

Using Systems Thinking to Tackle Complex Problems

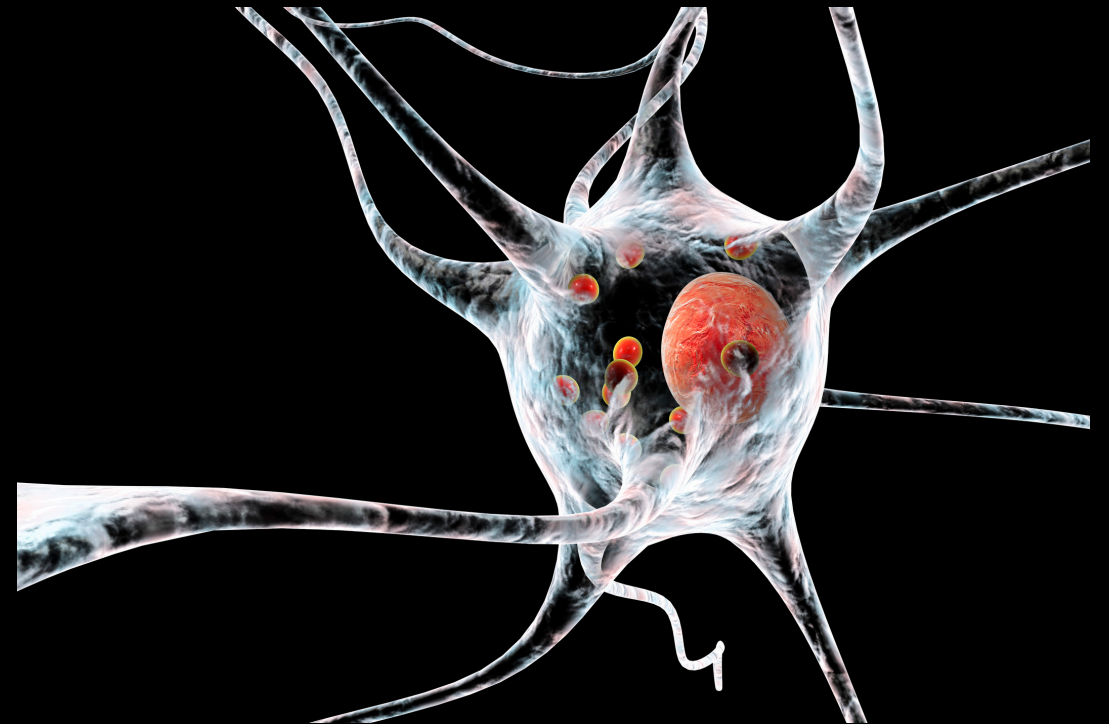
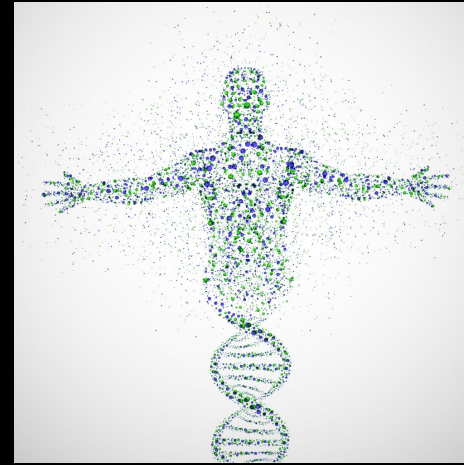
PELA 2021

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What is a system?

- Interconnected
- Part of a complex whole
- Concept comes from biological sciences
- Social-ecological

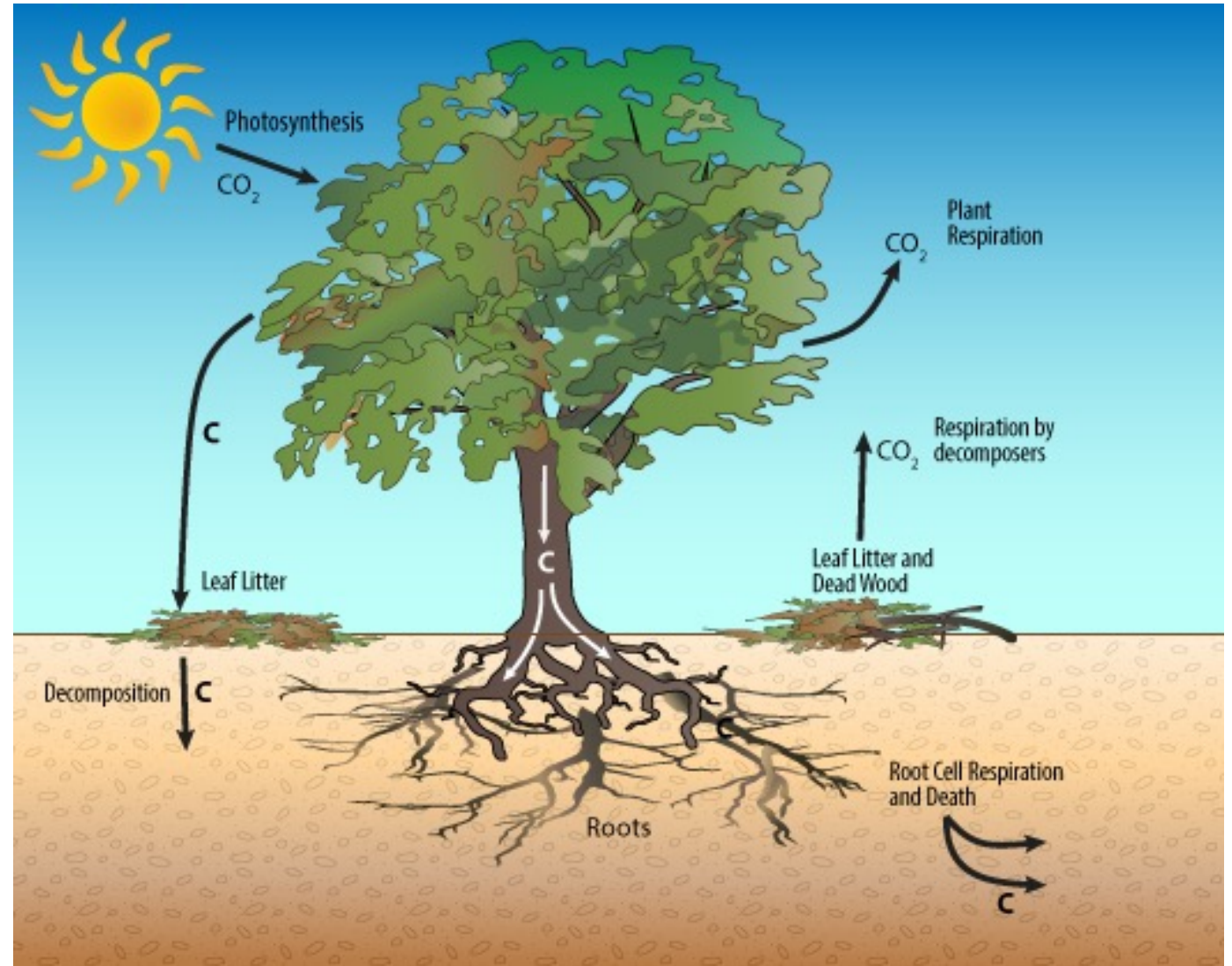
Examples of systems?



