

# Cut-out DNA model

## Aim

- To show the essential features of the structure of DNA (deoxyribonucleic acid).

## Organisation

It takes about 30 minutes to make this model. If the cut-outs (opposite) have also to be coloured-in, allow more time.

## Equipment and materials

Required by each student or group of students

- Scissors
- Strong paper glue, adhesive tape or a small stapler. *Note: double-sided tape is satisfactory, although it tends to come unstuck after some time.*
- Thread (to hang label from model, and to hang model up when completed)

*Note: to provide a sturdier model, two sets of the sugar-phosphate 'backbones' can be glued together, back-to-back.*

## Assembly details

- Cut out the sugar/phosphate 'backbones' A and B.
- Cut out the base pair 'rungs'.
- Fold down the tabs on the rungs as shown opposite.
- Stick the tab on one end of each rung onto the numbered boxes along backbone A. You can attach the rungs in any order (pointing either way).
- Stick the tabs on the other end of the rungs to the corresponding numbers on backbone B.
- Attach the label to the double helix model, using thread. The diagrams below could also be used to label the model, if desired.

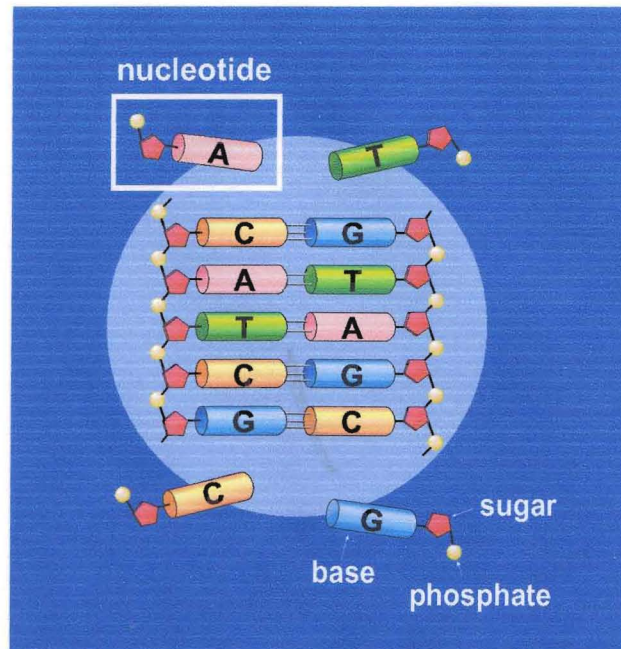
## Acknowledgement

This model is adapted from one devised by the government research organisation CSIRO, in Australia, for their 'Double Helix' Science Club. EIBE is grateful to CSIRO for the original idea and for permission to adapt their model.

	First position	Second position	Third position		
	T	C	A	G	
T	PHE PHE LEU LEU	SER SER SER SER	TYR TYR STOP STOP	CYS CYS STOP TRP	T C A G
C	LEU LEU LEU LEU	PRO PRO PRO PRO	HIS HIS GLN GLN	ARG ARG ARG ARG	T C A G
A	ILE ILE ILE MET	THR THR THR THR	ASN ASN LYS LYS	SER SER ARG ARG	T C A G
G	VAL VAL VAL VAL	ALA ALA ALA ALA	ASP ASP GLU GLU	GLY GLY GLY GLY	T C A G

## The genetic code

Each sequence of three bases on the DNA double helix encodes one of twenty amino acids represented in the body of the table by three-letter codes.



## The structure of DNA

Chains of sugar and phosphate molecules form the two 'backbones' of DNA. Between these, four bases: thymine (T); cytosine (C); adenine (A) and guanine (G) are linked by hydrogen bonds.

