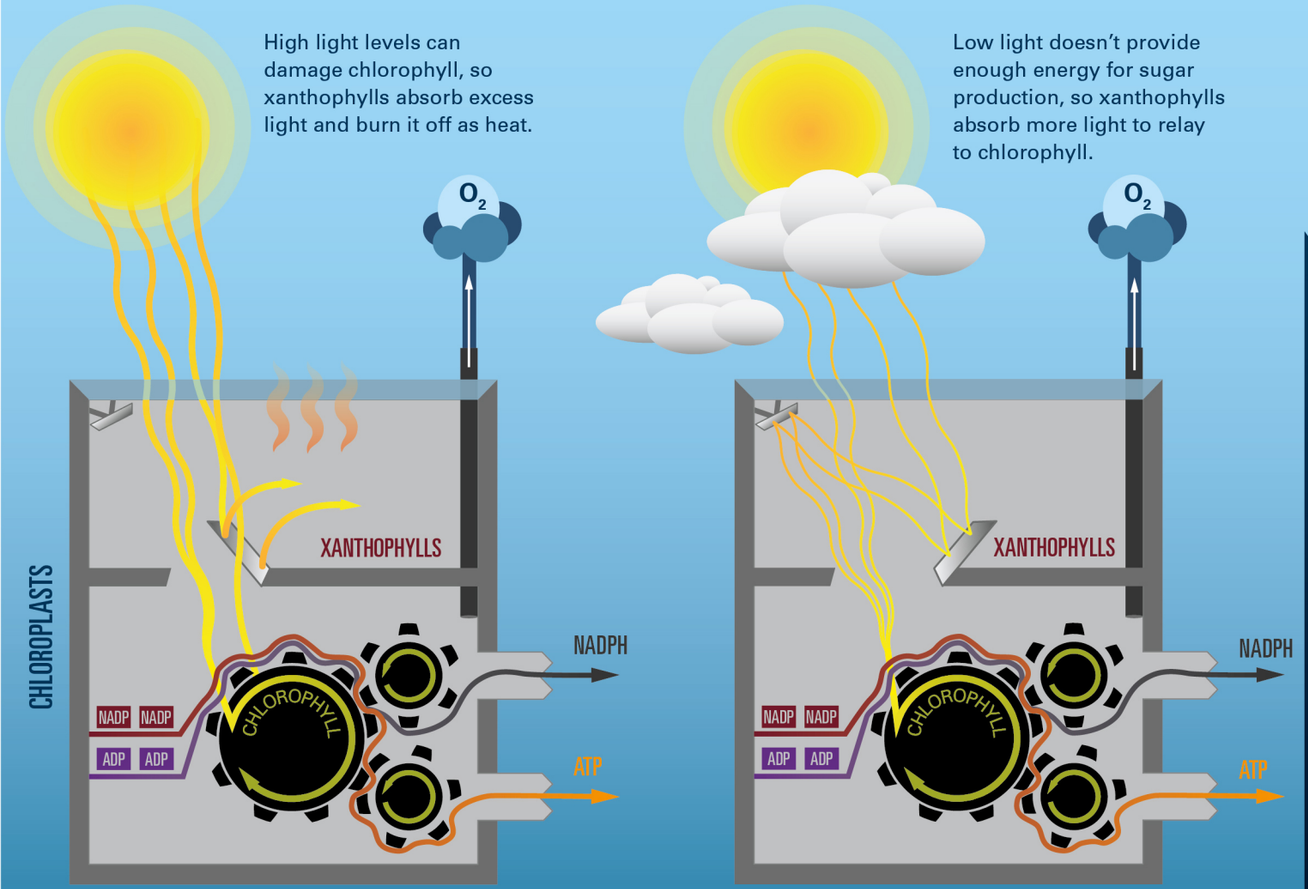
Let the sunshine in

Single-celled phytoplankton carry out photosynthesis inside organelles called chloroplasts containing the green pigment chlorophyll. Acting like little factories, chloroplasts take in energy (sunlight) and raw materials (carbon dioxide) and create products (sugars) and waste products (oxygen).

To cope with widely fluctuating light levels, many phytoplankton have certain red accessory pigments called xanthophylls that act like gatekeepers. As light levels change, their structures alter to send more or less light energy to chloroplasts.

High light levels can damage chlorophyll, so xanthophylls absorb excess light and burn it off as heat.

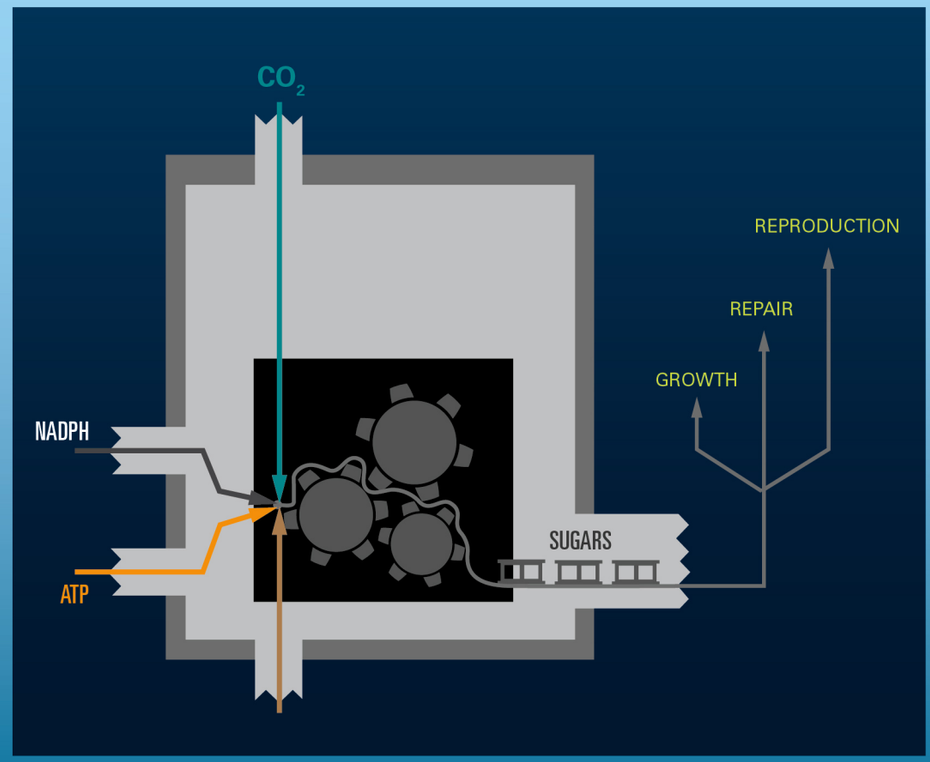
Low light doesn't provide enough energy for sugar production, so xanthophylls absorb more light to relay to chlorophyll.



Chlorophyll absorbs light energy that fuels the production of two important molecules, ATP and NADPH. Oxygen is a byproduct of the process.

FIRST STAGE – LIGHT REACTIONS

In the second stage of photosynthesis, different cellular "machinery" takes in carbon dioxide and uses ATP and NADPH to produce sugars that are used for growth, repair, and reproduction.



SECOND STAGE – DARK REACTIONS