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Acknowledgements

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The Australian Prevention Partnership Centre
Systems and solutions for better health
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Interactive systems training for healthy food environments

Workshop 2 – 8th December 2022

Facilitators:

Deakin University: Tari Forrester-Bowling, Tara Boelsen-Robinson, Miranda Blake

Amsterdam UMC: Joreintje Mackenbach, Cédric Middel, Josine Stuber, Jillian O'Mara, Naomi de Pooter, Coosje Dijkstra

Contact: Josine Stuber j.stuber@amsterdamumc.nl or Tara Boelsen-Robinson tara.b@deakin.edu.au

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Agenda

- Introductions and consent
- Workshop 1 recap & questions
- Tool 3: System maps (causal loop diagrams)
- Group Activity 1 – The system map
- **Break (10 min)**
- Tool 4: Four levels of systems thinking
- Group Activity 2 – Using the system map
- Present and reflect
- Live survey
- Closing

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Workshop 1 Recap & Questions

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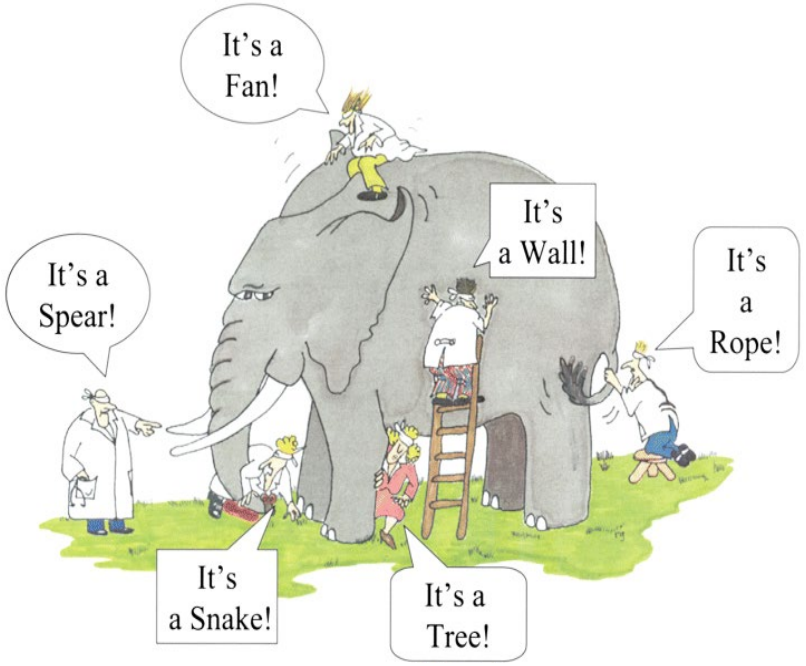
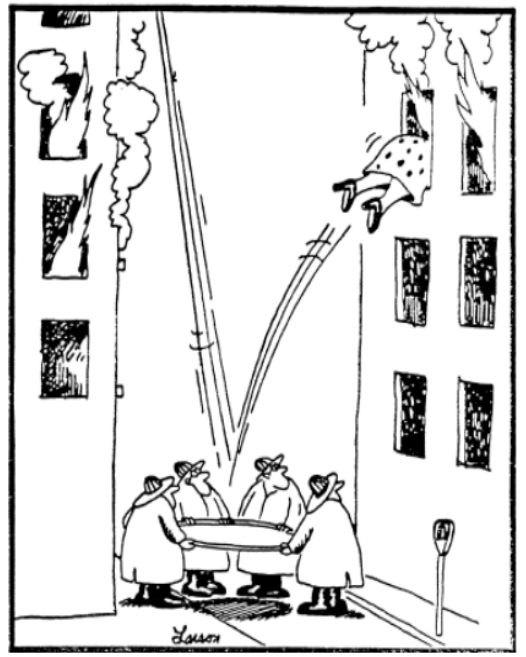
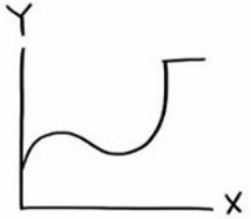
Summary

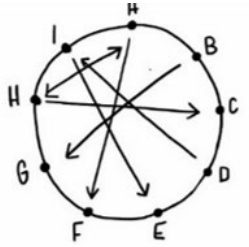
- By fixating on the parts of a system, we miss understanding the WHOLE
- A solution to one problem can lead to a new and bigger problem later on (unintended consequences)
- Challenge our mental models
- System dynamics tools can help



