Causes of Disease
Causes of Disease

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  - Non-infectious diseases
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What causes disease?

There are many different causes of diseases. Diseases can be divided into two main types according to how they are caused.

**Infectious diseases** can be passed on from person to person, or from an animal to a person. We often say that you can ‘catch’ this type of disease.

**Non-infectious diseases** cannot be caught from another person or animal. These include genetic diseases, diseases caused by diet and lifestyle and diseases caused by aging.
Infectious or non-infectious?

Decide whether the following diseases are infectious or non-infectious. Drag each disease to the correct box.

Press "start" to begin.

HIV
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What are inherited diseases?

Inherited diseases are diseases caused by faulty genetic material that is passed on from parents to offspring. They are sometimes called genetic disorders.

Many inherited diseases are caused by mutations in DNA.

Mutations can be spontaneous or caused by exposure to mutagens, such as radiation and certain chemicals.

There are over 4,000 known inherited diseases, although the specific alleles involved are only known for 25% of them.
Deficiency diseases

Some diseases are caused by not eating enough of a specific substance. These are called deficiency diseases. Match each deficiency to the disease that it can cause.

Press "start" to begin.
Body disorders

Sometimes things go wrong with our bodies, and this can lead to illness.

Insulin helps us convert sugar to glycogen so it can be stored. If a person has diabetes, they cannot do this easily, so sugars remain in their blood. Prolonged high blood sugar levels are dangerous.

Cells in our bodies have the ability to reproduce to help us grow and repair damage. Sometimes this process goes wrong and cell division gets out of control, which can lead to cancer.
Cancer and lifestyles

The way we live can increase or decrease the risk of certain cancers.

This picture shows James during a typical day.

Can you think of any ways in which James could reduce his risk of cancer?
A **tumour** is a swelling caused by abnormal growth and reproduction of cells in an area. If a person develops a tumour, a biopsy will be carried out to see what type of tumour it is.

**Malignant** tumours are caused by aggressive cell growth and they invade surrounding cells. New malignant tumours may form in other tissues.

**Benign** tumours are swellings which are kept in one area of the body. They may be harmless, but sometimes they can cause blockages, squash other tissues or make hormones, which may cause harm.
Benign and malignant tumours

What are the differences between benign and malignant tumours?

**Benign**

**Malignant**

**May invade surrounding tissue**
Press a button to find out more information about the statistics for surviving cancer

- cancer survival rates
- survival rates for prostate cancer
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Organisms that cause disease are called **pathogens**.

What are the four major types of pathogen?

- **bacteria**
- **fungi**
- **virus**
- **protozoa**
Diseases caused by pathogens

Match each pathogen to its image and the diseases it may cause

bacteria, protozoa, infections

Can you remember what examples of each of the main types of pathogen look like? Do you know the diseases associated with each type? Press on an object in each row to match up the correct answers.

Press "start" to begin.

start
Different pathogens have different transmission routes. Brainstorm the ways that pathogens can be transmitted, and think about which diseases are spread using each method. Then press on the buttons in this mind map to check your ideas.

Press "start" to begin.
Tuberculosis (TB) is an infectious disease caused by bacteria. Press on each tab to find out more about this disease.
Healthy people can fight TB

Only one percent of healthy people exposed to TB develop the active disease. People most at risk are those who:

- live in squalid or overcrowded conditions.
- have a weakened immune system

1,000 people exposed to TB

900 uninfected 100 infected

90 dormant TB 10 active TB

7 survive 3 die
UK TB deaths (1913–2004)

Infectious diseases usually decline as living conditions and standards of healthcare improve.
Deaths from TB infections

Press the buttons to draw graphs for each global area showing their annual rate of mortality from TB infections.

What trends do the graphs show?

Press "start" to begin.
Sometimes disease-causing pathogens get passed from animals to humans. We call the animals that carry the pathogens vectors.

Press "play" to find out more.
Malaria is a disease caused by protozoan parasites which are transmitted by a vector – the female Anopheles mosquito.

The symptoms of malaria include feverishness and headaches.

Malaria is a serious disease in tropical areas of the world. Every year there are approximately 250 million cases of malaria, and one million deaths from the disease.

In Africa, one in every five childhood deaths is due to malaria. Every 30 seconds a child in Africa dies from the disease.
Malaria is caused by a protozoan parasite called *Plasmodium*.

Press "play" to find out how mosquitoes act as vectors for malarial parasites.
The distribution of malaria

Malaria is most common in the world’s equatorial regions. The prevalence of malaria is linked to climate, because:

- malarial parasites in the mosquito develop quicker at higher temperatures
- the life span of a mosquito is linked to temperature and humidity
- mosquitoes need water to breed.

Malaria is therefore most common in warm, wet regions. How might climate change affect the number of people at risk from malaria?
Climate change and malaria: scenario for 2050

How is malaria distributed around the world, and how could it have spread by 2050? Press on the boxes to see the current and potential future distribution of malaria. Explore the world map by pressing on the plus and minus tools.

Press "start" to begin.
How could we break the cycle?

Understanding how vectors, such as mosquitoes, spread disease can help us to control these infections. How do you think the spread of malaria could be prevented?

- By killing mosquitoes or preventing them from breeding.
- Taking measures to prevent getting bitten, such as using a repellent.
- Taking measures to prevent protozoa from developing if you are bitten, such as taking anti-malarial medicines.
- Educating other people about how malaria is caused and how they can prevent infection.
Drugs from plants

Plants, as well as animals, can be attacked by pathogens. Plant diseases caused by pathogens include blight and root rot.

Some plants produce chemicals to protect themselves from pathogenic disease. Sometimes these chemicals turn out to be useful for treating human diseases as well. Examples include:

- salicylic acid, on which aspirin is based
- quinine used to treat cramp and malaria
- opiate painkillers, like morphine and codeine.
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Glossary of keywords: causes of disease

**antibiotic** – A chemical that either kills bacteria or inhibits their growth.

**bacteria** – A type of pathogen that can cause diseases including cholera and tuberculosis.

**benign tumour** – A tumour that is localized to one area of the body. Cells in benign tumours do not invade surrounding tissue.

**cancer** – A malignant growth or tumour that is caused by irregular cell growth and division.
Have you caught the biology bug?
See how much you know about causes of disease.

Press "start" to begin.