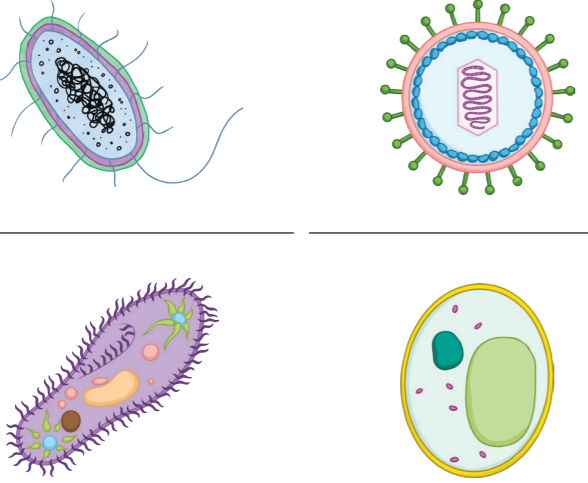


a
Write a definition for each type of disease and give two examples.
communicable disease: _____

non-communicable disease: _____

b
Label the pathogens below that cause infectious diseases.



c
Name three ways that pathogens are spread and give at least one example.

1. _____

2. _____

3. _____

d
How do pathogens cause disease? Fill in the gaps.

_____ reproduce rapidly by _____
_____. They may produce _____ that damage tissues and make us feel ill.

_____ take over the cells of your body. They live and rapidly _____ inside. This causes cell damage.

e
Simple hygiene measures are one of the most effective ways of preventing the spread of pathogens.

List five ways we can be more hygienic below:

1. _____

2. _____

3. _____

4. _____

5. _____

f
List three other methods for preventing the spread of pathogens.

1. _____

2. _____

3. _____

g
Salmonella
What type of pathogen is it caused by?

What are the symptoms?

How is it spread?

What can we do about it?

h
Measles
What type of pathogen is it caused by?

What are the symptoms?

How is it spread?

What can we do about it?

i
Tobacco Mosaic Virus
What type of pathogen is it caused by?

What are the symptoms?

How is it spread?

What can we do about it?

j
Gonorrhoea
What type of pathogen is it caused by?

What are the symptoms?

How is it spread?

What can we do about it?

k
HIV
What type of pathogen is it caused by?

What are the symptoms?

How is it spread?

What can we do about it?

l
Malaria
What type of pathogen is it caused by?

What are the symptoms?

How is it spread?

What can we do about it?

m
Rose Black Spot
What type of pathogen is it caused by?

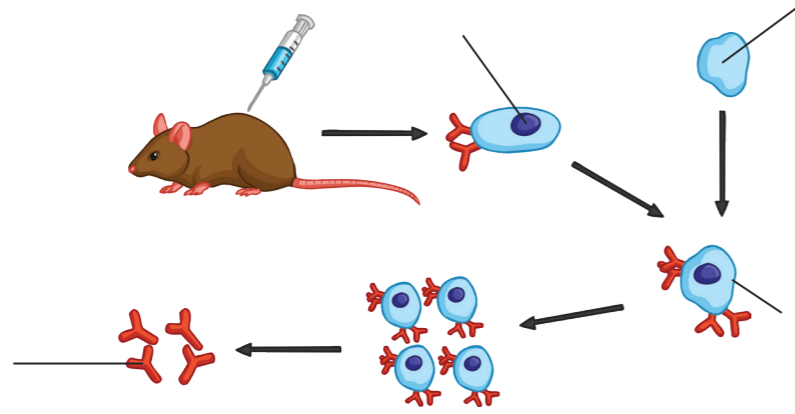
What are the symptoms?

How is it spread?

What can we do about it?

