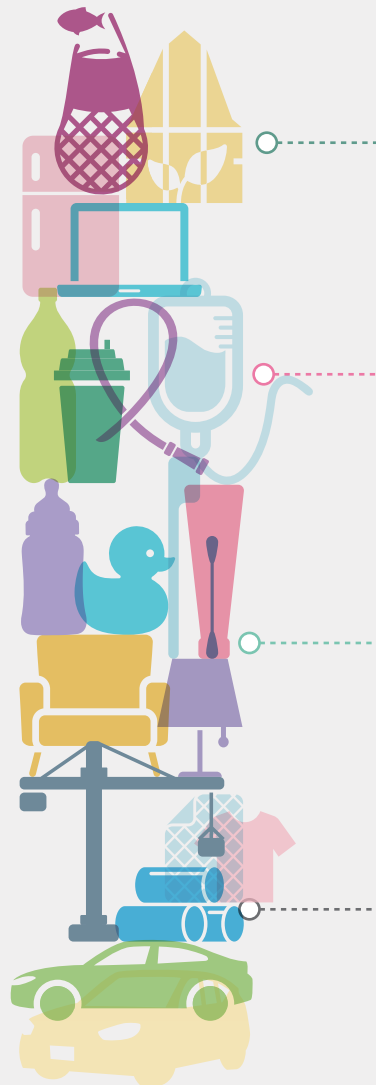


# ANATOMY OF PLASTICS

## WHAT'S IN MY PLASTICS?



**1 MONOMERS AND POLYMERS**  
constitute main building blocks of plastic material

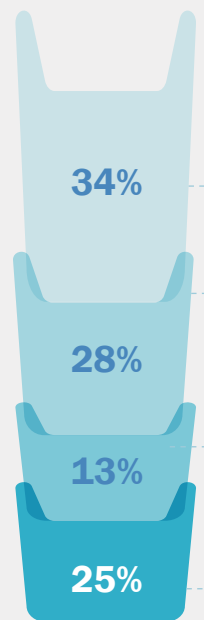
**2 ADDITIVES**  
bring desired functionality to the plastic material

**3 OTHER INTENTIONALLY ADDED SUBSTANCES**  
such as starting materials and catalysts

**4 NON-INTENTIONALLY ADDED SUBSTANCES**  
such as solvents, cleaning agents, or impurities from manufacturing or recycling

