The Mathematics of Life by Ian Stewart

1. What are the five great revolutions proposed by the author?
2. What is the proposed sixth revolution?
3. How have mathematical models added to our understanding of organisms?
4. What is the hierarchy of organisms under the Linnean classification?
5. What are the most important features used to classify a plant?
6. What gave rise to one of the first extensive applications of mathematics to a problem in biology?
7. Why do many structures in plants adhere to the golden ratio?
8. How did sequences lead Darwin to the idea of natural selection?
9. What is the scientific definition of the word “theory”?
10. How did Mendel’s results support the idea of dominant genes?
11. How did X-ray diffraction help lead to the conclusion of DNA’s structure?
12. What was the most effective way for DNA sequences to specify amino acid sequences?
13. How did the Human Genome Project aid biologists?
14. What type of graph can be used to help define a species?
15. What is the equation for the number of trees each species creates?
16. What shapes do most viruses take?
17. What was one of the first applications of mathematics to biology?
18. How did mathematics solve problems previously unsolvable?
19. How is a protein’s shape like a knot?
20. Who created a series of mathematical models that incorporated the role of genes?
21. What purposes does a model have in scientific advancement?
22. What theory can be applied to the concept of natural selection? What is it?
23. What types of networks does biology use, metaphorically and physically?
24. What is competitive exclusion?
25. What is the paradox of the plankton?
26. How can this paradox be represented mathematically?
27. How was Synthia created?
28. What is the probability of intelligent life being unique to Earth?
29. How has mathematics changed things in the past for biology?