

talk
to
me!

LET'S TALK EMPOWERMENT. LET'S TALK ENGLISH

Footprints without Feet 6

The Making of a Scientist

1. Watch and listen to the story

Click on the link below to watch a video of the story being read. Note the pronunciations of the words and read along using the subtitles.

[\(83\) The Making of a Scientist - YouTube](#)

2. Summary

'The Making of a Scientist' is a story about the famous scientist Richard Ebright. Richard was a very intelligent and curious child who was constantly encouraged by his mother. He started collecting butterflies as a child; by the time he was in second grade, he had already gathered 25 species of butterflies found in his hometown. He also collected coins, fossils, and rocks. One day, his mother gave him a book named 'The Travel of Monarch X'. This book proved to be a turning point in his life. He got more interested in science when he started to participate in county science fairs in his hometown in Pennsylvania. He won several prizes at these fairs, and this deepened his interest in science.

One of his most important projects was to find the role of the 12 tiny golden spots on the back of the Monarch pupa. This project won first place in the fair and also gave him a chance to work at the Walter Reed Army Institute of Research. Ebright and another brilliant science student made a device that proved that the gold spots were responsible for releasing a hormone that was necessary for its growth. He then solved one of the biggest mysteries of life. He found out how a cell reads the blueprints of its DNA. It was a big breakthrough and was published in a magazine.

He possessed a bright mind, had immense scientific curiosity, and always worked hard to do his very best. These traits that made him a good scientist.

This is how Richard Ebright looks now.



Do you want to know what Richard H. Ebright is doing now? He is the Board of Governors Professor of Chemistry and Chemical Biology at Rutgers University and Laboratory Director at the Waksman Institute of Microbiology. He was elected to the membership of the American Academy of Sciences in the category of biological sciences, one of the highest honors an American scientist can achieve.

Ebright was recognized for his work in transcription, the synthesis of an RNA copy of genetic information in DNA. Ebright has more than 30 issued and pending patents.

Remember his interest in science started with butterflies.

Please watch this absolutely fascinating video on the Great Migration of the Monarch butterflies:

<https://www.youtube.com/watch?v=QpffQtKN-gk>

3. Vocabulary

1. **Fascination** – being greatly interested in or obsessed with someone/something, strong attraction
Indians' **fascination** with cricket is well known.
2. **Theory** – ideas that are suggested to explain a fact or an event or, more generally, an opinion or an explanation
The villagers have a **theory** that the large hole in the ground has been caused by a meteorite.
3. **Article** – a piece of writing on a particular subject in a newspaper or magazine, or on the internet
There was an interesting **article** on the New Education Policy in the newspaper today.
4. **Proceedings** – a complete written record of what is said or done during a meeting; a series of events that happen in a planned way
The **proceedings** of the meeting were published in the annual journal.
We followed the **proceedings** of the Lok Sabha on television.
5. **Journal** - a magazine dealing with a specialized subject
I was very excited when I was asked to contribute an article to the college **journal**.
In 2020, all medical **journals** carried many articles on research on Covid-19.
6. **Big leagues** – groups of sports clubs or teams playing matches among themselves
The **big league** football matches are very popular in Europe and the United States.
7. **String of achievements** – a line of accomplishments, success in a number of things
Tendulkar's **string of achievements** in cricket will be hard to match.
8. **Kindergarten** – in the USA, the first year of school, for children aged five; in the UK, a nursery school
He learnt to read when he went to **kindergarten**.
9. **Determination** – an ability to continue trying to do something even if it is difficult
With his **determination** and focus he will certainly pass the IAS exam.

10. **Fossils** – parts of a plant or animal that have been preserved in rock or earth; specimens are usually considered to be fossils if they are over 10,000 years old; the oldest fossils are around 3.48 billion years to 4.1 billion years old
Fossil records show that the front limbs of birds developed into wings.
11. **Astronomer** – a scientist who studies stars, planets and other natural objects in space
Aryabhata was a very famous Indian **astronomer**.
If you hear someone talk of stars and planets you may wonder if he is an **astronomer**.
12. **Driving** – strong and powerful and therefore causing things to happen
The **driving** force behind this project has been our class teacher.
13. **Curiosity** – a desire to know or learn
A healthy **curiosity** helps children learn faster.
14. **Telescopes** – cylinder shaped devices for making objects that are faraway look closer and larger, using combinations of lenses and curved mirrors
Astronomers use powerful **telescopes** to study the Milky Way, our galaxy.
15. **Microscopes** – devices that use lenses to make very small objects look larger, so that they can be scientifically studied and examined
They look at the blood samples under **microscopes** to find out the white blood cell count.
16. **Mounting material** – material that provides a setting or support for another thing, usually biological specimens like plants or insects
I used pins and thick paper as **mounting material** for displaying my collection of butterflies.
17. **Equipment** – things needed for a particular activity
The **equipment** needed for the trek will be provided by the trekking agency.
18. **Companion** – a person you spend a lot of time with, often because you are friends or because you are travelling together
This stray dog has been my constant **companion** for the last one month.
19. **Species** – a set of animals or plants in which the members have similar characteristics to each other and can breed with each other
The panda is an endangered **species**.

