

**Make a DNA sequence bracelet with this hands on activity.**

**Age:** 7 - 11

**Time:** 20 - 30 min

**Topics:** DNA and genes, Living things, Evolution and inheritance

**Learning objectives:**

- DNA is found in all living things.
- DNA provides the instructions for all living things.
- Genes are sequences of DNA that provide the instructions to make a protein which has a particular function – these can be adaptations for survival.

## BACKGROUND

All the biological instructions for making an organism are contained in a long molecule called DNA (deoxyribonucleic acid). All living things, from humans and mice to plants and bacteria, have a unique set of instructions written in the four chemical letters of DNA: A, C, G, and T. It's like a recipe book written in code!

DNA has a unique shape. It is a double helix, and looks a bit like a twisted ladder. Each strand of the ladder is made of a long string of four DNA letters: A, C, G, and T.

These DNA letters known as bases always pair up in same way:

- **A** always pairs with **T**
- **C** always pairs with **G**

So we know when we have a T on one strand of the ladder, the other side will always be A, and if we have a G, the letter opposite it will be a C.

The order or sequence of DNA letters contains a code or instructions. Each of these coded instructions are known as genes. They provide instructions to produce molecules called proteins that are produced in cells and can give an animal or human particular features such as hair colour or they can carry out important features such as making muscles move or helping a fruit to ripen. They can even be essential adaptations to help the animal or plant survive.

This activity will enable participants to make a DNA bracelet based on a gene sequence of an animal or plant being sequenced as part of the 25 genomes project by the Wellcome Sanger Institute.

### Find out more

Read this fact page about DNA: [www.yourgenome.org/facts/what-is-dna](http://www.yourgenome.org/facts/what-is-dna)

Read this fact page on genes: [www.yourgenome.org/facts/what-is-a-gene](http://www.yourgenome.org/facts/what-is-a-gene)

Read this fact page to find out what DNA does: [www.yourgenome.org/facts/what-does-dna-do](http://www.yourgenome.org/facts/what-does-dna-do)

Read this article to find out more about the 25 genomes project: [www.sanger.ac.uk/news/view/25-species-revealed-25-genomes-project](http://www.sanger.ac.uk/news/view/25-species-revealed-25-genomes-project)

## ACTIVITY PREPARATION

### Materials

- ☐ DNA PowerPoint slides
- ☐ Instruction sheet
- ☐ Pairing rules sheet
- ☐ Sequence cards
- ☐ Pony beads (red, blue, yellow and green)
- ☐ Hat elastic
- ☐ Ruler to measure the elastic
- ☐ Scissors
- ☐ Pots for the beads

### Set up

To set up for this activity carry out the steps below:

1. Make a DNA bracelet in advance to show as an example.
2. Pre-cut the elastic into 30 cm lengths. Do this by wrapping the elastic around a 30 cm ruler and cut at each end. Tie two 30 cm strands together with a knot at one end (see instructions). This will speed up the activity and minimise waste of elastic.
3. Set up each table with:
  - Bowls of beads
  - Elastic
  - Sequence cards
  - Instruction sheet
  - Pairing rules sheet

## ACTIVITY GUIDANCE

### Warm up

Start with a quick discussion:

1. Using the PowerPoint slides provided show everyone the image of DNA. Ask if they know what this is. Ask them to describe its shape.
2. Using the next slide, explain that DNA is made up of 4 letters ATCG and the letters pair up in a particular way: A with T and C with G.
3. Using the next slide, explain that DNA is found in all living things. Ask if anyone can name a living thing that has DNA? Can they name any of the animals on the slide?

### Run the activity

Get going with the activity by following these steps:

1. Now the group is familiar with DNA explain, using the final PowerPoint slide, that they are going to make a DNA sequence bracelet.
2. Show them the instruction sheet to follow and the bracelet you made earlier – just like Blue Peter!
3. Explain that each DNA sequence card is different. Encourage everyone to choose a sequence card to follow. If the first DNA letter is red, add a red bead to the elastic, if the next DNA letter is blue add a blue bead, and so on.
4. Remind everyone that DNA is double stranded - their challenge is to remember the DNA pairing rule and to complete the second strand of their bracelet. Use the pairing rules sheet to help with this.
5. Once everyone has made a bracelet, encourage the students to talk about their DNA sequence, what species does it come from and what does the gene do? Each sequence card has a question. Ask the students to discuss their ideas in groups and share them with the class.

## TAKE IT FURTHER

Complement this activity by following it up with our **Creature Report** activity. Write a short information poster on one of the species featured on the sequence bracelets.

If you want to explore the topic of DNA further, try extracting DNA from fruit – all you need is fruit such as strawberries or blackberries, washing up liquid, salt, water, and vodka. Turn it into an investigation by comparing different fruits. For instructions and more information look at our **DNA Extraction** activity.

## SHARE IT

Don't forget to share your work with us by posting images on Twitter or emailing us at:

**[engage@wellcomegenomecampus.org](mailto:engage@wellcomegenomecampus.org)**

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