**BREAKDOWN**  
most widely produced plastic additives\*

\*Source: Geyer et al. 2017



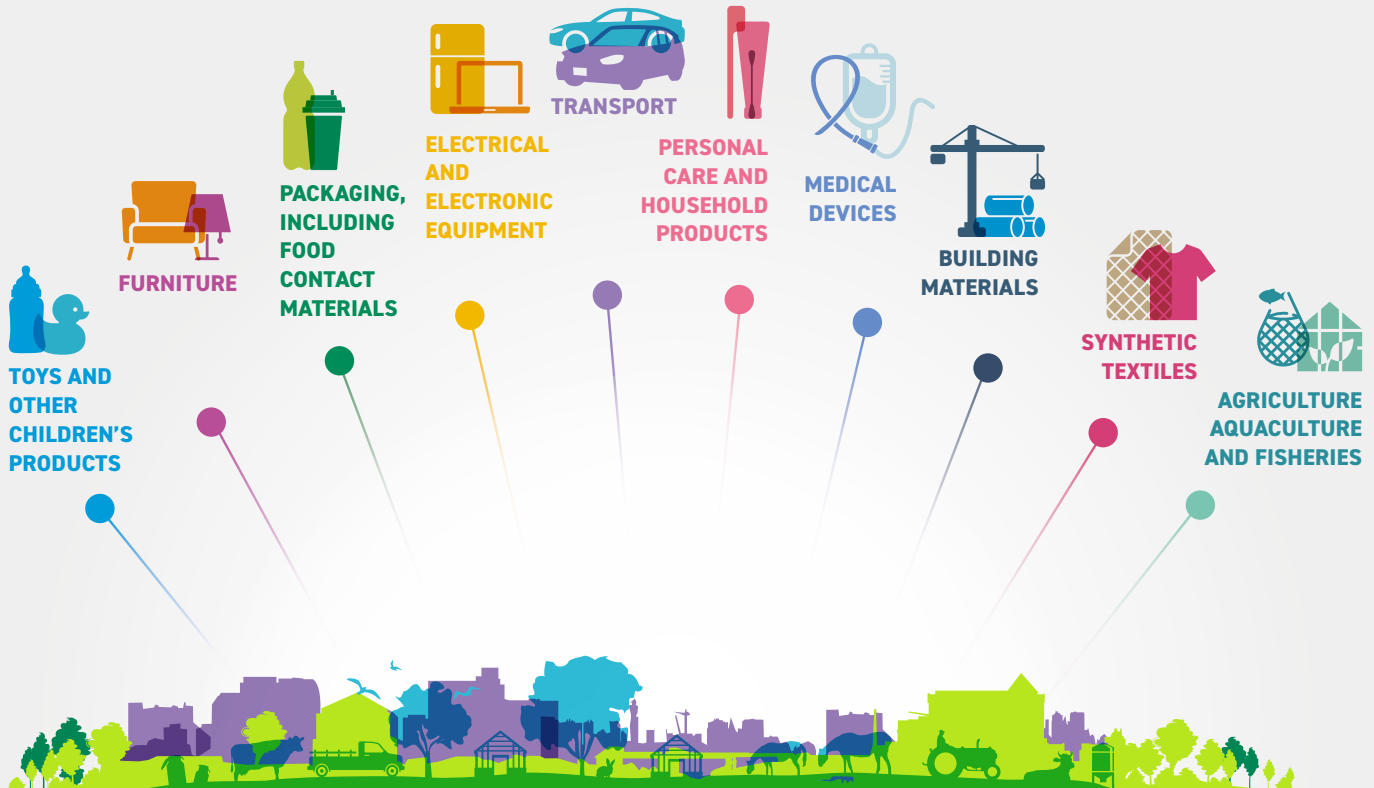
**Plasticizers**  
to make plastic softer and flexible  
e.g. phthalates, chlorinated paraffins