Label the diagram with the following keywords:

- lymphocyte
- monoclonal antibodies
- hybridoma
- tumour cell



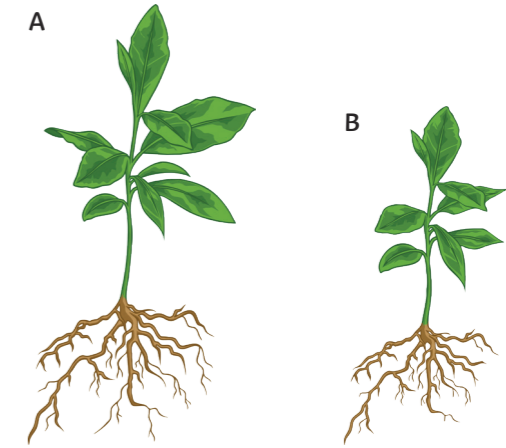
a

Give an example of a plant disease caused by each type of pathogen below.

virus: _____
 fungus: _____
 insect: _____

h

Plant B has an ion deficiency.



Identify which ion is deficient.

Explain how this ion deficiency causes the condition in the diagram.

k

Monoclonal antibodies are specific. What does this mean?

b

Explain how monoclonal antibodies can be used to treat cancer.

e

Why are monoclonal antibodies less widely used than intended when they were first developed?

c

Describe five ways in which monoclonal antibodies can be used.

1. _____
2. _____
3. _____
4. _____
5. _____

d

List seven ways that you can tell if a plant is diseased.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____

f

This plant has an ion deficiency.



Identify which ion is deficient.

Explain how this ion deficiency causes the condition in the diagram.

i

Name three physical defence responses that help a plant to defend against microorganisms.

1. _____
2. _____
3. _____

l

Give three ways to identify plant diseases.

1. _____
2. _____
3. _____

g

Name three mechanical adaptations that plants have to protect themselves against herbivores.

1. _____
2. _____
3. _____

j

Name two chemical plant defence responses.

1. _____
2. _____

m

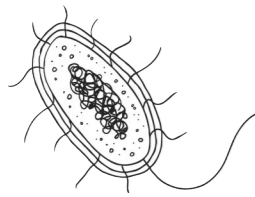


Write a definition for each type of disease and give two examples.

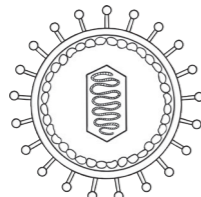
communicable disease: **Caused by pathogens and can be passed from one person to another. Possible examples: measles, salmonella, gonorrhoea, HIV, tobacco mosaic virus, rose black spot, malaria.**

non-communicable disease: **Can not be passed on from one person to another. Possible examples: heart disease, diabetes, cancer.**

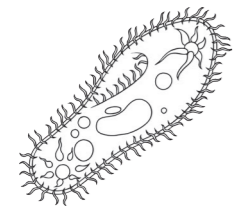
Label the pathogens below that cause infectious diseases.



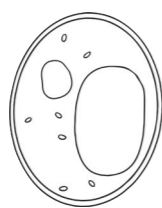
bacteria



virus



protist



fungi

Name three ways that pathogens are spread and give at least one example.

1. **By air: cold, flu, tuberculosis.**
2. **By direct contact: malaria, STDs, HIV.**
3. **By water: cholera, salmonellosis.**

How do pathogens cause disease? Fill in the gaps.

Bacteria reproduce rapidly by **binary fission**. They may produce **toxins** that damage tissues and make us feel ill.

Viruses take over the cells of your body. They live and rapidly **reproduce** inside. This causes cell damage.

Simple hygiene measures are one of the most effective ways of preventing the spread of pathogens.

List five ways we can be more hygienic below:

1. **Washing hands after going to the toilet, before cooking or eating and after contact with animals or sick people.**
2. **Using disinfectants on surfaces.**
3. **Keeping raw meat away from food that is eaten uncooked.**
4. **Coughing or sneezing into a tissue.**
5. **Keeping agricultural machinery, and people using it, clean to prevent the spread of plant diseases.**

List three other methods for preventing the spread of pathogens.

1. **Keep infected individuals in isolation.**
2. **Destroy the vectors that carry pathogens.**
3. **vaccination**

Salmonella

What type of pathogen is it caused by?
bacteria

What are the symptoms?
Fever, abdominal cramps, vomiting and diarrhoea.