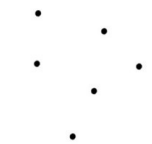
Tree as an Object



Tree as a System



TOOLS OF A SYSTEM THINKER



DISCONNECTION



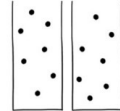
INTERCONNECTEDNESS



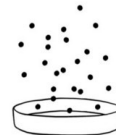
LINEAR



CIRCULAR



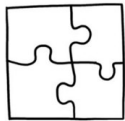
SILOS



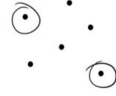
EMERGENCE



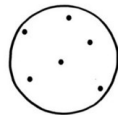
PARTS



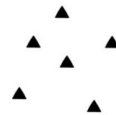
WHOLES



ANALYSIS



SYNTHESIS



ISOLATION



RELATIONSHIPS



Systems Thinking

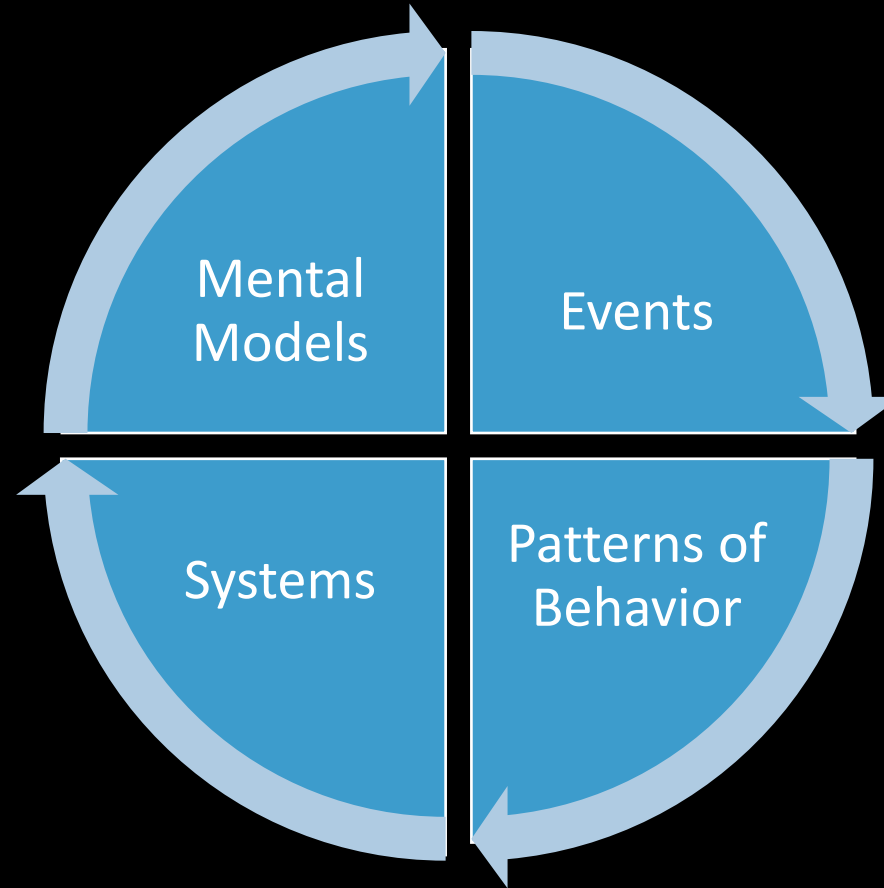
- Method to deal with complex issues
- Requires reframing how we typically think



Systems thinking allows us to:

