL

VIVEKANANDA COLLEGE THAKURPUKUR

NAAC ACCREDITED GRADE—'A'

Subject: Environmental Science
Topic: Genetic Drift

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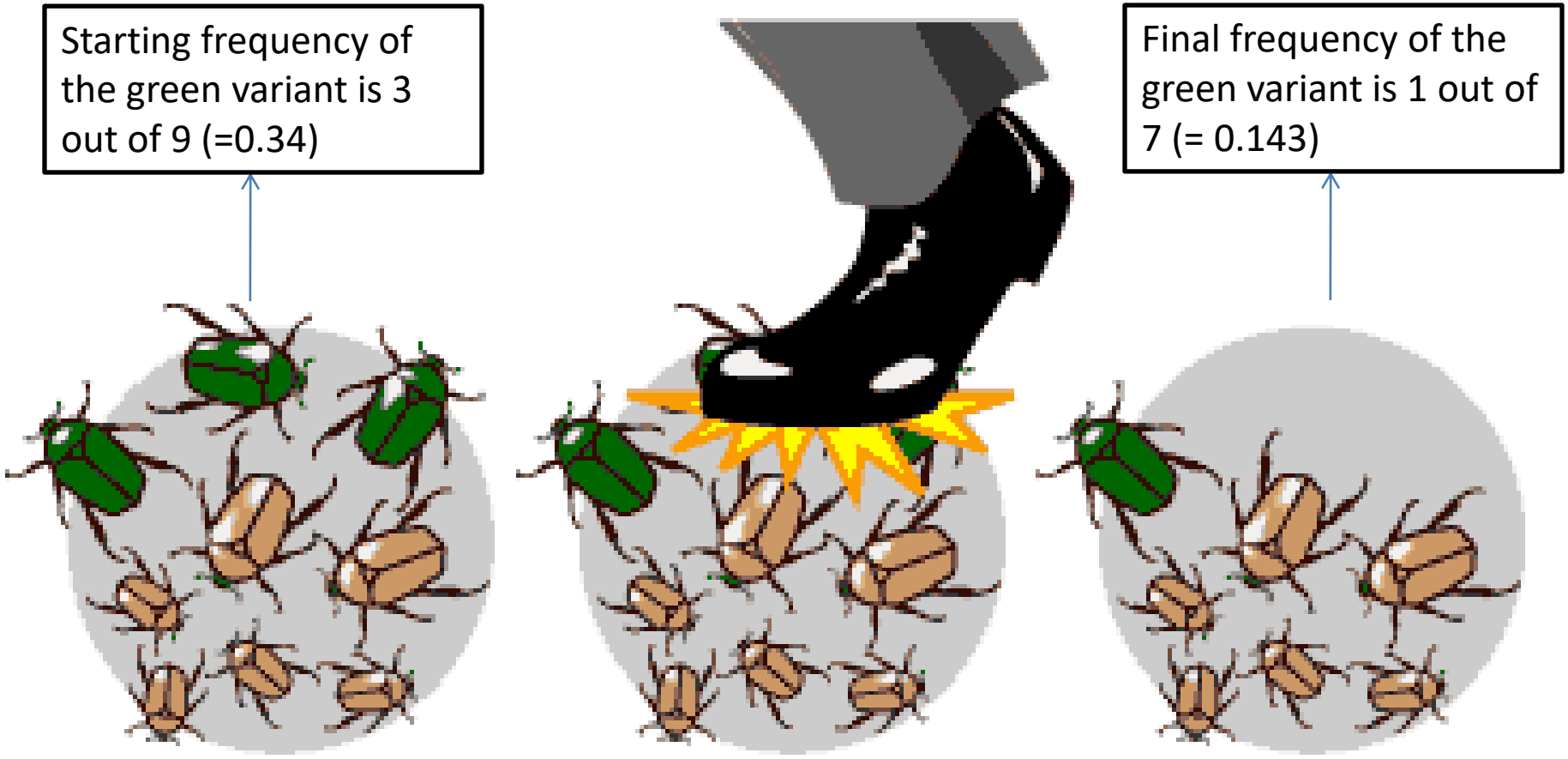
Introduction :

- **In each generation, some individuals may, just by chance, leave behind a few more descendents (and genes, of course!) than other individuals. The genes of the next generation will be the genes of the "lucky" individuals, not necessarily the healthier or "better" individuals. That, in a nutshell, is genetic drift. It happens to all populations — there's no avoiding the vagaries of chance.**
- **Genetic drift is change in gene frequency by chance.**

Change in frequency by chance



Genetic drift — along with natural selection, mutation, and migration — is one of the basic mechanisms of evolution.

