Natural Grass and Artificial Turf Fields
Sorting Out Facts from Myths

Susan Rudolph, MA, MBA
susanrud@optonline.net
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Acknowledgments

New York State Children's Environmental Health Centers

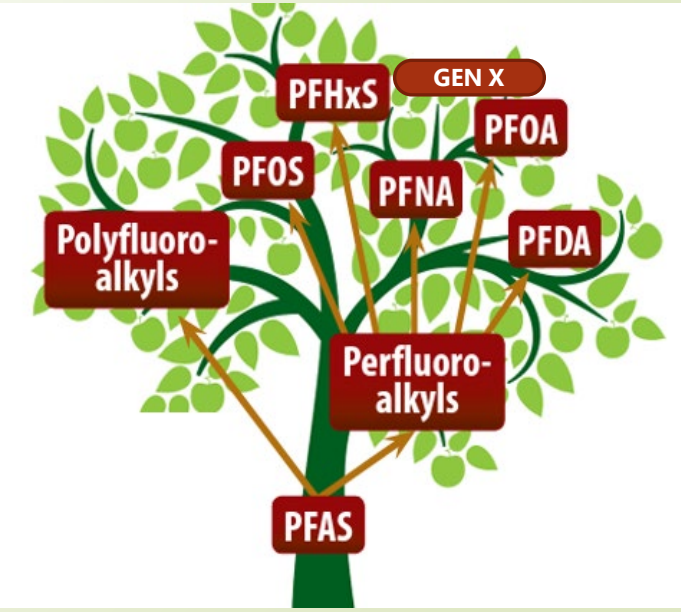
Safe Healthy Playing Fields

What is Artificial Turf (AT)?

PFAS
Per and Polyfluoroalkyl Substances

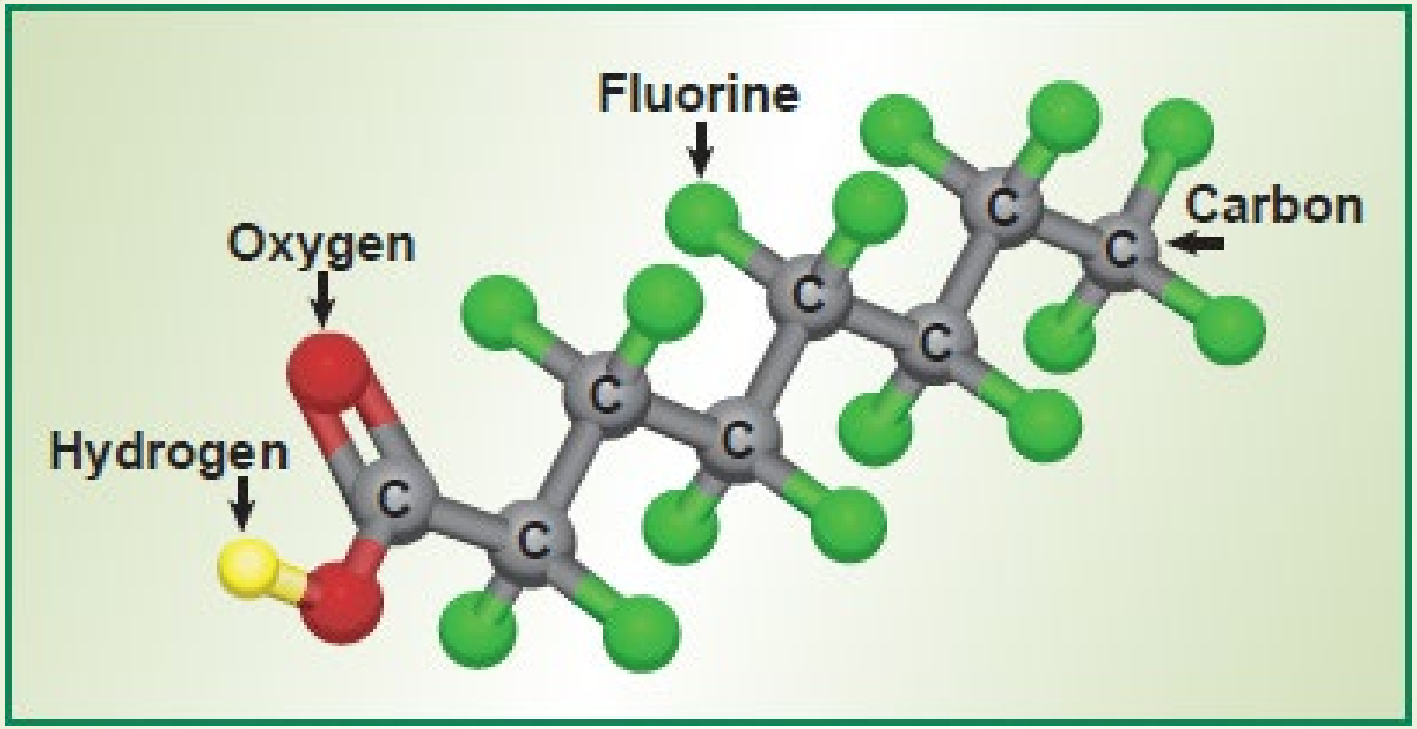
- PFAS: Man-made chemicals discovered in the mid-1930s; in use since 1940s.
  - Make products heat, water, stain, grease and resistant.
  - Common applications: nonstick coatings, textiles, electronics manufacturing, fire fighting foam and food packaging.
- AT CONTAINS PFAS.

