REVENGE OF THE SYNTH

STUDENT WORKBOOK

LAUNCH

ACTIVITY 1

IS PHOTOSYNTHESIS *JUST* FOR PLANTS?

Plants are autotrophs and get their energy from the sun. Animals are heterotrophs and get their energy from other organisms, right? What about microorganisms – heterotroph, autotroph, both, or neither? Let's find out!

I PHOTOSYNTHESIZING ORGANISMS

ORGANISM IMAGES

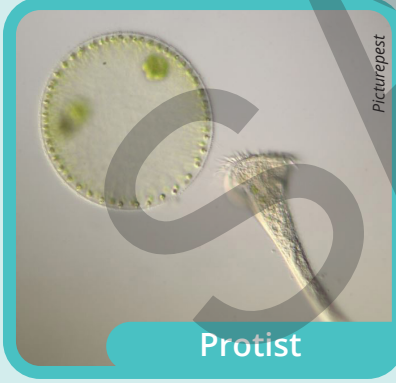
Spotted Salamander

Pea Aphid

Sea Slug

Spirulina

Escherichia coli



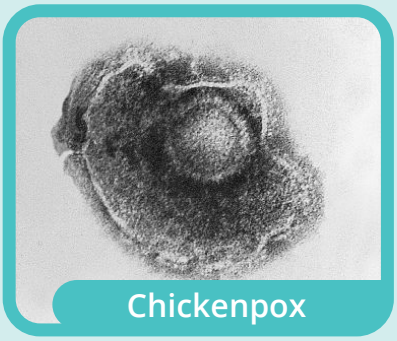
Picturepest

Protist

Yeast

Sunflower

Halobacteria



Chickenpox

In your experiment, you found different rows of color pigments in various colors. The mixture of different amounts of each type of pigment determines the color of a photosynthetic organism. One of the pigments was green chlorophyll, but the others were different colors.

Anthocyanins are water-soluble pigments that appear red, purple, blue, or black. Purple carrots and purple cauliflower contain a high number of these pigments in their tissues.

Carotenoids are fat-soluble pigments in yellow, orange, and red. Primarily, they are seen in organisms like butternut squash and oranges. Xanthophyll is a division within carotenoid that produce the yellow and brown pigments of fall leaves.

? Which pigments are found in the leaves you used? Explain.

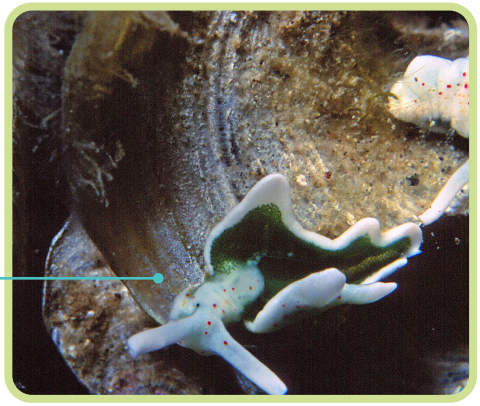
3 PHOTOSYNTHESIZING ANIMALS

The pigments of chloroplasts in plants can vary based on the species and time of year. Beyond photosynthesis in plants, chloroplasts are important for the photosynthesizing of the three animals you saw in Activity 1 – sea slugs, spotted salamanders, and pea aphids.

Kleptoplasty

In Activity 1, you saw a sea slug known as *Elysia timida. Elysia* is a genus of sea slugs, many of which are capable of photosynthesizing. This genus feeds on algae as its primary source of energy, but many *Elysia* are capable of **kleptoplasty.**

When the sea slugs are consuming their prey – algae – they will take chloroplasts from their food source and incorporate them into their own cells, rather than digest them. The stolen chloroplasts will continue to then provide energy to their host – the sea slug – through the process of photosynthesis.



What looks like green dots on the back of Elysia timida are stored kleptoplasts. Kleptoplasts are chloroplasts obtained through kleptoplasty.

REFLECT

1. Return to the KWLQA chart and add to the L (Learned) and Q (Questions) sections to account for your new knowledge about photosynthesis.

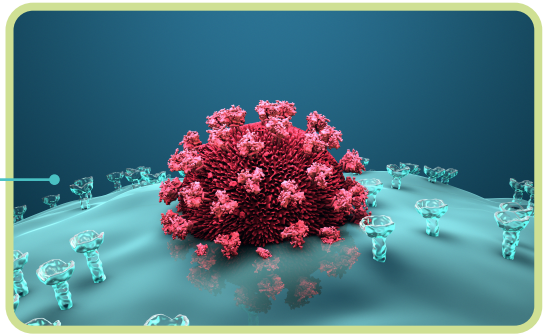
2. Explain the similarities and differences between the three kingdoms of living things you learned about in this section.

I'M NOT ALIVE!

6

Only living things are found in the classifications systems discussed in the last section, where microorganisms, plants, and animals are found. Some microscopic things, like the chickenpox virus, appears living, but is not. Therefore, they are not microorganisms nor are they found within the classifications of living things.

Because they are non-living, viruses cannot photosynthesize. However, they can support photosynthesis in other organisms, specifically bacteria.



For a virus to work, it must infect a cell. This might be a plant or animal cell, but can also be a bacteria cell. Once it has moved into the cell, it changes what the cell does, including producing more of the virus.

When we think of a virus, we think about getting sick. Illness in the virus' host isn't always a good thing. One symptom of illness caused by a virus is a fever and high temperatures can kill viruses, so the resulting fever can actually be just as harmful to the virus as it is to its host. If the symptoms caused by the virus are too extreme, it can kill the host before the virus is able to spread to a new host.

For a virus to spread from one host to the next, it needs to have a form of transmission. You might think of sneezing or coughing, where droplets containing the virus spew from one host to the next.

LAUNCH

SCIENCE UNLOCKED

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Kit	SU-REVSYN
Instructions	IN-REVSYNS
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