



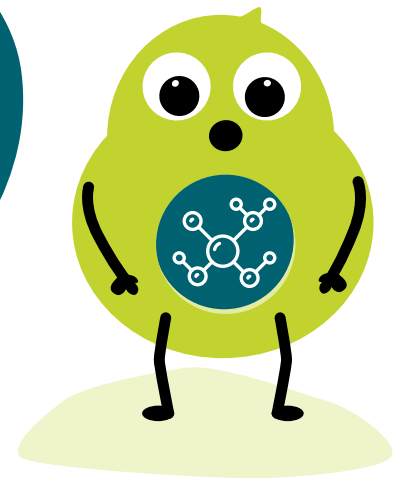
BRITISH
SCIENCE
WEEK
2022

MAKING MICROSCOPIC MACHINES

Your body contains thousands of tiny machines, called proteins. Proteins are made of smaller building blocks, called amino acids that form long chains. Their order and shape makes them 'bind' with other molecules and this determines how they work. In this activity, you will build your own tiny machines and think about how their sequence and shape matters.

 30 minutes

Skill set: Logical, organised, patient



Kit list

Scissors

Pen

Paper

Printed cut out sheet

Instructions

- 1 Cut out the amino acid shapes and two molecules. There are 20 different amino acids that have different properties and shapes. We have five amino acids in this activity. What are the differences between these amino acids?
- 2 Amino acids join to form a ribbon, and their order makes the ribbon bend into a shape (called a protein). The different shaped ribbons are different proteins. Some proteins, called enzymes, carry out chemical reactions on molecules.
- 3 Make a protein with the sequence "ABCDE". Proteins bind molecules like a jigsaw. Does this protein fit with either molecule?
- 4 Look at the protein chain on the next page. Can you work out the letters of each amino acid only from looking at the shapes?
- 5 Which sequence of amino acids fits molecule 2?
- 6 Make a random four amino acid sequence. Compare your sequence to others. Does anyone have the same? How many different sequences do you think you can make?

Watch out

Be careful when cutting out the amino acid and molecule shapes.

Next steps

A DNA mutation may change an amino acid in a protein. Does the 'ABBDE' protein fit molecule 1 as well as ABCDE? How about ACCDE? Do you think the protein still works? Look up common causes for DNA mutations.

At home

Enzymes can help digest food. A potato crisp will start tasting sweet when chewed. Research which enzyme is responsible. For more information about how enzymes work visit: bbc.co.uk/bitesize/topics/zf339j6/articles/zs9dkty 🔍.

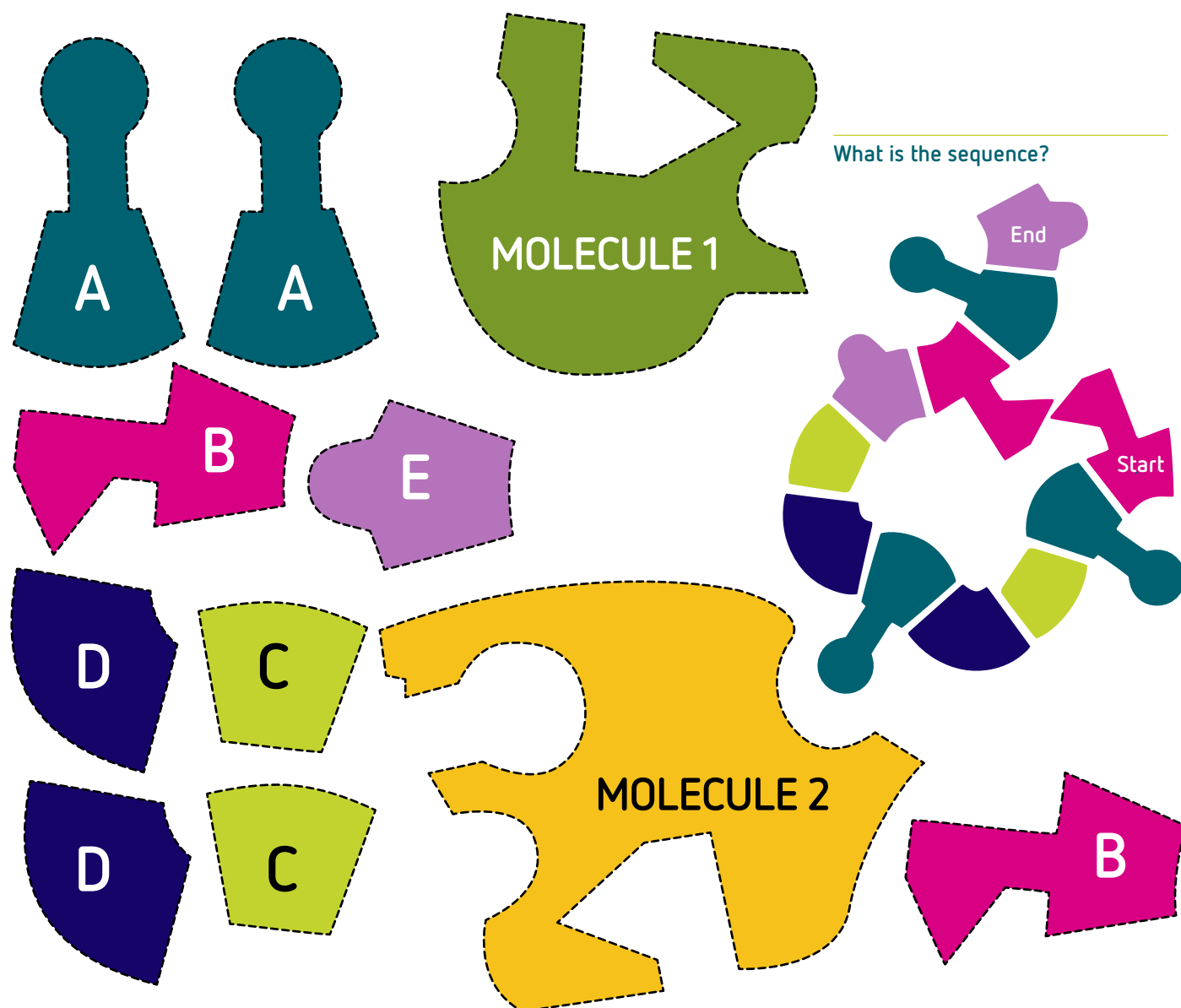
Career options

There are lots of jobs studying proteins and changing how they work. Proteins are also used in new and better medicines, washing powders, food production, genetic research and chemical industries. Lateral flow tests use protein antibodies to detect COVID spike protein, and new vaccines are simply instructions to make protein sequences.

MAKING MICROSCOPIC MACHINES CUT OUT SHEET

Printed

What is the sequence?



Answers

BACDADCEBAE