- More than 12,000 different PFAS compounds.
- Lower detection methods and new equipment have been developed. Now an active area of research.
- Exposure to PFAS associated with a **wide range of adverse environmental and human health effects**.



PFAS

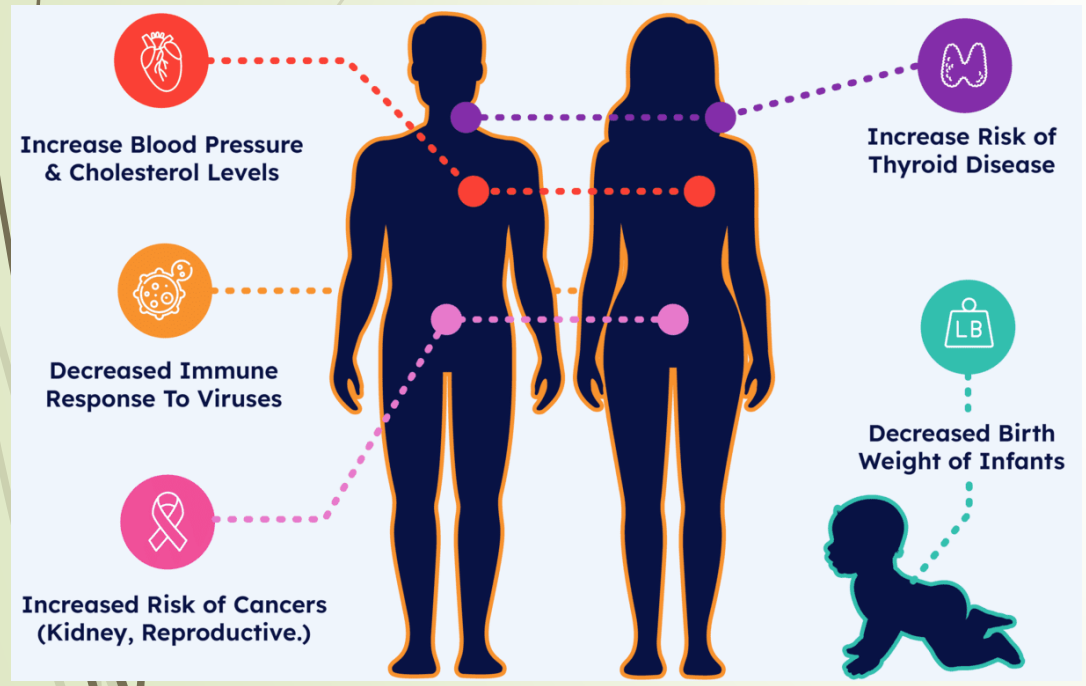
KNOWN AS FOREVER CHEMICALS



PFOA

perfluorooctanoic acid. (C8)

PFAS: Endocrine-Disrupting Chemicals (Interfere with hormone systems)