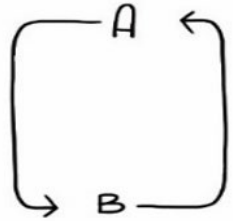




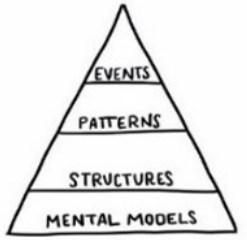
BEHAVIOUR OVER TIME GRAPHS



CONNECTED CIRCLES



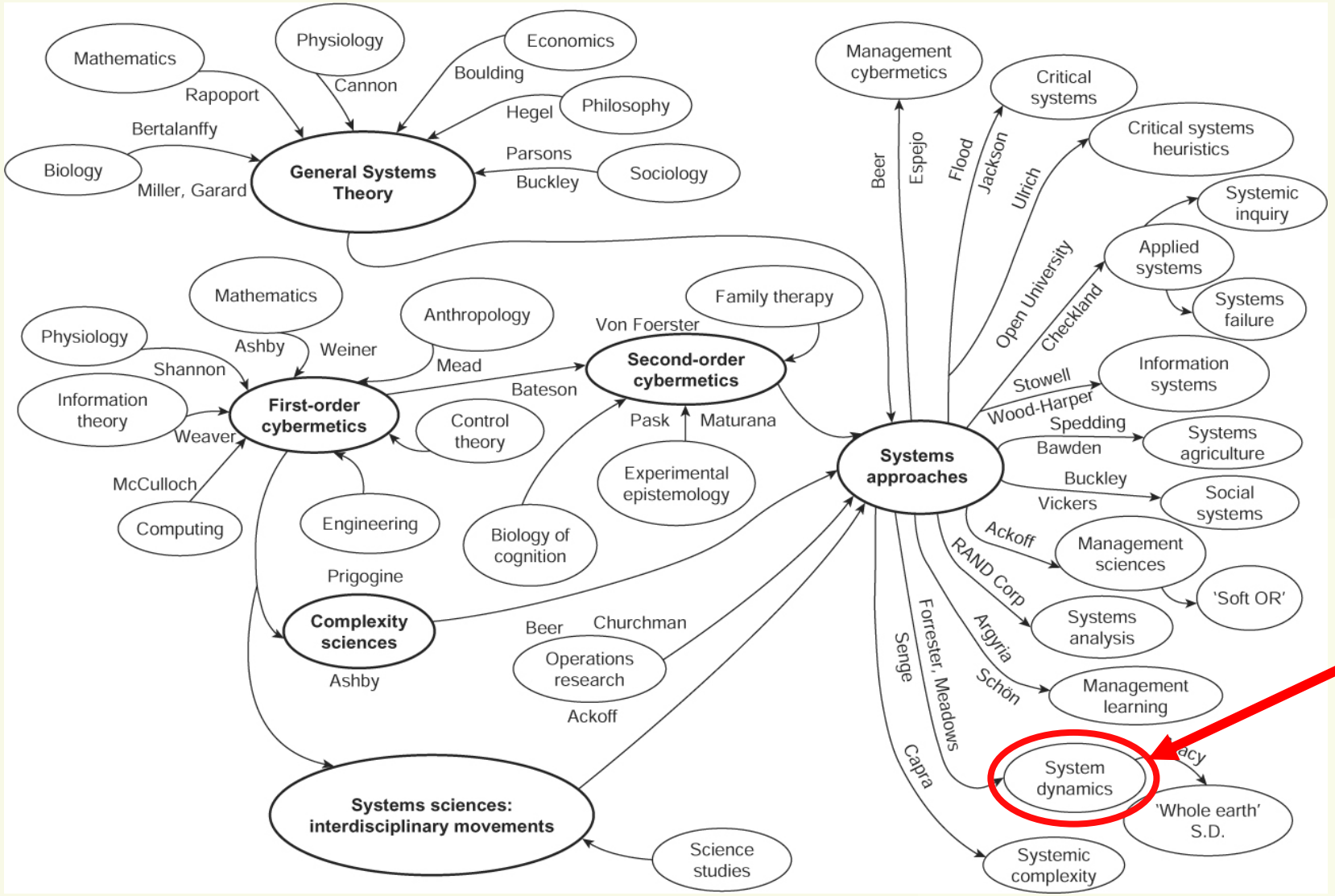
CAUSAL LOOP DIAGRAMS



