Best Practices from the classroom of Candace Roy

**Symmetry (This takes a whole 50 minute period.)**
I present the three types of symmetry for about 5 minutes maybe and then we play the following game.
I have the students work in pairs with one piece of paper for the pair.
The instructions:
I will call out one of the three types of symmetry and you have 3 minutes to get up and look around the room to find items of that symmetry and write them down on your paper.
The team with the longest list of correct items wins candy. You may not name the same item several times even if it is in the room in multiple copies. For example, you can not name all the different titles of books in the room you can only say book once, or poster, or person, etc. You may be specific such as to say the doorknob on the door but not the door. Lettering, buttons, or any attachments to an object that do not change the overall shape of the object do not count.
Then I work my way through the three types of symmetry. After each one, I have the class help me check the longest list and we work our way down until we find the true longest list of correct objects. By critiquing their classmates list we are discussing the various symmetries and many examples and they all get the concept by the end.

**Condensation reaction and hydrolysis activity (this takes about 5 minutes)**
Ask a group of volunteers to play ‘choo-choo’. As they walk around, mention how much fun it is to relive the carefree days of elementary recess. Make a great show of putting water in a bucket or cup (in reality, only put a few tablespoons in). Suddenly yell “Watch Out” and pretend to throw the bucket of water at the train. The students will scatter.
Then I say, “The water is gone, you can reform the train.” After they have done this, I talk about how a carbohydrate is like a train, a string of monosaccharides. When I added water, the train broke-up. When the water was taken away, the train reformed.

**Activity on protein structure (this takes about 10 minutes)**
Give each student a strip of paper. On it, have them draw a string of amino acids, referring back to the cars of a train idea. Point out that it is easy to tell a tank car from a boxcar, yet they must have a commonality in order to be part of the train. Then I have the students pleat the strip to demonstrate secondary structure and coil the pleat to demonstrate tertiary structure, pointing out that releasing the strip causes the coil to open. Something must be ‘glueing’ it in position = disulfide bridges. Last, have them nestle several strips into a group for quaternary structure. Now is a good time to discuss denaturing proteins.

**Lorenzo’s Oil movie and website (This takes 3 days on a 50 minute schedule.)**
I like to show this movie when discussing human genetics and various disorders. You can use it to discuss a variety of topics from scientific method, how each gene controls the production of a protein but many genes may work together to control a particular human trait to how the efforts of one person can make a huge difference in the world through effort and perseverance.
You can also go to the website and they have up to date information on how the real Lorenzo is doing and the current research being done. One year my classes decided to collect money for the arm bands and make a donation to myelin research.

**NIH curriculum supplement series (9-12)**

Here is the contact information to request these materials. They are provided for free to high school teachers. You may also be able to request them by going to the National Institute of Health website.

Biological Sciences Curriculum Studies  
5415 Mark Dabling Boulevard  
Colorado Springs, CO 80918  
[http://www.bscs.org](http://www.bscs.org)  
(719)531-5550

The current modules I have are:  
Cell Biology and Cancer  
Human Genetic Variation  
Emerging and Re-emerging Infectious diseases  
Sleep, Sleep Disorders, and Biological Rhythms

I use the first three to various extents in Biology I, Honors Bio, and even AP Bio. The cancer module is my favorite.