

A Science Odyssey: Origins Part 2

Essential Questions: The Fundamental Rules that govern the evolution of life itself

- How could ancient organisms (seen in fossils) evolve into the variety of life we see today?
- What mechanisms could explain an individual's characteristics being passed down to future generations?
- How could an entirely new species be created?

A: Chromosomal Inheritance (1:00 - 1:16)

1. Whose work was rediscovered in 1900? _____
2. What did Mendel have no idea how to explain?
3. What is the process that drives evolution, according to Charles Darwin:
4. What will make an organism more likely to survive?
5. According to Darwin, how can a whole new species arise?
6. What did scientists not understand about mutations at the start of the 20th Century?
7. Why does Thomas Hunt Morgan start his experiments?
8. What had nobody ever produced by selective breeding?
9. What did Hugo de Vries discover in 1903?
10. What did TH Morgan decide to look for in animals?
11. What did Morgan use as his animal model? _____ Why was it a perfect choice?
12. For how long did Morgan do his work without finding any mutations?
13. Finally! What mutation did Morgan discover in his fruit flies?
14. How does that mutation differ from what Morgan was expecting to find?
15. [Not in the film] What would Mendel predict about the offspring of the red and white-eyed flies?
16. Why were Mendel's ideas ignored for 35 years?
17. (1:11) What happens when he breeds the mutated fly to a normal red-eyed female?
18. How many of the F2 flies were white eyed?
19. What was peculiar about the white eyed flies?

20. Eventually, after finding other sex-linked traits, what is Morgan willing to say is true about the physical location of the white-eyed gene?

Morgan studied over 13 million flies [Wow! what a way to make a living. That's real science!] Morgan became convinced that genes were passed on during cell division.

B: Molecular Inheritance (1:16 - 1:31)

21. What does Morgan's work tell us about the role of mutations in evolutionary change?

22. There were still many questions in the "Black Box" about heredity. List some:

23. Scientists began investigating the chemical basis of life. By the 1940's scientists know that genes contain _____.

24. Dr. Lander says proteins were thought to contain heredity, but, "the experiments kept pointing to the fact that it was DNA which when transferred to a new organism contained the secret of heredity." Whose experiments is he talking about?

25. In 1951, at King's college in London, Rosalind Franklin took a photo of DNA; it suggests _____.

[Whoah! Check out Watson's hair!!]

26. James Watson is shown Franklin's picture. Back at Cambridge University, Watson and Crick built a first DNA model. It was _____.

27. What are the base pairs found in DNA:

28. After building a second model out of cardboard, they realize that the shape is a _____.

29. Why didn't Franklin share the Nobel Prize in 1962?

30. Why is the structure of DNA the "Secret of Life?"

31. Normally the copy is exact. The occasional error in copying is inevitable. The accumulation of these mutations gets selected upon by natural selection. It gives rise to all the diversity on planet Earth. [there's no question here; I just wanted to point out that the structure of DNA pretty much explains everything]

32. DNA change is a clock. How different is our DNA from a chimpanzee?

33. When did the human - chimp ancestor live, according to the DNA clock?

34. What can genes from human cells do to yeast cells?

35. Why is this significant?