ICEBERG MODEL

System Dynamics

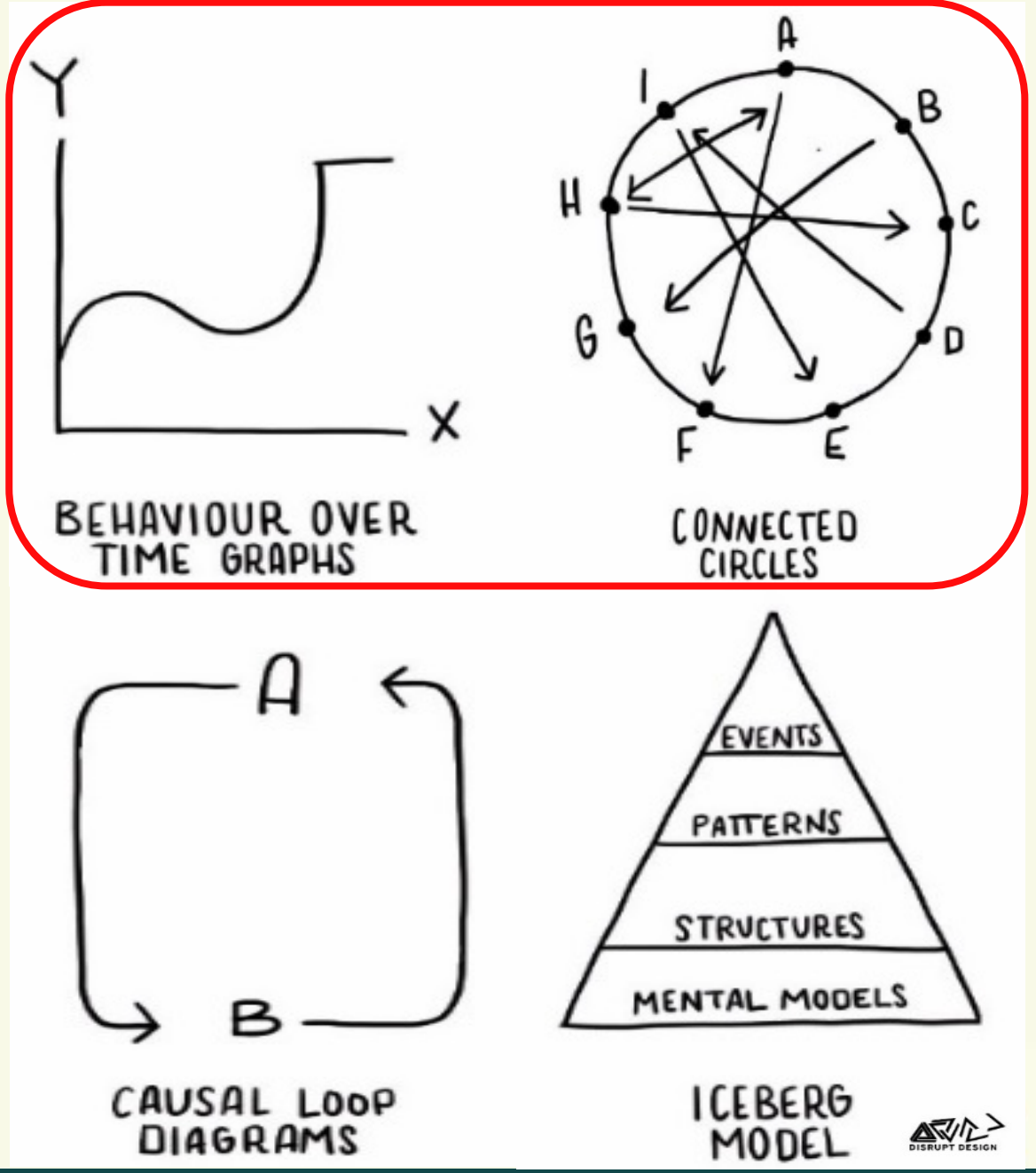
- One approach to non-linear behaviour of complex systems.
- Relationships between things, events and ideas.



