Green chemistry = Social and Environmental Justice

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Thank you!

Beyond Benign and the Green Chemistry Commitment

Feel free to send in questions at any time!

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Outline

- Goals and objectives of this webinar
- Warm-up questions
- Role of chemistry in society & unintended consequences
- What is Social/Environmental Justice?
- What is the “social (in) justice of chemical exposure”?
- Examples
- **Pause for questions**
- Perspective Change: Green Chemistry = Social & Environmental Justice
- Next steps
- **Homework questions**

Goals and Objectives

- **Goals:** To build on the enthusiastic discussions that began at the 2016 GC&E conference in Portland, establish the future direction for this discussion by expanding our current knowledge in defining, identifying and understanding the issues.

- **Objectives (long-term):**
  - Establish dialog and collaborations between the green chemistry community and other disciplines to share knowledge and experiences.
  - Determining the strengths, weaknesses, opportunities and threats.
  - Build confidence to better discuss these issues.
  - Develop educational resources.

Framing the dialog….

Think about the following questions & feel free to share your answers during the webinar. This will help with future planning.

(1) Why hasn't the issue of social (in)justice of chemical exposure received more attention?

(2) What issues related to the social/environmental (in) justice of chemical exposure are <u>you</u> aware of?

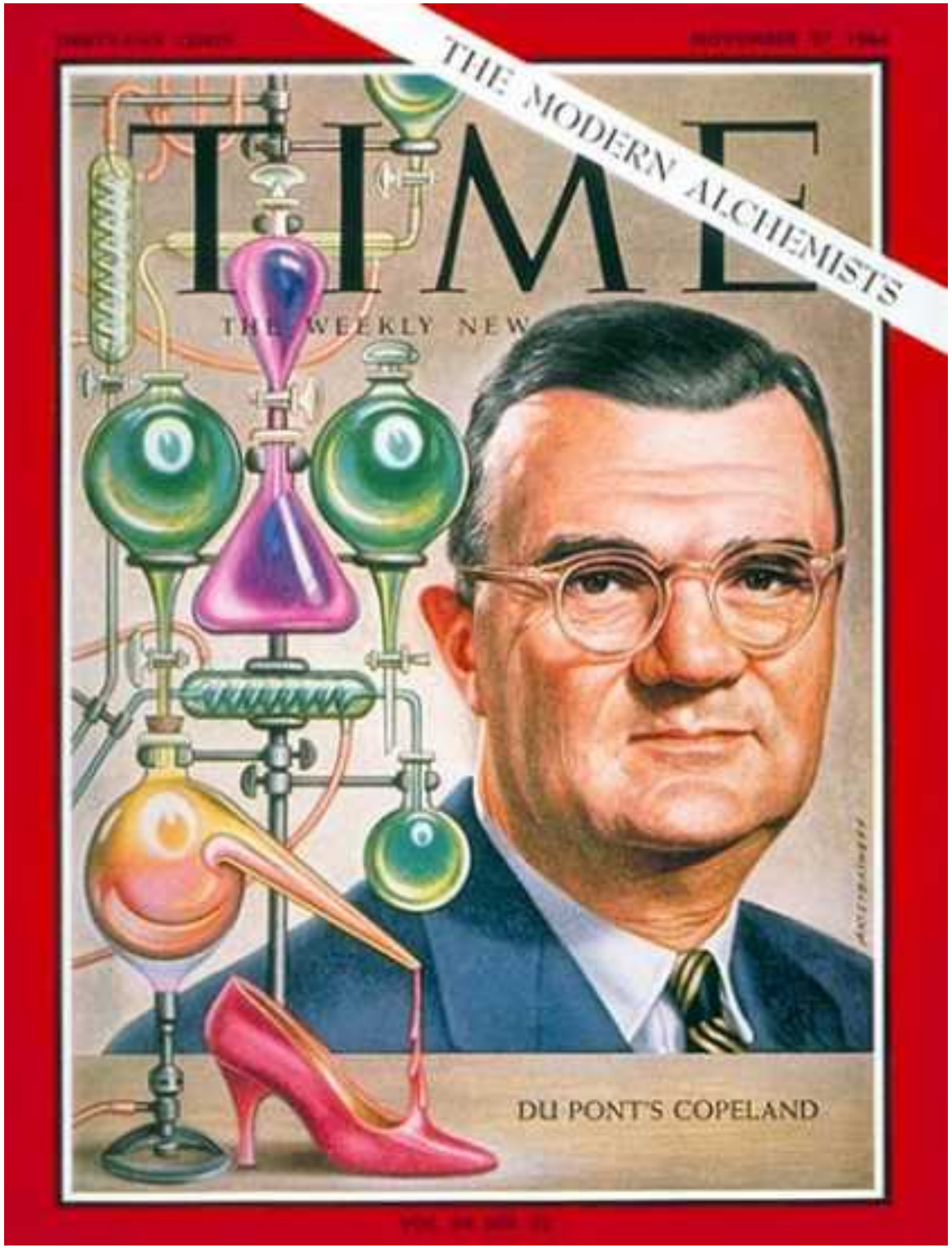
(3) Why are you here? Why is this topic relevant and/or important to you?

