

BIOENGINEERING MODELS FOR K-12 VISUALLY IMPAIRED AND SIGHTED STUDENTS

ABSTRACT

Understanding the basics of cellular structure and function is a critical cornerstone of the biological sciences, but can be difficult to conceptualize due to the drastic size and scale difference from our natural experience. In conventional cell biology education, sectioned renderings and microscopy are the primary media used to illustrate these concepts. Unfortunately, this limited media often translates poorly to when designing curricula for educating visually impaired students. To this end, the manipulatives produced during this project were meant to translate the conventional media into tactile models – providing visually impaired students with the same information their sighted peers receive through visual renderings.

RATIONALE

In science education, misconception is an important concept which may contribute to the construction of new knowledge. Many studies have found that students' prior knowledge of scientific concepts interacts with the new knowledge through science instruction (Arnaudin, Mintzes, 1985; Catherall, 1981; Wandersee, 1985).

Conceptual Change

Vosniadou (2001) describes conceptual change as a constructivist approach that involves restructuring of prior, experiential, lay cultural knowledge. Conceptual change theory explains the ways that students exchange naive views of science concepts for more scientific ones.

OUTCOMES/FUTURE PLANS

We have successfully piloted these models in a 4-week bioengineering unit with 6th through 12th grade students at The Ohio State School for the Blind. The models helped eliminate student misconceptions and increased conceptual change.

Use of these models naturally leads to active, project-based learning where students can interact with content knowledge at a much deeper level.

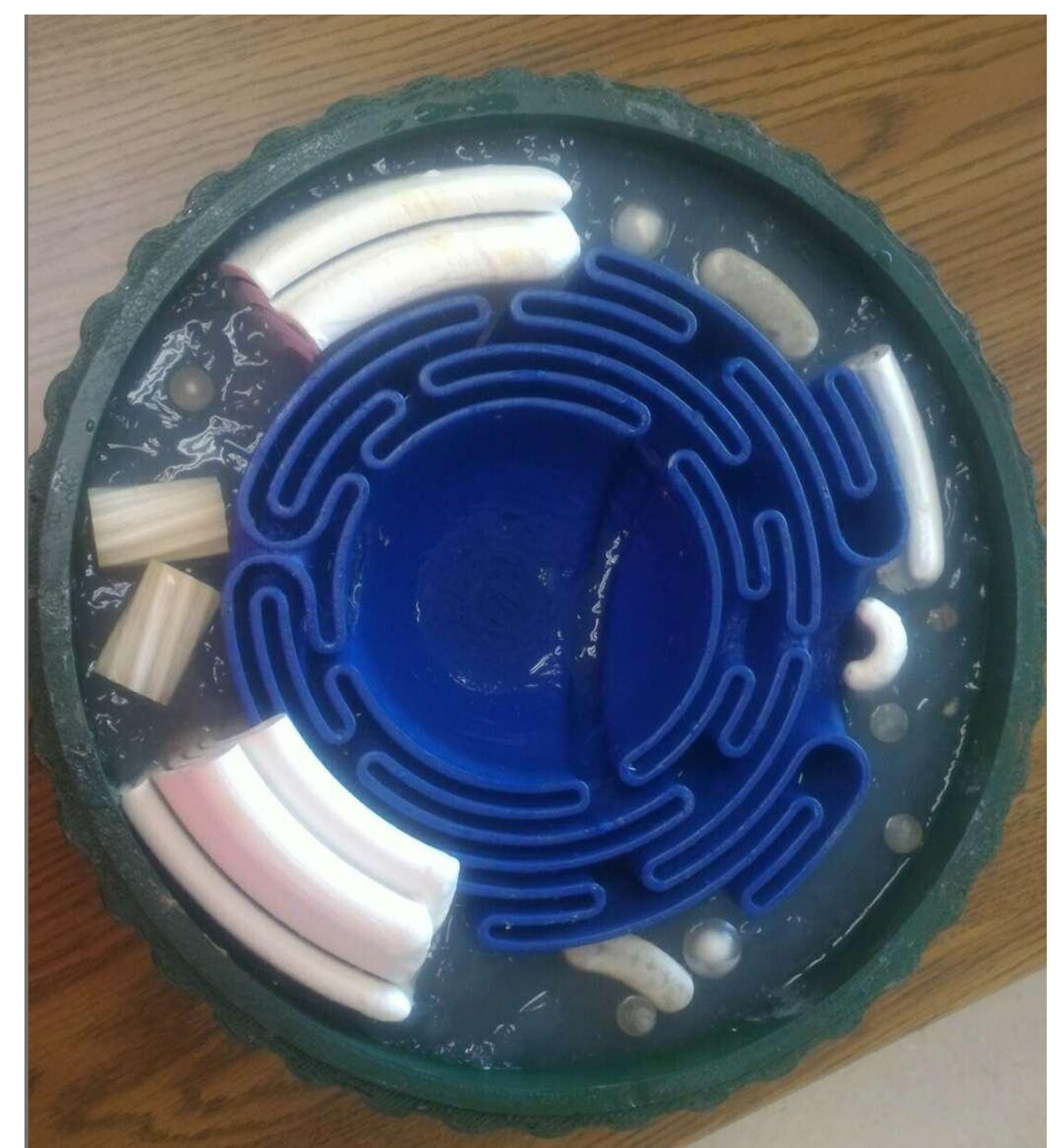
We plan to continue to develop more models for classroom use, not only with visually impaired students but also for their sighted peers.