We are here

System mapping tools

- enhance learning in complex systems,
- understand connectedness and interactions, and
- understand feedback and dynamics (behaviour over time)
- model problems, not systems
- model to advance a solution to a problem



Sterman, J. D. (2001). System Dynamics Modeling: Tools for Learning in a Complex World. *California Management Review, 43*(4), 8-25. doi:10.2307/41166098

System mapping tools

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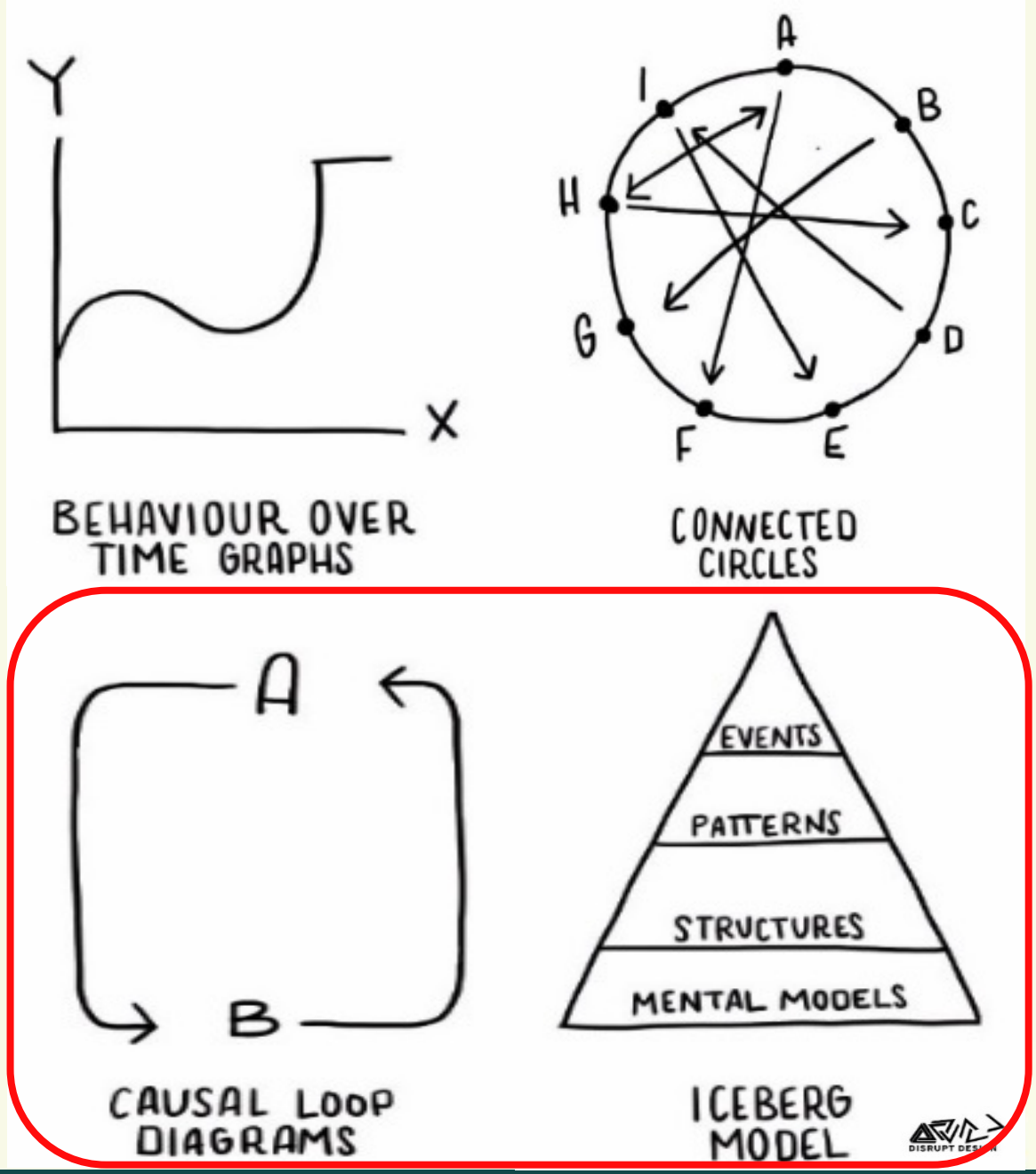
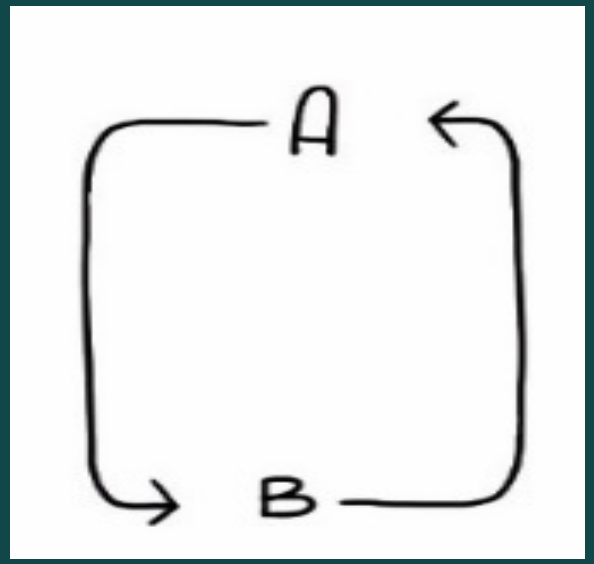