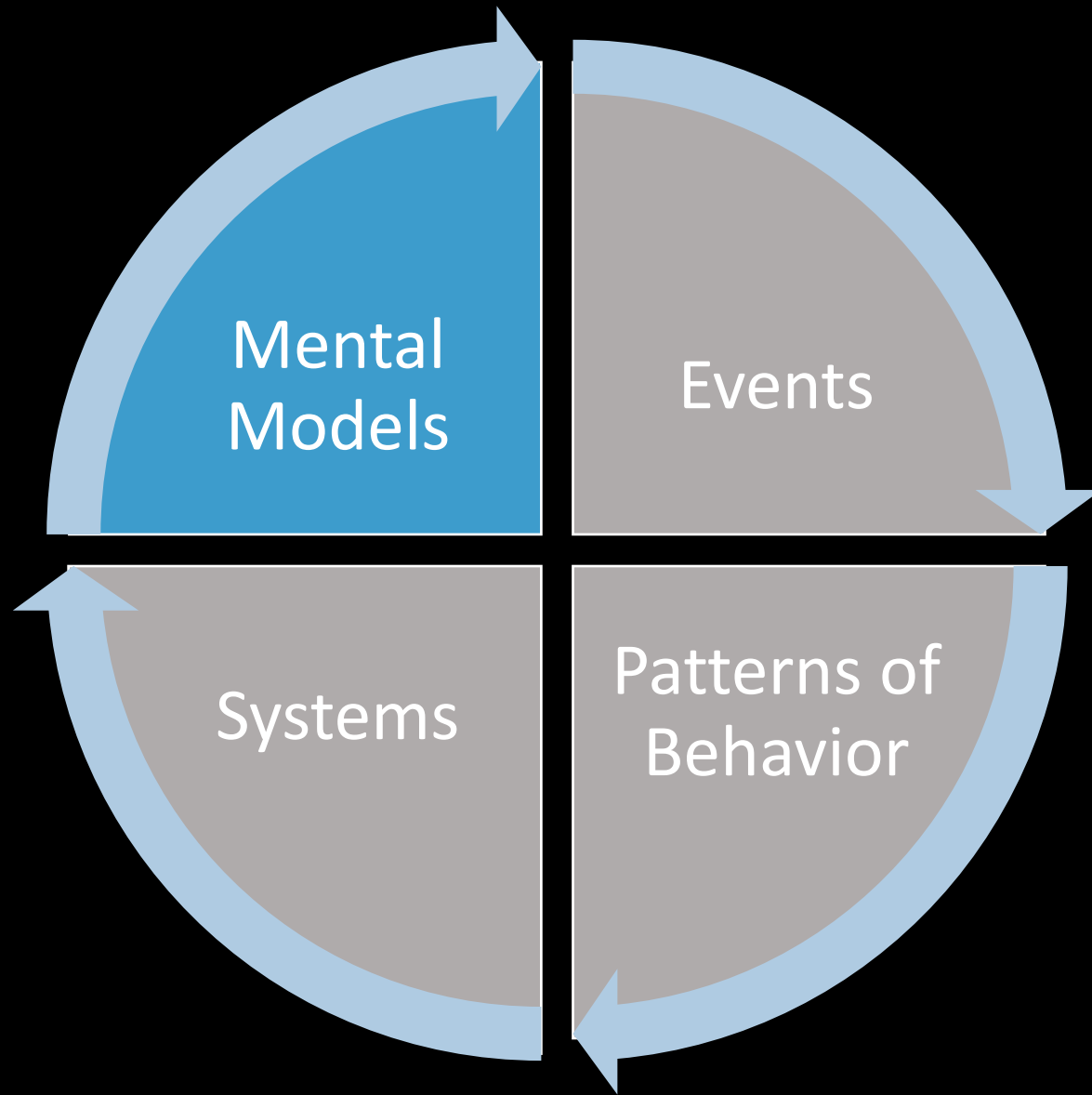
- Understand inclusion/exclusion of stakeholders
- Appreciate multiple perspectives
- Understand relationships
- Think in terms of systems themselves

