What is Cystic Fibrosis and How Does It Affect the Body?

KS4 Lesson Plan
Science/biology

Learning objectives

- Define the terms non-communicable disease and inherited disorders.
- Describe the main symptoms experienced by people with CF.
- Explain how CF is inherited and how the main classes of CFTR mutation affect the body.

Resources required

- Lesson Presentation
- CF Guided Reading Sheet
- CF Information Sheet (including puberty and fertility)
- CF Information Sheet (without puberty and fertility)
- True or False Quiz

Key vocabulary

Cystic fibrosis, lungs, digestive system, mucus, disease, condition, respiratory, heredity (noun), hereditary (adjective), genes, genetic, mutation, enzymes, pancreas, physiotherapy, CFTR, antibiotics, calories, non-communicable, SMI, protein.

Prior learning

No specific prior learning or knowledge is required but understanding of the nature of disease and infection may prove useful.

Special considerations

We know that CF is often discussed in schools when teaching about genetics and genetic conditions. If you have a young person with CF in your class, this lesson could be difficult for them. We've created a factsheet for teachers full of important information that can help you with teaching a lesson on CF.

Special considerations

This lesson mentions puberty and fertility on the **CF Information Sheet (including puberty and fertility)**. Be mindful of any children with CF who may be in the class and may find discussions of puberty and fertility particularly embarrassing. Use your discretion and use the **CF Information Sheet (without puberty and fertility)**, if more appropriate. You could just say male and female fertility can be affected in CF, however improved treatments mean more and more adults with CF are becoming parents.

Be mindful of the fact that some children may share details of their health conditions (CF and other conditions) during discussion and group work activities. Consider how you will support any students who may find the content of this lesson challenging, in line with your school policy. This may include signposting students to external organisations.

Time	Main activity	Notes and key questions
10 mins	Use the **Lesson Presentation** to introduce the lesson title and the learning objectives. As a starter activity, instruct the students to try and match the name of the condition with the relevant description. They can do this by writing 1 - B, for example, rather than writing out the full description. They should then attempt to identify what the three conditions have in common.	The correct answers can be displayed using slide 4 once students have made their attempts.
5 mins	Use slide 5 to explain how all three diseases in the starter activity were inherited diseases that are passed down from parental genes and that they do not 'spread' like Covid 19 or influenza. Give the students the task of defining the terms 'inherited disorders' and 'non-communicable disease'.	The degree of explanation required from you will vary depending on the students current knowledge and understanding.

Time	Main activity	Notes and key questions
25 mins	Introduce the condition CF and tell students that they'll be watching a video about it. Ask the students to note down something that they already knew about CF, two things they learned and one thing that surprised them while watching. Play the video on slide 7, then share the students notes as a class. Hand out the **CF Information Sheets** and set the students the task of closely reading and summarising some of the main effects of CF. Share and discuss the answers as a class.	This provides the opportunity for students to share existing knowledge and also any preconceptions that students may hold to be addressed. A random name selector could be useful here to ensure a wide variety of voices are heard.
15 mins	Hand out the **CF Guided Reading Sheets**. Set the students the task of closely read the text. Then for each paragraph, they should underline three keywords or terms. In the spaces underneath the paragraph, they write a definition for each term based on the context that they have read it in Finally, they are to come up with a title for each paragraph that neatly summarises its contents. Share and discuss students' responses. Explain that although CF is a lifelong condition, there are many treatments available. Ask students to answer questions as they watch another video, which is on slide 11.	You may choose to put a word limit on the length of the title and ask students to explain their choice of key terms. Depending on time available and the ability of the students, you can amend these questions to provide varying levels of challenge.
5 mins	Revisit the learning objectives on slide 12 and hand out the **True or False** Quiz sheets as a plenary activity to assess students' learning.	Share the answers or collect named slips from students at the end of the lesson.

Lesson reflections / next steps / teacher notes

Assessment criteria

Define the terms non-communicable disease and inherited disorders.
Describe the main symptoms experienced by people with CF.
Explain how CF is inherited and how the main classes of CFTR mutation affect the body.

Further learning opportunities

- As part of the non-communicable disease in humans aspect of the GCSE biology course, students could research and explore other non-communicable diseases that are not inherited. These include lung cancer, type 2 diabetes and liver cirrhosis.

Home learning opportunities

- Students can research other treatments for people with CF that we have not looked at today.
- Students can research recent developments in genetic therapies for people with CF and what this might mean future treatments in the future.