Sterman, J. D. (2001). System Dynamics Modeling: Tools for Learning in a Complex World. *California Management Review, 43*(4), 8-25. doi:10.2307/41166098

Tool 3

System maps (causal loop diagrams)



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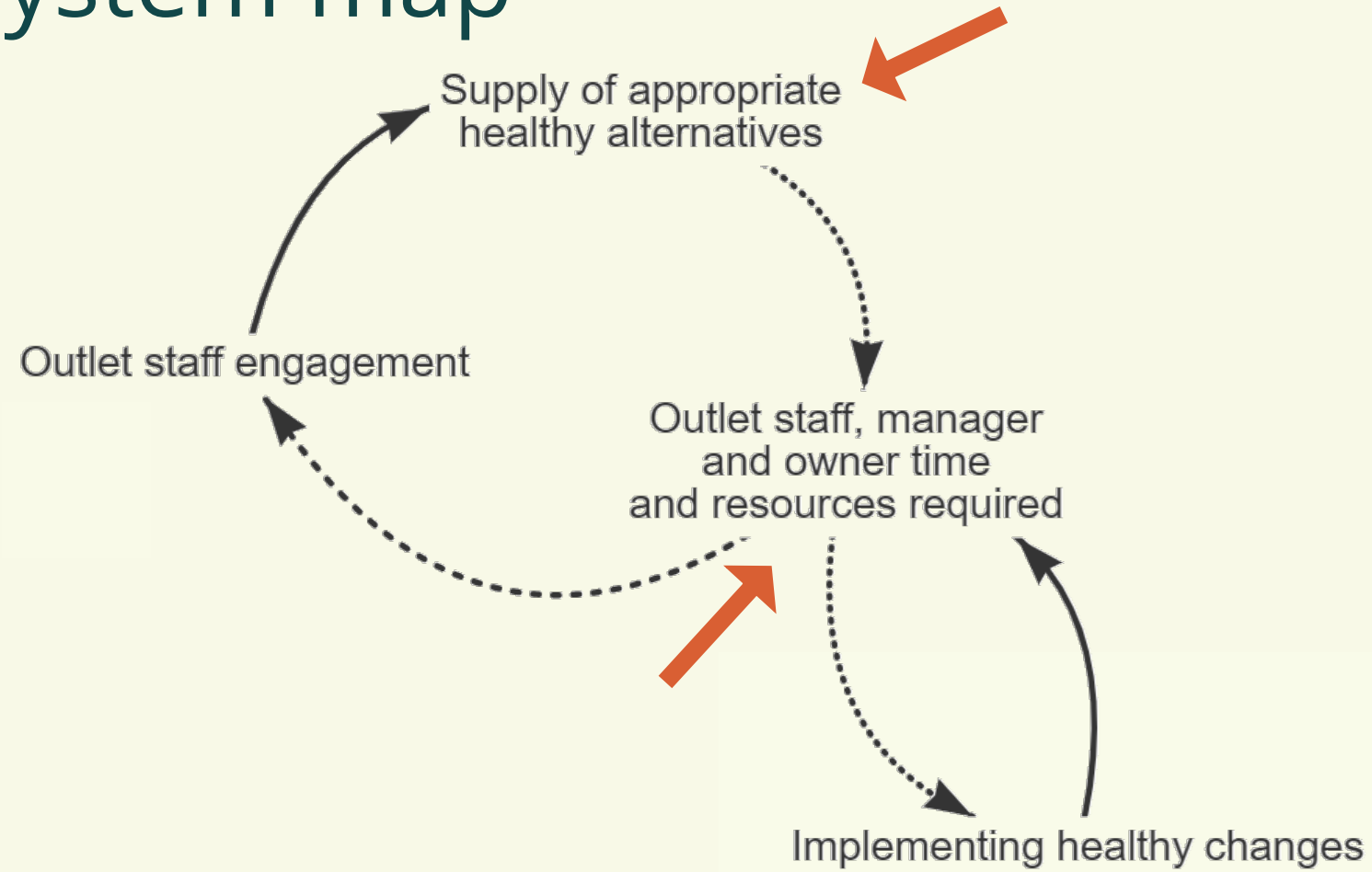
How to read a system map