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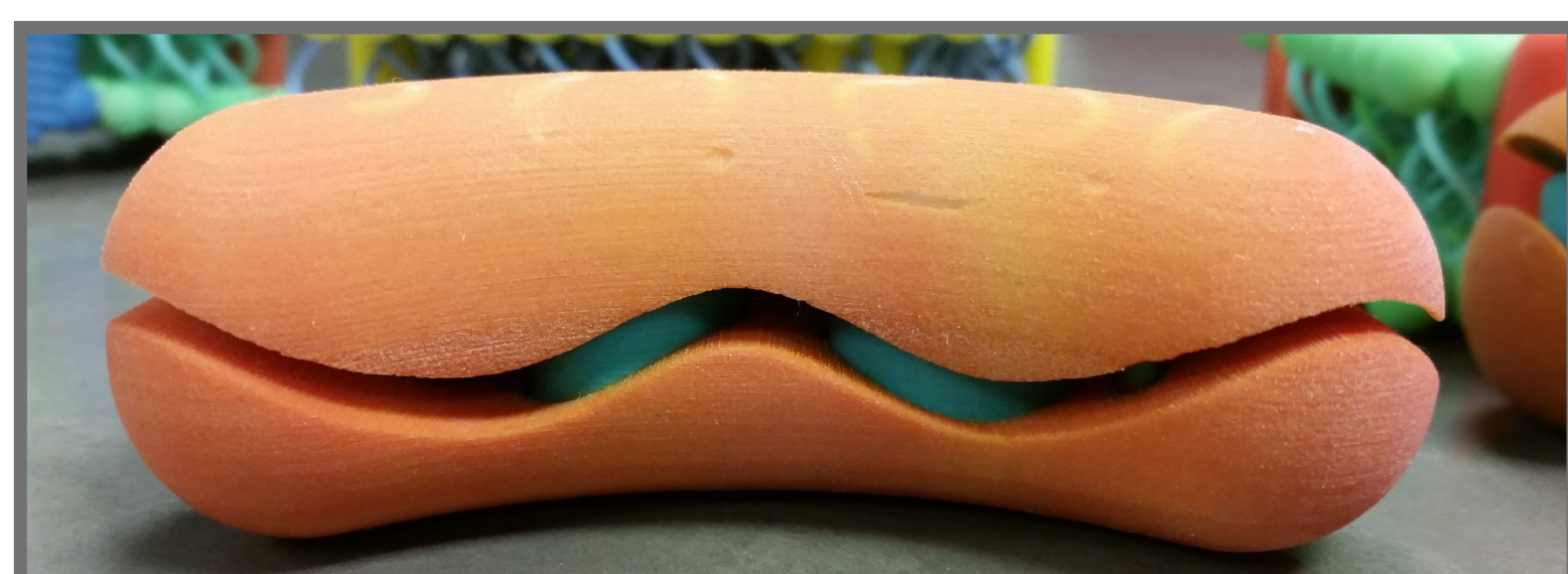