(4) What do you hope to get out of this webinar? Was it successful?

(5) What specific and/or general roles can, or has green chemistry played in resolving these disparities?

(6) How do you see this issue fitting into your own teaching, research or outreach?

Time Magazine, November 27, 1964




Tide

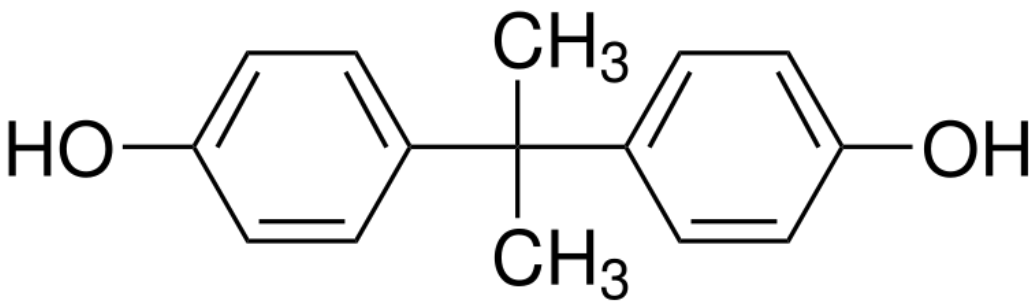

seventh
GENERATION


Motrin
IB
Advil
RITE AID
ibuprofen

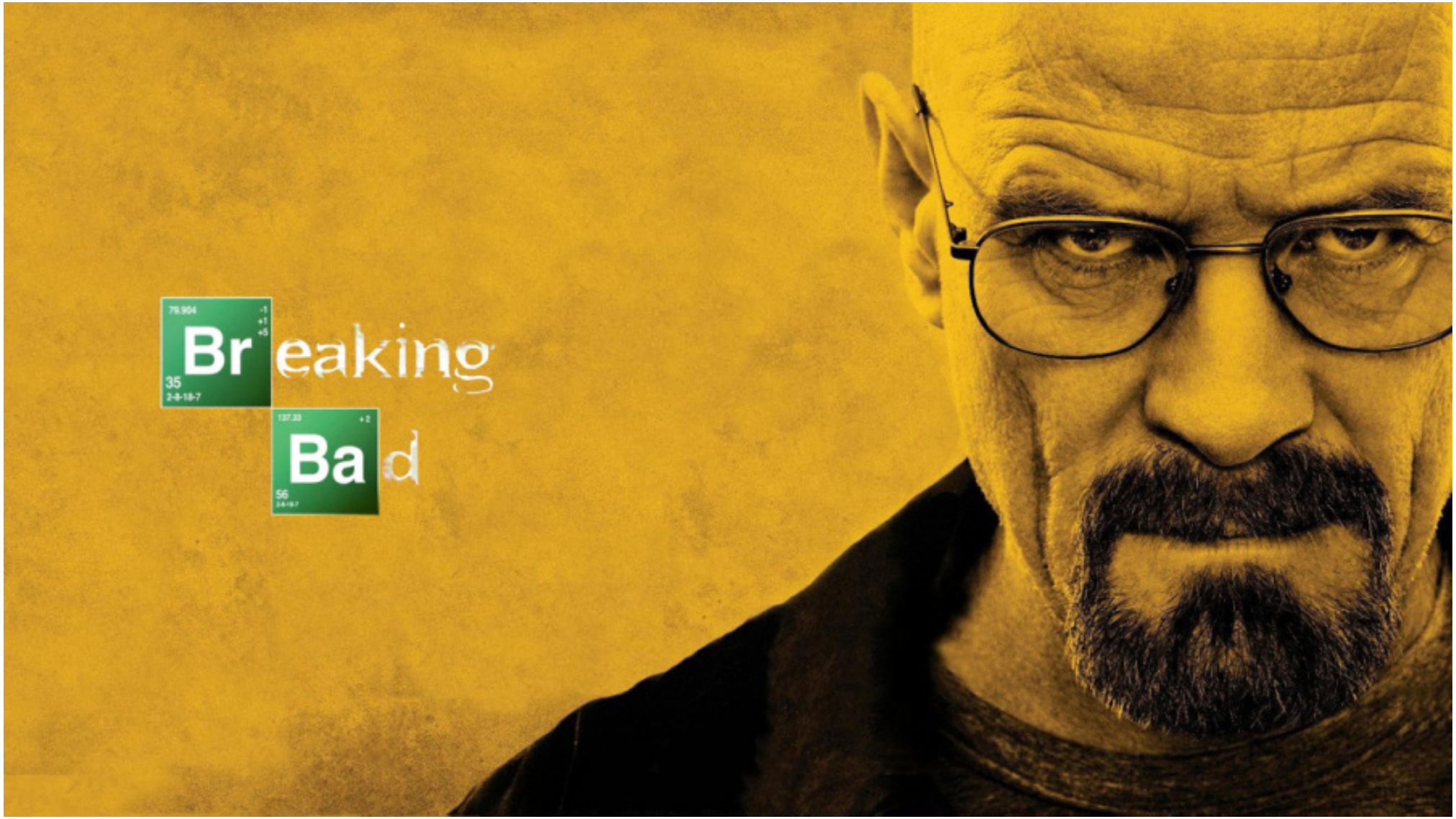
The Problem. We have admittedly made some poor choices in the chemicals we use that have resulted in unintended consequences on human and environmental health.

