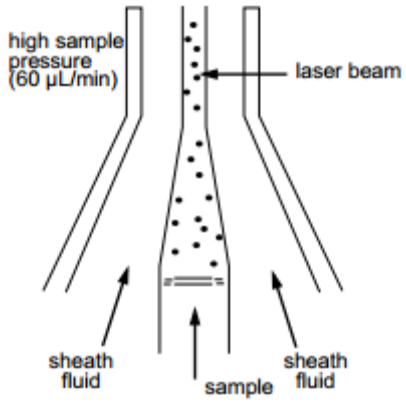
Flow Cytometry Worksheet

Flow cytometry is a technology that measures and then analyses multiple physical characteristics of single **p_ _ _ _ _ _ _ _s**, usually cells, as they flow in a **f_ _ _d** stream through a **b_ _m** of light. The properties measured include a particles' relative size, relative **g_ _ _ _ _ _ _ _ _y** or internal **c_ _ _ _ _ _ _ _y**, and relative **f_ _ _ _ _ _ _ _ _ _e** intensity. These characteristics are determined using an optical-to-electronic coupling system. This system records how the cell or particle **s_ _ _ _ _ _s** laser light and **e_ _ _s** fluorescence.

A flow cytometer is made up of three main systems: fluidics, optics and electronics.



The fluidics system transports particles in a stream to the laser beam for interrogation.

The optics system consists of lasers to **i_ _ _ _ _ _ _ _e** the particles in the sample stream and optical filters to direct the resulting light signals to the **a_ _ _ _ _ _ _ _ _e** detectors.

The electronics system **c_ _ _ _ _ _s** the detected light signals into electronic signals. These signals can then be **p_ _ _ _ _ _ _d** by the computer.

In the flow cytometer, particles are carried to the laser intercept in a fluid stream. Any suspended particle or cell from 0.2-150 micrometers in size is suitable for analysis. The portion of the fluid stream where particles are located is called the sample core. When particles pass through the laser intercept, they scatter laser light. Any fluorescent molecules present on the particle fluoresce. The scattered and fluorescent light is collected by appropriately positioned **l_ _ _ _s**. A combination of beam splitters and filters brings the scattered and fluorescent light to the appropriate detectors. The detectors produce electronic signals. These signals correspond with the optical signals striking the detectors.

Questions:

1 What properties of a cell or particle can be measured by a flow cytometer?

_____

2 What light source is used in most flow cytometers?

_____

3 What are the three main systems in a flow cytometer?

_____

4 What is the name given to the portion of the fluid stream where the cells are located?

_____

5 When cells labeled with fluorescent molecules pass through the focused laser beam, what two types of light signals are generated?

_____

6 Light emitted from a particle is collected by

Flow cytometry – listening

A Match these words to make collocations:

1 compare	a cells through the cytometer
2 treat	b cells into a single file
3 put	c through the laser beam
4 pass	d to the blood
5 detect	e patients
6 spread	f results
7 label	g leukaemia
8 align	h with a fluorescent antibody

B Listen and decide if the statements are true or false.

1 Dr Wallace meets a lot of patients every day.
2 He mentions three examples of samples he works with.
3 As examples of antigens, CD4, leukaemia and lymphoma antigens are talked about.
4 As part of his job, he looks for ways to eradicate minimal residual disease.
5 The flow cytometers in their laboratory can handle up to 70 000 cells per hour.
6 With their equipment, they can find one cell out of 500 000.
7 They are able to get results in two hours.
8 Cytogenetics and the molecular are mentioned as examples of ancillary tests.

Vocabulary warm-up

1 Particles	odpovídající, příslušný
2 Fluid	vydávat, vyzařovat
3 Beam	čočky
4 Granularity	optická lavice/soustava
5 Complexity	zpracovat
6 Fluorescence	granularita
7 Emit	částice
8 Scatter	paprsek
9 Illuminate	složení (buňky)
10 Appropriate	kapalina
11 Convert	světélkování
12 Process	laločnatost
13 Lenses	rozptýlit
14 Lobularity	osvítit, ozářit
15 Optical bench	přeměnit

Grammar point

Past perfect (předminulý čas)

15.1 **Read the situations and write sentences from the words in brackets.**

1 You went to Sue's house, but she wasn't there.
(she / go / out) She had gone out.
2 You went back to your home town after many years. It wasn't the same as before.
(it / change / a lot) .....
3 I invited Rachel to the party, but she couldn't come.
(she / arrange / to do something else) .....
4 You went to the cinema last night. You got to the cinema late.
(the film / already / start) .....
5 It was nice to see Daniel again after such a long time.
(I / not / see / him for five years) .....
6 I offered Sue something to eat, but she wasn't hungry.
(she / just / have / breakfast) .....

15.2 **For each situation, write a sentence ending with never ... before. Use the verb in brackets.**

1 The man sitting next to you on the plane was very nervous. It was his first flight.
(fly) He'd never flown before.
2 Somebody sang a song. I didn't know it.
(hear) I ..... before.
3 Sam played tennis yesterday. He wasn't very good at it because it was his first game.
(play) He .....
4 Last year we went to Mexico. It was our first time there.
(be there) We .....

15.4 **Put the verb into the correct form, past perfect (I had done) or past simple (I did).**

1 'Was Paul at the party when you arrived?' 'No, he had gone (go) home.'
2 I felt very tired when I got home, so I ..... (go) straight to bed.
3 The house was very quiet when I got home. Everybody ..... (go) to bed.
4 Sorry I'm late. The car ..... (break) down on my way here.
5 We were driving along the road when we ..... (see) a car which ..... (break) down, so we ..... (stop) to help.