

Suggestions for reflection

Reflect on the autumn leaves writing, and take some time to nurture your reflections by

- Going for an outdoors walk in nature. You might pick up a symbol of autumn - a fallen leaf or other object that draws you to ponder all the life it symbolizes.
 - Sitting on your porch or deck, or by a window where you can observe nature in autumn.
- Reflecting on your own memories of times in nature in autumn

Some questions to ponder

- Ponder all that have been part of your life - and that you have nurtured in this past growing season. Take a moment to be thankful for the people, events, and your environmental surroundings that have been a gift to you.
 - What sights, sounds, colors, textures have been particularly beautiful to you in this autumn season?
 - What or who, as the anthocyanin pigments are to leaves, have protected you or brought beauty and new gifts to you in this season?
 - What has been changing/transforming in you over the recent past? How have your true colors been revealed?
 - What do you need to let go of (old patterns, behaviors, thoughts, activities)? Be open to the letting go process, knowing that it makes room for new growth in a future season, and that 'recycling' those parts of us, often nurtures other life.
- Take time to be aware of all that is part of your own roots and trunk (family/friends, spirituality, culture, commitments) that gives you strength and depth.

You might find it helpful to dialogue with a tree or other aspect of nature in autumn. Invite it to speak to you of its wisdom and to encourage your entering into the beauty of the letting-go process of the autumn leaves. Invite the companionship of its sturdy trunk and deep roots, as you let go of summer's season of growth and prepare for winter rest.

"I invite you . . . to care for beauty, and beauty will in turn heal many wounds that mark the hearts and souls of men and women today." (Pope Francis, Dec, 2016)



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Fall Color Nature Observation and Reflection Guide

Marianist Environmental Education Center

Restoring communities of land and people



Fall color change is triggered by decreasing daylength. Thus, the order in which different tree species show signs of changing leaves is set by the sun and does not change from year to year. What does vary - sometimes greatly - is the duration of their autumnal display and the relative brightness of the colors. The interplay between several factors can make the difference between amazing color one year and a dull dud of a display the next.

To best understand this, let's look at why trees produce all those reds and oranges and yellows and purples in the first place. Simply put, it's recycling. Nitrogen is one of the limiting elements of tree growth - it is in shorter supply than other elements such as carbon. Trees use nitrogen to build chlorophyll for photosynthesis, and to form the proteins that run all the biochemical reactions, so it's pretty important! Shedding green leaves that are still full of valuable nitrogen doesn't make a lot of sense for the tree since, compared to other elements, it's harder to come by. So each fall, in response to shorter days, trees begin disassembling their photosynthetic apparatus and storing nitrogen in the form of proteins in the phloem, sapwood and roots. Photosynthesis is driven by red and blue light, which is why trees that are active in this sugar-making process appear green during most of the growing season. As the chlorophyll is broken down and the green fades other colors show through, most apparently the yellows and oranges of carotenoid pigments.

It's also at this time of year that anthocyanins - the reds and purples - are manufactured in much greater quantities. Anthocyanins protect leaves from the sun's energy that continues to bombard them as they are packing up for the year. Earlier the sun's photons would be captured in chloroplasts and put to good use. Without chlorophyll, though, those photons can produce a lot of damage. Think of anthocyanins as late-season sunblock!

So what's the difference between a "good" year for autumn tree-watchers and a bad one? Mostly temperature and soil moisture. While frosts aren't typically harmful to leaves, a freeze of 28 degrees Fahrenheit for four hours or more will kill leaves and lock the color change in time. There's a trade-off trees have to make at the end of summer. When they start recycling nitrogen they must stop making sugars. Start that process too early and they forgo future growth; too late, and they risk a hard freeze that traps the nitrogen in dead leaves. Also, trees that are water-stressed from drought heading into fall don't produce strong color. Everything a tree does can be compromised by lack of moisture, and fall color is no different. The best fall colors result from sunny autumn days that drive high anthocyanin production, cool nights that slow sugar transport and a late frost that doesn't stop the show early.

As you're enjoying this fall, pay close attention to the leaves under your feet. Clues to each leaf's history is written on its surface. You can see

the relative amount of nitrogen left by the proportion of green area that remains. Leaves usually harvest nitrogen first from their outer edges, and the cells around the veins are the last to turn. They sometimes look like maps of river valleys! Some, like the hickories, don't produce anthocyanins at all while others, like the maples produce it in abundance. Sometimes half a leaf shows more red than the other half. That leaf was likely partially shaded during those clear days that drive anthocyanin production. The bite marks of sucking insects are also highly visible in the fall, showing just how important that leaf was as a primary producer in the food web.

We think of the turning of the leaves as an end, but it's really readying for the new year. The proteins the tree is making is the beginning of next year's growth. Fallen leaves recycle their nutrients into the soil and act as a nursery for numerous immature insects, and shelter for a fair number of mature ones. If you have deciduous trees on your property, leave the leaves, or carefully move them to a designated natural area of your property. The local ecology will thank you, and add to your diversity and joy in the next growing season!

“...by learning to see and appreciate beauty, we learn to reject self-interested pragmatism. ...stop and admire something beautiful...” (Pope Francis, *Laudato si*. 215)

At Mount St. John we find ourselves in the time of beautiful colors of leaves transformation. In this time of pandemic and election season, many are asking what transformations our society as a whole needs. We know those changes begin with each of us. In *Laudato si*, Pope Francis invites each of us into a process of transformation - an ecological conversion to help make the changes in our own lives and spheres of influence to live more sustainably in our care for the common home we share. He emphasizes that our encounter with the beauty found in nature is an important part of our process of growing in harmony with the earth, one another and with God.

Autumn provides many images to inspire our spiritual life, from the changing colors of leaves to bird migration and abundant golden harvests. We are blessed in the temperate regions to have a four-season experience that is not found in the equatorial birthplaces of our Judeo-Christian and other world religious traditions. These know more of a 2-season (rainy and dry) tradition. So we might ponder, what images might Jesus and other great teachers have used were they in our north temperate region?