**The X factors**

There are many different abiotic factors. Not all abiotic factors are present in all ecosystems.

Below is a list of ten common abiotic factors.

* Limited water supply
* High levels of rainfall
* High humidity (water content of the air)
* Low temperature
* High temperature
* Salinity of the water (the amount of salt in the water)
* Waves
* Wind speed
* Light intensity (the amount of light)
* Soil

**To do in your pair**

1. Four different ecosystems are named in the table below.

Decide which of the ten abiotic factors from the list will be factors in each ecosystem.

|  |  |  |  |
| --- | --- | --- | --- |
| **Seashore** | **Arctic** | **Desert** | **Rainforest** |
|  |  |  |  |

1. 2. From the list of abiotic factors you have chosen for each ecosystem, decide which factors you think are the most important for that ecosystem.

Explain why you have chosen each factor.

**Seashore**

|  |  |
| --- | --- |
| Most important abiotic factors | Explanation |
|  |  |
|  |  |
|  |  |

**Arctic**

|  |  |
| --- | --- |
| Most important abiotic factors | Explanation |
|  |  |
|  |  |
|  |  |

**Desert**

|  |  |
| --- | --- |
| Most important abiotic factors | Explanation |
|  |  |
|  |  |
|  |  |

**Rainforest**

|  |  |
| --- | --- |
| Most important abiotic factors | Explanation |
|  |  |
|  |  |
|  |  |

*Biology > Big idea BOE: Organisms and their environments > Topic BOE2: Organisms in their environments > Key concept BOE2.1: Ecosystem components and dynamics*

|  |
| --- |
| **Response activity** |
| **The X Factors** |

**Overview**

|  |  |
| --- | --- |
| Learning focus: | The environmental conditions in different ecosystems, and in different parts of an ecosystem, affect and are affected by the organisms that live there. |
| Observable learning outcome: | Recognise that there are different environmental conditions in different ecosystems, and this affects what lives there. |
| Activity type: | Discussion |
| Key words: | ecosystem, abiotic, species, humidity, wave, temperature, light intensity |

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

* Diagnostic question: Ecosystems

**What does the research say?**

Research suggests that students lack awareness and understanding of the interactions between the living (biotic) and non-living (abiotic) components of ecosystems. Work conducted by Adeniyi (1985) found some students aged 13-15 years old believed there was no interaction between living and non-living things in an ecosystem. Brehm et al. (1986) found that even some college students perceived that ecosystems consisted only of living things, and Prokop’s (2007) work with students aged 11-12 found that whilst students perceived living things as major components in ecosystems, they considered the abiotic components to be less essential than living things.

**Ways to use this activity**

Students should complete this activity in pairs/small groups. The focus of the activity should be on group discussion to answer determine which abiotic factors will play an important role in each of the four ecosystems.

It is through the discussions that students can check their understanding and develop their explanations. Listening in to the conversations of each pair/group will often give you insights into how your students are thinking. The quality of the discussions can be improved with a careful selection of pairs/groups, or by allocating specific roles to students in each pair/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.

Students may initially find it difficult to explain why they have selected a factor as being more important than another. Through careful questioning you should be able to draw out this answer for the students.

After their discussions, each pair/group should be prepared to report the key points of their discussion to another pair/group, or to the class.

**Expected answers**

|  |  |  |  |
| --- | --- | --- | --- |
| **Seashore** | **Artic** | **Desert** | **Rainforest** |
| High levels of rainfall  Low temperature  High temperature  Salinity of the water  Waves  Wind speed  Light intensity | Low temperature  Salinity of the water  Waves  Wind speed  Light intensity | Limited water supply  Low temperature  High temperature  Wind speed  Light intensity | High levels of rainfall  High humidity (water content of the air)  High temperature  Light intensity  Soil |

**2**. All factors will play an important role in an ecosystem, the purpose of the second section is not necessarily to determine if students do know which may play a greater role, but more to see if they understand why that role is important. Those highlighted in red in the table above would be interesting abiotic factors to discuss with the class in relation to those ecosystems.

It will be important at the end of this activity to discuss with students the role abiotic factors play in creating an environment which allows species to inhabit that ecosystem.

**Acknowledgments**

Developed by Elizabeth Lupton (UYSEG).

Images: pixabay.com/TanteTati(1005700)

**References**

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