**Fillers**  
that occupy space without changing functional properties  
e.g. mica, talc or clay

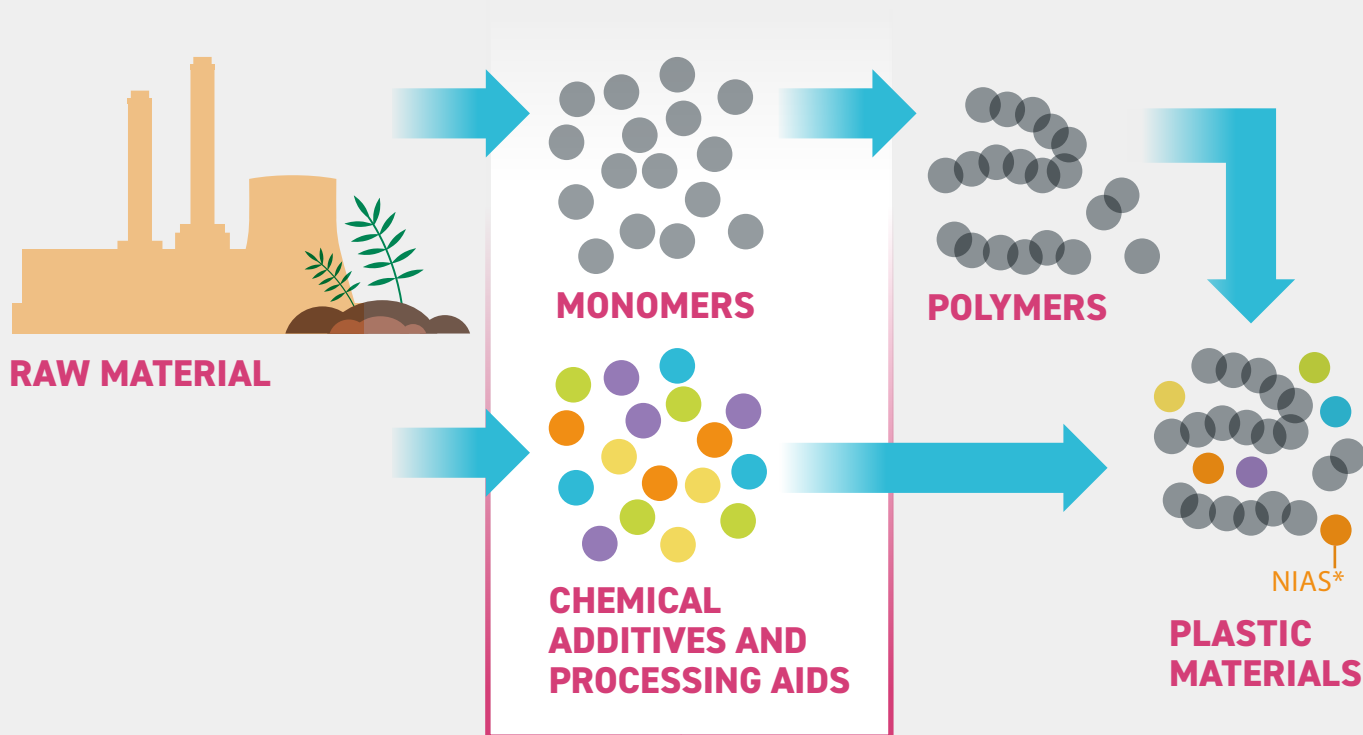
**Flame retardants**  
to reduce flammability and prevent spread of fire - e.g. brominated and chlorinated flame retardants

