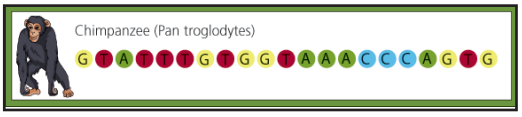
Sequence bracelets

You can make a bracelet that carries some of the code for a organism, such as a person, trout, chimpanzee or butterfly.

Just like in DNA, there are four different kinds of units that make up the sequence - red, green, yellow and blue. Your bracelet will contain two strands of beads that match up the same way the units (or bases) in DNA do. That means if you know the sequence of one strand, you can work out the sequence of the other.

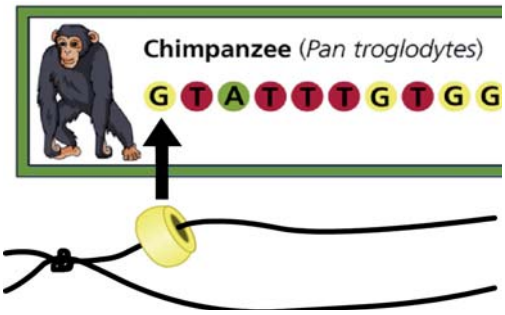
1. Choose one DNA sequence to make.



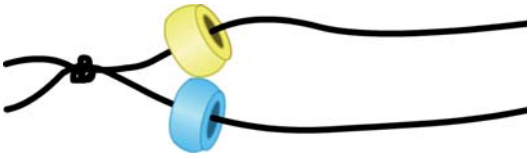
2. Find or cut two pieces of elastic each about 30 cm long.

3. Tie a knot about 5 cm from one end of each string; then tie the two strings together at the knots.

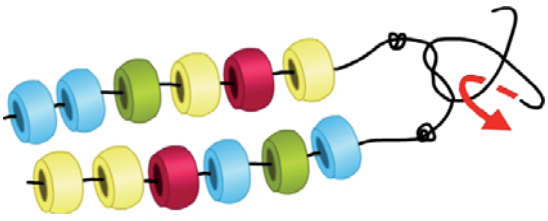
4. Look at the first letter in your sequence and find the right colour bead to thread.



5. Thread that bead onto string 1 and thread the bead for the matching base onto string 2 (see the Pairing Rules sheet for guidance). Keep threading beads according to your sequence until you've finished the sequence on your card.



7. Knot each string after the last bead, and then tie the two new knots together.



8. Now tie the ends of your double-stranded sequence bracelet together.

You've finished! Congratulations!

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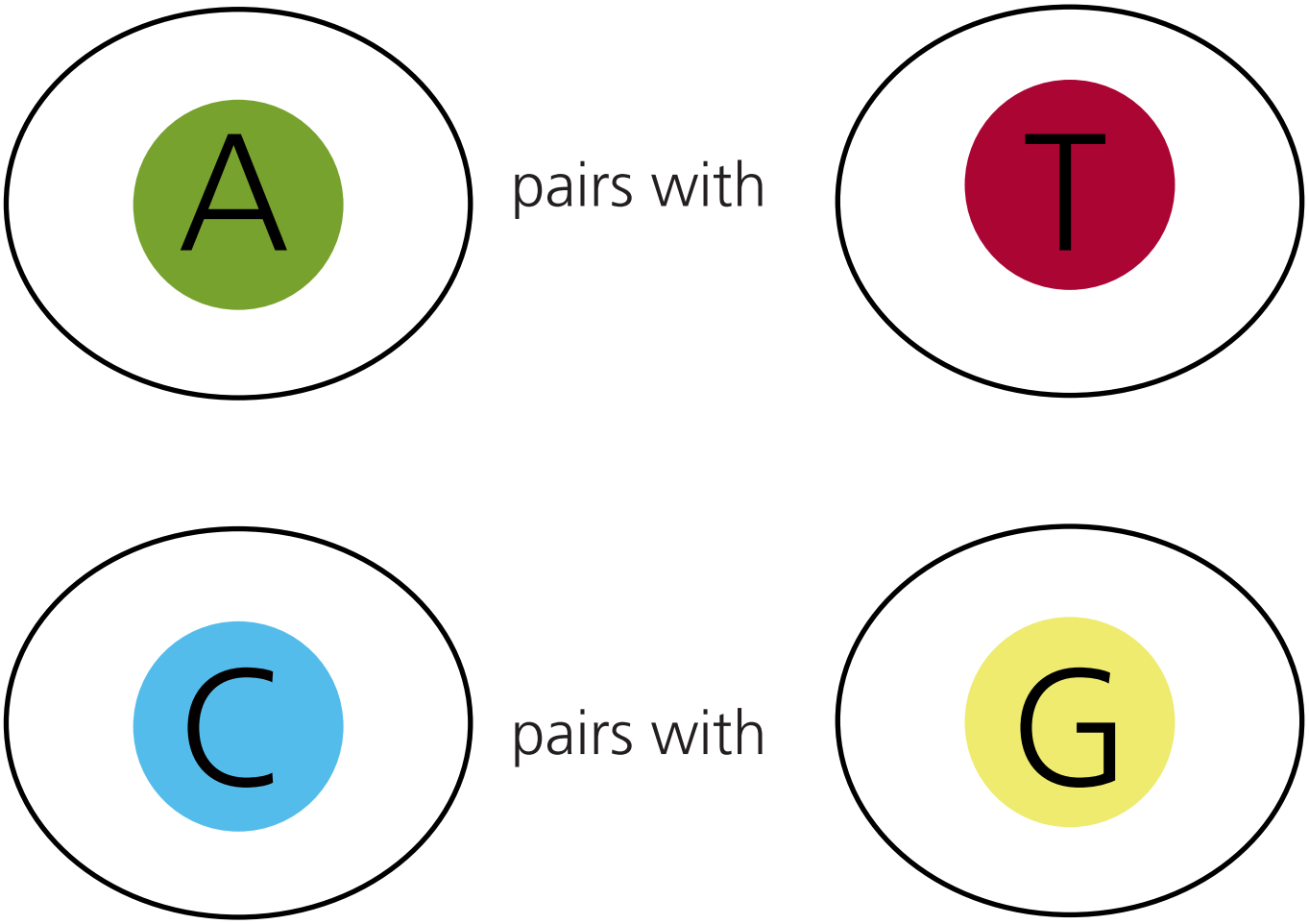
Sequence bracelets

