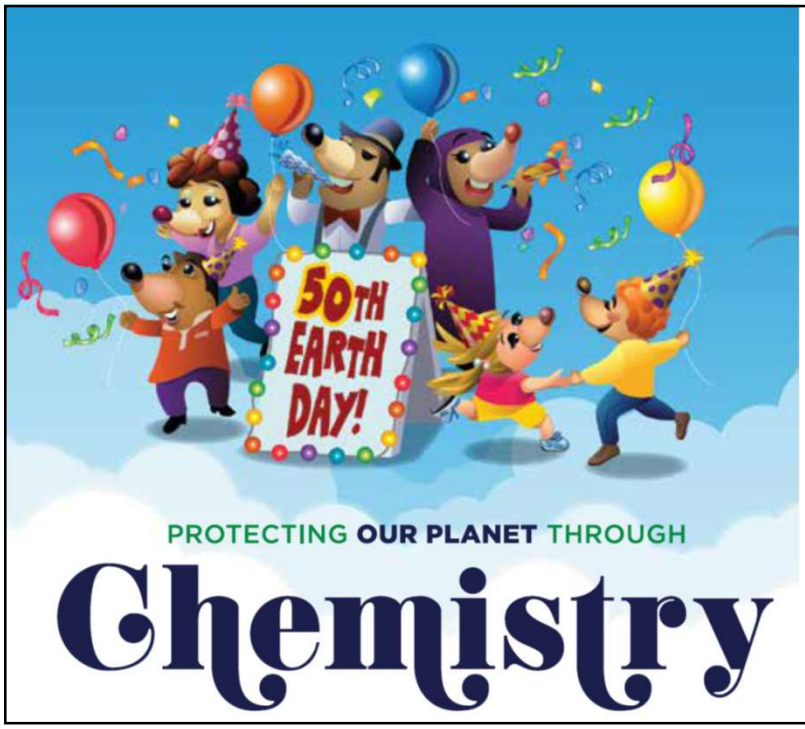

CCEW Webinar Teach-In April 9, 2020

CHEMISTS CELEBRATE EARTH WEEK

Lehigh Valley Section

ACS Chemistry for Life®

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What's the Celebration About?

- Earth Day 50 years on: What has changed?
  - Diversification of Energy Sources; Conservation
  - Tougher Environmental Laws
  - Acceleration of Climate Change
  - What else?
- UN Sustainable Development Goals
  - What is Chemistry's role?
- Global Sustainability Challenges
  - ✓Plastic Pollution and Biodegradability
  - ✓Water Recycling and Waste Treatment
  - ✓Renewable Resources and Processes
  - ✓Climate Action: Clean Energy Sources
- What can Chemistry do to help?
  - ✓Teach in terms of Global Impact and the roles Chemistry will play
  - ✓Environmentally Balanced Strategies for Products and Services
  - ✓Apply a Global Waste Hierarchy
  - ✓What specific concerns do we have in the Lehigh Valley area?

CHEMISTS CELEBRATE EARTH WEEK

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How can Chemistry Help Achieve These?

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Educational Goals

- NO Planet B
- Everything we do impacts the global ecosystem (air, water, land)
- Understand Reduce vs Reuse vs Recycle vs Recover vs Landfill
- Make products that better balance global EHS with cost and performance
- Explain why Chemistry has a key role in both identifying environmental challenges and finding solutions for them

Words to Know

Atom - the smallest part of an element that has the characteristics of the element.

Biodegradable - capable of being decomposed by bacteria or other living organisms.

Bioplastics - plastics made from plants, such as corn or potatoes, instead of petroleum.

Chemical reaction - the process of rearranging atoms between substances to make different substances.

Compound - a pure material that combines two or more elements in a specific, stable form.

Compost - a mixture of decomposed plant and animal matter that can be used as a plant fertilizer.

Element - a pure substance, such as copper or oxygen, made from a single type of atom.

Environment - the natural world, surroundings, or conditions in which a person, animal, or plant lives.

Green chemistry - chemistry design that avoids the creation of toxins and waste; also, the design of chemical products and processes that reduce and/or eliminate the use or generation of hazardous substances.

Molecule - the smallest unit of a chemical compound.

Natural resources - materials found in nature that have practical use and value to people.

- **Renewable** - a resource that cannot be used up (like sunlight, water, or air), but pollution makes harder to use.
- **Nonrenewable** - a resource that takes thousands of years to form (like stone, oil, or gases) that people use faster than it can form.

Plastic - a man-made material, usually made from petroleum, that can be molded or set into a variety of shapes.

Pollution - the presence or introduction into the environment of a substance or thing that has harmful or poisonous effects (one example is toxic waste).

Sustainability - the ability to protect our natural resources and maintain ecological balance, so that we can meet the needs of people today, and also future generations.

Waste - material that isn't wanted anymore, such as unusable remains or byproducts.