How is it spread?
Eating undercooked food or food contaminated from contact with raw meat, e.g. raw chicken.

What can we do about it?
Poultry are vaccinated to control the spread.

Measles

What type of pathogen is it caused by?
virus

What are the symptoms?
A fever and red rash on the skin. Can be fatal if there are complications.

How is it spread?
By air - the inhalation of droplets from coughs and sneezes.

What can we do about it?
There is no treatment, so young children are vaccinated against it.

Tobacco Mosaic Virus

What type of pathogen is it caused by?
virus

What are the symptoms?
Mosaic discolouration of the leaves which reduces photosynthesis and affects the growth of the plant.

How is it spread?
Direct contact between diseased plant material and healthy plants. Insects can also act as vectors.

What can we do about it?
TMV resistant strains. Good hygiene and pest control.

Gonorrhoea

What type of pathogen is it caused by?
bacteria

What are the symptoms?
Thick yellow or green discharge from the vagina or penis and pain on urinating.

How is it spread?
sexual contact

What type of pathogen is it caused by?
Treat with antibiotics. Use a barrier method of contraception.

HIV

What type of pathogen is it caused by?
virus

What are the symptoms?
Initially causes a flu-like illness. Damages the immune system so that it can't deal with other infections or cancers.

How is it spread?
Sexual contact or exchange of bodily fluids, such as blood.

What can we do about it?
Antiretroviral drugs help to stop the virus attacking the immune system. There is no cure or vaccine.

Malaria

What type of pathogen is it caused by?
protist

What are the symptoms?
Recurrent fever - can be fatal.

How is it spread?
Mosquitoes act as a vector, passing the protist to the human bloodstream when they feed on the blood.

What can we do about it?
Preventing the vectors (mosquitoes) from breeding. Using mosquito nets and repellents to avoid being bitten. Taking antimalarial drugs.

Rose Black Spot

What type of pathogen is it caused by?
fungus

What are the symptoms?
Purple or black spots develop on the leaves. Leaves turn yellow and fall off prematurely which reduces photosynthesis, affecting the growth of the plant.

How is it spread?
Spores are carried by water or wind.

What can we do about it?
Use fungicides to treat the plant. Remove and destroy affected leaves.

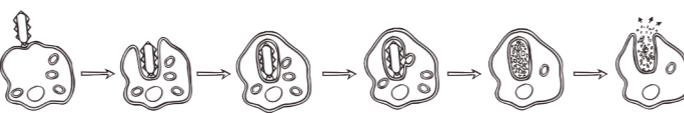
Explain how your skin prevents microorganisms getting into your body.

It acts as a barrier to prevent pathogens reaching the tissues beneath. Platelets quickly form scabs to seal any cuts.

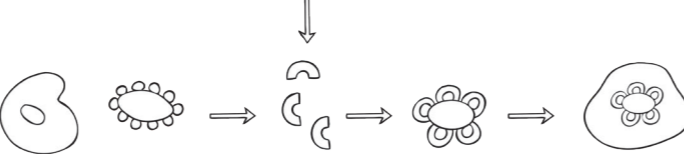
It produces antimicrobial secretions to kill pathogens.

It is covered with microorganisms that act as an extra barrier to entry.

Describe each role of a white blood cell and explain how it protects you against disease.



Some white blood cells ingest pathogens, digesting and destroying them.

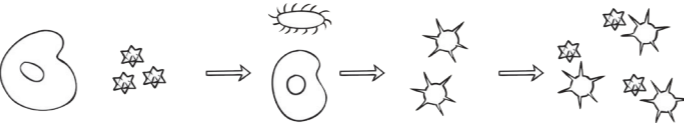


Some white blood cells produce antibodies which are chemicals that target specific pathogens and destroy them. An antibody only works for one type of pathogen.

Explain how the respiratory system is adapted to reduce the entry of microorganisms.

