Morris Arboretum of the University of Pennsylvania

100 Northwestern Avenue
Philadelphia, PA 19118

Food Factory tour – pre-visit activity

When taking the Food Factory tour at the Morris Arboretum, your students will look at, act like, and touch different parts of plants in order to better understand:

1. Plants make their own food
2. How plants make their own food
3. People are dependent on plants

Before your visit to the Morris Arboretum, your students should know what a factory is.
When we talk about a factory at the Arboretum we have in mind a place where various materials or ingredients are brought together and then changed or arranged to make a product.

Examples:

A pattern
Fabric
Scissors
Thread
Sewing machine
Electricity

To make a Shirt

A design
Metal
Paint
Glass
Wires
Gears
Wheels
Cushions
Electricity

To make a Car

A recipe
Sugar
Butter
Flour
Eggs
Bowls
Mixers
Heat

To make Cookies

A design
Tree trunk
Knife
Muscles

To make a Boat

Note that all these products start out with a pattern, design or recipe and that a factory changes the materials or ingredients into a new form. To do this some form of energy is needed for the change to take place. This may be human energy, electricity, or heat from a furnace.

ACTIVITY 1:
Think of a product. Ask students to break it down into the simplest ingredients/materials they can think of and determine what types of energy were needed to make the product.

ACTIVITY 2:
Think of a product. Ask students how quickly they can determine what the product is as you list ingredients needed to make that product and the energy needed to transform it .

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Food Factory tour – post-visit activity

On the Food Factory tour at the Morris Arboretum, students will look at trees, get to know the different parts of plants, and even act like a tree in order to better understand:

1. Plants make their own food
2. How plants make their own food
3. People are dependent on plants

Word match

a. Chlorophyll	1. Part of the tree that soaks up water
b. Sun	2. Part of the tree that takes in air
c. Carbon dioxide	3. Part of the tree that carries water to the leaves
d. Roots	4. Part of the tree that carries sugar to the rest of the tree
e. Xylem	5. The food that is made in the leaves
f. Flower	6. The green substance that captures the sun's energy
g. Oxygen	7. The part of a tree that makes the fruit
h. Phloem	8. The source of energy for the tree
i. Stomates	9. The part of the air we breathe out and the tree breathes in
j. Sugar	10. The part of the tree that holds the seed or nut
k. Fruit	11. The left-over gas a tree gives to all of us

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Trees Need Light

A tree is alive and requires energy. We humans get energy from the food that we eat. A tree captures energy from the sun and converts it. This means that trees have to have sunlight in order to live. What would happen to a tree if it didn't get enough sunlight?

To conduct this experiment, you need:
black construction paper;

tape;

scissors;

a tree with large leaves (such as maple, linden, oak, or lilac). . .
This experiment doesn't work well with conifers.

Procedure

1. Cut two squares or rectangles of construction paper large enough to cover a leaf.
2. Sandwich the leaf between the two pieces of construction paper. IMPORTANT: THE LEAF MUST BE ALIVE AND STILL ON THE TREE.
3. Tape the construction paper so that it stays on the leaf. The leaf must be completely covered so that no light gets to it.
4. Leave the paper in place for a few days, then take it off

What occurred?

Go back and look at the leaf a week after you take the construction paper off. Has the leaf turned green again? Is it dead?

Redo the experiment, this time cutting small circles in the construction paper

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Trees Need Air

Trees are alive and they need to breathe. But they don't have mouths or noses, they breathe through their leaves!
The undersides of leaves are covered with tiny holes through which oxygen and other gases are taken in. What would happen to a leaf if it couldn't breathe?

To conduct this experiment, you will need:
a jar of petroleum jelly *(Vaseline)* and a tree. Hardwoods are better suited for this experiment than conifers.

Procedure

1. Coat the underside of a leaf with petroleum jelly. IMPORTANT: THE LEAF MUST BE ALIVE AND STILL ON THE TREE.
2. Coat both sides of another leaf with it.
3. Coat the topside of a still another leaf with the jelly.

Note what happens after 2, then 3 days.

Did the three leaves react the same?

Try the experiment on different species of trees.

Do they react the same?