Get hands-on with real-life science

DNA Gel Electrophoresis Wall Tank

This photocopiable resource has been developed by the Easter Bush Science Outreach Centre

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THE UNIVERSITY *of* EDINBURGH
Easter Bush
Science Outreach Centre

Instructions

1) Organise pupils into groups (max. 6 pupils per group). Print the sequences (A3 paper) below and cut them, give one or more sequence(s) to each pupil in the group
2) Remind pupils that DNA has two strands, remind them of complementary base paring and ask them to write the 3'->5' missing strand
3) Pupils count the bases in each of their DNA fragments and write the number of bases on the back of their sequence, this indicates the size of DNA fragment
4) Pre-prepare the "DNA gel electrophoresis wall tank" with the lanes (1-6) along the top (assign each group one lane) and the DNA ladder down the left hand side (largest at the top, smallest at the bottom)
5) Remind pupils that gel electrophoresis is a technique used in the lab to separate DNA fragments of different sizes, smaller fragments travel faster than larger fragments
6) Ask pupils to "load the fragment" into the well at the top of the gel and "migrate" it down it position, they then stick their fragments in the correct place

All these DNA used in this activity are real DNA sequences, from GenBank, a genetic sequence data base https://www.ncbi.nlm.nih.gov/genbank/

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TGATGGTAAGCCTCAACACCGCCTGTGGGGTTAGGACTGGCAGCCTCCCATCTCCCGGCAAATTTGTATCCCGAGTATCTGGAAGACAGGCAGACTTTTCGCCACA
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TGTGATAGTTCCTGCAAATTGCAACAATGTACAAGTTCTTTTCAAAAATATGTATCATACAGTCTTTA
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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Learning Objectives

- Gel electrophoresis is a technique used in the lab to separate DNA fragments of different sizes, smaller fragments travel faster than larger fragments, so they move further in a given period of time
- DNA has a negative charge, so it travels from the negative electrode at the top of the tank to the positive electrode at the bottom of the tank

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TCTTGATAACAATCT
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Notes:

- Ensure that your pupils realise that to see DNA using gel electrophoresis in the lab:
  - The DNA has to be stained so the DNA can be see/visualised
  - Lots of DNA fragments of the same size are needed to see a band of DNA on a gel
  - Scientists use techniques such as Polymerase Chain Reaction (PCR) to make billions of copies of a fragment of DNA so that it can be seen on a gel

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GCAAATTTGTATCCCGAGTATCTGGAAGACAGGCAGACTTTTCGCCACA
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TCTTGCTCTTAGGCCTGGCTCCTCCCCAGCATCTTATCCGGGTGGAAGGTCTTGCTCTTAGGCCTGGCTCCTCCCCAGCATCTTATCCGGGTGGAAGG
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GCCTACTTCTACCCTGAGCTTTTCAGACAATTCTACCAGCTGGATGCCTATCCATCTGGTGCCTGGTATTACGTTCCACTAGGCACACAATACACTGATGCCCCATCATTCTCTGACATCCCTAATCCCATTGGCTCTGAGAACAGTG
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