



Envision Experiential Learning Activities for the Classroom

It's hard to find more impassioned proponents of experiential learning than the staff here at Envision. We'd like to help you take *your* turn with this engaging educational approach. Here are a couple ideas for your classroom – formatted for easy printing.

The Outdoor Classroom

Age Group: Elementary or Middle School

On a budget? Create a classroom out of nature – by simply taking your students outside. No matter what region of the world you're in, you've got something out there to learn about: plants, soil types, rock formations, clouds, the shadows cast by the Sun, etc.

Other outdoor ideas include:

Scavenger Hunt – Kids engage quickly when there's a little friendly competition involved. Divide the students into groups (make sure there's an adult available to accompany each group) and set them in search of a list of specific items. You can create your own list, tailored to your specific grade level and region, or you can use the one we provide. Feel free to add to our list with any of the myriad of ideas available on Google Images.

Supplies:

- Print one copy of the list for each group
- One collection bag per group
- One pen or pencil per group, so they can mark off their finds as they collect them

For printing purposes, we've included our sample list on a separate page.



Scavenger Hunt List

Will Your Team Be the First to Find ALL of these Items?

- ___ A leaf that isn't green
- ___ A piece of bark
- ___ A pinecone
- ___ A feather
- ___ A bug
- ___ A spider
- ___ Clover
- ___ A flat rock
- ___ A wild flower or dandelion
- ___ Something to recycle
- ___ Something U-shaped or Y-shaped
- ___ The "fruit" of a plant or tree



Be Like Ben – or Dan

Age Group: Middle School

At some point, your curriculum probably mentions Benjamin Franklin, who was almost as famous for his inventions as for his role in the American Revolution. The book *Amazing Ben Franklin Inventions You Can Build Yourself* is a great source of inspiring hands-on activities. We've included a few of Ben's top invention ideas here.

Political Cartoons – Ben's famous "Join or Die" illustration, as published in his Pennsylvania Gazette in 1752, was widely considered to be America's first political cartoon. After a discussion of current events, ask your students to create their own illustrated commentary on politicians or world events.

Swim Fins – Is there a pool at your school? Ben credited his health and strength to swimming. He's even recognized by the International Swimming Hall of Fame! At age 11 he invented paddles that could be grasped in the hands to improve thrust underwater. He later invented some rudimentary (and clunky) swim fins. Challenge your students to do the same, using materials they find at home, and then get in the pool to try them out!

Create a Thermometer – Of course Ben didn't invent the thermometer – that was Daniel Gabriel Fahrenheit (alcohol thermometer in 1709 and mercury thermometer in 1714). But Ben must have applauded the ingenuity, and used the mercury version when he helped map the Gulf Stream.

This hands-on project helps students understand the concepts of air and water pressure, as well as temperature. Step-by-step instructions, as found on Home Training Tools, are included below.



Instructions for Creating a Thermometer

As water heats up, it expands and becomes less dense. When it cools down, it contracts, becoming more dense. This cycle is called convection. (Note, however – when water gets cold enough to freeze, the molecules line up in an open crystalline structure that is actually *less* dense than the liquid form. This is why ice floats.)

Supplies (enough for each group):

- Plastic water bottles
- Modeling clay
- Clear plastic straws
- Food coloring

Instructions:

Put a few drops of food coloring into the water bottle and fill it to the top with lukewarm water. Insert the straw a couple inches into the bottle and mold the clay around it to seal the bottle and hold it in place. When you have a tight seal, water should go up into the straw. Use a marker on the outside of the bottle to indicate how high the water rose into the straw. Label this mark “Baseline.”

Set the bottle in a bowl of hot water. After a minute or two, mark the new water level and label it “Hot”.

Now set the bottle in a bowl of ice and watch what happens. Record the “Cold” water level.

What did you find? When the water in your bottle thermometer heated up, it expanded. But since the bottle was sealed, it had nowhere to go but up through the straw. When cooled, it dropped back down.

