Sexual vs Asexual Reproduction

Sexual reproduction

1. **Costs of sexual reproduction**—males unable to produce offspring so only half of parent genome is passed on—disrupts parent genome and beneficial alleles could be lost
2. Benefits outweigh costs for sexual reproduction as it **increases genetic variation**— this provides raw material for adaptation & increases survival under changing selection pressures
3. The Red Queen hypothesis can explain persistence of sexual reproduction
4. Co-evolutionary interactions between parasites and hosts may select for sexually reproducing hosts—hosts better able to tolerate parasites have greater fitness and parasites able to feed, reproduce and find new hosts have greater fitness.
5. Genetic variability in the offspring of sexually reproducing hosts will decrease chance of parasitic infection

Asexual reproduction

1. **Asexual reproduction benefits**—whole genome is passed from parent to offspring (particularly beneficial in narrow stable niches or when recolonising disturbed habitats)
2. In asexual reproduction, 1 parent can produce daughter cells & establish a colony of virtually unlimited size over time.
3. Examples of asexual reproduction in eukaryotes = vegetative cloning in plants (runners, tubers, bulbs) parthenogenesis in lower plants and animals (reproduction from a female gamete without fertilisation)
4. **Parthenogenesis** is more common in cooler climates (disadvantageous to parasites) or regions of low parasite density or diversity
5. Offspring can be reproduced more often and in larger numbers with asexual reproduction
6. Asexually reproducing populations can't adapt easily to changes in their environment—mutations can provide some variation and enable natural selection & evolution.
7. Asexually reproducing organisms often have mechanisms for **horizontal gene transfer** between individuals to increase variation (eg: plasmids of bacteria and yeast)
8. Horizontal gene transfer speeds up evolutionary change