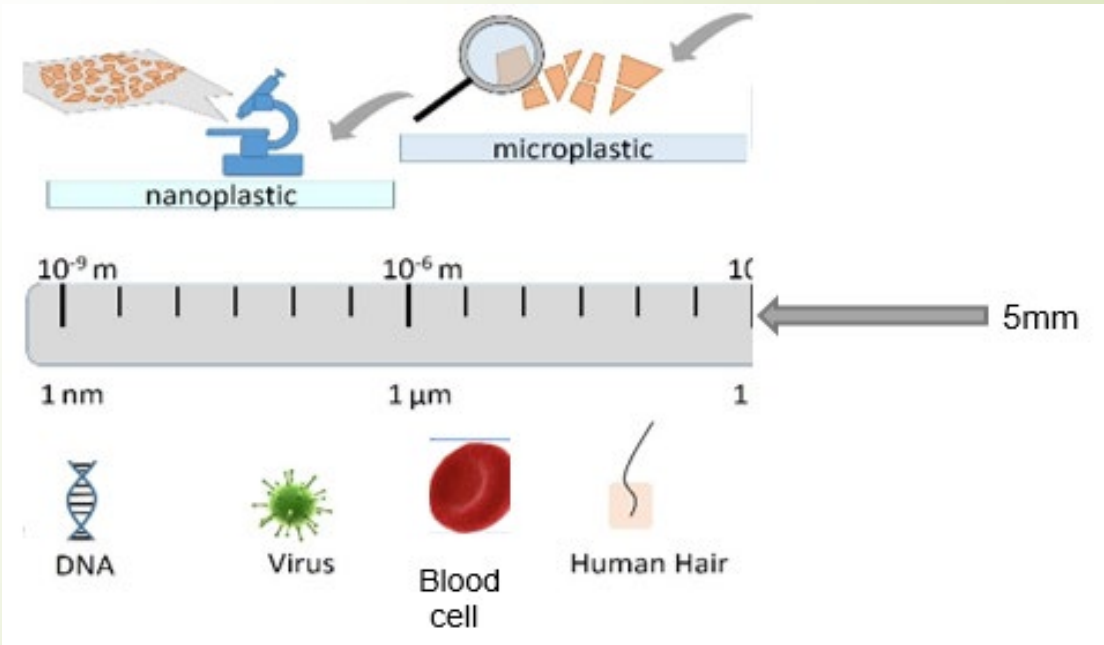
The National Academies of Science, EPA, CDC, EPA's Science Advisory Board have confirmed adverse health effects from PFAS (_____ High Certainty)

- Kidney cancer
- Liver damage
- Thyroid disease
- High blood pressure
- Increased cholesterol levels
- Increased risk of diabetes
- Interferes with female reproductive health
- Lowers sperm count/testicular cancer
- Prenatal/postnatal development
- Lower birth weight
- Increased risk of childhood obesity
- Early puberty
- Growing, learning and behavioral issues
- Decreased immune system
- Decreased vaccine response
- Bio accumulate

Microplastics and Nanoplastics (MNPs) A Growing Concern

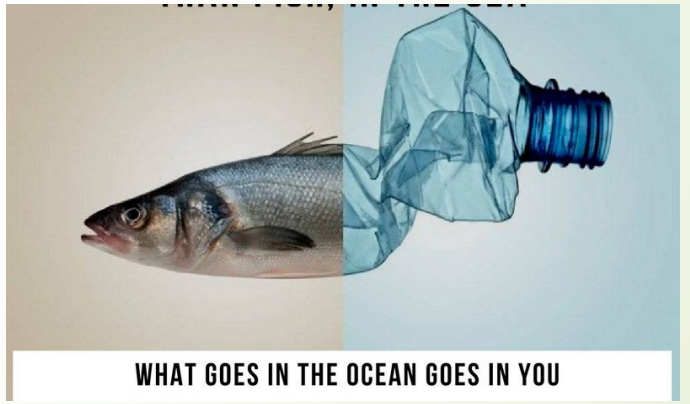
- Small plastic particles from degradation of plastics.
- A large and growing body of evidence shows how micro- and nano- plastics are hazardous to people, other living beings, and the environment.
- One AT field (≈87,000 sq. ft.) can shed up to 8% of its blades annually.
- MNPs migrate to land, water and air.
- Act as Trojan horses.
  Carry microorganisms and pollutants.

(Illustration not to Scale)



MNPs: A Growing Concern contd.

- Harmful to birds, animals and marine life.
- Enter human food chain:
  - Nanoplastics small enough to disrupt organ cells … like sand in an engine.
  - *"Microplastics and nanoplastics (MNPs) are emerging as a potential risk factor for cardiovascular disease in preclinical studies."* New England Journal of Medicine March 6, 2024



- Documentaries explore health risks. (*We're All Plastic People Now; Plastic People)*

"With microplastics, scientists are in a race against time."