Bis-phenol A (BPA) (endocrine disrupting chemical)

The role of chemistry in society: Every product we use is composed of chemicals that provide the function **we** demand.



The Problem. We have made some poor choices in the chemicals we use resulting in ***unintended consequences*** on human and environmental health.



American University, Science Blog, “Breaking Chemistry's Bad Rap” (Maggie Barrett, September 26, 2011)

“….. the show plays into our preconceived notions that chemists are mad scientists and that chemicals are bad for you….”

Unintended Consequences: Social and Environmental (in)Justice of Chemical Exposure

- Social Justice is a strategic priority at BSU, integrated into the curriculum, integrated into my research group and teaching.

- General background:
  - ❖Chemicals are part of our everyday lives, and everyone in the world is exposed to manufactured chemicals.
  - ❖We've made some poor choices: "unintended consequences".
  - ❖Disproportionate exposure based on race or socio-economic status.
  - ❖Children are the most vulnerable.
  - ❖Urgent need for collaboration, research, education, and activism.

Unintended Consequences: Social and Environmental (in)Justice of Chemical Exposure Definitions

Social Justice (via Mary Kirchhoff):

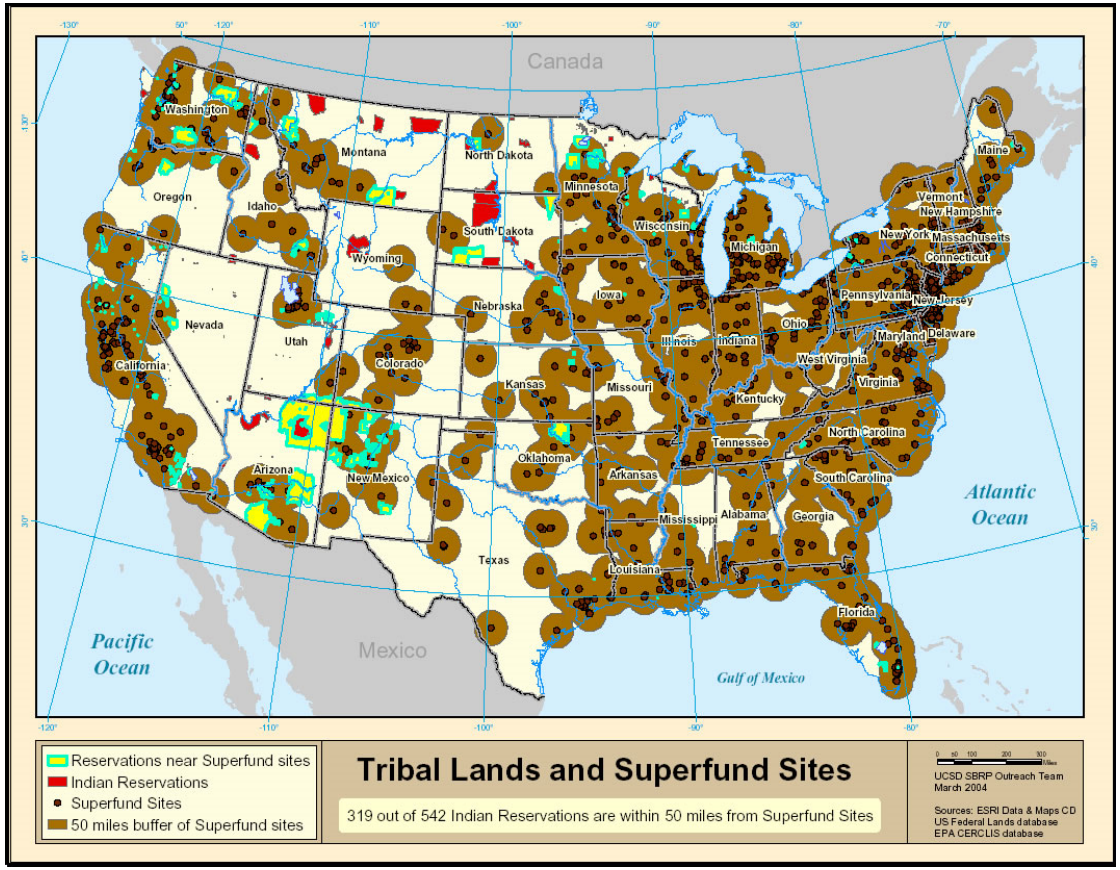
- Justice in terms of the distribution of wealth, opportunities, and privileges within a society.
- Promoting a just society by challenging injustice and valuing diversity.
- Justice that follows the principle that all individuals and groups are entitled to fair and impartial treatment

Environmental Justice: All people (independent of race and socio-economic status) are entitled to clean air to breathe, safe water to drink and to live in healthy communities where they raise their families, work, learn and play.

Unintended Consequences: Social and Environmental (in)Justice of Chemical Exposure "Word Cloud"

The U.S. perspective…….

The U.S. perspective……



The U.S. perspective…….children

EHN Special Report: 'Chemicals of high concern' found in thousands of children's products

Stress + pollution = health risks for low-income kids

Under orange skies

The fallout of locating minority public schools in polluted areas

Chemicals linked to obesity in black children

International perspective…….

- January 2016: Universal call to action to end all forms of poverty, fight inequalities and tackle climate change, while ensuring that all people enjoy peace and prosperity.

