Activity One: How Cancer Starts
Curriculum Links: Chromosomes, DNA and genes, and inheritance
Learning Objective: To know that cancer is caused by damaged DNA

Activity Two: Clinical Trials
Curriculum Links: Experimental skills and investigations
Learning Objective: To select, plan and carry out the most appropriate types of scientific enquiries to test hypotheses

Activity Three: Stop To Stand Up
Curriculum Links: Health, disease and the development of medicines
Learning Objective: To understand the impact of lifestyle factors on the incidence of non-communicable diseases
HOW CANCER STARTS
YOU NEED KNOWLEDGE TO STAND UP TO CANCER

All living things are made up of cells. They are the smallest units of life. Our bodies are made up of approximately a hundred million million cells. You can fit 100 cells on the top of a pinhead.

The nucleus of a cell is the ‘control centre’, which holds the cell’s DNA (deoxyribonucleic acid). Your DNA carries all the instructions to help your body know how to grow, develop and function. Each instruction is carried on a unique piece of DNA called a gene.

Cancer starts when a healthy cell becomes damaged, and starts to multiply out of control. The DNA is copied but there is a mistake. The cell checks to see if everything is okay with the DNA. Usually a cell with damaged DNA will die. But sometimes the cell ignores this warning and continues.

The cell divides, despite the warnings, and the new cells are faulty. The faulty cells no longer have the correct instructions and this causes mistakes. Most of the time these mistakes are harmless, but sometimes these mistakes can build up and cause cells to multiply out of control. This leads to the development of cancer cells.

Watch the How Cancer Starts video (youtu.be/m5_yo6uEeEc) to learn more.

Our cells grow and multiply by a process called mitosis.

Create a visual representation of a strand of DNA. Use various art forms such as sculpture with metal or wood. Host a pop-up exhibition for parents, governors and other members of the school community.

Draw a 2D cell.

Sketch a 3D chromosome.

Outline a strand of DNA.

Investigate the timeline of the discovery and development of DNA. Note your findings below:
CLINICAL TRIALS
YOU NEED KNOWLEDGE TO STAND UP TO CANCER

Stand Up To Cancer funds translational research, which accelerates the speed at which scientific breakthroughs can be turned into treatments for patients. Medical research studies involving people are called clinical trials.

Clinical trials can look at:

- Risks and causes - how genetics, lifestyle and other factors can increase people's risk of cancer
- Preventing cancer - using drugs or changing lifestyle factors to reduce risk
- Screening - for people at higher than average risk, or for the general population
- Diagnosing cancer - new tests or scans
- Treatments - new drugs or combinations of drugs. New ways of giving and new types treatment and new techniques for radiotherapy and surgery
- Controlling symptoms or side effects - new drugs or new techniques for radiotherapy and surgery
- Support and information for people with cancer

Clinical trials are divided into different stages, called phases. The earliest phase trials may look at whether a drug is safe or the side effects it causes. A later phase trial will aim to test whether a new treatment is better than existing treatments.

Phase 1 trials are usually small, recruiting only a few patients. Phase 2 trials may be for people who all have the same type of cancer, or who have several different types of cancer. Phase 2 trials are often larger than phase 1, there may be up to 100 or so people taking part. Sometimes in a phase 2 trial, a new treatment is compared with another treatment already in use, or with a dummy drug (placebo).

Phase 3 trials compare new treatments with the best currently available treatment and usually involve many more patients than phase 1 or 2. This is because differences in success rates may be small so the trial needs many more patients to be able to show the difference.

Crossing the bridge from an idea to a treatment is a long and expensive process, but one that works. Every successful trial is another eureka moment.

Every day scientists come up with new ideas. This is the critical moment for research into cancers. Advances in science have put cures within our grasp.

**Plan your own clinical trial in school.**

What will the trial look like? What information is needed? Who will take part? How many people will take part? What does success look like?

**Develop a class ethics committee to see which clinical trials will be funded.**

The committee makes sure that the trial is well planned, likely benefits of the new treatment are greater than the probable side effects, information for patients taking part is complete and easy to understand, and patients will be recruited correctly. Read about the Research Ethics Committees on the Cancer Research UK website, cruk.org.

Watch the What is Translational Research? animation (youtu.be/FzKMT0CyPxc) to learn more.

Trials aim to find out if a new treatment or procedure is safe and has any side effects; if it works better than or has fewer side effects than the current treatment, and if it will be better at saving lives.

You will raise funds for groundbreaking new cancer treatments and tests.
Tobacco smoking accounts for more than 1 in 4 of all cancer deaths in the UK, and nearly a fifth of all cancer cases. Tobacco was responsible for more than 100 million deaths worldwide in the 20th Century. The World Health Organisation has estimated that, if current trends continue, tobacco could cause a billion deaths in the 21st Century.

Ways to use tobacco include industrially manufactured cigarettes, hand-rolled cigarettes, cigars and pipes, shisha or hookah pipes, and smokeless tobacco (which is chewed, sucked or inhaled).

There is no such thing as safe smoking. Risk of an early death increases the more you smoke but even light or occasional smokers are at higher risk than people who do not smoke.

Breathing in other people’s smoke, called passive smoking, can increase a non-smoker’s risk of getting lung cancer by a quarter.

Chemicals in cigarette smoke enter our bloodstream and can then affect the entire body. This is why smoking causes so many diseases, including at least 14 types of cancer, heart disease and various lung diseases.

Smoking is the most important preventable cause of cancer in the world. For smokers, stopping smoking is the most important thing they can do for their health.

Each cigarette can damage DNA in many cells, but it is the build up of damage in the same cell that can lead to cancer.

Challenge a member of your family or close friend to stop and Stand Up. Stop smoking and donate the cost of their cigarettes to Stand Up To Cancer. The Smoke Free services can help your friend or family member find the best way for them to stop. With this professional support, they’re around three times more likely to quit than going it alone.