Real thermometers use mercury rather than water because water doesn't respond to temperature change very quickly. Try filling your bottle with 50% rubbing alcohol and 50% water. Does the liquid move up and down the straw faster? Why do you think this is?

With your handmade thermometer you aren't actually measuring temperature, just seeing temperature changes. To compare your findings to a Fahrenheit equivalence, you will need to have a real thermometer on hand. Challenge your students to figure out a way to record approximate Fahrenheit equivalencies on their handmade inventions.



Edible Science

Age Group: High School

One important concept for high school-level experiential learning is to give more (or total) control of the project to the students themselves. Empower them to use their own creativity and sense of responsibility to make the project as interesting and educational as possible.

Edible Cell Model – Challenge your students to recreate a plant or animal cell out of all-edible materials. You can start by baking a round cake, but a sugar cookie will work just as well (and Pillsbury can supply the dough, ready-made!) Fancifully colored candies of various shapes and sizes can represent cell elements such as lysosomes and Golgi apparatus. Frosting makes up the cytoplasm, with a different color for the cell membrane.

We provide step-by-step directions from WildSimplicity; however, your high school students shouldn't need much hand-holding. Whenever possible, let them select their own supplies and resources. Dividing the students into small groups will produce more exciting varieties on the final product.



Edible Animal Cell Model Using Cake

Step 1: Supplies

These instructions describe how to make an animal cell model using cake. As noted above, you can let your students select their own materials, if budget permits, and perhaps substitute ready-made sugar cookie dough to keep it simple. You can also have your students do plant cells instead of animal cells, or have different groups do different types of cells.

CAKE SUPPLIES	ORGANELLE SUPPLIES
Round Cake Pan	Dots
Cooking Spray	Mike & Ikes
Mixing Bowls	Candy Belts
Spatula	Circular Sprinkles
Oven Mitts	Candy Fruit Slices
Funfetti Cake Mix	
Vegetable Oil	
Eggs	
Frosting	
Food Coloring	

Your students' edible nucleus can be a cupcake – or a smaller cookie, if you're using cookie dough.

Step 2: Bake Your Animal Cell Cake

Follow the instructions on the box to make your cake batter. Once it's smooth, add a few drops of food coloring to mimic the pink color of many animal cells' cytoplasm. Pour the batter into a round cake pan and place the pan in the oven. Bake for approximately 30 minutes, or until a toothpick comes out clean when stuck into the middle of your cake.

Step 3: Frost Your Cake

For "scientific accuracy," you'll need to dye your frosting two different colors. One color will be used to create the cytoplasm, represented by the TOP of your cake. The second color will be used to create the cell membrane, represented by the SIDES of your cake. If you chose to bake a nucleus cupcake, you'll also need to prepare a small amount of frosting that is dyed a third color.



Step 4: Add Your Organelles

Organelles are the "mini organs" found inside every animal cell. Each organelle has a different function and physical appearance, and together they work to keep the cell alive. Here's a breakdown of the specific organelles found in animal cells and examples of the edible materials you can use to represent them:

Cell Membrane - purple frosting

Cytoplasm - pink frosting

Nucleus - green-frosted cupcake (a purple Mike & Ike adds authenticity by representing the nucleolus)

Golgi Apparatus - green sugar-coated candy belts

Endoplasmic Reticulum - pink sugar-coated candy belts attached to the nucleus

Ribosomes - circular sprinkles

Mitochondria - purple candy fruit slices

Vacuoles - green Dots

Lysosomes - blue Mike & Ikes

Edible DNA Model – The infamous DNA molecule project becomes more fun when the students are challenged to use edible materials (think Twizzlers and miniature marshmallows, for example). But why stop with DNA? The edible concept can be applied to many types of model construction. With Halloween around the corner, maybe some aspiring zombies would enjoy making edible body parts and human organs?