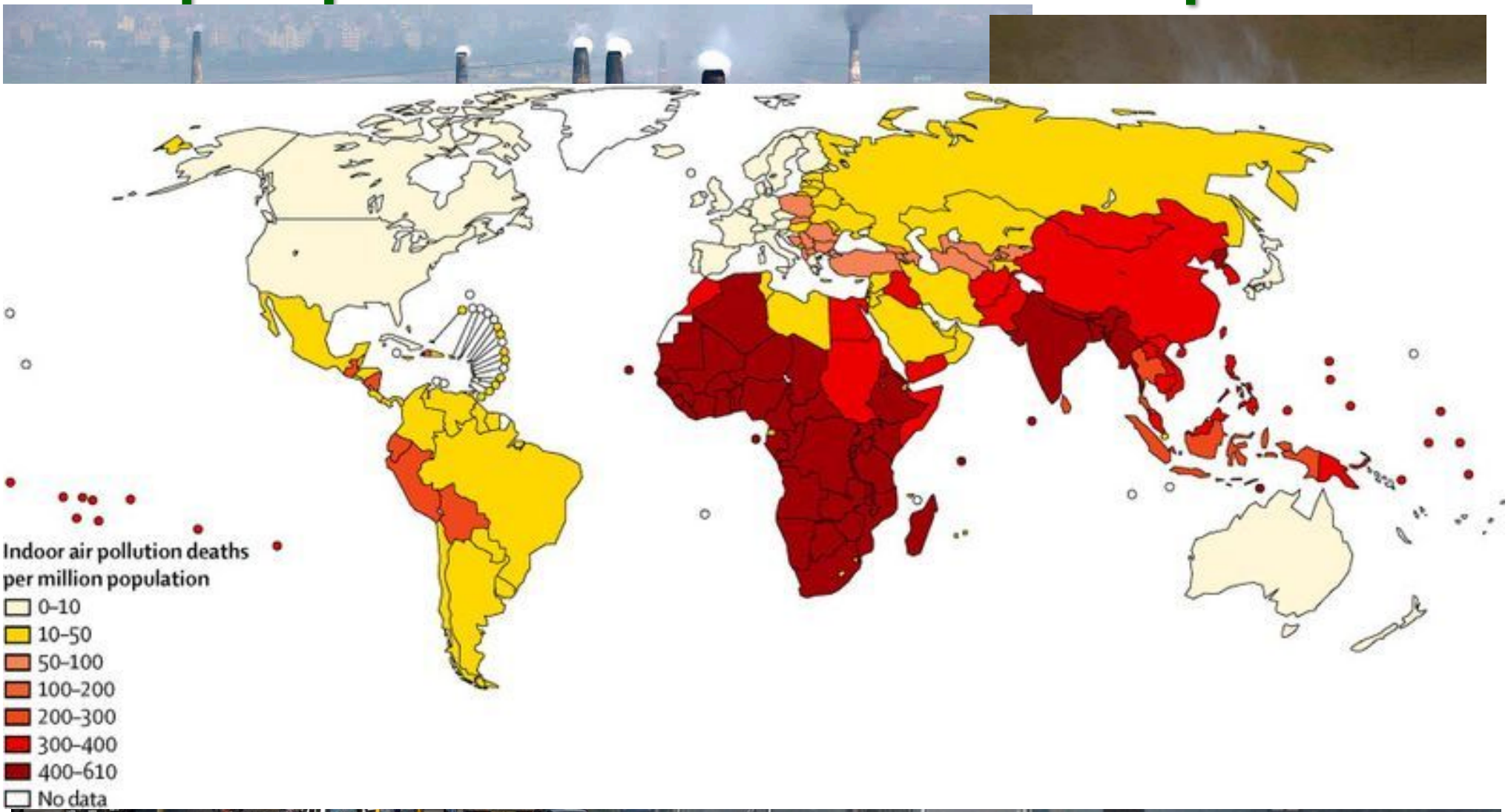
International Programs at BSU: Mandela Washington Fellows Program

- **2016 Fellowship for Young African Leaders (YALI)** is designed to increase connections and mutual understanding between U.S. partners and counterparts from African nations.

- BSU hosted 25 of the YALI Fellows for a six-week academic and leadership institute to help young African leaders develop skills and networks to build their countries and communities.

- Discussed social & environmental injustices in Africa related to chemical exposure, and the role of green chemistry.

