DNA SEQUENCE BRACELETS

Activity Pack

Description: Make DNA sequence bracelet that codes for eye colour.

Duration of Activity: 10 mins approx.

Age: 7yrs+

Topic: Molecular and Cellular

Key words: DNA, Double Helix, Gene, Alleles, Adenine, Thymine, Cytosine, Guanine, Nucleotides

Resources:
- Instructions and Equipment List
- Activity Worksheet
- Cell-Chromosome-DNA Sheet
- MRC Lab Scale/DNA Poster
- Activity Evaluation Poster - Children

Related Activities: Chromosome Challenge, DNA Extraction

With thanks to MRC Human Genetics Unit at the University of Edinburgh
DNA Sequence Bracelets
Instructions and Equipment List

Key messages

» Genes contain all the instructions needed for a living thing (plant or animal) to grow
» Different versions (alleles) of genes exist that control what we look like
» Genes are made of stretches of DNA
» DNA is made up of four building blocks or bases known as A,C,T and G
» The order of these bases differs between genes and that’s why people have different eye and hair colours
» Children inherit their genes/DNA from their parents

What MRC Scientists do?

» study genes and DNA to learn more about their role in diseases
» try to work out the influence genes have on both health and disease
» By studying genes carried by healthy people and people with diseases, we hope to understand how these diseases are caused, and so how effective treatments could be developed

Activity overview

Participants make a DNA sequence bracelet that codes for eye colour.

Steps

1. Invite participant to select the correct DNA sequence for their eye colour (as marked on the activity sheet.
2. Provide each participant with a bracelet length of two stands of knotted elastic.
3. Help participants to get started by showing them how to thread the beads one at a time. The first bead on the first strand of elastic, the second matching bead on the second strand and so on.
4. Make sure they are matching A to T (green bead to red bead) and C to G (blue bead to yellow bead). If looking for a challenge, cover up the matching sequence with a post-it note.
5. When the sequence is complete knot the two strands together then tie the two ends of the double elastic together to make a bracelet.
Suggested Script and background information

The best way to gauge understanding of participants is to ask them questions like

» Do you think everyone has the same colour eyes or hair?
» What colour are your eyes?

Note that we don’t all have the same colour of eyes or hair because what we look like depends on information that we inherit from our parents.

Today we are going to make a DNA bracelet just for you that is a copy of the pattern sequence of DNA held inside your genes.

Does anyone know what a gene is?

Not to be confused with a pair of trousers!

A gene is a tiny code of genetic information that gives your body instructions. We all have genes inside every single one of our cells. Your genes control the colour of your eyes, hair, skin and everything else about what you look like.

The code in genes is also called DNA.

DNA is made up of 4 different building blocks that have different structures, each block is represented in your bracelet by a different coloured bead.

» A and T always fit together (A = green bead, T = red bead)
» C and G always fit together (C = blue bead, G = yellow bead)
» Other combinations don’t fit

Let’s make everyone a bracelet that matches their eye genes.

Further information

Everyone gets one copy of their eye colour gene from their mum and one from their dad. If you get two blue copies you will have blue eyes, one blue copy and one brown copy gives brown eyes because the brown gene is dominant. Two brown copies gives you brown eyes.

If you have hazel, green or grey eyes it’s more complicated because other genes are involved in deciding these eye colours. MRC Researchers are working hard to understand which genes are involved in deciding how we looks. We all have genes but we all have different combinations and that’s what makes every one of us unique.
Further information on DNA and chromosomes

Every cell in our bodies (except red blood cells) carries all our genetic information packaged tightly into chromosomes and every time we grow the chromosomes are copied and passed onto the new cells.

Cells carry all of the genetic information needed to make an animal, or human, or plant. Women have 22 pairs of chromosomes and two X chromosomes. Men have 22 pairs of chromosomes and one X and one Y chromosome. Scientists study chromosomes to learn about human health.

DNA structure

DNA stand for DeoxyriboNucleic Acid and is made of just four chemical bases that you can think of as building blocks. These are called adenine (A), cytosine (C) and thymine (T) and guanine (G). These bases are arranged in different orders to give each cell in the body a code that tells it what to do. It's a bit like using the letters of the alphabet to spell words, DNA uses A, C, T and G to spell out instructions in groups called genes.

DNA has two strands that wrap around each other in a shape called a double helix. To help DNA stick tightly together the bases match up in pairs. A always partners with T and C always joins up with G. The spiral shape lets DNA wind itself up tight and small. There is about 2 metres of DNA inside each cell.

For further information visit MRC Research
DNA Sequence Bracelets
Equipment List

Staging
This activity is best conducted on tables that participants can stand or sit.

Required
» Coloured beads suitable for threading
  » 4 colours Green, Red, Blue and Yellow 20 beads per bracelet
» Thin elastic cord
» Containers to hold the beads
» DNA Sequence Bracelet Worksheet – print and laminate

Optional
» Double Helix Model
» Cell-Chromosome-DNA Sheet
» MRC Lab Scale/DNA Poster
» Lab coat - one per participant
» Activity evaluation poster - children
DNA SEQUENCE BRACELETS

Worksheet

Every living thing has its own pattern of DNA that controls its shape, size and colour. What you look like depends on the DNA code you inherit from both of your parents.

DNA is made up of four chemicals represented here by the letters A, C, T and G. It has two strands that wrap around each other in a shape called a double helix. To help DNA stick tightly together A always partners with T and C always joins up with G.

You can make a bracelet with coloured beads that matches the DNA you carry for the colour of your eyes.

To make your own DNA Sequence Bracelets you need...

Green, red, blue and yellow beads and two 15cm long strands of thread, wool or thin elastic.

Start by tying the two strands together. Then, follow the DNA code for your eye colour by threading beads one at a time onto the strands. Once you’ve added all the beads, tie the ends of the two strands together to make a bracelet.

Credit: Thanks to www.yourgenome.org for the bracelets concept and Dr Joe Rainger at the MRC Human Genetics Unit for the eye colour codes.
DNA FACTS

- DNA stands for DeoxyriboNucleic Acid
- DNA is in every cell except red blood cells
- There are about 2 metres of DNA inside each cell