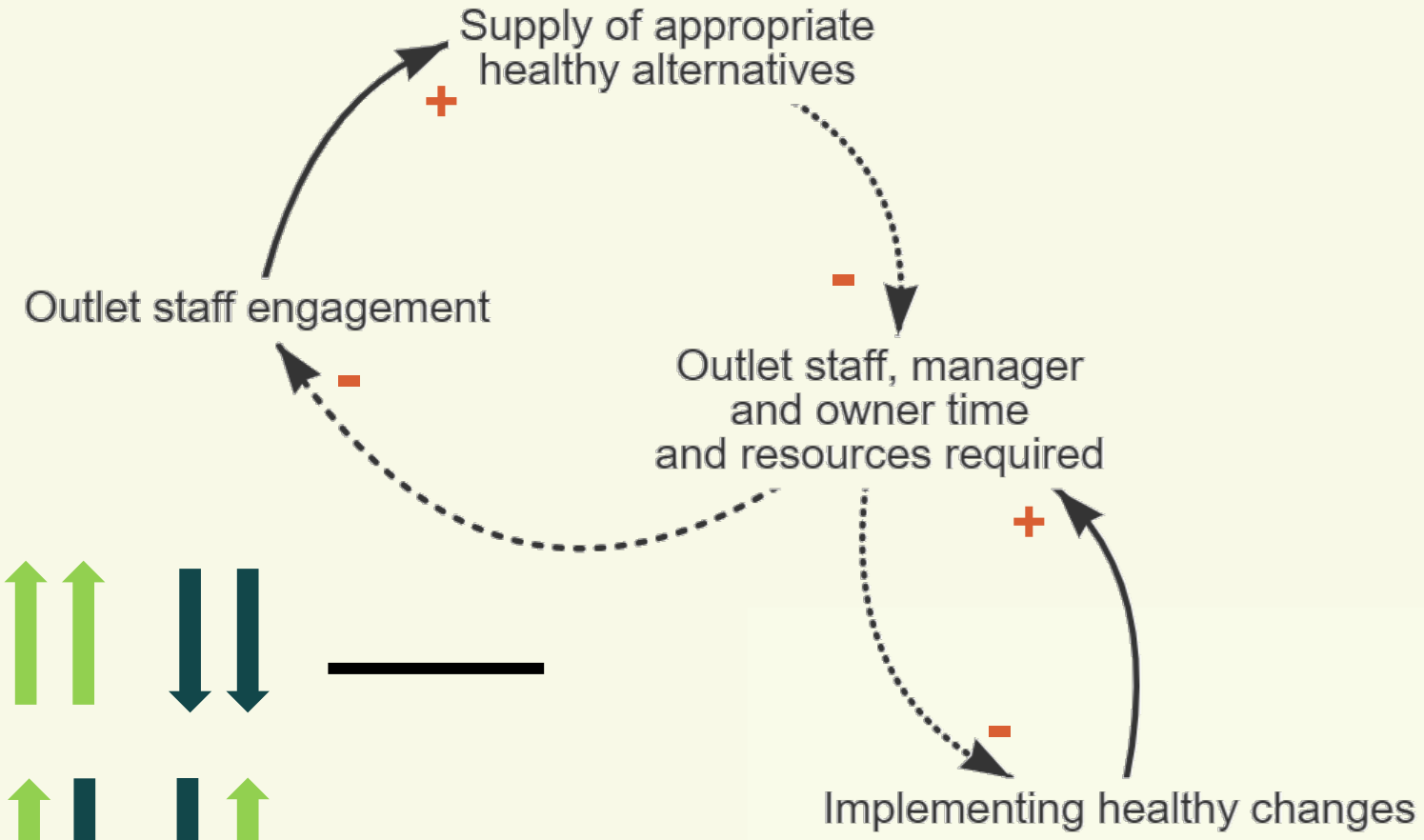
- Circular cause-effect
- Arrows indicate cause-effect relationships



Introduction to causal loops. https://www.youtube.com/watch?v=tTo06jbSZ4M

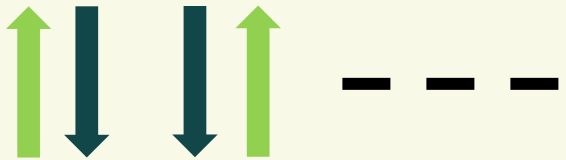
How to read a system map

- Circular cause-effect
- Arrows indicate cause-effect relationships
- Two types of polarity