The lining of the nose produces mucus and is full of hairs to trap particles in the air that may contain pathogens.

The lining of the trachea and bronchi produce mucus which is moved to the back of the throat by the cilia projections of epithelial cells.



Some white blood cells produce antitoxins that counteract the toxins released by pathogens.

Explain how the digestive system is adapted to reduce the entry of microorganisms.

The stomach produces hydrochloric acid that destroys pathogens.

Tick the correct boxes.

	Treats Symptoms	Kills Bacteria	Kills Viruses
painkillers	✓		
antibiotics		✓	

Define the following terms:

vaccine: **Dead or inactivate form of a disease-causing microorganism.**

antigen: **Unique protein on the surface of cells.**

antibody: **Produced by white blood cells to recognise specific antigens.**

herd immunity: **When vaccination of a significant proportion of the population provides protection for individuals who are not immune.**

Describe how vaccinations prevent illness.

1. **Introduce small quantities of dead or inactive virus;**
2. **this stimulates white blood cells to produce antibodies;**
3. **if the live pathogen enters the body, the white blood cells recognise it and respond quickly so you don't get ill.**

Fill in the missing words:

The use of **antibiotics** has greatly reduced the deaths from infectious **bacterial** diseases. However, the evolution of strains that are **resistant** to antibiotics is a concern.

Antibiotics are specific which means they **only work against certain bacteria.**

State where the following drugs were discovered.

the heart drug digitalis: **foxglove**

the painkiller aspirin: **willow**

the antibiotic penicillin: **Penicillium mould**

Who discovered penicillin?
Alexander Fleming

Why is it difficult to discover new medicines?
You need to find a chemical that kills bacteria without damaging human cells.

Where do most new drugs now come from?

Synthesised by chemists in a lab, but they might still start from a chemical extracted from a plant.

What has to happen before a drug can be used?

1. **Test whether the drug is effective against the disease.**
2. **Check that the drug is not toxic.**
3. **Work out what dose to use.**

Describe each process of drug testing.

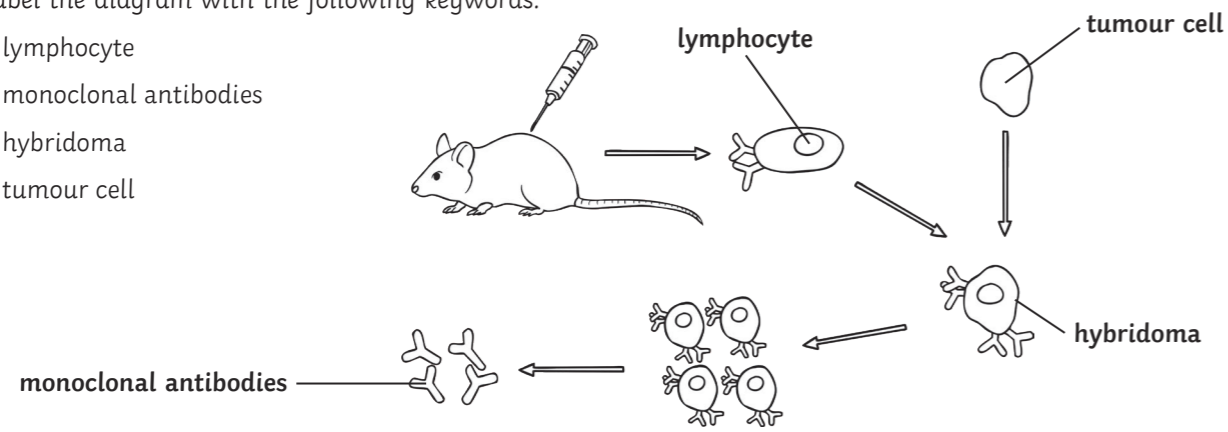
preclinical testing: **This happens in a laboratory using cells, tissues and animals.**

clinical trials: **To use healthy volunteers and patients. Starting off with very low doses to check for side effects. If it is safe it is tested on patients.**

double-blind trials: **These tell you how effective a medicine is. Neither the patient or the doctor know whether the patient has been given a placebo or the real drug.**

Label the diagram with the following keywords:

- lymphocyte
- monoclonal antibodies
- hybridoma
- tumour cell



a

Give an example of a plant disease caused by each type of pathogen below.