DNA bases : pairing rules



DNA is made up of four units or ‘bases’, known as A,C,T and G.

Each of the bases binds with one partner: A with T; C with G.

Your sequence bracelet should obey the same rules: look in the circles above to work out which coloured beads you should use.

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Chimpanzee (*Pan troglodytes*)

G T A T T T G T G G T A A A C C C A G T G

Brown trout (*Salmo trutta*)

T A C A T C A G C A C T A A C T C A A G G

Human (*Homo sapiens*)

T C T G A G T T C T T A C T T C G A A G G

Human (*Homo sapiens*)

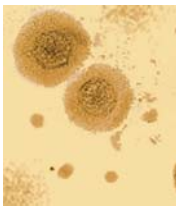
T C T G A G T T C T T A C T T C G A A G G

Butterfly (*Danaus plexippus*)

A T G A T C C C G A C T A T T A C T A T G

Malayan Spitting cobra (*Naja sputatrix*)

A A C C G A C C G C T G C A A C A A C T G

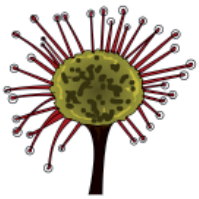


Flesh eating microbe (*Mycoplasma alligatoris*)

C A A C A G T G A T T T A G G T T A C A C

Sweet Orange (*Citrus sinensis*)

T G C T A C A G T T G C T G T T G T T G G



Carnivorous plant (*Drosera rotundifolia*)

G T A G C C A C A G A C T C A G T C A T C

Madagascar hissing cockroach (*Gromphadorhina portentosa*)

G A T T C G C C G C T A T C A G A A G A G

Corpse flower (*Amorphophallus titanum*)

T C G A A C C C G T T G T T G G G G A G G

Sequence bracelets

Sequence information

Chimpanzee (*Pan troglodytes*)
GTATTTGTGGTAAACCCAGTG
Sequence taken from the gene that codes for granulysin. Granulysin is a toxic protein that is released by immune cells in response to infection, to kill pathogens like bacteria.

Brown trout (*Salmo trutta*)
TACATCAGCACTAACTCAAGG
From trout mitochondrial DNA; variation in this sequence can be used to trace trout populations and evolution. Mitochondria are small energy factories within eukaryotic cells that have their own genome of about 16,000 base pairs.

Human (*Homo Sapiens*)
TCTGAGTTCTTACTTCGAAGG
Part of the *OCA2* gene sequence. The *OCA2* gene codes for a protein involved in pigmentation and variation in its sequence is a major influence on whether we have brown or blue eye colour.

Butterfly (*Danaus plexippus*)
ATGATCCCGACTATTACTATG
Sequence from a gene that codes for an 'opsin' protein. This particular opsin reacts to ultraviolet (UV) light, which the butterfly uses to navigate.

Malayan spitting cobra (*Naja sputatrix*)
AACCGACCGCTGCAACAACTG
Sequence from a gene that codes for a toxin protein. This toxin is a component of the cobra's venom, and blocks signals between the nerve and muscle cells of the cobra's prey, paralysing it.

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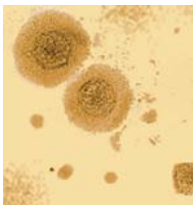
Sequence bracelets

Sequence information



Flesh-eating microbe (*Mycoplasma alligatoris*)

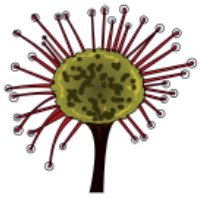
CAACAGTGATTTAGGTTACAC

Part of the gene that codes for an enzyme called sialidase. When these bacteria infect an alligator they secrete sialidase to break-down the alligator's tissues, enabling them to spread through its body.

Sweet orange (*Citrus sinensis*)

TGCTACAGTTGCTGTTGTTGG

Sequence taken from the gene that codes for pectinesterase. Pectinesterase is an enzyme that helps to break down the cell walls of the orange when it ripens, making the flesh soft.



Carnivorous plant (*Drosera rotundifolia*)

GTAGCCACAGACTCAGTCATC

Part of a gene that codes for a chitinase enzyme. The plant secretes these enzymes to break down the chitin-rich body casing of any insect that gets trapped on its tentacles.

Giant Madagascar hissing cockroach

(*Gromphadorhina portentosa*)

GATTCGCCGCTATCAGAAGAG

From the gene that codes for histone 3. Histone 3 is one of eight histone proteins that combine to form nucleosomes, the bundles around which DNA is wrapped in the nucleus.

Corpse flower (*Amorphophallus titanium*)

TCGAACCCGTTGTTGGGGAGG

This sequence is from the gene that codes for ribulose-1,5-bisphosphate carboxylase/oxygenase (RuBisCO),an enzyme that is involved in plant photosynthesis and respiration.

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