**Other**  
including colorants, antioxidants, heat and light stabilizers, lubricants, biocides or antistatic agents

# CHEMICALS IN PLASTICS PRIORITY USE SECTORS



# CHEMICALS IN PLASTICS OVERVIEW



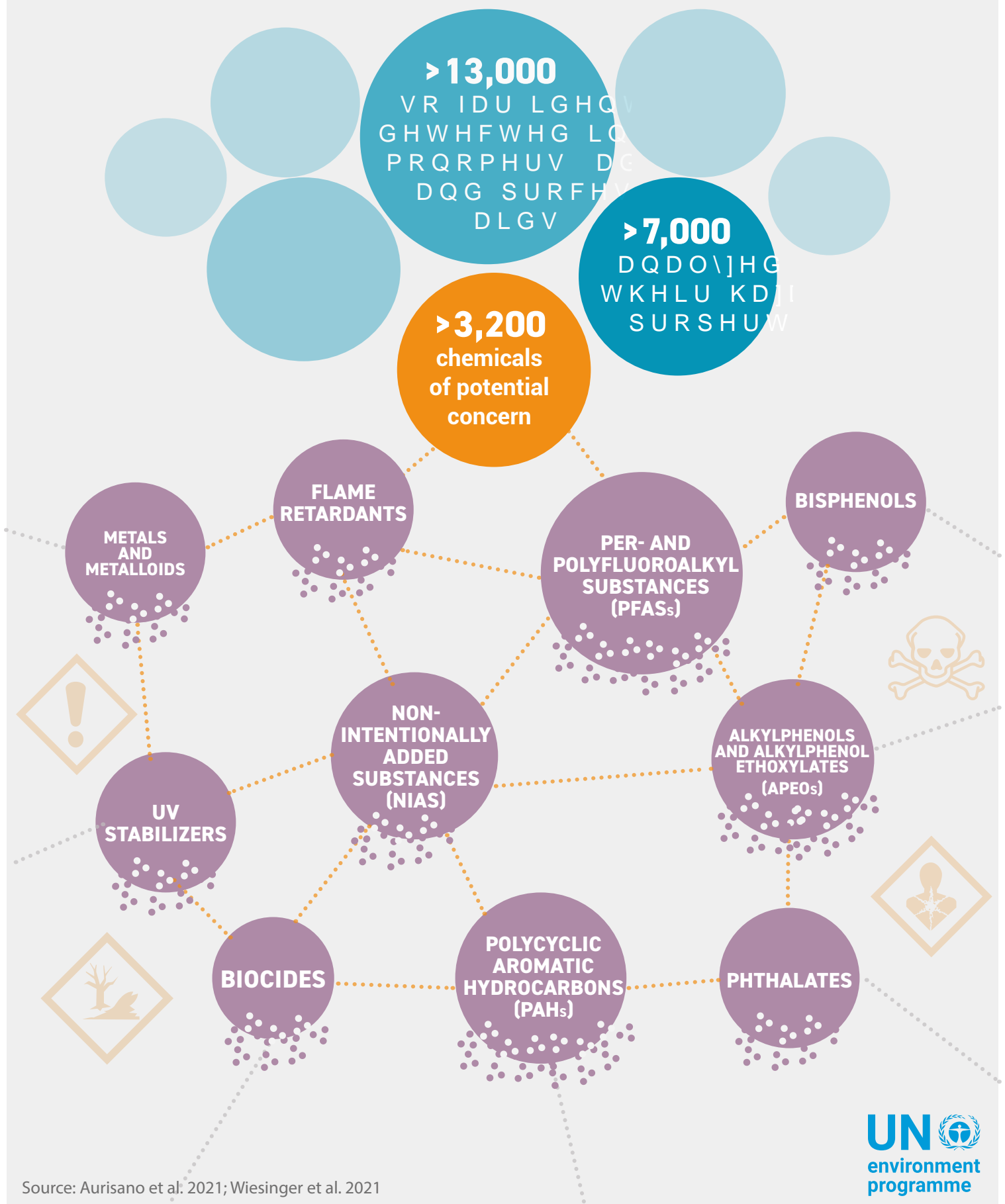
**> 13,000**  
so far identified or  
detected in plastics as  
monomers, additives  
and processing  
aids

**> 7,000**  
analyzed for  
their hazardous  
properties

**> 3,200**  
of potential  
concern

\*NIAS = non-intentionally added substances, including (1) break-down products of polymers, additives and other chemicals in plastics, (2) impurities, (3) contaminants from processing such as production and recycling, and (4) reaction byproducts.

# CHEMICALS OF CONCERN IN YOUR PLASTICS



Source: Aurisano et al. 2021; Wiesinger et al. 2021

# HUMAN EXPOSURE TO CHEMICALS IN PLASTICS

## SOURCES



**EVERYDAY PLASTIC PRODUCTS**, e.g. plastic-based food contact materials, building materials, electronics, textile, clothing and personal care and household products



