



COMIC “ADVENTURES IN THE FARM”; an introduction to the world of microorganisms

This material is aimed at students aged 10-12. The comics are inspired by the fundamental principles of synthetic biology. In the comics, the microorganisms share their “superpowers”. These “superpowers” are specific features that certain microorganisms have. In nature, microorganisms are able to transfer their features from one organism to another. This phenomenon inspired scientists to develop a field that is known today as synthetic biology. In this field of research, scientists try to isolate certain features of organisms and transfer them into other microorganisms.

Goals:

- Encourage young students to participate in scientific activities.
- Develop scientific reasoning.
- Learn about the various microorganisms that are invisible to our eyes.
- Acquire the ability to differentiate microorganisms and their characteristics.
- Understand the principles of synthetic biology through a game.
- Encourage solving problems by cooperation and group dynamics.

Topics:

- Prokaryotic (bacteria) and eukaryotic (yeast, amoeba) microorganisms and their characteristics.
- The world of microorganisms and their differences.
- Examples of how organisms in nature adapt to different environments.
- What synthetic biology is and how it uses different characteristics of living organisms.

Methodology/presentation of material:

Materials (introduction):

- Powerpoint presentation (file name: “BioluminescentMark.pptx”) - this document should be displayed with a projector
- PDF files (file name: “BioluminescentMark.pdf”) - this document should be displayed on tablets

Introduction:

- A series of comics will be used to introduce the previously mentioned topics to students. In the comics, the main characters are a group of microorganisms that can be found in nature and they will go through a number of adventures.



- First: introduce and show the character Mark with a projector (slide 1) and/or tablet (page 1).
- Second: show Chapter 1 with a projector (slides 2-10) and/or a tablet (page 2). This can be done in front of the whole class or in groups.
- Third (optionally): show examples of bioluminescence from nature with a projector (slide 10-12) and/or tablet (page 3).

After the presentation of the previously mentioned material (“BioluminescentMark.pptx” or “BioluminescentMark.pdf”), we propose the following follow-up activities.

Materials (activities):

- Document with activities (file name: Activities.pdf) - this document can be printed or displayed on tablets/projector.
- Trading card with 6 characters (file name: TradingCard.pdf) - this document should be printed

Activities:

- Activity#1: Mini Quiz after the comic #1 to assess the interest and understanding of students.
- Activity #2 (Group work): Students should be divided into a maximum of 4 groups. Trading cards showing the characters with their introduction and specific features are placed in the middle. The beginning of the story from the document with activities (file name:Activities.pdf) should be read up to the point when the problem is presented. Students need to discuss which character’s “superpower” they would use to overcome the problem.
- Activity #3 (Group work): Students should be divided into a maximum of 4 groups. A character is assigned to each group and they are asked to come up with a story together, and then present it to the whole class or between two groups. They are encouraged to sketch the comic, inventing what the microorganisms would look like after the superpower was shared.

By the end of October, Chapters 2 and 3 will be completed. These chapters can be covered in a separate session. The stories from these chapters are an example of plots similar to the ones that students should have had come up with during Activity #3.

Please keep in mind that all of this information is a proposal on how our educational materials could be implemented and that we are open to suggestions.