\+ goes in the **same** direction

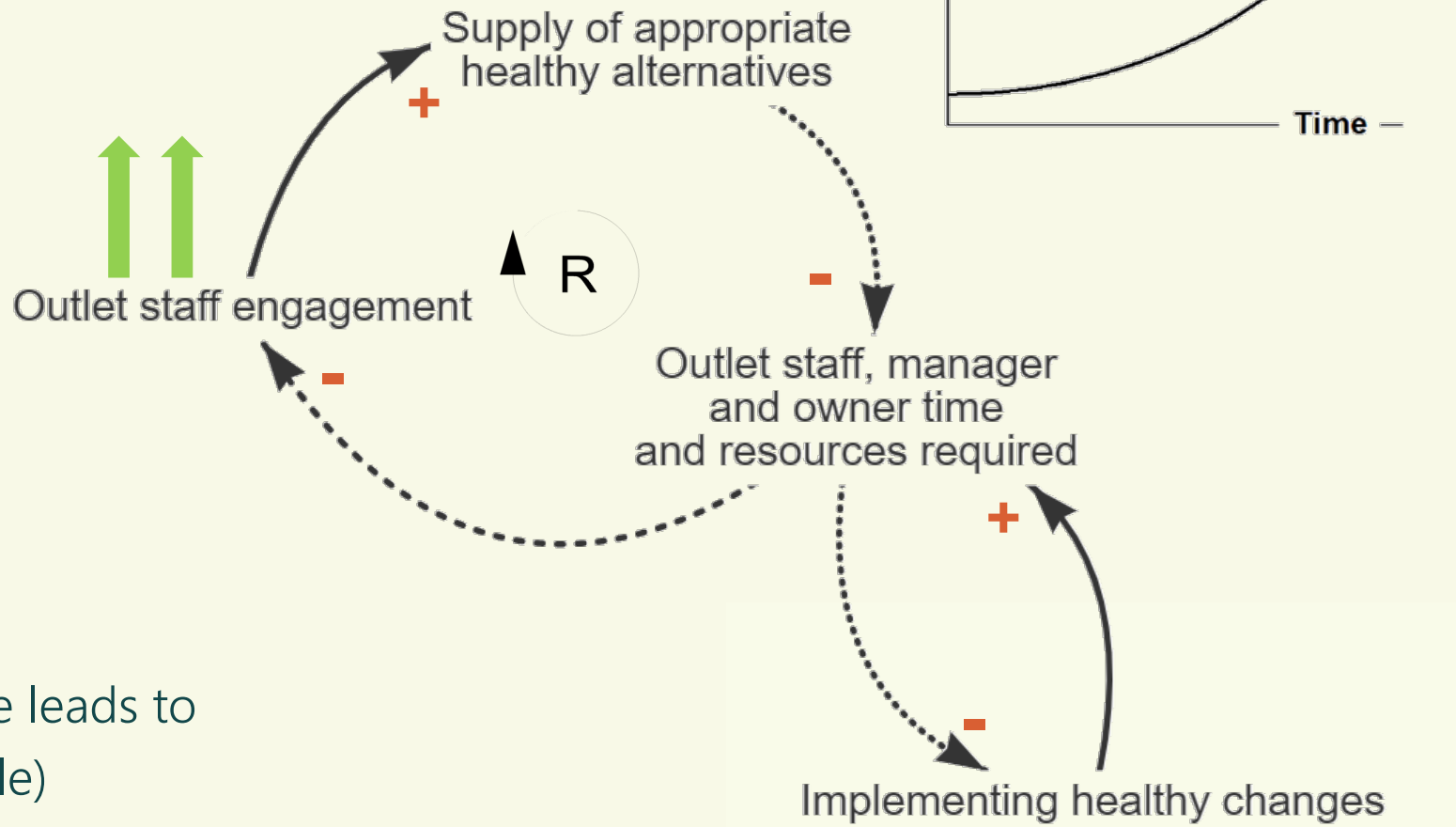
\- goes in **opposite** directions

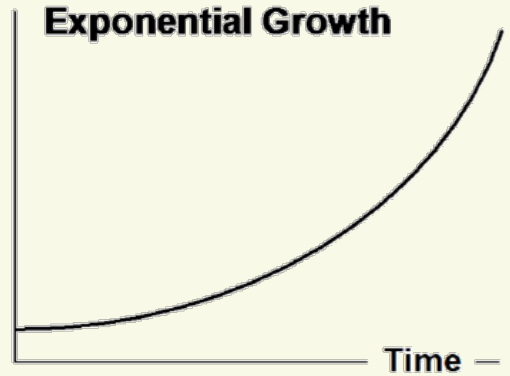


Introduction to causal loops. https://www.youtube.com/watch?v=tTo06jbSZ4M

