

Yarden, A., Brill, G., Levine, N., Hadad, S. and Guy, H. (2001). A Close Look at the Living Cell: A Computerized Learning Environment (developed in collaboration with and distributed by the Center for Educational Technology, Tel Aviv, The Amos de-Shalit Israeli Center for Science Teaching, grades 7-12).

Short summary of the main features

This publication is another part of a package of learning materials aimed at introducing the living cell topic as a central axis in the biology curriculum throughout the 3 years of junior high school. This computerized environment includes numerous microscopic images, videos, animations and graphic representations of cellular processes which accompany all of the biological topics studied in junior high school. The computerized environment enables the demonstration of results obtained using current technologies in cellular biology (not available in schools) in the classroom. This environment includes two unique tools that were developed especially for learning the living cells topic in a computerized environment:

1. A transparent “millimeter-paper” can be dragged from the tool bar and used for measurements and calculations of the magnification of every microscopic image which is included in the environment. Each microscopic image in the environment is accompanied by a scale bar and the actual size of the bar in the original sample is marked (Fig. 1), as commonly used in scientific publications by the scientific community. A detailed description of the initial use of the millimeter-paper is provided for practice, and the users are then able to measure and calculate the relative magnification of every microscopic image in the environment. This tool overcomes the differences in the sizes of computer screens and enables accurate measurements of the magnification of every image.
2. A schematic representation of the “size scale in nature” (the principles of which are presented in detail in the description of the book: “*A Journey into the Living Cell*”) pops up from the tool bar each time an image in the environment is enlarged. This “size scale in nature” is designed to highlight the specific level of organization shown by each image in the environment. For example, if a mitochondrion is presented in an image, the word “organelle” is highlighted when the “size scale in nature” pops up, thus enabling the user to determine the level of organization of every image, as well as to make connections with other learning materials in this topic, which are not in computerized form.

The chapters of the computerized environment are^[1]:

- A. What is a living cell?
 - A-1. The cell is the smallest living unit
 - A-2. The size scale in nature

- B. Similar cells-different functions
 - B-1. A small cell without a nucleus –yet a world on its own
 - B-2. A cell with a nucleus
 - B-3. The relationships between cell structure and function
- C. Cells originate from cells
 - C-1. The making of a new cell
 - C-2. Cells of the reproduction and fertilization systems
 - C-3. From a single cell to a multicellular organism
- D. The occurrences inside the living cell
 - D-1. Energy production within the cell
 - D-2. From gene to protein-from protein to function
- E. Movement and communication
 - E-1. Cell movement
 - E-2. Cell communication
 - E-3. Transport of materials through the cell membrane
- F. The cycle of life and death of the living cell
 - F-1. Death for life
 - F-2. Eternal life
- G. Activities
 - G-1. How to calculate the magnification
 - G-2. Pictures in a gallery

Please note: The environment can be viewed only on a PC, using Windows versions: 95, 98, ME or 2000. An automatic loading system will operate once the CD-ROM is inserted into the computer.

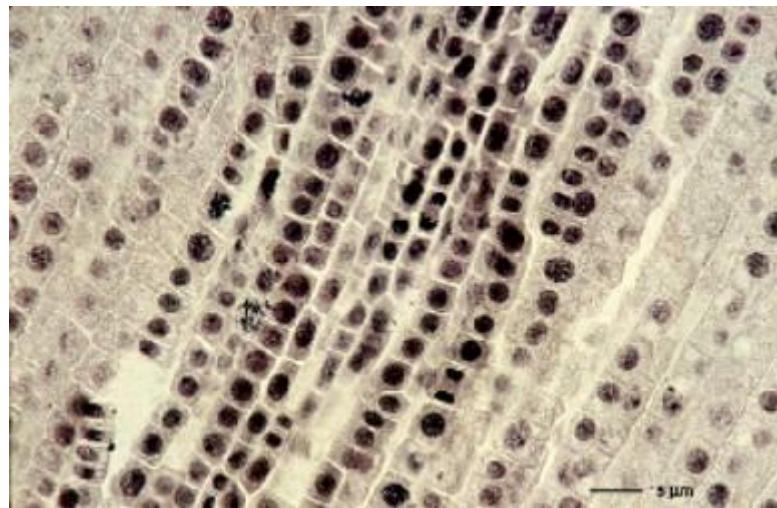


Fig. 1 An image of onion-root cells, taken from the computerized learning environment: "A Close Look at the Living Cell," in which the scale bar and its actual size are seen. Such a scale bar appears on every microscopic image in this environment.

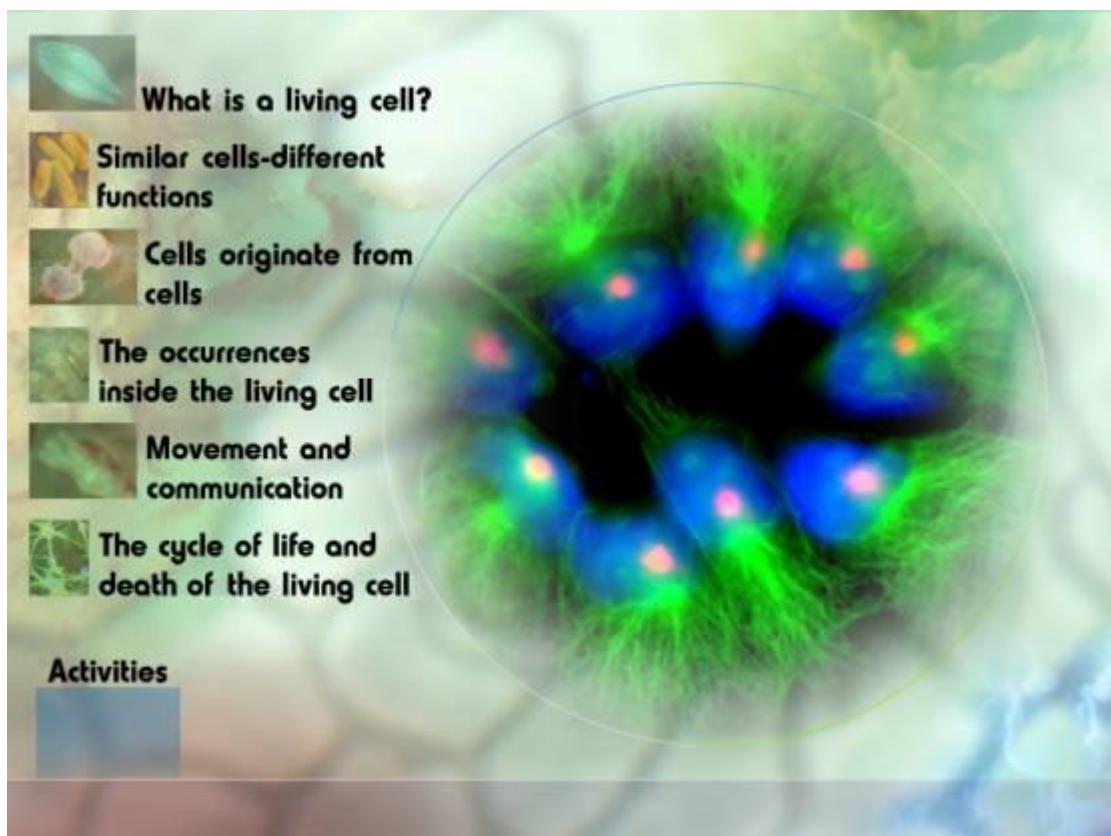


Fig. 2. The main screen of the computerized environment: "A close look at the living cell", from which the users navigate to the six main topics or activities.

The main screen of the environment is shown in Fig. 2