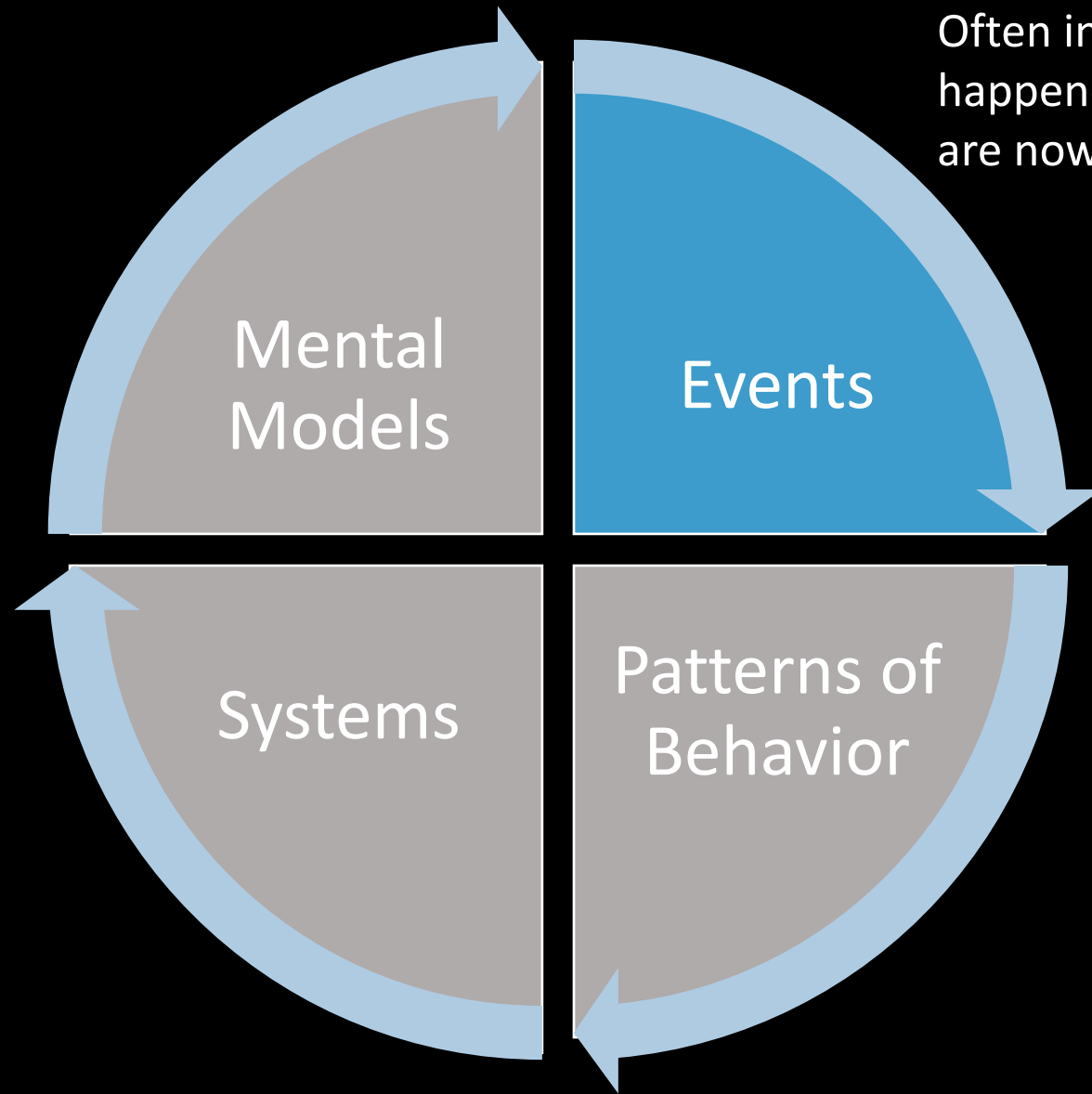
Four Levels of a Systems View



Models: Simplified representations of a part of reality

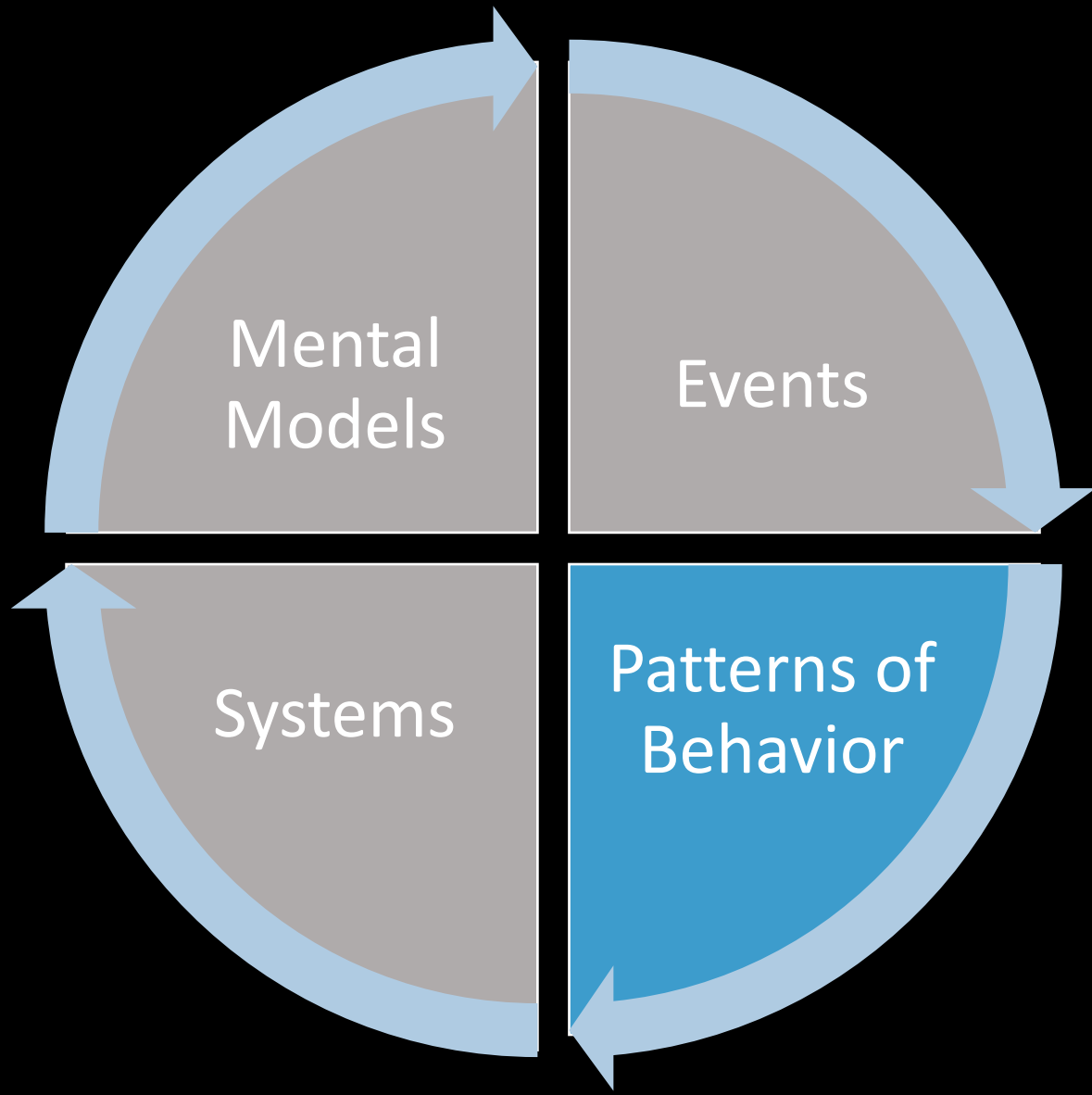
Mental model: An explanation of how an individual perceives how something works



