

Inquiries in Science Series: Synthesizing Macromolecules (Carolina Biological Supply, \$199.95)

Overview of Product

This is a kit containing an inquiry lab that teaches macromolecules and applies it to enzymes.

Learning Goals & Standards

This set of lab activities guides students through the inquiry process to model monomers and polymers of the major groups of macromolecules. Structures, formulas, and polymerization are investigated. The final activity has students designing and carrying out an experiment to test how a variable such as temperature, concentration, or pH affects enzyme activity. National standards addressed include scientific inquiry, cells, and matter, energy, and organization in living systems.

Materials & Preparation

The kit comes with Minit molecular model kits. Although the parts were small, my students had no trouble using them. They were also durable. The activity is detailed, and students will need to read it carefully. This is truly “hands on”; there is little writing until the end of the activity. Preparation was simple: all I had to do was pass out the kits! The second part of the inquiry involves enzymes. This involved quite a bit of set-up compared with other enzyme labs I’ve taught. Lots of test tubes, beakers, graduated cylinders, etc. So much so, I think my students got lost in trying to follow the procedure instead of spending the

time exploring enzymes. I think with a change to a simpler procedure with fewer materials, the inquiry would go smoother. The kit came with filter paper, pH paper, and hole punch. Glassware, hydrogen peroxide, and a source of catalase (potato) had to be provided. This portion of the activity was time-consuming to set up, complete, and clean up. My students took the “required time” plus half as much additional time.

Instruction

As in the rest of Carolina’s Inquiries in Science series, the “5E” model of instruction (Engage, Explore, Explain, Extend, and Experiment) is used. Students work through 5 activities on macromolecules. This is followed by a sixth activity that is an inquiry about enzyme activity. My students commented that the macromolecule activities contained too much reading material that did not focus on the main concepts of the activities. The large amount of reading material would be necessary if the students had no background in atoms and molecules at all. If this activity was completed after some background lecture on bonding and valence electrons, less reading would be necessary. Having most of the processing questions at the end of the activity forces the teacher to more actively monitor for understanding as the activity proceeds.

The enzyme (sixth) activity requires the teacher to gather many test tubes, graduated cylinders, ice baths, and small beakers per group of students. Students also have to gather and set up quite a bit of simple equipment before actually running the experiment.

Having students design an experiment to test a variable is very valuable, but a less complicated enzyme procedure might provide more understanding. Students may become frustrated as they seem to spend more time setting up and cleaning up than running the actual experiment.

Summary

Overall, I really like the “Synthesizing Macromolecules” inquiry kit. Most of my students felt that using the models led to a greater understanding of molecular structure and how dehydration synthesis works. It really helped them visualize double and triple bonds. The enzyme inquiry was also a valuable tool to show students how different factors influenced enzyme activity; however, I will probably change the materials and procedure to something simpler. This is a kit that I plan to continue using!

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