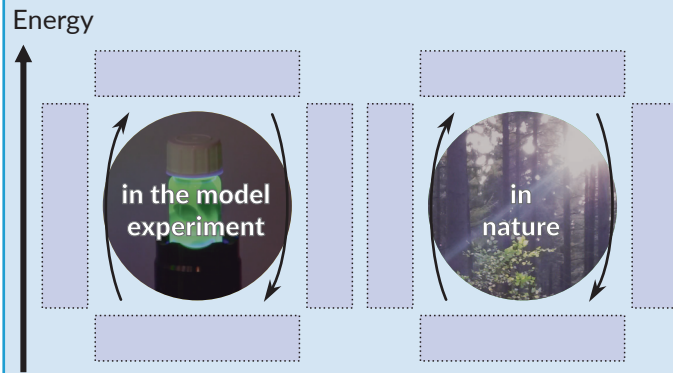


The Photo-Blue-Bottle-Experiment

Analysis A

A1 Fill in the boxes with these words:

blue solution, cellular respiration, high-energy substances, low-energy substances, photosynthesis, yellow solution, + oxygen, + light



A2 Match the terms *oxidation* and *reduction* to the arrows and give reasons for your choice.

A3 In a Venn diagram, collect similarities and differences between the two processes (model experiment vs photosynthesis/cellular respiration).

Finished? An assignment for the quick ones:

A4|B3 In a chart or in a mind map, collect all forms of energy you have already come across in your science classes. Add an application example ("In which process is this form of energy being used?"). Specify the function of the respective energy form. Add a title to your diagram.

Hint: When working with a mind map, use different colours for energy form, application, and function. Create a legend.

E1 Find different ways to set off a chemical reaction in the closed screw-top vial based on the material at hand (hot plate, torch with different light colours, UV torch). Once you can observe the formation of a blue substance in the yellow solution, you have been successful.

Jot down your findings in a chart like this:

energy form	colour; temp.; etc.	observation

Hint: colours within the visible light spectrum



E2 Is the statement **T** rue or **F** alse?

Test your decision either by conducting or by suggesting an appropriate experiment.

- ☐ In order to take place, the reaction yellow solution → blue solution requires energy supply.
- ☐ The reaction BLUE → YELLOW will not take place if there is no air above the solution.
- ☐ The reaction cycle YELLOW → BLUE → YELLOW runs only two times.
- ☐ The reaction BLUE → YELLOW requires oxygen.
- ☐ The forward- and backward-reaction in the Photo-Blue-Bottle-experiment simulate the natural photosynthesis-respiration-cycle.
- ☐ The reaction cycle YELLOW → BLUE only takes place if the temperature is above 5 °C.

Analysis B

B1 Fill in the gaps with an appropriate term:

back reaction; cellular respiration; chemical reaction; energy; energy conversion; high-energy (2x); light energy; low-energy; model experiment; released; sugar; yellow

Photosynthesis is a process which comprises

both and matter conversion

(a While is being transformed into chemical energy,

..... substances (i.e. carbon dioxide and water) are transformed into high-energy substances (i.e.) and oxygen is released.

In the the yellow low energy solution is transformed into the blue solution

by means of light energy. By shaking

the is set off due to the contact between oxygen and the blue solution (oxidation). As a

result, the blue solution is transformed back into

the solution. Hereby

the stored in the blue solution is released. This process simulates

The energy

from substances serves as an energy source for animals and plants, which need it for their growth.

B2 By creating a list of the model experiment's advantages and disadvantages, assess it.