

Models as a tool for active learning and enhancing critical thinking skills



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Target audience:

- Students enrolled in Principles of Biology I (BI 107)

Goals of the assessment:

To engage students in active learning and critical thinking:

- Highlight the differences in cellular organization between bacteria, plants and animals
- Establish the link between form and function in cellular structures
- Compare the sizes, shapes and structural components
- These activities were accomplished using 3D models of bacterial, animal and plant cells designed using a computer-aided design software (SolidWorks®) and printed in a Rapid Prototype Printer

Method:

- Students were assigned to groups
 - Each group was assigned to identify one type of cell (plant, animal or bacterium) using a combination of cellular structures
- Students engage in active learning and develop critical thinking skills *via*:
 - Strategizing to identify the cell type
 - Discussing with other groups
 - Summarizing their conclusions in a questionnaire



- Assessed conceptual, analytical and critical thinking skills during the activity

Learning Outcomes and Assessment

Class Average in questions related to cell structure and function

(With Activity)	(Without Activity)
13.7/20 (69%)	7.2/20 (36%)

Results:

- I observed a significant improvement in student performance, when tested on concepts related to the activity
- Hands-on experience with models and solving the “puzzle” as a team: important components in the learning process and student success

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