20. **Probably** – used to mean that something is very likely
I will **probably** be going to visit my grandmother tomorrow.
21. **Eager** – keen, enthusiastic
He was very **eager** to reach the base station and begin the climb to the top of Mount Everest.
22. **Migration** – seasonal movement of animals from one region to another, movement of people to a new area or country to find work or better living conditions
During winter, there is a **migration** of birds to warmer climates.
23. **Tag** – a small piece of card or material fastened to something to give information about it, label
I could not tell the cost of the dress as the price **tag** had fallen off.
24. **Adhesive** – glue, sticky tape
This is a strong **adhesive** and can be used to glue many materials.
25. **Basement** – a part of a building consisting of rooms that are partly or completely below the level of the ground
Her office was in the **basement** of the house.
26. **Caterpillar** – a small, long animal with many legs that feeds on the leaves of plants, and develops into a butterfly or moth
The **caterpillar** has eaten up almost all the leaves of the plant.
27. **Pupa** – an insect in the stage of development after it has been a larva (caterpillar) and before it becomes an adult. During this time, it lives protected by a hard covering that does not allow it to move
A beautiful butterfly emerged out of the **pupa**.
28. **Stages** – parts of an activity or periods of development
The Metro railway project is at its final **stage** of construction and should be completed by December.
29. **Development** – the process in which someone or something grows or changes and becomes more advanced
We should constantly interact, talk and play with babies to ensure their healthy **development**.
30. **Tedious** – boring and long, tiresome
The journey was long and **tedious** because the bus stopped at all the small villages.

31. **Feedback** – comment, response, report
The teachers give regular **feedback** to the students on their homework.
32. **Recaptured** – to take something in your possession again, specially by force
The army **recaptured** the border post after a short combat.
33. **Experiments** – tests done in order to learn something or to discover if something works or is true
Scientists are carrying out **experiments** to test the new vaccine.
34. **Display** – exhibit, show
The **display** of miniature paintings at the National Museum is on till June.
35. **Competitive** – eager to be more successful than others, ambitious, competing with others
The telecom business is very **competitive**.
36. **Stack** – pile of things, a large amount
He hid the **stack** of money at the bottom of the suitcase.
This **stack** of clothes is for washing.
37. **Suggestions** – mentions of ideas, possible plans, or actions for other people to consider
We have received many **suggestions** about how the school can be improved.
38. **Viral** – caused by a virus, something that quickly becomes very popular or well known by being published or sent on the internet
Flu is a **viral** infection and can leave a patient feeling very weak.
Meera became an internet sensation after her song went **viral** online.
39. **Beetle** – an insect with a hard shell-like back
The **beetles** have destroyed all the potato plants.
40. **Overall** – in general rather than in particular; including all the people or things in a particular group or situation
Overall, the Government is trying to do its best to control COVID -19, despite many challenges.
41. **Hormone** – a chemical usually occurring in the body that makes an organ or the body do something
Growth hormones stimulate growth and cell reproduction.

42. **Cells** – the smallest basic units of plants and animals
The Covid-19 virus attacks the immunity building **cells** in our body.
43. **Assumed** – accepted something to be true without question or proof
I **assumed** that you knew each other as you went to the same school.
44. **Ornamental** – decorative, beautiful
This is an expensive **ornamental** piece; so place it carefully on the shelf.
45. **Excellent** – extremely good
The food at the restaurant was **excellent**.
46. **Device** – a tool or equipment made for a specific purpose, a clever method of getting the result you want
Communication and security **devices** are sold in the mall.
He thought of a clever **device** to fool the supervisor.
47. **Entomology** – the scientific study of insects
After her graduation, she is planning to specialize in **entomology**.
48. **Laboratory** – a room or building with scientific equipment for doing scientific tests or for teaching science, or a place where chemicals or medicines are produced
The **laboratory** had very expensive equipment for studying atoms and their components.
49. **Advanced** – modern and well developed
The Rafale aircraft is a very **advanced** fighter plane.
50. **Culture** – cells, tissues, organs or organisms grown for scientific purposes
Penicillin was discovered when Sir Alexander Fleming found that a mould was stopping the growth of bacteria in a **culture**.
51. **Wing scales** – thin pieces of skin covering the wings of insects
When we touched the butterfly wings with our fingers, the yellow **wing scales** came off on them.
52. **Graduation** – finishing a degree or other course of study at a university or school; or the ceremony at which you are officially said to have finished; here, it refers to finishing schooling
After **graduation** from school, he decided to find a job to support his family.