The perspective from Africa…….air pollution

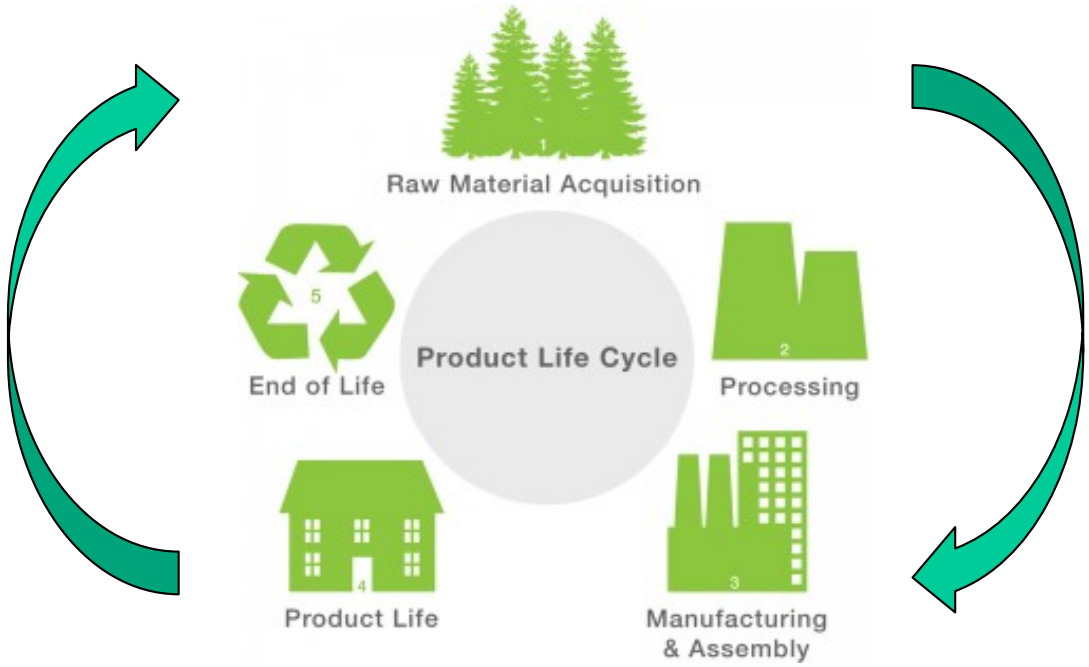


The perspective from Africa…….mining
(a delicate balance of economics & environment)

Let’s change the perspective…..

Questions?

Green Chemistry is the science focused on making <u>informed, evidence-based decisions</u> in how we design, make, use and dispose of chemicals and chemical products.



(Command & Control)

0 Risk = ~~Hazard~~ x Exposure x Vulnerability

(Green Chemistry)

12 Principles of Green Chemistry

<u>Guidelines</u> for sustainable molecular design to produce consumer products that are *better, safer and cheaper*.

Green Chemistry…..

- Focuses on pollution prevention
- Safer chemistry by design (benign by design)
- Chemistry that is safer, cleaner, more efficient, more elegant
- Minimizes the risk of releases and exposure
- Lower production costs and higher efficiency
- More dependable synthetic processes
- Improved worker safety

GREEN CHEMISTRY
A U.S. EPA Program

US EPA Green Chemistry Challenge Awards

Winning technologies = billions of pounds of progress:

- >800 million pounds of hazardous chemicals and solvents eliminated each year.
- >20 billion gallons of water saved each year (amount used by >800,000 people annually).
- >8 billion pounds of carbon dioxide equivalents eliminated each year (equal to >800,000 automobiles off the road).
- New catalysts using earth-abundant metals
- Plastics from methane-based greenhouse gas
- Reduction in fertilizer nitrate leaching

It is implicit that Green Chemistry = social & environmental justice

Next steps: Fill in the gaps

(1) Other examples of social and environmental injustices of chemical exposure; impacts of climate change.

(2) Examples of how race & socio-economic status impacts <u>accessibility</u> to chemicals and chemical products?

