**Job ads: Cell structures wanted!**

Imagine if cell structures had to apply for their jobs.

Here’s what the job adverts could look like:

***Management position in the cell***

We require an individual to manage cells activities. You will be responsible for controlling reactions within the cell. Part of your job will also be to determine when the cell reproduces. Other roles include storing most of the cell’s DNA. You will be required to work animal and plants cells, but not bacteria.

*Salary: £65K per year + Bonus*

**Storage specialist required**

We need a large storage structure to be located in the middle of a cell.

* This position is available in plant cells where you will store large amounts of water and sugars (cell sap).
* In times of need you will release water to other parts of the cell.

Salary: £20,000 per year

**Are you tough and strong?**

This is a security job working on the outside of plant cells. You will surround the plant cell membrane with a rigid and strong structure to stop the cell bursting when water is taken up.

**Salary: £10K**

*Ever wanted to control what can enter and leave a cell?*

You will be needed in to work in all types of cells where your main duties will include allowing cell parts to receive useful material such as oxygen and digested food. You will allow waste material to leave the cell.

**Interested in a career supporting cell reactions?**

We are looking for an individual with the following qualities:

1. Liquid where reactions can take place.
2. Ability to store water and other chemicals.
3. You will be located in all types of cells.

£7.50 per hour

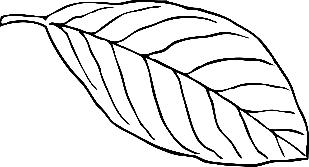
***BUSY BUSY BUSY***

Highly energetic individuals wanted

Cell organelles needed that can perform respiration reactions to release energy from food in plant and animal cells. We will provide oxygen and food, and you will give us the energy needed for cell activities including movement and reproduction. In the muscles and liver you will be working in large numbers. Salary by negotiation.

**Ever wanted to work in a leaf?**

Sun-loving cell structures needed to make food. Your job will be managing the reactions of photosynthesis. We will provide you with water and carbon dioxide. This role will also see you working closely with the green chemical chlorophyll to absorb light. £25K per year.



**To do**

Join each **cell structure** to the correct **job advert title**.

|  |  |  |
| --- | --- | --- |
| **Cell structure** |  | **Job advert title** |
|  |  |  |
| cell wall |  | BUSY BUSY BUSY |
|  |  |  |
| cytoplasm |  | Ever wanted to work in a leaf? |
|  |  |  |
| cell membrane |  | Storage specialist required |
|  |  |  |
| chloroplasts |  | Are you tough and strong? |
|  |  |  |
| nucleus |  | Interested in a career supporting cell reactions? |
|  |  |  |
| mitcohondria |  | Management position in the cell |
|  |  |  |
| vacuole |  | Ever wanted to control what can enter and leave a cell? |

*Biology > Big idea BCL: The cellular basis of life > Topic BCL1: Cells > Key concept BCL1.2: Cells and cell structures*

|  |
| --- |
| **Response activity** |
| **Job ads: Cell structures wanted!** |

**Overview**

|  |  |
| --- | --- |
| Learning focus: | Organisms are made up of one or more cells, which have common structures that carry out life processes. |
| Observable learning outcome: | Identify subcellular structures and their functions. |
| Activity type: | Role play, discussion |
| Key words: | cell, organelle |

This activity can help develop students’ understanding by addressing the sticking-points revealed by the following diagnostic question:

* Diagnostic question: Organ or organelle?

**What does the research say?**

Researchers (Arnold, 1983; Dreyfus and Jungwirth, 1988; Driver et al., 1994) have reported a number of misunderstandings that students have about cells, including:

* poor or no appreciation of size and scale
* animistic and anthropomorphic views, including that cells and cell organelles can have faces, limbs, internal organs or the ability to speak.

Dreyfus and Jungwirth (1988) found that many 16-year-olds struggled to explain how cells carry out life processes. Many of the students thought that cells contain macroscopic organs such as a digestive tract (e.g. for nutrition) or lungs (e.g. for respiration). Even students who could identify the correct cell organelles could not explain how they carry out their functions, especially how the nucleus ‘controls’ the structure and functions of a cell.

Some researchers (e.g. Cherif et al., 2016) have suggested that getting students to role-play as cell organelles can help to engage them in deep learning about cell structures and promote conceptual change.

**Ways to use this activity**

Students should complete this activity in pairs or small groups to discuss the job adverts and reach a mutual decision about which cell structure or organelle is described by each advert.

The job adverts and the names of the cell structures cut be printed and cut out for students to physically organise. The activity could be conducted as a role-play, with students taking it in turns to play interviewer and interviewee. Alternatively, the ‘join the boxes’ answer frame on the second page of the student sheet could be completed as a pencil and paper task following group discussion of the adverts.

Giving each group one worksheet to complete between them is helpful for encouraging discussion, but each member should be able to report back to the class. Listening in to the conversations of each group will often give you insights into how your students are thinking.

Note that care must be taken when using this type of approach to avoid reinforcing animistic and anthropomorphic views of cell organelles as living entities with desires and intentions or the ability to speak. Make sure students understand that it is just a role-play game, and they are using their imaginations to represent structures that cannot usually think or speak.

*Differentiation*

The quality of the discussions can be improved with a careful selection of groups; or by allocating specific roles to students in the each group. For example, you may choose to select a student with strong prior knowledge as a scribe, and forbid them from contributing any of their own answers. They may question the others and only write down what they have been told. This strategy encourages contributions from more members of each group.

**Expected answers**

|  |  |
| --- | --- |
| cell wall | Are you tough and strong? |
| cytoplasm | Interested in a career supporting cell reactions? |
| cell membrane | Ever wanted to control what can enter and leave a cell? |
| chloroplasts | Ever wanted to work in a leaf? |
| nucleus | Management position in the cell |
| mitochondria | BUSY BUSY BUSY |
| vacuole | Storage specialist required |

**Acknowledgments**

Adapted by Alistair Moore (UYSEG) from an activity developed for the York Science project.

Images: pixabay.com/Clker-Free-Vector-Images (305353)

**References**

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