53. **Freshman** – a student in the first year of high school, college or university; it is a term used mainly in the USA
My niece is a **freshman** at Stanford University.
54. **Sophisticated** – if a way of thinking, a system, or a machine is complicated or made with great skill
The university has a **sophisticated** computer system which is used for performing all the calculations.
55. **Instruments** – tools or devices used for performing a particular piece of work
All the **instruments** in the laboratory were destroyed by the fire.
56. **Identify** – to recognize someone or something and say or prove who or what that person or thing is
She could **identify** all the plants in the garden.
57. **Chemical structure** – the arrangement of chemical bonds in a molecule and the geometric shape of the molecule
Scientists are studying the **chemical structure** of the substance in order to identify it.
58. **Eureka** – a cry of triumph at a discovery
Archimedes, a famous Greek scientist, ran naked through the streets of his hometown shouting, "**Eureka!** Eureka!", when he made an important scientific discovery.
59. **Puzzles** – situations that are difficult to understand, also games
Scientists have been trying to solve the **puzzles** of the Universe for hundreds of years.
Rita loves to play with complicated puzzles that have 500 pieces!
60. **Blueprint** – a complete plan that explains how to do or develop something, a model design, diagram
The builders of the City Centre have submitted the **blueprint** to the authorities.
61. **Nucleus** – the central part of an atom, the central or most important part of something
The **nucleus** of an atom consists of neutrons and protons which, in turn, are made of particles called quarks.
The Community Centre is the **nucleus** of all activities in the colony.

62. **Heredity** – the process by which characteristics are passed from parent to child through the genes
Medical discoveries about the role of **heredity** have helped identify cause of diseases.
63. **Function** – the way in which something works or operates
COVID-19 often affects the normal **function** of the lungs.
64. **Constructing** – building something or putting together different parts to form something whole
They were **constructing** a new bridge over the river.
65. **Molecules** – Units of a chemical substance, usually groups of two or more atoms
Molecules of water are made up of hydrogen and oxygen atoms.
66. **Surprising** – unexpected
The election results were very **surprising**.
67. **Highest honours** – completing a school or university qualification with the highest scores in exams
She passed her graduation exams with the **highest honours**.
68. **Processes** – series of changes that happen naturally; a process is also a method of doing or making something
The **processes** of our body are very complex and dependent on each other.
69. **Preventing** – stopping something from happening, or someone from doing something
A blockage in the pipe was **preventing** the water from flowing.
70. **Eventually** – finally, in the end
Though it was very hot, we **eventually** fell asleep.
71. **Champion** – someone or something, either a person or an animal, who comes first in a competition
She is the world **champion** in boxing.
72. **Debater** – a person who takes part in a serious discussion of a subject with many other people
He was a keen **debater** in school and college.

73. **Canoeist** – a person who paddles a canoe, a light boat
The two **canoeists** paddled hard as they raced each other down the river.
74. **All-around** – having a good variety of skills or abilities
He was an **all-around** cricket player.
75. **Outdoors-person** – a person who enjoys being out in the open
Sanjay is often outside, either gardening or cycling, as he is an **outdoors-person**.
76. **Expert** – a person with a high level of knowledge or skill relating to a particular subject or activity
My mother is an **expert** mathematician.
77. **Exhibits** – displays in a public place like a museum
The museum does not allow photography of its **exhibits**.
78. **Straight-A student** – a student who gets the best results in all examinations
She was a **straight-A student** until her mother died and she had to take on the responsibility of cooking for her family every day.
79. **Adviser** – someone who gives an opinion about what you should do or how you should act in a particular situation
He is the government's main economic **adviser**.
80. **Ingredients** - qualities necessary to make something successful, food items used in preparation of a dish
The **ingredients** of a successful career are hard work and sincerity.
I have all the **ingredients** required to bake a cake.
81. **Qualities** – characteristics or features of someone or something
She had all the necessary **qualities** to be a good teacher.

4. Questions Read and Find Out

1. How did the book become a turning point in Richard Ebright's life?
2. How did his mother help him?

3. What lesson does Ebright learn when he does not win anything at a science fair?
4. What experiments and projects does he then undertake?
5. What are the qualities that go into the making of a scientist?

Think about it

1. How can one become a scientist, an economist, a historian ...? Does it simply involve reading many books on the subject? Does it involve observing, thinking and doing experiments?
2. You must have read about cells and DNA in your science books. Discuss Richard Ebright's work in the light of what you have studied. If you get an opportunity to work like Richard Ebright on projects and experiments, which field would you like to work on and why?

Talk about it

1. Children everywhere wonder about the world around them. The questions they ask are the beginning of scientific inquiry. Given below are some questions that children in India have asked Professor Yash Pal and Dr Rahul Pal as reported in their book, *Discovered Questions* (NCERT, 2006).
 - (i) What is DNA fingerprinting? What are its uses?
 - (ii) How do honeybees identify their own honeycombs?
 - (iii) Why does rain fall in drops?Can you answer these questions? You will find Professor Yash Pal's and Dr Rahul Pal's answers (as given in *Discovered Questions*) on page 75.
2. You also must have wondered about certain things around you. Share these questions with your class, and try and answer them.

5. Suggested reading

- 'Journey by Night' by Norah Burke
- Children Who Made It Big by Thangamani
- School Days by Tom Brown