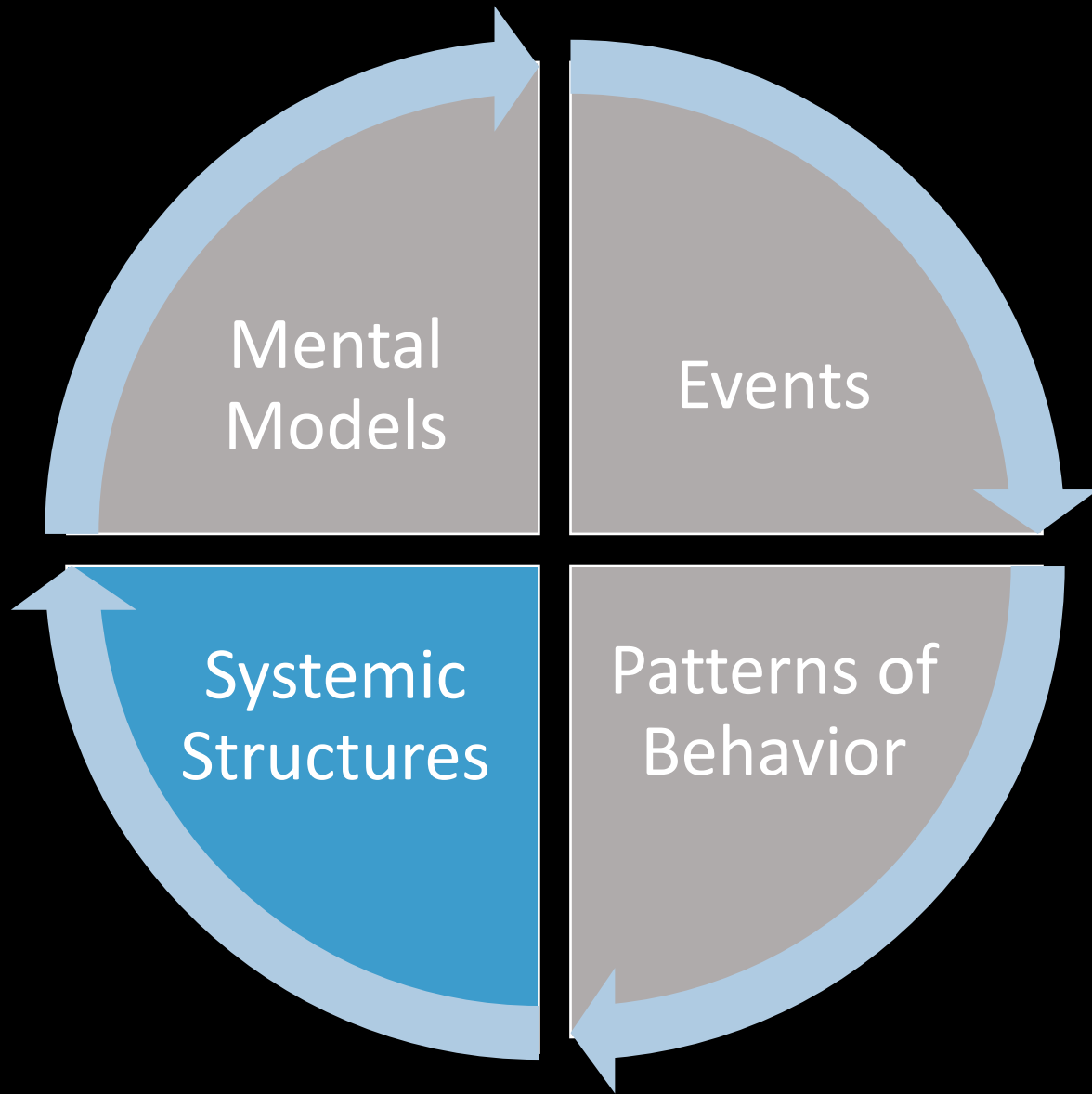


Often involves storytelling...what happened that got us to where we are now

Useful, but without the other elements, provides insufficient understanding of a problem or issue



What are the behaviors of people, indicators or processes over time that are affecting the current conditions?



Go beyond listing factors to articulating causal relationships.

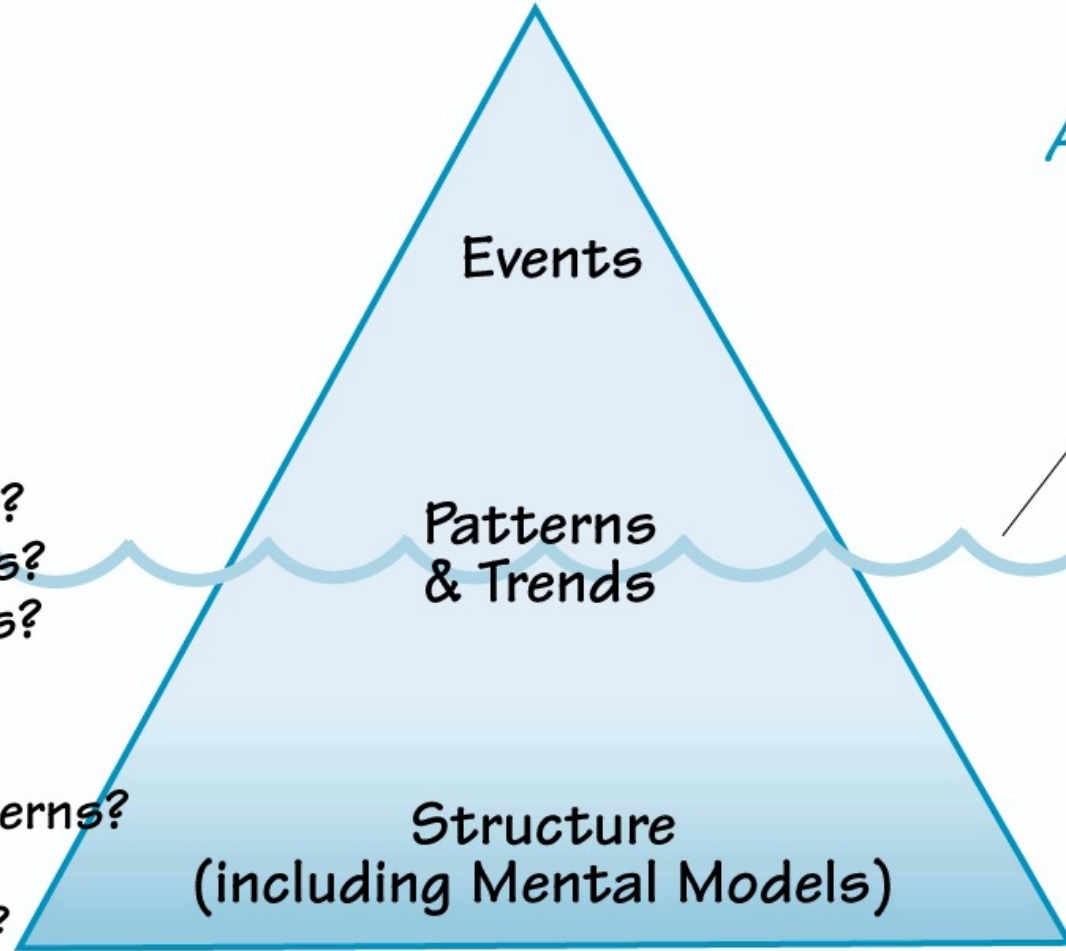
May not be observable, create hypotheses and test them.

Questions to Ask

What happened?

What's been happening?
Where are there changes?
Contrasts? Continuities?

Why and how?
What would explain the patterns?
What is the thinking
and what is its impact?



Action Perspective

React, Respond

“Water Line”

