Utilizing Common, Inexpensive Objects in Biology Instruction

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During tough economic times, many school systems have reduced funding for science supplies. It has become increasingly more important for educators to find instructional resources in common, inexpensive objects. Below I have listed several low cost items that I have found useful when teaching biology. With some creativity and ingenuity, I hope you too can see how one man's junk can become your biological models.

Finger models for your kinesthetic learners:

Finger models are a great way to engage the kinesthetic learner in a quick simulation of various biological processes, while allowing students to stay in their seats.

DNA molecule

1. Cross two fingers on the same hand to demonstrate the DNA double helix.

DNA replication

1. Cross fingers to represent a DNA molecule.
2. With opposite hand, make a fist "DNA helicase" to break the DNA molecule. Now the fingers are apart forming a "V."
3. Now use fist "DNA polymerase" to add nucleotides.
4. End with fingers crossed on both hands to represent the two DNA molecules that are made.

Polypeptide chains

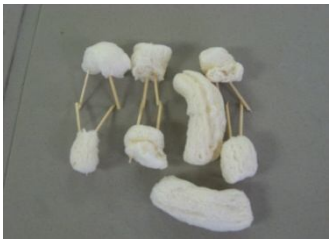
1. Each fist represents an amino acid.
2. Join both fists to begin the polypeptide chain.
3. Students can join hands to complete their protein.

Phospholipid

1. Students touch their one "hydrophilic" head.
2. Then students touch their two "hydrophobic" tails…aka their legs.

Biodegradable packing peanuts:

Dissolve packing peanuts in water to use as a starch solution for organic compound testing.



Students build models of the plasma membrane using the packing peanuts as the phospholipid heads and proteins (use toothpicks for the phospholipid tails).

Plastic air-filled packing material:

Model of cytokinesis in plant cells (also need duct tape/marker to mark the cell plate)

Model of tissue (emphasizes that organisms get larger by getting more cells…not because the cells get larger)

Sour worms or gummy worms:

Use sour worms or gummy worms to represent chromosomes. Activities simulating chromosomal mutations, crossing-over, mitosis, and meiosis can be completed using this candy.

Mason jar with vegetable oil, water, and food coloring:

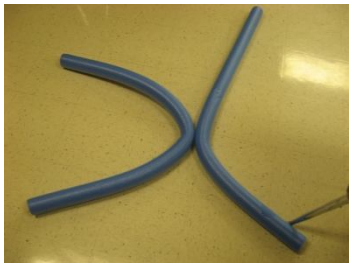
Model depicting the insolubility of lipids in water. Add the food coloring to the water so students are better able to see the two distinct layers.

Balloons:

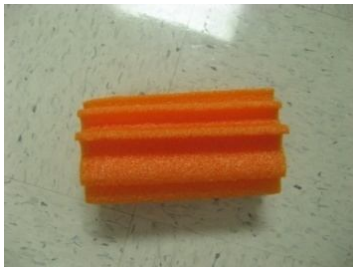
Use as a class demonstration for cells in a hypotonic solution (cytolysis – balloon bursts with the water…big class hit) and hypertonic solution. The balloon serves as the cell and water is added or removed from the balloon.

Model of cytokinesis in animal cells. Twist balloon in two parts to show cleavage furrow. A piece of yarn or string can be used to represent the contractile ring of microfilaments.

Swimming pool toys (purchase at the end of the summer when these items are on clearance):



Use pool noodles to have students simulate the movement of chromosomes in mitosis. Students can also use balloons or star-shaped pool noodles to represent the centrioles and streamers to represent the spindle fibers.



Model of a centriole using a small section of a star-shaped pool noodle

Model of bacterium with cilia using a swimming pool ball

Play-doh:

Use play-doh to make models of cells, organelles (especially chloroplasts and mitochondrion), cellular junctions, organisms in food chains, fluid mosaic model (phospholipids), and ecosystems (biotic and abiotic).