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1 Thoughts about evolution

Biological and mathematical ways of seeing



Biological evolution is the change in time through selection, which is the difference in reproductive success of a population due to varying fitness. This mechanism may noticeably alter the frequency of a trait over even a single generation.

2 Lens eyes or compound eyes?

Two very different ways to see the world



The light-sensitive cells of all eyes – no matter their difference from ours – evolved either from the nervous system, or from cells of the skin. It only took those two types of cells to produce lens eyes and facet eyes, although only after a large number of generations.

3 The world is 3D

Spatial vision



The size and positioning of many animal's eyes reveal a lot about their lifestyles. Predator eyes tend to be directed towards the front, in order to capture their prey in three dimensions. The eyes of prey animals, on the other hand, are placed to maximize the field of vision.

4 The limits of clarity

Fine tuning of retina and optics



Any good eye requires high-quality optics and/or a high-quality retina. Birds of prey gain the most from improving their retina, while some crabs are remarkably successful at growing high-fidelity optics in each of their facets.

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