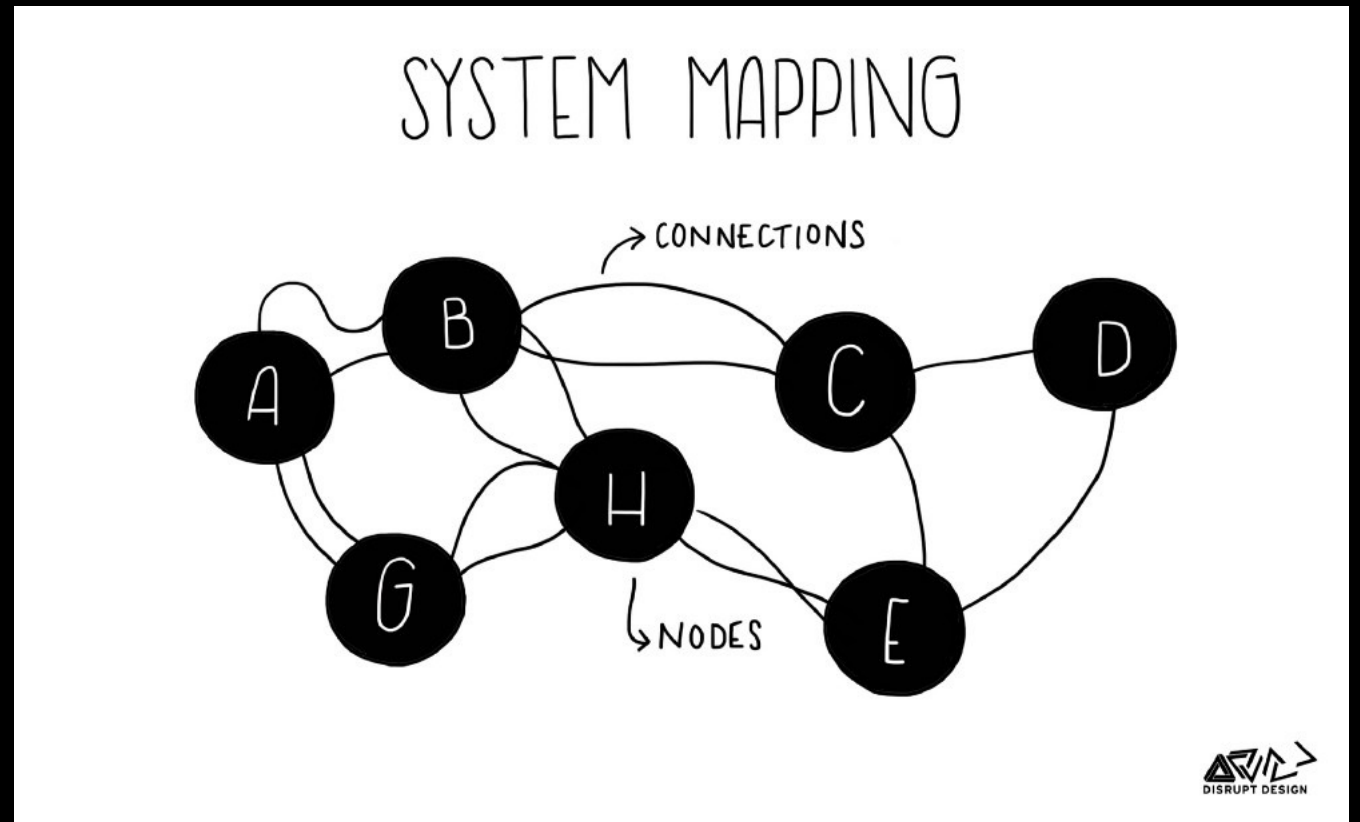
Anticipate
Plan
Prepare

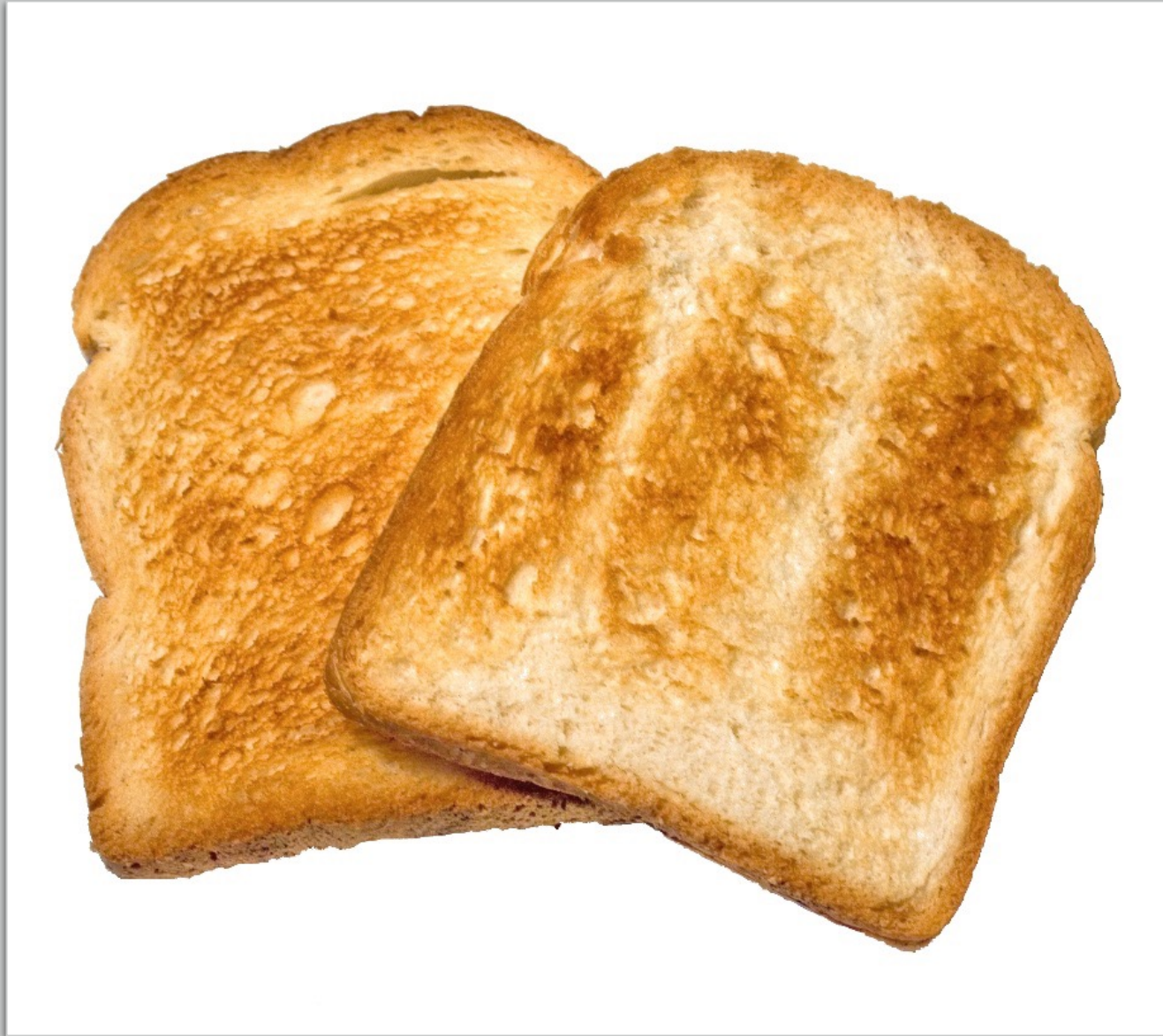
Design
Create
Transform

Level of Perspective	Current Reality	Desired Future Reality
Vision	What is the current vision-in-use?	What is the espoused vision of the future?
Mental Models	What are the prevailing assumptions, beliefs, and values that sustain the systemic structures?	What assumptions, beliefs, and values are needed to realize the vision?
Systemic Structures	Which systemic structures are producing the most dominant pattern of behavior in the current system?	What kinds of systemic structures are required to operationalize the new mental models and achieve the vision?
Patterns	What is the behavior over time of key indicators in the current system?	What is the current vision-in-use?
Events	What are some specific events that characterize the current reality?	What are some specific events that illustrate how the vision is operating on a day-to-day basis?