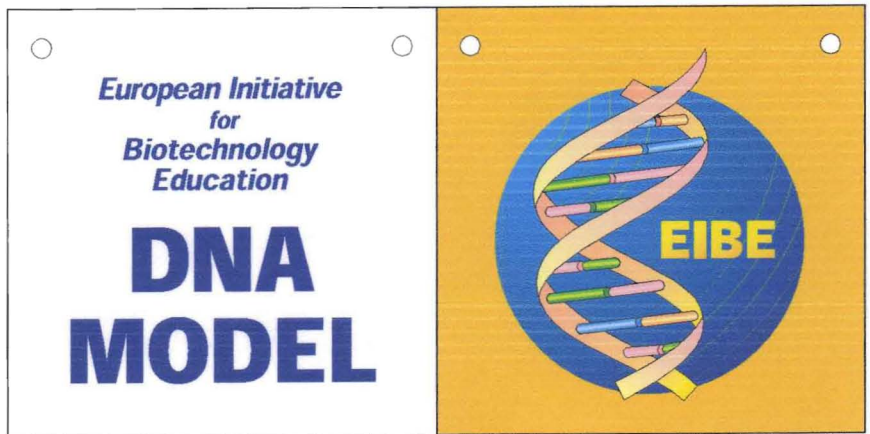
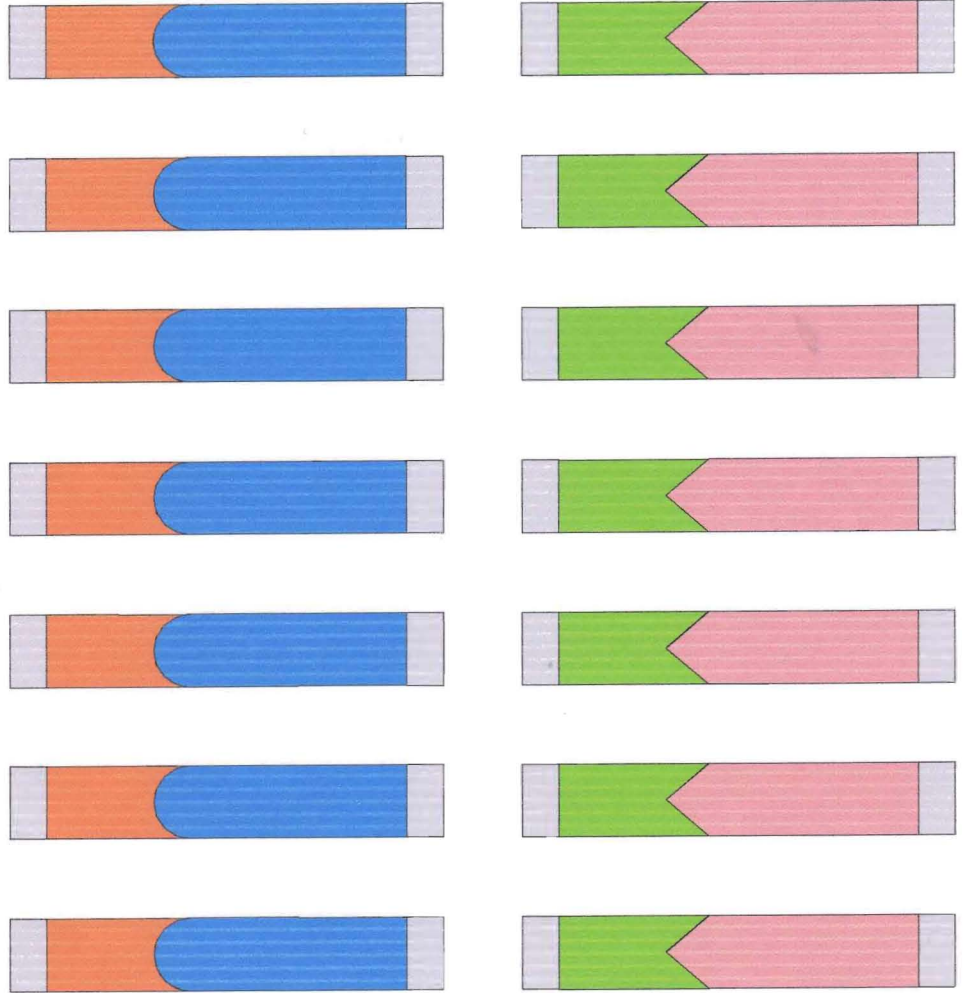
Backbone A



Backbone B



Base-pair 'rungs'



Cytosine

Guanine

Thymine

Adenine

Phosphate

Sugar