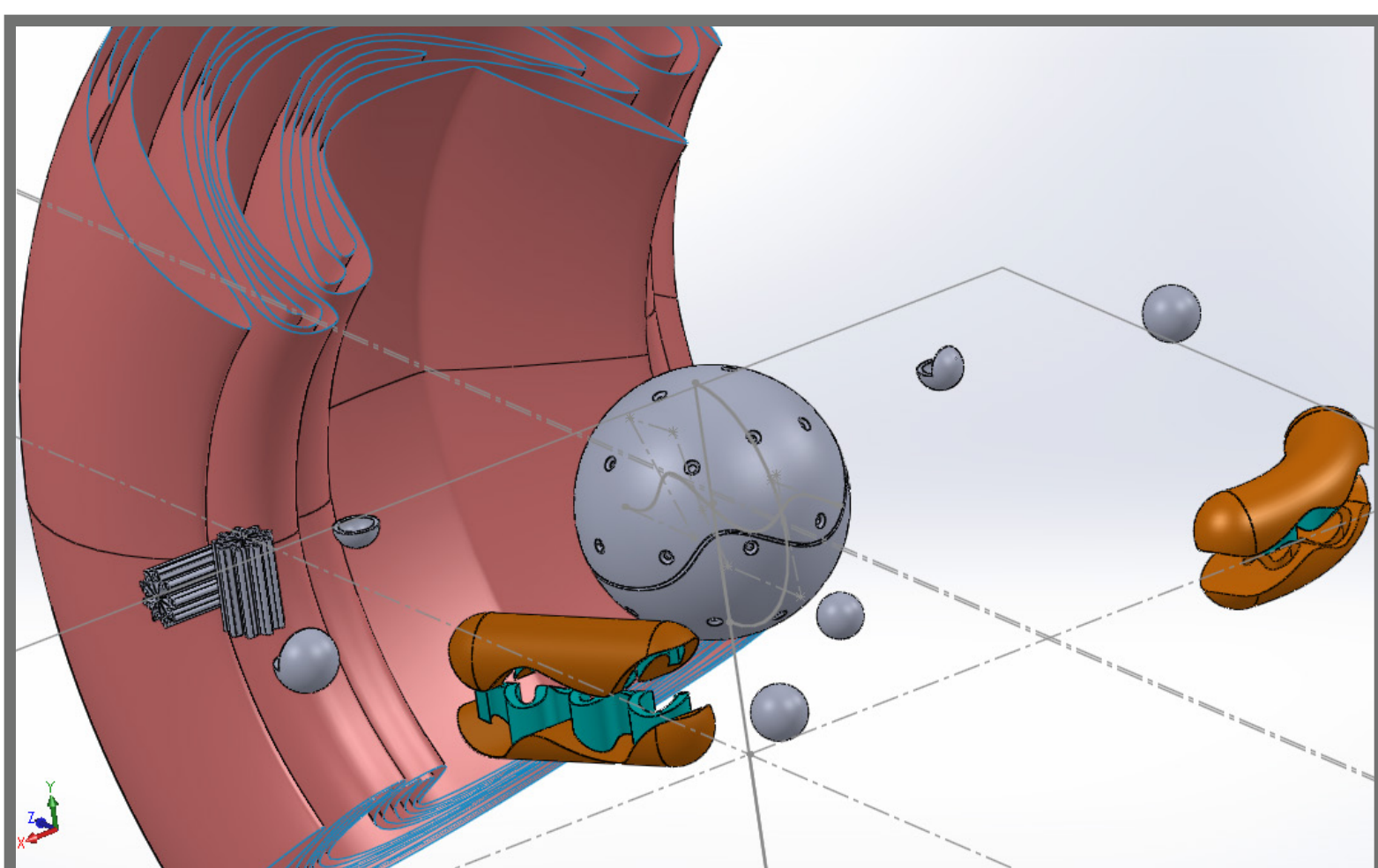
Need Better Biology Models?

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