

### OVERVIEW

Aimed at **key stage 3** pupils.

In this activity, the class will learn about the structure of a cell using a model made up of everyday items.

### LEARNING OBJECTIVES

- Cells contain many components, including the nucleus that contains DNA

### CURRICULUM LINKS

- KS3:** Life processes are supported by the organisation of cells into tissues, organs and body systems

### PREPARATION

- Gather the following resources:
  - Duvet cover
  - Pillow case
  - Balloons (anticipate using 20 in total)
  - Socks (23 pairs ideally)
  - Option of making other organelles if you feel creative (eg. bubble wrap taped into balls could be used to form mitochondria). Let your imagination run wild!
- Place the socks inside the pillowcase to represent chromosomes inside the nucleus.
- If possible, begin to unravel the wool/cotton from one of the socks to demonstrate that chromosomes (socks) are made of DNA (wool).
- Place the pillowcase and balloons etc inside the duvet cover, which represents the cell membrane.
- You could involve the class in blowing up the balloons or making the organelles to fill the cytoplasm or prepare them yourself.

### Activity

- Take the model apart with the class, discussing each object and what it represents
- Explain that DNA has to be tightly coiled and carefully packaged into chromosomes to keep the DNA organised.
- Class complete worksheet.
- This activity can easily be linked with the **Pairing the socks** activity.
- Option of watching **What "genes" means** animation from Genes Are Us website

#### Points to potentially discuss when looking at the model:

- The size of real cells (the largest human cell is the egg which can be seen by the human eye. An excellent website exists that shows how the size of an egg cell relates to other structures eg. a grain of rice – see further information below).
- What job each component does within the cell
- The differences between plant and animal cells
- That the cytoplasm is not just made up of water, but contains many other substances and also contains important organelles.

### ANSWERS

| Object             | What does it represent? | What is its job in the cell?   |
|--------------------|-------------------------|--|
| Duvet case         | Cell membrane           | The layer on the outside of a cell that controls what can move in and out of the cell.   |
| Pillow case        | Nuclear membrane        | The layer surrounding the nucleus.   |
| Socks              | Chromosomes             | They are made of DNA and keep genetic information organised into packages.   |
| Wool/cotton/thread | DNA                     | Contains the genetic information – that helps your body to grow, develop and function.   |
| Balloons           | Cytoplasm               | This is the fluid around the nucleus of a cell. It has a number of roles, including helping to move materials around the cell. |

### FURTHER information

There are obviously lots resources to help pupils understand cell structure and scale.

Our favourite that demonstrates the size of cells is an excellent page on the Utah Genetic Science Learning Centre's website:

<http://learn.genetics.utah.edu/content/begin/cells/scale/>

FOR MORE RESOURCES LIKE THESE AND TO SIGN UP FOR JEANS FOR GENES DAY, VISIT US AT [WWW.JEANSFORGENES.ORG](http://WWW.JEANSFORGENES.ORG)

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# THE BIGGEST CELL YOU'VE EVER SEEN

Draw a diagram of the model of a cell in this box and include labels for:



Cell membrane



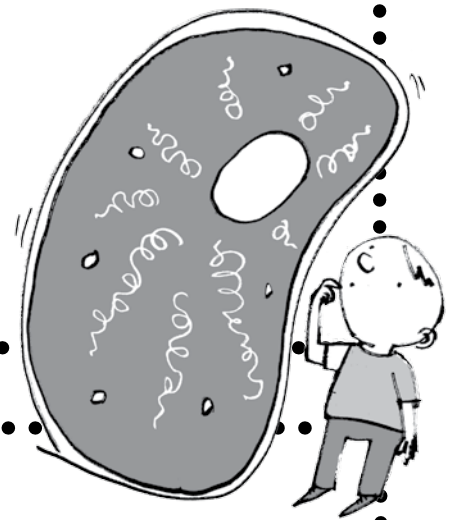
Nucleus



Chromosomes



Cytoplasm

Fill in the blanks in the table below.

| Object      | What does it represent? | What is its job in the cell?   |
|-------------|-------------------------|--|
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| Pillow case | Nuclear membrane        | The layer surrounding the nucleus.   |
|             |                         | They are made of DNA and keep genetic information organised into packages.   |
|             | DNA                     |  |
| Balloons    |                         | This is the fluid around the nucleus of a cell. It has a number of roles, including helping to move materials around the cell. |

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