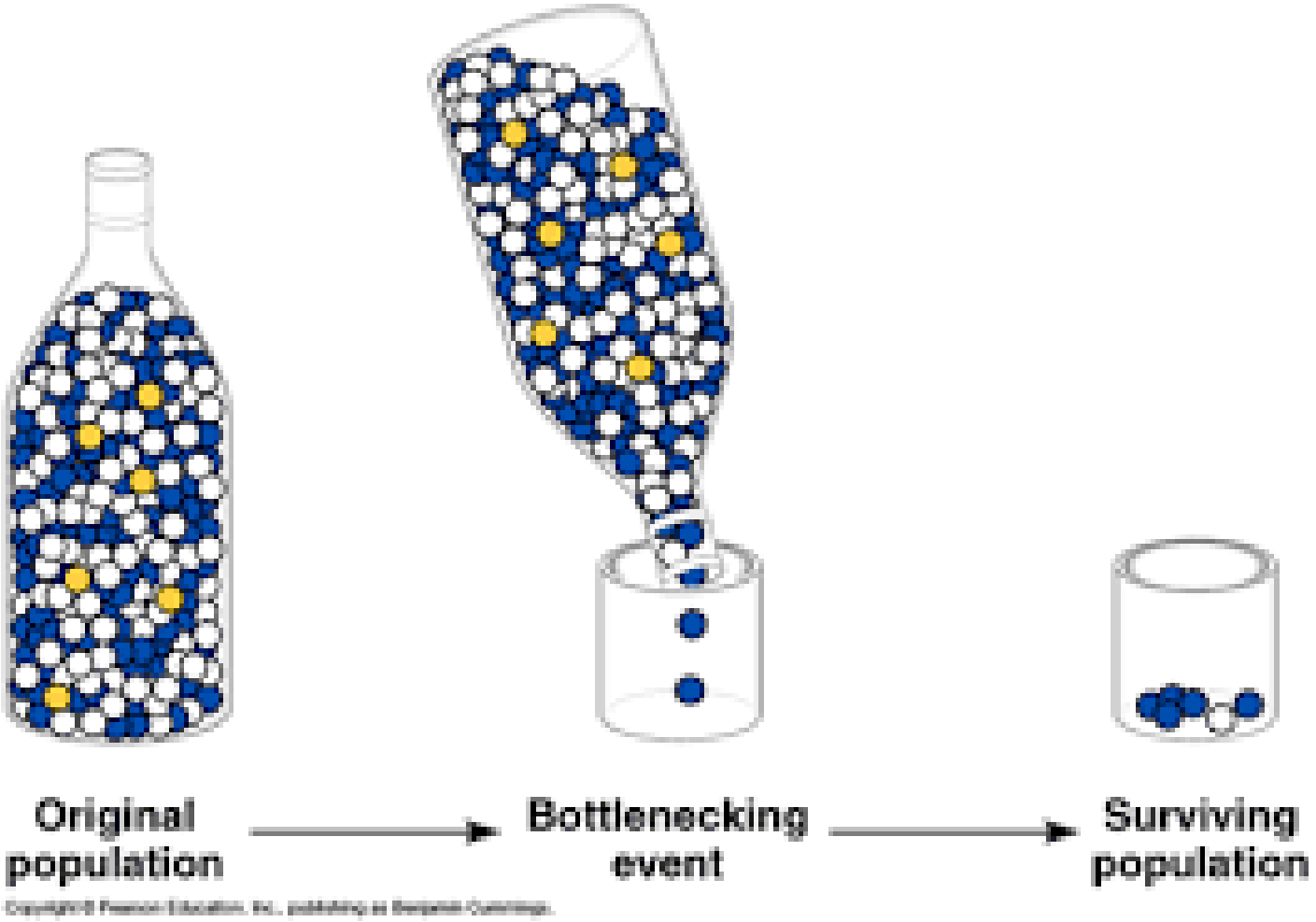
- **Genetic drift (also known as allelic drift or the Sewall Wright effect after biologist Sewall Wright) is the change in the frequency of an existing gene variant (allele) in a population due to chance.**
- **Genetic drift is a change in allele frequency in a population, due to the forces of chance. These changes in genetics can increase or decrease in a population, simply due to chance. Although variations of genes (also known as *alleles*) can be selected for because they help or hinder an organism with reproducing. When the allele is not responsible for the change in its frequency in a population, genetic drift is acting on the allele.**

Population bottle neck

- **A population bottleneck is a type of genetic drift in which a population's size severely decreases. This could be caused by predators, disease, or competition from another source.**