**CHILDREN'S** products e.g. toys, clothing or furniture.



**OCCUPATIONAL** exposure at various stages of the plastic value chain

## EXPOSURE PATHWAYS examples

inhalation of contaminated air

ingestion of contaminated food, water and dust

dermal contact



## ADVERSE HEALTH EFFECTS examples

abnormal hormone functions

reduced fertility

damaged nervous system

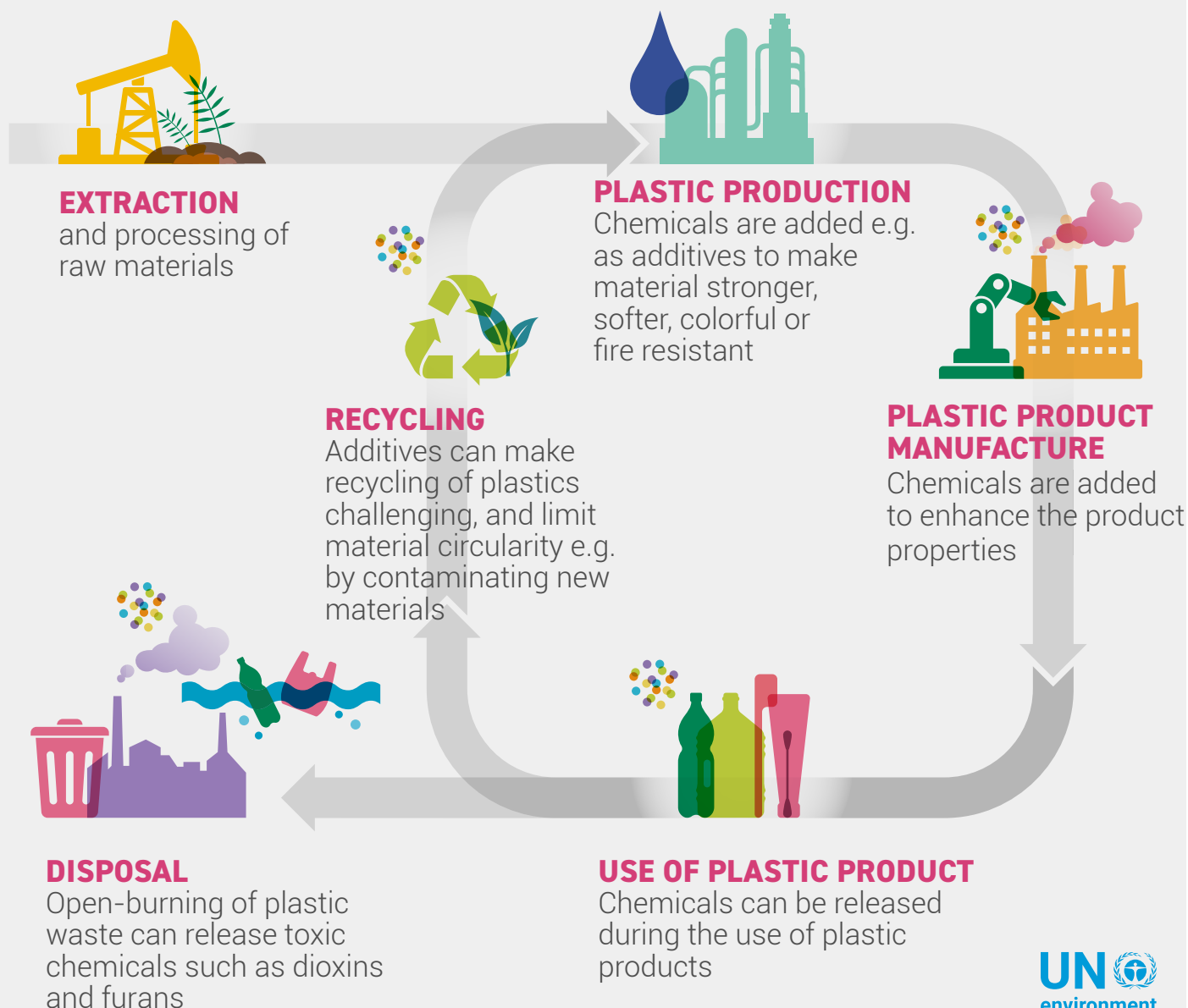
hypertension/  
cardiovascular disease

lung and liver cancer

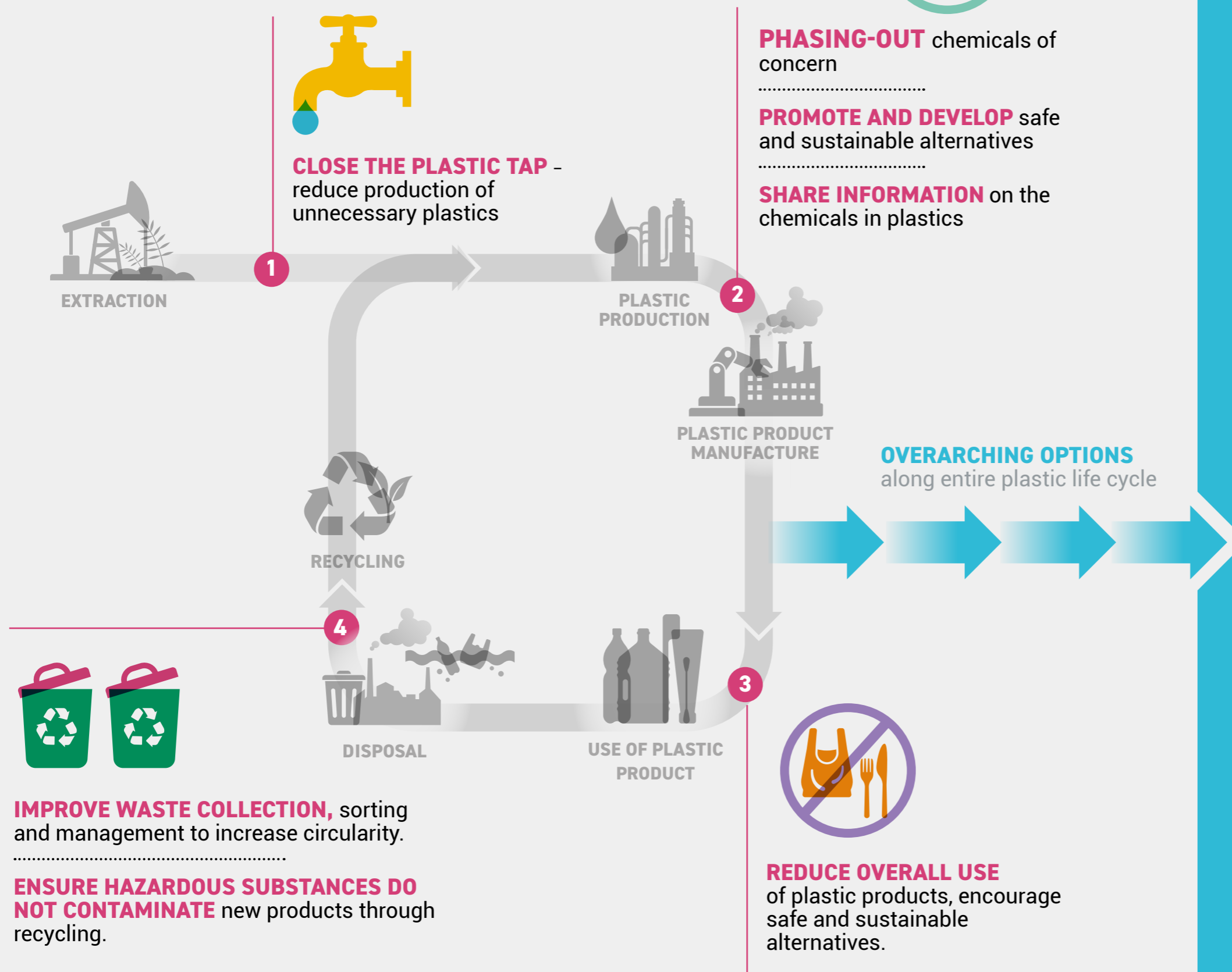
# HAZARDOUS CHEMICALS ALONG THE PLASTIC LIFE CYCLE



Hazardous chemicals can be released from plastics along the entire life cycle, finding their way to air, water and soils.



# OPTIONS FOR ADDRESSING CHEMICALS ALONG THE PLASTIC LIFE CYCLE



## REGULATIONS:

**ADDRESS** fragmentation and gaps in legal frameworks to cover chemicals along plastic life cycles

**RESTRICT** chemicals of concern in plastics globally



## SCIENCE:

**DEVELOP** more robust methodologies to assess human and ecosystem exposure, and further research on impacts, in particular with respect to mixtures and multiple exposure pathways.



## TRANSPARENCY:

**IMPROVE** transparency and information-sharing on chemicals along the plastic value chain



## AWARENESS RAISING:

**RAISE** awareness on workplace safety and exposure reduction measures along the plastic value chain