Identifying your system

- Identify components (nodes)
- Determine how they connect to one another (links)
- Nodes may be stakeholders, steps in a process, or component problems





How to make toast

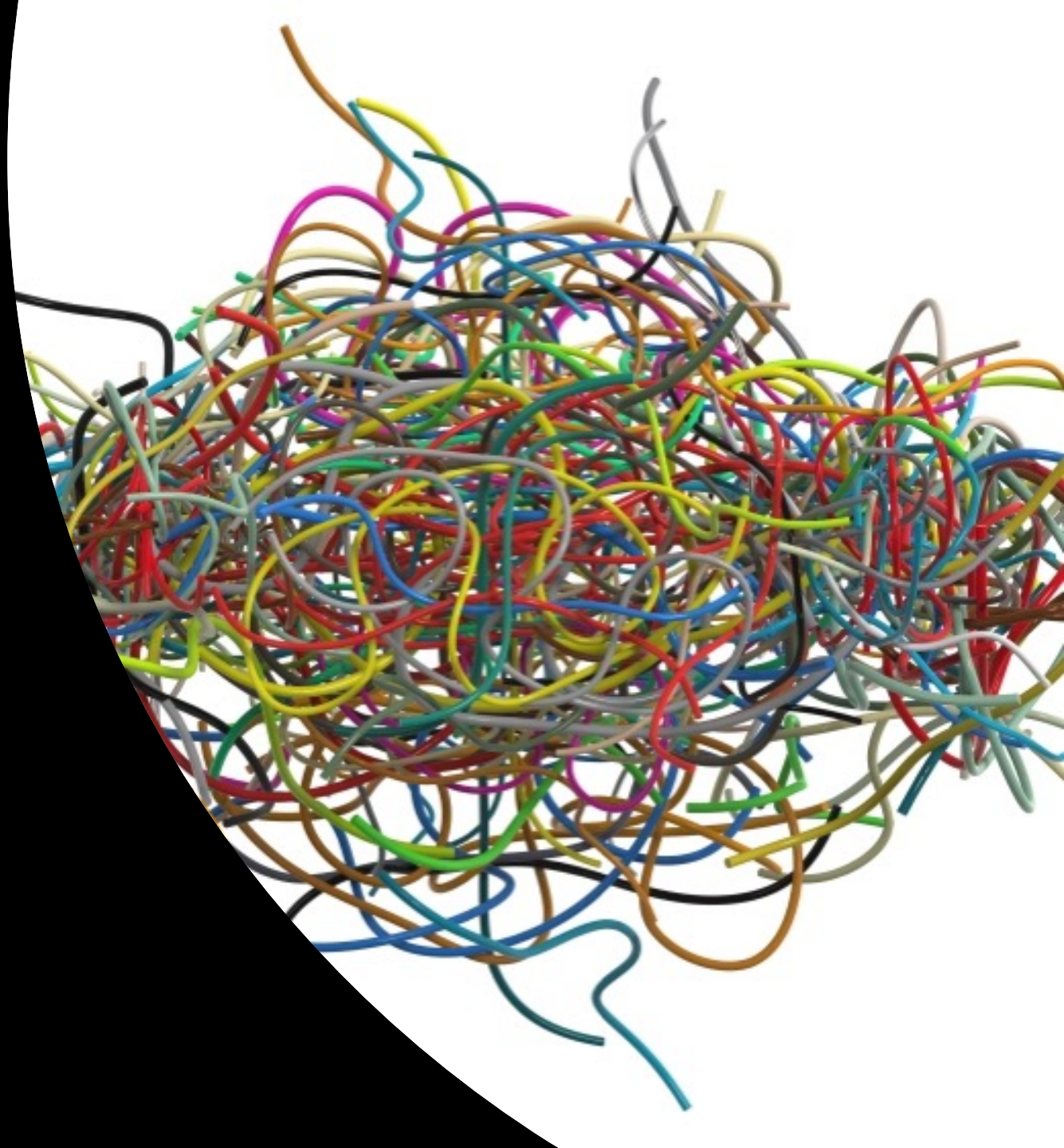
Draw the steps to show a person how toast is made. Assume they have no idea how to do it.



Complex/"Wicked" Problems	Simple/"Tame" Problems
Can be tamed, not solved	Can be solved
Interjurisdictional	Single jurisdiction
Multicausal	Identifiable cause
Non-linear	Linear
Adaptive change needed	Technical change sufficient

Wicked or Complex Problems

- Social change required
- Involves behavioral change
- Interventions may lead to unintended consequences
- Collaborative approach is best