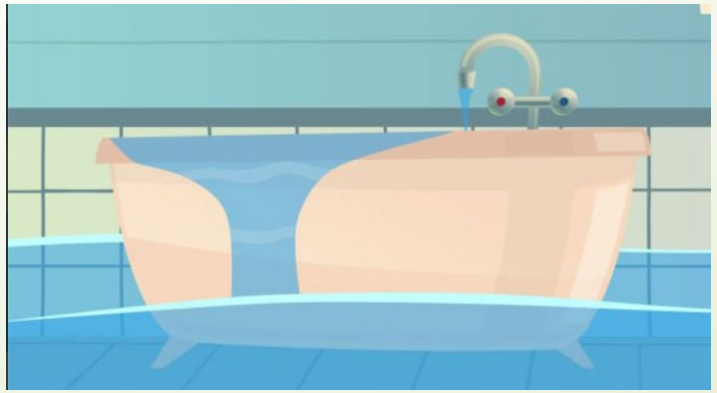
Global Plastic Pollution Crisis

- Big oil, plastic and chemical industries promote **recycling & reusing**.

  - ✓ Less than 10% of world's plastics recycled and less than 6% in US.

    Note: Exported plastic is often counted as "recycled" even when it ends up dumped or burned.

  - ✓ Recycling (e.g. heat, chemicals) is energy intensive and polluting. **Can't recycle our way out of the problem**.



Environmental Impact

AT gives off CO_2 while **Natural Grass** absorbs it.

Manufacturing, installation, maintenance and disposal of a 2 acre AT field (≈10 years) generates 55+ metric tons of carbon dioxide.

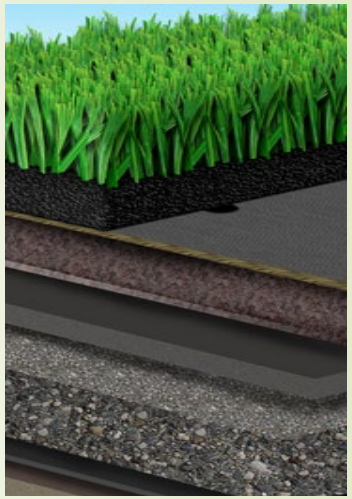
1861 trees would need to be planted as a carbon offset.

Natural grass provides a **net reduction** of 16+ metric tons of CO_2.

AT: More Environmental Harm

AT degrades soil → dead zones in the earth

- Destroys ecosystem
- Causes loss of wildlife habitat
- Contaminates water, air and soil



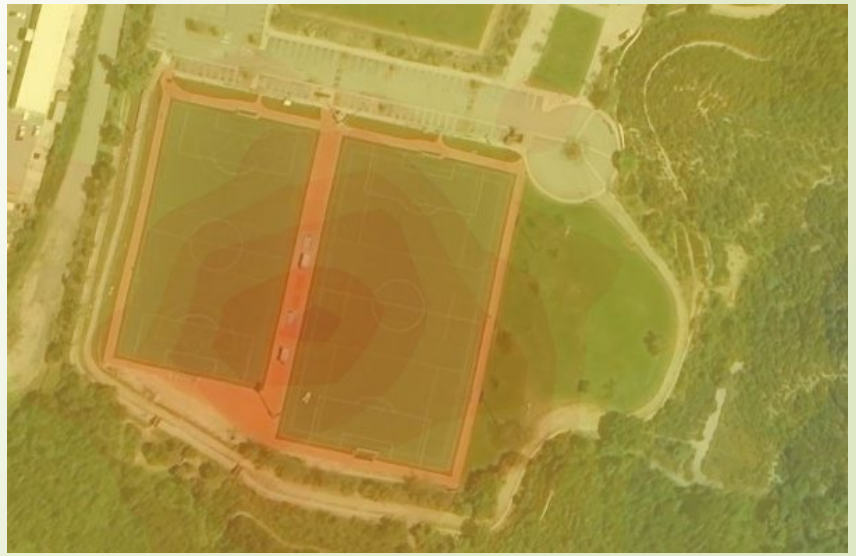
Grass → supports biodiversity

- Improves flood control
- Reduces erosion
- Produces oxygen
- Absorbs sound
- Reduces temperature in environs

AT Field Creates a Heat Island

- Surface temperatures of AT 25°- 55°F hotter than natural grass.
- Average heat season about 49 days longer than recorded in the 1960's, and continues to increase. Reduces number of "safe" days for using AT field.

  Yale Center on Climate Change and Health:
  "Summer heat will continue to arrive earlier, with more severe and frequent heat waves."
- Escalates summertime energy demands, increases air conditioning costs.
- It's a double whammy. A field covered with AT adds a hot surface AND takes away a cool one.



Injuries from AT

- Heat cramps, dehydration, respiratory difficulties, heat exhaustion, and heat stroke (the most severe form of heat illness)
- Heat induced blisters
- Turf burns
- Increased risk of infection

Natural grass absorbs sweat, spit, vomit, blood, and urine as well as animal excreta that could otherwise cause infections.

