

STEM Buffet 5-6

Project Equipment (tools used throughout week or common household items)

REQUIRED:

- 1 Pair of Scissors (sturdy, can cut toothpicks or skewers or craft sticks)
- 1 box cutter (adult help recommended - something to cut foam board or cardboard)
- 1-2 Strong Adhesive Tape - (e.g. duct tape, packing tape)
- 2 Adhesive Tapes - (any two types, e.g. masking tape, scotch tape, electric tape, painter's tape, etc.)
- 1 adhesive tape - clear, double sided (possible substitution: glue stick)
- 1 marker, black (permanent preferred, washable may suffice)
- 1 pencil with eraser, sharpened
- 1 notebook (can be partial) (possible substitutions: copy paper, loose leaf paper, scrap paper, etc.)
- 2 Hand towels (possible substitutions: paper towels, old rags, anything absorbent that can clean up water)
- 1 small-medium container to fill with water (e.g. plastic bin; bucket, larger tupperware)
- Ruler, 12"
- 10-15 Balls, variety of sizes (e.g. marbles, ping-pong, bouncy balls, golf balls, styrofoam balls, whiffle balls, small metal ball bearings, etc.)
- Markers, washable (fine tip if possible) (possible substitutions: crayons, colored pencils, etc.)
- Calculator (can use online calculator if needed)
- 1 sealable container (16-20oz) to store homemade red cabbage indicator
- 1 large cup (12-20oz, can be reusable or disposable) Safety glasses (possible substitute: swim goggles, glasses or sunglasses)
- Washers, ~1-2", with hole in middle (possible substitutions: small objects with mass you can tie a string around)
- String (kite string, yarn, shoelaces; anything you can tie a knot in)
- Variety of common objects to gather and measure (**need 5, each a different size**):
 - Such as: Plates, play doh lids, candle lids, rolls of duct/masking tape, Sporting balls (golf, tennis, soccer, etc.), round dog toys, Toilet paper/paper towel tubes, CDs, records, phone pop-sockets, Anything that is round/circular (can be 2D or 3D, even cylindrical)

OPTIONS FOR EQUIPMENT - ACQUIRE WHAT YOU CAN:

- Safety compass (for drawing circles)

Activity Supplies (things that could be used-up or incorporated into a project)

REQUIRED:

- Shoebox (medium to large is best)
- Head of red cabbage (requires advanced prep - see END of this list) (Possible substitutions: pH paper/litmus paper, purchase pre-made red cabbage indicator)
- 3 Round coffee filters (requires advanced prep: pre-soaked in red cabbage indicator and dried overnight)
- Toothpicks, round
- 10-15 Skewers, wooden, sturdy, pointed, 12"
- 15 flexible/bendy straws
- 4-8 Items that can perform as wheels (such as bottle caps, cookies, etc) should all be the same size in at least pairs, preferable groups of 4.
- 5-10 Plastic spoons (possible substitutions: plastic sporks, jumbo craft sticks)

- 5 Rubber bands (thinner preferred over thicker)
- Cardboard scraps (shipping boxes, cereal/pasta boxes, etc)
- 2-3 Foam board (8"x10") (possible substitutions: yard-sale type signs, flat plastic that can be cut with scissors, such as large disposable food/food storage containers, etc.)
- 2-3 sheets Graph paper (can print at home using online template)
- Pipe cleaner, green or asst colors with green (possible substitutes: skewers, pencils, chopsticks, straws, etc.)
- 2 Disposable pipettes (possible substitutes: eye droppers, medicine droppers, syringes, small turkey baster, spoons, straws, etc.)
- 10 small plastic cups (2-4oz, clear or white, can be reusable or disposable)

OPTIONS FOR ENGINEERING PROJECTS - ACQUIRE WHAT YOU CAN:

- 20 sheets Paper, any type or color (cardstock, construction paper, copy paper, etc.)
- 5 Toilet paper tubes
- 5 paper towel tubes (possible substitutions: roll-up paper or thin cardboard & secure with tape)
- 5 balloons, 9-12"
- 5-10 Coffee straws
- 50 Craft sticks, any size/color (aka popsicle sticks) (possible substitutions: wooden skewers, nail files/emery boards, wooden coffee stirrers, etc.)
- 5-6 Zip ties (aka cable ties) small (possible substitutes: pipecleaner, floral wire, twist ties)
- Play doh (possible substitutions: modeling clay)
- Hot glue gun with glue sticks (possible substitutions: tacky glue white glue, tape, etc.)
- Cups (any size/type; should be disposable/incorporated into an arcade game; make sure the balls you gathered will fit in these cups: i.e. if using marbles, 3-4oz dixie cups should work; if using a large rubber bouncy ball, a larger cup is needed) its best to have at least 3 of a few different sizes (totaling 6-9 cups).
- At least one (or as many as possible) of the following liquids/types of liquids from this list (need 4-8oz or 1/2cup-1cup of each):
 - Salt water
 - Vinegar
 - Lemon juice or orange juice
 - Coffee (brewed)
 - Soda
- At least one (or as many as possible) of the following liquids/types of liquids from this list (need 4-8oz or 1/2cup-1cup of each):
 - Rubbing alcohol
 - Distilled water
 - Tap water
 - Milk
- At least one (or as many as possible) of the following liquids/types of liquids from this list (need 4-8oz or 1/2cup-1cup of each):
 - Dish soap
 - Laundry detergent (if powdered, dissolve in water)
 - Windex
 - Baking soda/water

Here is an Amazon Shopping List for some items that may not be easily available at your local store!

https://www.amazon.com/hz/wishlist/ls/CO8IAFYNH16W?ref=wl_share

SEE NEXT PAGE FOR ADVANCED PREPARATION INSTRUCTIONS

ADVANCED PREPARATION: There is some advanced preparation required for this program. It includes making approximately 16oz of "red cabbage indicator" solution and soaking coffee filters in some of it (and saving the rest). To make it, follow the instructions below (you use boiling water & fresh red cabbage and a microwave).

NOTE: This solution is needed on Wednesday of our program week, and once made, it keeps for up to one week in the refrigerator in a sealed container. This solution is needed for two purposes:

1. soak three coffee filters in advance (so they are dry and ready for Wednesday's activity)
2. using the solution during the activity on Wednesday

NOTE: Making this will result in a cabbage-smell in your home, so you may wish to do it on a day that you can open your windows. If you'd prefer to avoid the work of making this solution at home, and/or if you're worried about the smell, here are some alternatives:

1. purchase pre-made red cabbage indicator (on amazon list, best option - expensive though)
2. purchase litmus paper (pH paper, also on amazon list, will work but may not be as fun)

DIRECTIONS FOR MAKING RED CABBAGE INDICATOR AT HOME:

To Make 16oz of red cabbage juice:

1. Get some water boiling (stove-top, tea kettle, etc.).
2. Break apart or cut-up the red cabbage head into smaller chunks and place in a microwaveable bowl.
3. Half-fill the bowl (containing cabbage) with boiling water
4. Microwave the bowl containing cabbage and boiling water for 3 minutes.
5. Strain out liquid (keep the liquid) from the bowl into a container and allow it to cool to room temperature. (***Depending on the size of microwaveable bowl, repeat this process as needed until you have the required amount***)
6. Discard boiled cabbage but keep the liquid. Store it in a sealed container in the refrigerator (mason jar, tupperware, empty/cleaned pasta sauce jar, etc.). It will be good for up to a week.
7. Don't forget to soak 3 coffee filters for a few minutes and then allow to dry overnight (so they are ready for Wednesday's activity).