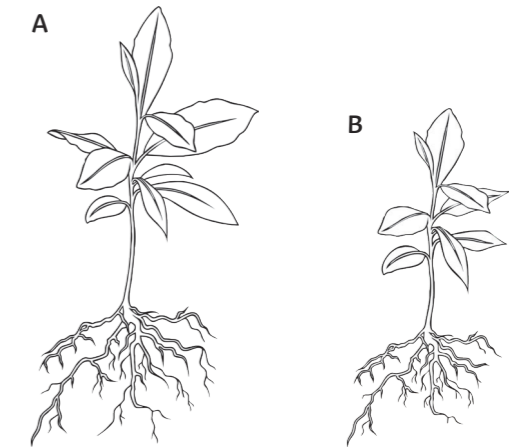
virus: **tobacco mosaic virus**

fungus: **black spot**

insect: **aphids**

h

Plant B has an ion deficiency.



k

Monoclonal antibodies are specific. What does this mean?

They only bind to one antigen. This means they can be used to target a specific chemical or cell in the body.

b

Explain how monoclonal antibodies can be used to treat cancer.

The antibody can be bound to a radioactive substance, a toxic drug or a chemical which stops cells growing and dividing. It delivers the substance to the cancer cells and because it is specific to the cancer cells, it doesn't harm other cells in the body.

e

Why are monoclonal antibodies less widely used than intended when they were first developed?

They create more side effects than expected.

c

Describe five ways in which monoclonal antibodies can be used.

1. **For diagnosis, such as in pregnancy tests.**
2. **For measuring the levels of chemicals (such as hormones) in the blood.**
3. **For detecting pathogens.**
4. **For research, to identify or locate specific molecules in cells or tissues.**
5. **To treat some diseases.**

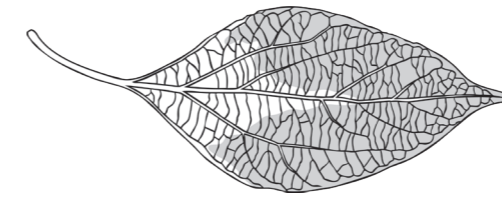
d

List seven ways that you can tell if a plant is diseased.

1. **stunted growth**
2. **spots on leaves**
3. **areas of decay/rot**
4. **growths**
5. **malformed stems or leaves**
6. **discolouration**
7. **pests**

f

This plant has an ion deficiency.



i

Identify which ion is deficient.

magnesium

Explain how this ion deficiency causes the condition in the diagram.

Magnesium is needed to make chlorophyll. The leaves become yellow because there isn't enough chlorophyll. This is called chlorosis. Plant growth will slow down because the plant cannot photosynthesise fully.

Identify which ion is deficient.

nitrate

Explain how this ion deficiency causes the condition in the diagram.

Nitrate ions affect protein synthesis. They help a plant to convert the sugars made in photosynthesis into proteins needed for growth. This means if there isn't enough nitrate, the plant will have stunted growth.

l

Name three physical defence responses that help a plant to defend against microorganisms.

1. **cellulose cell walls**
2. **Tough waxy cuticle on leaves.**
3. **Layers of dead cells around stems (bark on trees) which fall off.**

Give three ways to identify plant diseases.

1. **Reference a gardening manual or website.**
2. **Identify the pathogen in a laboratory.**
3. **Use a testing kit containing monoclonal antibodies.**

g

Name three mechanical adaptations that plants have to protect themselves against herbivores.

1. **Thorns and hairs to deter animals.**
2. **Leaves that droop or curl when touched.**
3. **Mimicry to trick animals.**

j

Name two chemical plant defence responses.

1. **antibacterial chemicals**
2. **poisons to deter herbivores**

m