- Knee and ankle injuries

Young Children Vulnerable

to heat, chemicals and gasses from AT

Multiple routes of exposure

inhalation dermal absorption ingestion

Susceptible because:

Breathe faster than adults so more inhalation exposure

Children produce more body heat per unit mass, but sweat less than adults

Closer to the ground

Roll around on the plastic grass

Hands in mouths or on their faces

Dumped, Buried or Burned

- AT field typically replaced after 8 – 12 years.
- Ends up in landfills, illegally dumped, shipped to another country, or incinerated.

- Toxic chemicals and gasses continue to leach into soil, air and water.

AT field Removal and Disposal
Turfgrass Resource Center (no date)

	62,625 sf field	85,000 sf field
Removal & disposal (TRC)	$115,000 - $148,000	$149,000 - $191,000

Cost Comparison

AT and Natural Grass Field

Years 1-5

Natural Grass	Item	Synthetic Turf
$250,000	New installation of football field	$900,000
$26,460	Maintenance Labor	$9,100
$43,050	Materials	$0
$11,000	Outsource Services	$17,500
$17,500	Maintenance Equipment (amortized)	$10,000
$45,360	Irrigation Water	$0
$393,370	**5 Year Total Cost (Out of Pocket)**	**$936,600**

Years 6-10

Natural Grass	Item	Synthetic Turf
$250,000	New installation of football field	$900,000
$54,243	Maintenance Labor	$18,655
$88,253	Materials	$0
$22,550	Outsource Services	$32,735
$35,875	Maintenance Equipment (amortized)	$18,450
$15,000	Major Field Maint or Renovation / Resurfacing	$425,000
$92,988	Irrigation Water	$0
$558,909	**10 Year Total Cost (out of pocket)**	**$1,394,480**

Cost Comparison: AT & Natural Grass

"Most comparative data that has been published and ultimately used in athletic field purchasing decisions in recent years is dramatically slanted by the synthetic turf manufacturers and/or construction companies. **A synthetic field will always be far more expensive than natural grass."** *Texas-Multi-Chem, Ltd, a sports field contractor*

HARVARD
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ORGANIC MAINTENANCE PROGRAM

The cost of a natural turf management program is incrementally higher in the first two years, but then decreases significantly as soil biology improves and water requirements diminish. Once established, annual cost savings of greater than 25% can be realized.

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TOXICS USE REDUCTION INSTITUTE
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In nearly all scenarios, the full life-cycle cost of natural turf is lower than the life-cycle cost of a synthetic turf field for an equivalent area.

Greenwashing

eco-friendly, nontoxic, zero waste, biodegradable, compostable, recyclable

- A marketing technique to convince consumers a product is more eco-friendly than it actually is.
- Marketers can say (buzzwords) whatever they like unless someone files a lawsuit and brings them to court.

  “Don’t worry, it’s all going to be recycled.”

  “No evidence that children are harmed.”

  “No studies show the fields cause cancer.”

- Consumers have to sort through the greenwashing to find the truth.

Lawsuits/litigation

When will the turf debate enter the courtroom?

- **Reuters:** "*The courtroom battle over artificial turf safety may be closer than we think*"

The New York Times

- May 9, 2024 *Flood of 'Forever Chemicals' Lawsuits Expected*
- June 10, 2024 ***Chemical Makers Sue Over Rule to Rid Water of 'Forever Chemicals'***

  Industry groups said the E.P.A. had exceeded its authority in requiring the drinking-water cleanup.

- **Rye, NY** (April 2024): Pending Lawsuit: "the project does not account for the health risks associated with turf fields, flooding issues in the area, and the concerns of local and regional agencies, including environmental groups."

  Named defendants: City of Rye, Rye City Council & City Board of Appeals

Yes, but……..

"… AT fields can provide more hours of playing time."

"… we need more hours of playing time for all our school and community activities."

"… other schools have artificial turf fields. Why shouldn't we?"

" …the anti turf leaders have highlighted negative data."

"…it's nonstop use for both our school and our rec programs. It's great."

Questions Not Part of the Conversation … but Should Be!

- What can we do to improve our grass fields?
  (Rarely part of the conversation.)
- Are we willing to ignore science, research and the advice of physicians?

Think About It

"It's only a matter of time before [artificial turf] is banned."

Kyla Bennett, PhD, JD and Director of Science Policy at PEER.
(Public Employees for Environmental Responsibility)

History of tobacco, Agent Orange and asbestos: Confirming the dangers can be lengthy and challenging.

"In a few years we're going to be asking,
'How on Earth did we ever allow this to happen?'"

THANK YOU!