



Name _____

Mark up the text: Question, Connect, Predict (Infer), Clarify (Paraphrase), and Evaluate (at least one of each type of annotation). Circle unfamiliar words, draw arrows to make connections within the text, use exclamation points & question marks in the margin, and label examples (EX).

“Foliage Afire” by Esther McGuire

All across the state, from the peaks of the Adirondacks to Montauk Point, from Chautauqua Lake to Lake Champlain, and thousands of vantage points along the way, the brilliant colors of autumn are ready to explode on the landscape.

Songs have been written about this stunning natural phenomenon and artists are tireless in their pursuit to capture the panorama on film or canvas. Leaf peepers cram into tour buses and cars and pay big bucks to catch a glimpse. Even the seasoned Northeasterners, the ones who have witnessed autumn in New York year after year, are left awestruck at the sight and many take pause when the red, yellows, oranges and bronzes burst out for the autumnal show.

Chlorophyll – the Mask

Contrary to what many people think, the annual change in the leaves is not caused by cooler temperatures or by the first frost, but is triggered by changes in light. When the days start to shorten and less sunlight is available, there is also less energy for photosynthesis, the chemical reaction that enables plants to use sunlight to manufacture sugars for their food, said Bill Schongar, a DEC forester in Schenectady County. As the amount of sunlight decreases, the leaves react and begin to shut down. Trees that were deep green, transform into brilliant reds, yellows and oranges.

In spring and summer, the leaves act like small factories and produce food for the tree and allow it to grow. Chlorophyll, a molecule that gives leaves their basic green color, takes sunlight, carbon dioxide and water and turns it into sugar. The chlorophyll is produced constantly during spring and summer, making the leaves appear green.

When the days start to shorten, a layer is formed at the base of the leaf stalk. This layer stops the supply of needed materials to the leaf so it no

longer makes chlorophyll. In turn, the chlorophyll wears out and is not replaced. Other colors that have been hiding in the leaf all spring and summer, but were masked by the green, last longer than chlorophyll and begin to show themselves. "The tree is really cutting off its nutrient flow to the leaves, the chlorophyll makes sugar for the leaves. As the sun moves farther away, less light is getting to them. The chlorophyll dies," said Schongar.

The pigments, known as carotenes and xanthophylls, which produce the yellow in bananas and orange in carrots, are exposed and show in the form of yellows and oranges particularly in aspen trees. Anthocyanins, a group of red pigments that color cabbage, roses and irises, form in the leaf and produce reddish or purplish fall colors found in sugar maples, dogwoods, sumacs and some oaks. The breakdown of leftover sugar in the leaf in bright sunshine results in the greatest amount of this pigment and the most brilliant scarlet foliage.

The colors also depend upon the species. Red maples turn scarlet, sugar maples change to orange-red. Black maple turns yellow. Oaks become red-brown or russet; hickories turn golden-bronze and aspen and yellow poplar are known for their golden-yellow hues. Other trees exhibit little color and just turn brown and eventually the leaves shrivel up and die.

Damaged Trees

The idea that Jack Frost causes foliage to turn also is overrated. Leaves that are severely frozen during the growing season usually turn brown and remain attached to the tree.

People sometimes see a tree or two in their neighborhood or backyard with leaves that have already turned in early September. They will invariably say: "Looks like fall is coming earlier this year." Those people would be wrong. The premature color change is more likely the result of root damage to a tree or indicates that the tree is under some stress. Stress to a tree is caused by many environmental factors including pollution, disease, injury or drought. Just as we humans like to vacation in the summer months -- by August the trees are also starting to take it easy. "The leaves are really not producing much sugar in September. They are ready to retire," said one forester. "They are coasting."

Wind, rain or hail storms often cause the colorful leaves to fall off the tree because they are only supported by veins of the stem. The tree eventually severs the tissues that support the leaf and it seals the cut so when the leaf is blown off by the wind, or falls from its own weight, a leaf scar is left.

Awesome Art

The foliage does create a sense of awe in many people. Bill Robinson, a biology professor at SUNY Albany, trying to explain the universal appeal, compared the foliage to an art museum. "It changes during the course of the day. It is like a giant art gallery that you can wander through and be part of." The contrast is also what is so appealing. On every horizon you get a different palette. It is always changing with combinations of greens, yellows, reds and golds. It changes around every corner of this gallery.

"Some years are much more spectacular than others, even when the foliage is not so great. It's evocative and brings back memories," said Robinson. There is often more to it than just pure aesthetics. The smell of the leaves and the sound of their rustle underfoot brings back memories that many people yearn for. Once the leaves fall, the show is over and this art gallery is closed for another year. Instead of admiring the leaves we rake them, mulch them and jump into huge piles that spill over and fly into the air. But hope springs eternal -- the leaves and needles that fall to the ground are not wasted. They eventually decompose and rejuvenate the soil with nutrients that make up the spongy humus layer of the forest. The layer is an important one because it holds rainfall. The leaves also become food for organisms in the soil that are vital in the forest.

Come spring the buds unfurl, the leaves uncurl and the cycle begins anew.

Questions. Answer on a separate sheet

1. Write a four-sentence summary of this article.
2. Make a T-chart showing the colors and the types of trees or other plants
3. Imagine you are a talking leaf. Write a journal entry describing the changes you are beginning to experience at the end of summer and into the autumn. Describe what is going on inside you and why this is happening. (~8-10 sentences)