(3) Is it accurate to say that it is “implicit that green chemistry = social/environmental justice? Can we point to any current green chemistry technologies for evidence to back this statement? How might future green chemistry technologies help correct these disparities?

(4) Educational Resources. How can we work together to develop “Open Educational Resources” (OERs).

(5) Research. Identify databases for relevant info (i.e., exposure data); development and use of personal sensor technology; etc.

Next steps: Continuing the conversation green chemistry in a social justice context

(1) Education and awareness. Engage in dialog on campus, in your community and beyond.

(2) Write articles for the Nexus blog (Green Chemistry Institute)

(3) Reach out and include colleagues and students outside of your discipline in the discussion.

(4) Contribute at professional conferences:

ACS San Francisco (April 2-6, 2017): CHED "*Green Chemistry Theory & Practice*"

Green Chemistry & Engineering, Reston, VA (June 13-17, 2017), *"Green Chemistry = Social and Environmental Justice: Theory and Practice"*

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Thank you!

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Resources:

- Environmental Health News (EHN) e-newsletter
- 2013 Environmental Health News (EHN) series of special reports: “Pollution, Poverty and People of Color”
- Kids’ health news e-newsletter

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“Homework” Questions

1) What are the most significant health issues that you are aware of?
2) What segment(s) of the population are effected the most?
3) Are you aware of disproportionate exposure based on gender, race and/or socioeconomic status?
4) For which of these can exposure to hazardous chemicals be considered a contributing factor?
5) What measures are currently being taken? Have they been effective?
6) What are the challenges to making change?
7) What are the best approaches to making change?
8) How can this issue be integrated into education and community outreach?