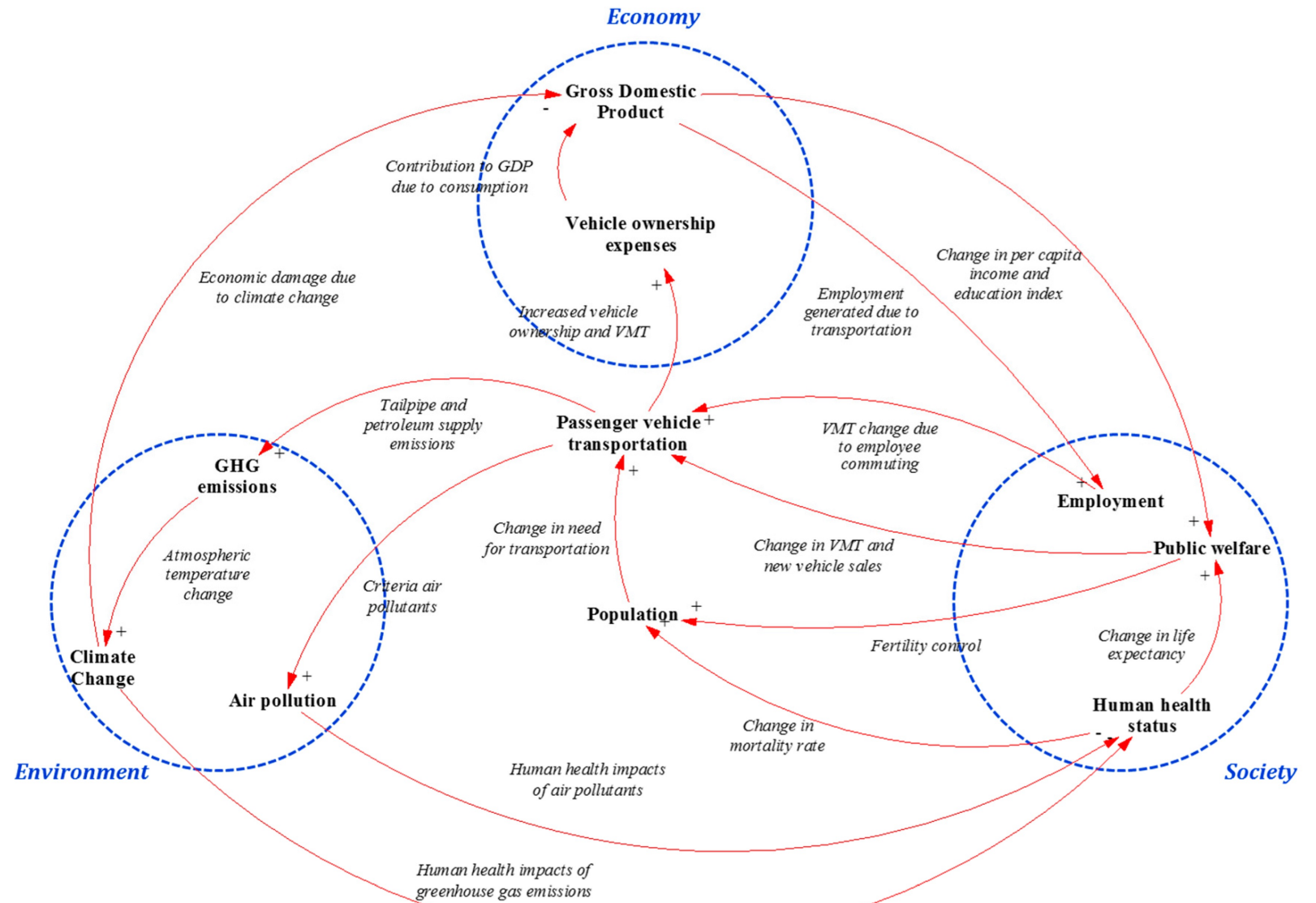




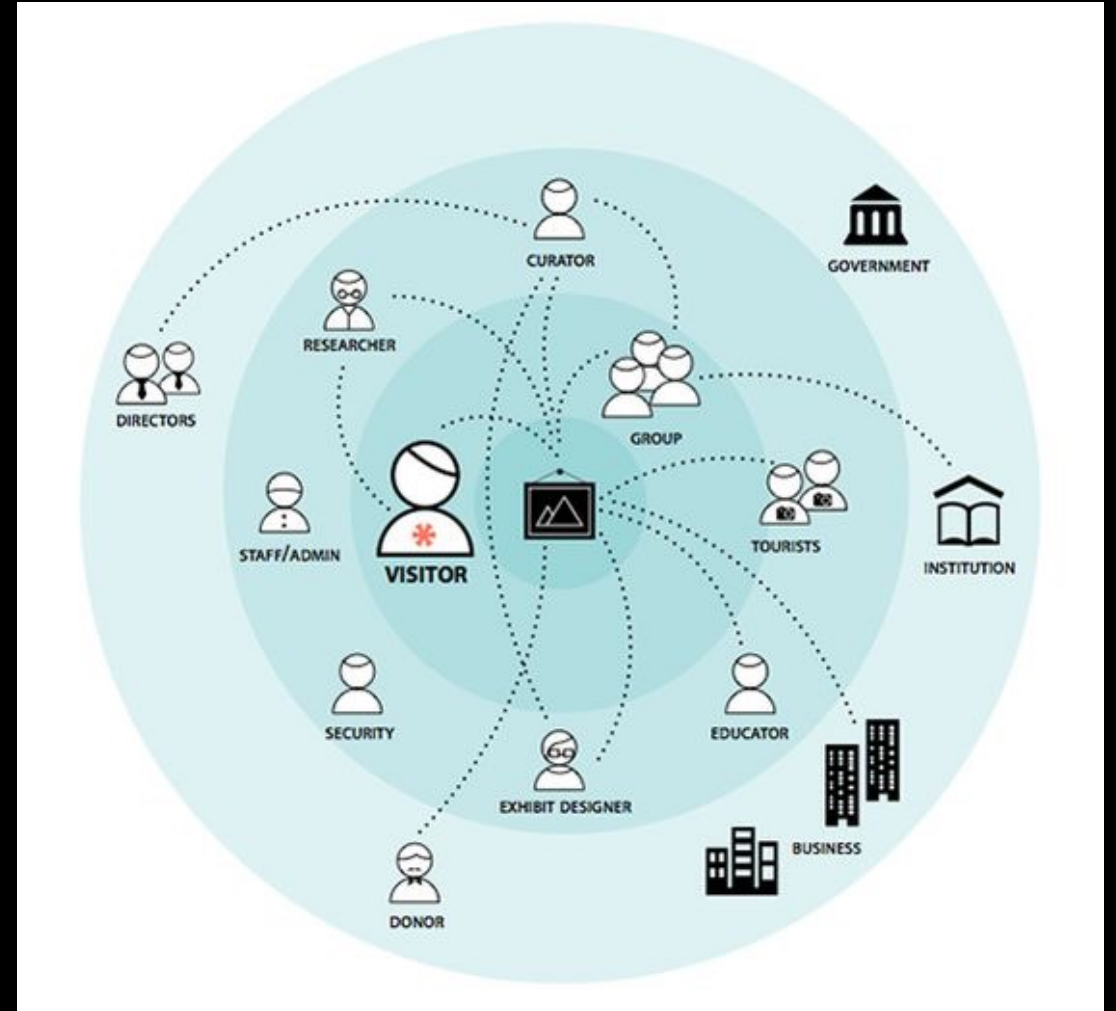
Why do wicked problems require a system-wide mediation effort?

- Problems don't exist in isolation
- Parts of the problem are interconnected
- Risk of unintended consequences

Causal Loop Diagram Sustainability



Cluster Mapping— Wicked Problems



Steps for dealing with complex problems systemically

- Map the problem—4 levels of systems view/
- Map the stakeholders
- Engage additional stakeholders
- Be flexible and open-minded

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