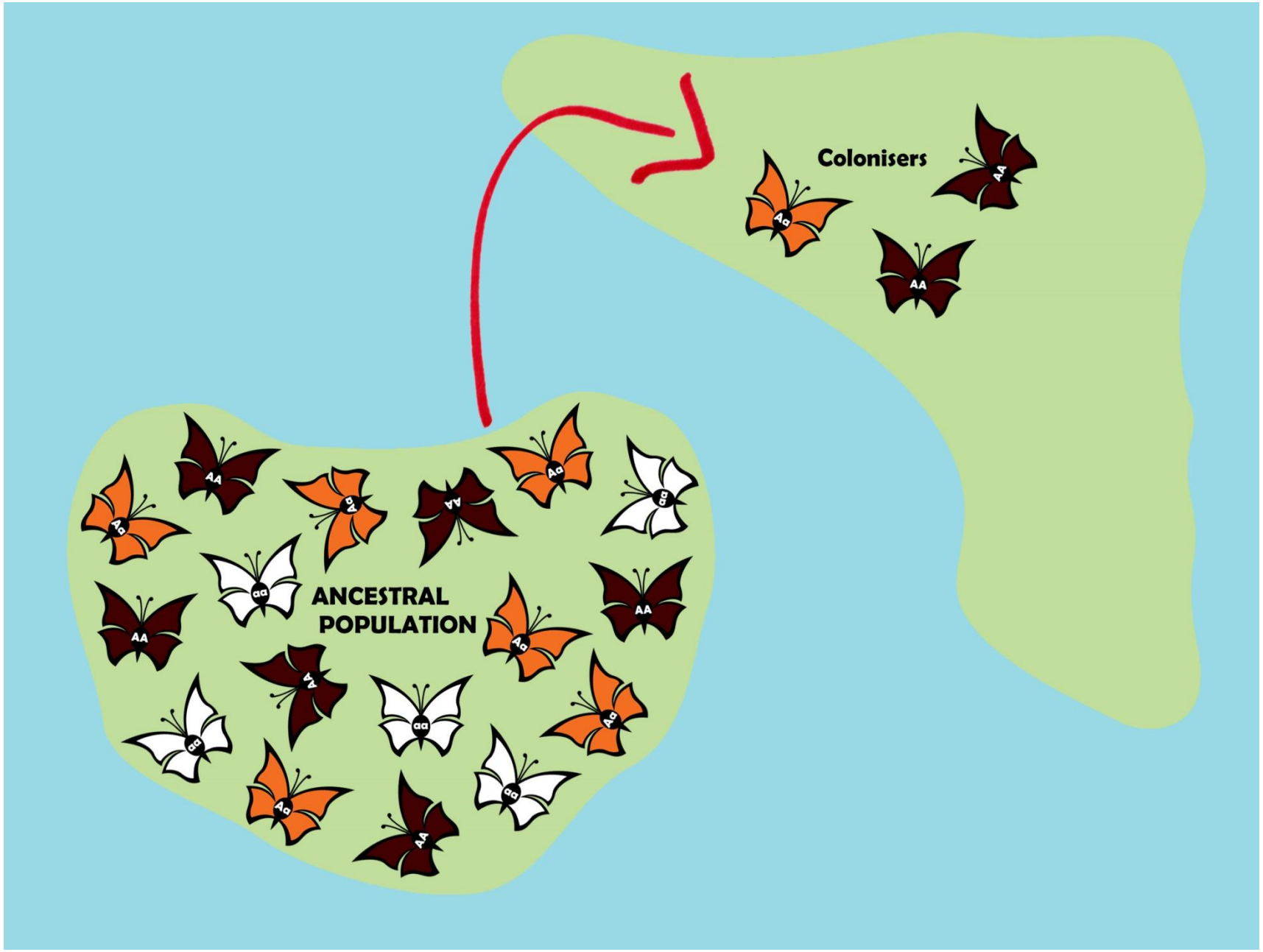
- **As the population becomes smaller, certain alleles change in frequency in the population simply because the organisms that carry them get killed or eaten. The other alleles increase in frequency, simply because they are the only alleles left.**

Population bottle neck



Founder effect :

- **In another type of genetic drift known as the founder effect, a new population is formed, or founded, in a new location. If this new population does not interact and reproduce with the main population, the allele frequencies in this population will be much different from that of the parent population.**
- **Many islands contain species that only exist on a single island because of the founder effect. For instance, if only two birds of a species land on an island, their alleles alone will account for the diversity present. While these alleles will dominate at first, mutations will arise in the population that will lead to new adaptations.**
- **Because the two populations of birds are separated, they cannot share this new adaptation. With enough time, the two populations can diverge to a point which they can no longer interbreed. This is one way that separate species are created.**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- **Genetic drift is much more likely in smaller populations of organisms. When the population is small, and many alleles exist , any of the alleles can quickly become fixed or extinct in the population.**
- **When there are many organisms in the population there is less of a chance of losing an entire allele, because many organisms carry the allele and it is less likely they will all be wiped out.**

- **Examples of Genetic Drift**
- **In a hypothetical population**
- **A population of rabbits lives in the woods. The rabbits have many different coat colours: black, brown, tan, white, grey, and even red. In the population, the different alleles that create coat colour are equally distributed. A disease comes into the rabbit population and kills 90% of the rabbits. The only rabbits that are left are red and grey rabbits, simply by chance. The genes have thus "drifted" from 6 alleles to only 2.**

Thank you