

Avrahami, M., Eran-Zoran, Y., Mizrahi, E., Piontkevitz, Y. and Yarden, A. (2002). *To the Cell and Back: Learning Activities for Teaching the Living Cell Topic as a Longitudinal Axis*. (A teacher's portfolio, The Amos de-Shalit Israeli Center for Science Teaching, grades 7-9).

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 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 (see Figure 1).

According to our suggested strategy the living cell topic should be continuously connected to the biological processes which are studied at the macro level enabling to continuously form connections between the micro level and the macro level. Along the portfolio there is an extensive usage 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*").

The teacher's portfolio "*To the Cell and Back: Learning Activities for Teaching the Living Cell Topic as a Longitudinal Axis*" contains 45 learning activities (for 1-3 hours of teaching each) that present the cellular aspects of all biological topics which appear in the junior-high Science and Technology syllabus, namely: reproduction, genetics, water consumption, nutrition and energy, transport systems and the senses. Each activity contains 2 parts:

1. Guidelines for the teachers, which include the rationale of the activity, the objectives of the activity, the prior knowledge which is required in order to learn the activity, prior misconceptions and comprehension difficulties which were reported with regards to the specific content of the activity, recommendations of how to incorporate the activity in the learning materials which are available on the topic, expected problems and suggestions of how to try to overcome those difficulties and the specific equipment and materials required for teaching the activity in class.

2. The activities for the student, which include a variety of learning approaches: laboratory experiments, problem solving activities, construction of models, group discussions, integration of information from various resources, constructing meaning from various visual aids (including

dynamic data which appears in the computerized learning environment: “A Close Look at the Living Cell”) and numerous questions, texts and drawings all adjusted to the junior high school level. In order to enable the teachers to modify each activity and adjust it to the specific interests and levels of their own students, the portfolio is accompanied by a CD-ROM which contains all the students activities in MS Word format.

Grade	Topic
7th	Let's characterize life The living cell Reproduction
8th	The living cell Senses and sensors The blue planet Transport systems- the heart of the matter
9th	The living cell Genetics Nutrition and energy

Fig. 1. Suggested sequence of studies of life-sciences and the incorporation of the living cell topic into the Junior-High school program in Israel.