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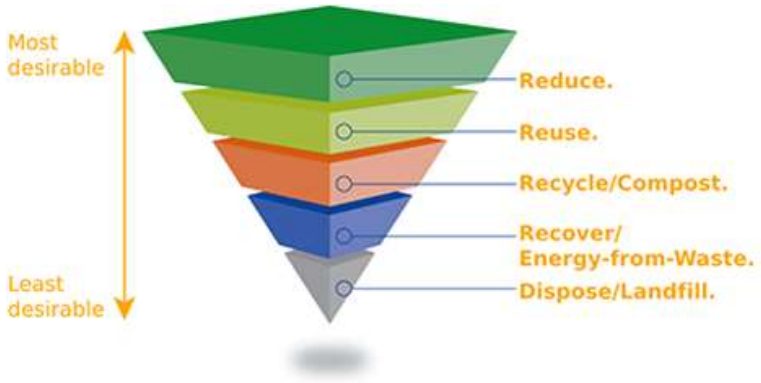
Waste Hierarchy Model



- Reduce: make rational decisions around product use (type and amount)
- Reuse the product whenever possible
- If you cannot reuse, recycle to another form (alternative use; biodegradation)
- If you cannot recycle, try to recover energy value and reduce volume of waste
- Only after all other routes applied, dispose in landfill

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Lehigh Valley Section Area: Specific Concerns

- LVACS represents six counties in PA (Northampton, Monroe, Lehigh, Schuylkill, Berks, Carbon) and Warren County, NJ
- Watersheds
  - Lehigh, Schuylkill and Delaware river ecosystems: run-off, disposal issues
  - Drinking water system quality
- Airshed: 55th worst metro area in the country for smog (ALA)
  - Construction and manufacturing plant particulates
  - Auto/Truck emissions particulates and ozone (EPA marginal?)
  - Pb: Berks (2 areas)
- Land use: steady decline of agricultural uses
  - Industrial: accelerating development of large footprint warehouses
  - Residential: many more "McMansion" bedroom communities
  - Expansion of entire area as a commercial transportation hub
- Other concerns?

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ACS Suggested CCEW topics/demos for all ages

https://www.acs.org/content/acs/en/education/outreach/celebrating-chemistry-editions.html

- Sustainability of the Oceans/Lakes/Rivers (discussion: plastic pollution)
- The Water Cycle (discussion: chemical pollutants)
- Water Recycling Chemistry (Demo: purifying water by evaporation)
- Biodegradable /Compostable Plastics (Demo: making edible water pods)
- Plants (e.g. trees) as the ultimate sustainable resource and protector of the planet (air, soil and water) (discussion: sustainable products from wood)
- Composting Chemistry (Demo: composting rates of food containers)
- Sustainable Infrastructure (discussion: extending construction material lifetimes)

➢ In-person activities cancelled this year: going digital…

✓ **Thursday, April 16th 3:30 pm "**Plants! Perfect Planet Protectors!" including activities for kids (Jeanne Berk)

✓ **Saturday, April 18th 11:00 am** "(Re)Cycling Water" including water purification demo (Greglynn Gibbs)

✓ **Saturday, April 25th 11:00 am** "Earth Friendly Plastics" including making waterpods demo (Greglynn Gibbs)

✓ **More activities TBA: What would YOU like to hear about?**

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What are Your Questions and Ideas?

GENERAL CCEW TOPICS(*denotes follow-up webinar potential)

- Need to educate everyone about how chemistry can help our daily lives (e.g. why soap is one of our best defenses against SARS-CoV-2/COVID-19).
- How to address deep skepticism of some towards scientific results.
- No concept among populace of simple concepts like 'discard dates.'
- Going back to first Earth Day: "Organic" vs "Chemical" – how do we demonstrate that these are not opposites!
- Re: UN Sustainability Goal #14 (Life below water) – good example of bio-plastics (alginates).*
- A lot of what is in the UN Goals is also in the so-called 'Green New Deal' of AOC, et al.
- On a recent trip to the UK, my students were struck by lesser amount of plastic wrappings.
- We need to make rational choices (e.g. single-use plastic bags vs multi-use; note regression with COVID-19!)

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What are Your Questions and Ideas?

REGIONAL CCEW TOPICS (*denotes follow-up webinar potential)

- Palmerton, PA superfund site (since 1983; former NJ Zinc plant): site is only just now recovering from extreme heavy metal (Zn, Cd and Pb) contamination after being closed in 1980. Main benefit is recent lime applications to raise pH and insolubilize metals.*
- Other superfund sites locally are the former paper mills along the Delaware.*
- Ned Heindel (Lehigh U, retired) could speak about land use issues (e.g. PennEast pipeline).*
- How about renewable energy field trips or talks
  - Talen/Susquehanna Steam Electric (Nuclear) Plant or Bob Artz, Nuclear Chemist, former Excelon/Oyster Creek Plant .*
  - Solar and Wind Farms? (maybe associated with a school such as Moravian Academy?)*
  - Someone representing a "Community Solar" installation?*
- Visit fossil fuel plants (e.g. conversion of Talen/Foul Rift plant from coal to oil burning).*
- Impact of rapid growth of warehousing/truck traffic on particulates and ozone emissions.

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