OBJECTIVES

1. Understand that the human body has specialised cells that perform specific functions
2. Understand that cells within the body produce proteins and sugars
3. Describe the role of mucus production in the body

BACKGROUND INFORMATION

Mucus is vital for good health. It performs many roles in our bodies:
- It helps to protect the lungs by removing particles from our airways
- Prevents tissues from drying out
- Protects the body from invading pathogens (disease causing agents such as bacteria, viruses and fungi)

Mucus is a water-based liquid that contains proteins, carbohydrates, salt and some cells. The primary types of proteins are the mucins, which have a sugar coating that enables them to absorb large quantities of water. This gives mucus its characteristic consistency and wetting properties. Apart from the mucins, the other proteins present hold the key to the protective functions of mucus. These include antibodies that kick start the body's defences against invading pathogens and antiseptic enzymes, such as lysozyme, that can directly kill bacteria.

Mucus can also protect the lungs because it is sticky meaning that it can trap particles of dust, dirt, bacteria and pollen that could otherwise cause irritation and infection. But once the particles are firmly lodged like this they need to be disposed of and this is achieved by coughing, sneezing and nose-blowing.

Mucus is secreted by mucous membranes, of which there are many in the human body. Mucous membranes are a lining of epithelial cells, continuous with the skin, which protect the cavities and canals of the body that come into contact with the outside world, including our lips, ears, nostrils, mouth, digestive tract, genitals and anus.

Within the mucous membrane is a specialised cell type which, due to its characteristic shape, is known as a goblet cell. The sole function of the goblet cell is to produce mucus, although other cells can make it too. The mucin proteins are packaged in small sacks, called vesicles, which then make their way to the edge of the cells. They subsequently fuse with the membrane (plasma membrane) that surrounds the cell, enabling the contents to be released. As the mucin is released and soaks up water it can expand up to 600 times. Indeed, it is estimated that a healthy nose will pump out more than a litre of mucus a day, although the amount can vary enormously; for example when you cry most of your tears will run into the nose and mix with the mucus, increasing its volume. This is why crying is often accompanied by a runny nose. Also, as one of the roles of mucus is to remove particles, mucus production is stimulated by airway infection and irritation. For example, hayfever sufferers may experience a runny nose as the body attempts to flush out the problem pollen that's triggering the effect.

ACTIVITY
In this activity you will use sugars (golden syrup) and proteins (gelatine) to make your own mucus. You will find your mucus is sticky and stringy just like the real thing!!

WHAT YOU NEED
- Golden syrup
- Unflavoured gelatine 2x sachets
- Measuring cup or beaker
- Water
- Microwave, hotplate, or kettle
- Green food colouring
- Fork

WHAT TO DO
1. Heat 1/3 cup of water until it boils
2. Take the pan off the heat and add a drop of food colouring
3. Sprinkle in 2 sachets of gelatine
4. Let it soften for a few minutes and stir with a fork
5. Add enough corn syrup to make ¾ cup of mixture
6. Stir with a fork and lift out the long strands of gunk
7. As it cools, you’ll need to add more water, spoonful by spoonful.
QUESTIONS/ANSWERS

1. What happened when you put some dust into your fake mucus? Why would your body need this to happen? *The fine dust becomes trapped in the mucus. Your body needs this to happen so that dust, pollen from the air can be trapped to prevent moving into airways.*

2. Which ingredient do you think helped make the mucus long and stringy? *Protein/gelatine*

3. Which ingredient do you think made your mucus sticky? *Sugar/Golden syrup*

4. Your stomach has hydrochloric acid inside. This acid is strong enough to eat through a piece of metal zinc. Why doesn’t it eat through your stomach? *The inside or your stomach is lined with a thick layer of mucus protecting it against the hydrochloric acid. Your stomach makes a new layer of mucus every two weeks, otherwise it would digest itself.*

5. What colour is your mucus usually? *Mucus is usually white or clear. The health of a person can be determined by the colour of their mucus.*
   *Brown and brown grey is common in smokers*
   *Rusty colour can indicate something serious eg. Bleeding from the airways*
   *Yellow or green is usually a sign of infections*

6. Why do you think some smokers of brown to brown/grey mucus? *This is caused by cigarette tar sticking to the mucus.*

CURRICULUM

Essential Learnings Year 5:
Structures of living things have particular functions.

Essential Learnings Year 7:
Cells are the basic unit of all living things and perform functions that are needed to sustain and reproduce life.

Essential Learnings Year 9
Complex organisms depend on interacting body systems to meet their needs internally and with respect to their environment.

REFERENCES
