Yarden, A. and Bartov, D. (1997). A Journey into the Living Cell (a student text and a teacher's guide, The Amos de-Shalit Israeli Center for Science Teaching, grades 7-8, 2nd edition 1999, 3rd edition 2002).

Short summary of the main features

This publication is one part of a package of learning materials aimed at introducing the living cell topic as a central axis in the biology curriculum during the 3 years of junior high school. In our suggested strategy, the topic of the living cell, which is known to be abstract to students, is introduced together with the biological processes that are studied at a more concrete level in junior high school, and not as an independent topic, as commonly practiced worldwide.

The book "*A Journey into the Living Cell*" is the introductory part of this program, which provides a basis for the cell topic in 7th grade. In this book, we take the children on an excursion into a living cell "in their own skin," as we learn about the basic structure of cells, while demonstrating various magnification devices.

One of the central features of our program is the continuous emphasis that is placed on the relative sizes of cells and subcellular components relative to the entire organism, on the one hand, and to the molecular and atomic level on the other. In this book we introduce, for the first time in this program, what we have called "the size scale in nature," which shows that multicellular organisms are made up of systems, organs, tissues, cells, organelles, etc. (Fig. 1 and pp. 13, 35, 64, 81 in the student text). This "size scale in nature" accompanies the students throughout their studies as they encounter the cellular or subcellular aspects of a biological process. The specific location of the discussed stage on the "size scale" is highlighted for the students, as well as its relation to, and influence on the other stages, up to the organism level. This scale is intended to serve as a "knowledge organizer" for biology studies throughout junior high school.

Another feature of our program is that the cellular organelles are introduced gradually, in context throughout the 3 years of studies in junior high school, rather than all at once. Therefore, in this introductory part only the cell membrane, cytoplasm, cytoskeleton and nucleus are detailed. We have attempted to introduce only those cellular components which can be observed by the students with a simple light microscope in schools, and we

include a detailed description of how to carry out such observations for 7th graders (i.e. pp. 26, 31, 32, 41, 79 in the student text).

In the student text we have attempted to use authentic images, obtained using light or electron microscope rather than graphical cell models (i.e. pp. 29, 30, 33, 39, 50, 54, 55, 56, 57, 60, 61, 74, 78, 84 in the student text). This feature enables us to show cells in their natural environment and not as independent entities, which are detached from their natural context. The text is accompanied by numerous concept maps (i.e. pp. 10, 29, 48, 59, 62, 80, 85 in the student text), questions and activities to enhance comprehension of the learning material.

The chapters of the student text are:

A. All living organisms are built of basic structural and functional units – cells
   A-1. Getting ready for the journey
   A-2. Introduction to magnification devices
   A-3. Looking at epithelial cells
B. Entering the cell
   B-1. Crossing the cell membrane
   B-2. Inside the cell – the cytoplasm and the cytoskeleton
   B-3. The cell nucleus
   B-4. Materials within cells
C. Cells have different functions
   C-1. Muscles and the cells that build them
   C-2. Red blood cells
   C-3. Plant cells
   C-4. Cells of the nervous system
   C-5. Bacteria – organisms without nuclei

Dictionary

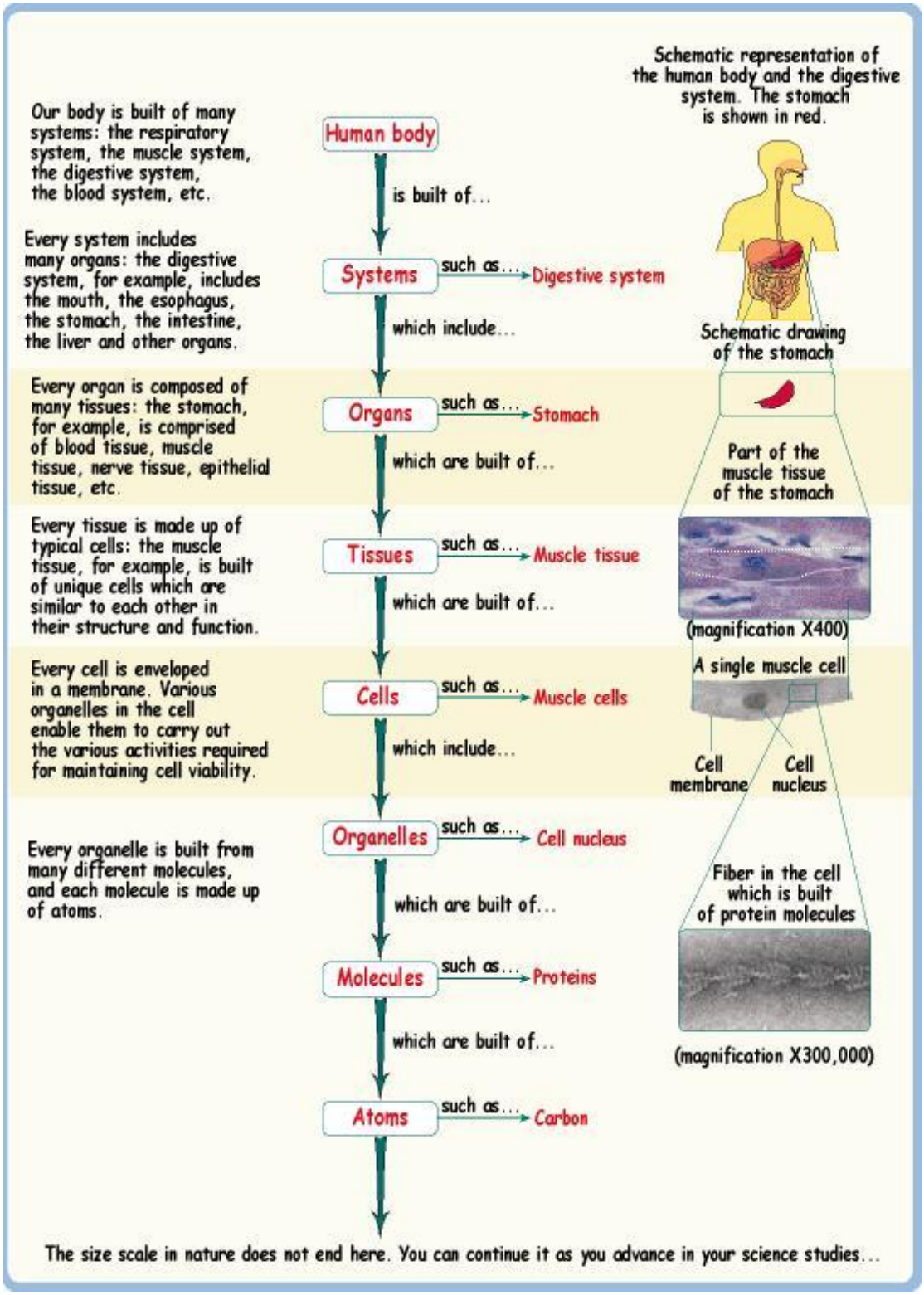

Fig. 1. An example of the "size scale in nature" which accompanies all of our learning materials in the living cell program for junior high school (translated version of p. 13 in the student text).