How to read a system map

- Circular cause-effect
- Arrows indicate cause-effect relationships
- Two types of polarity
- Feedback loops



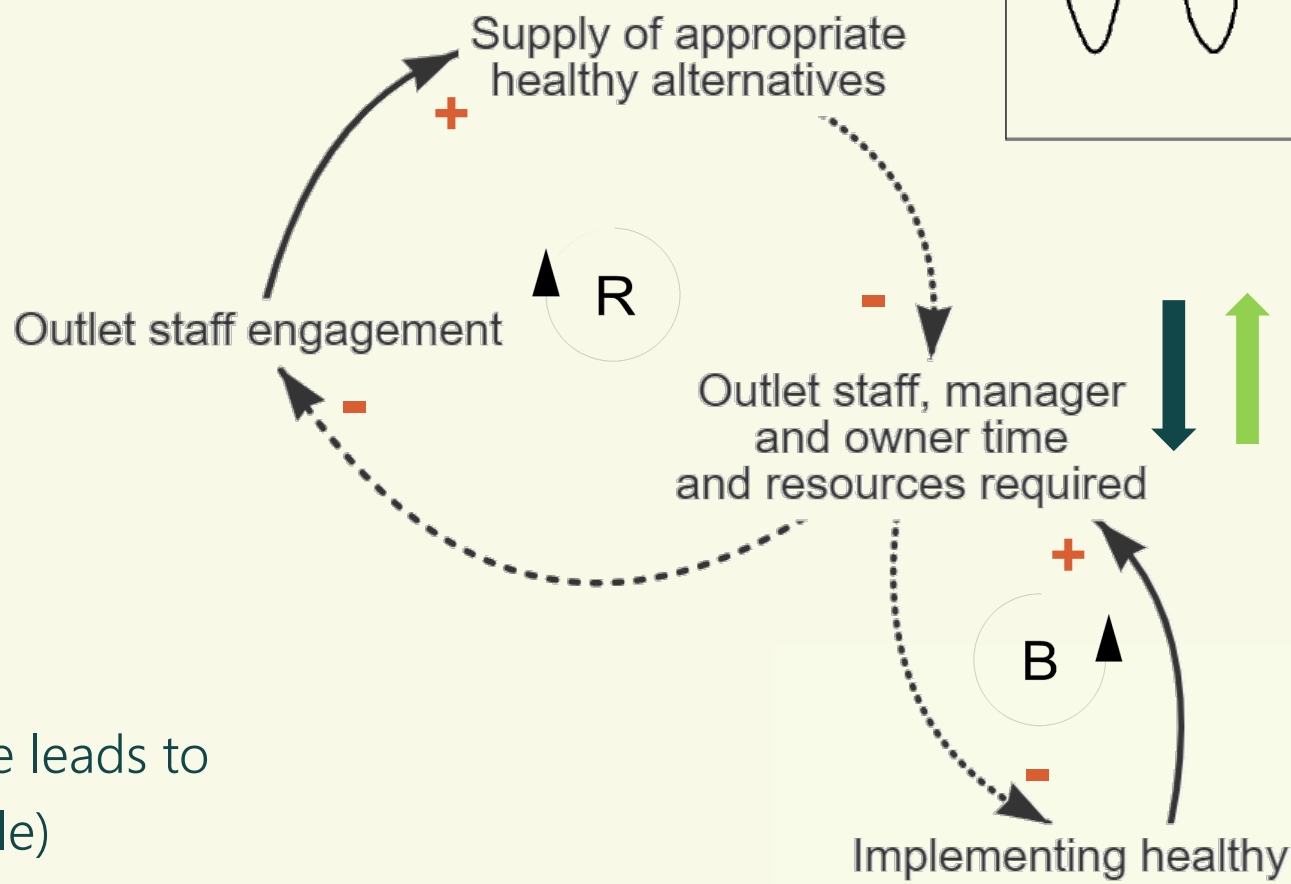


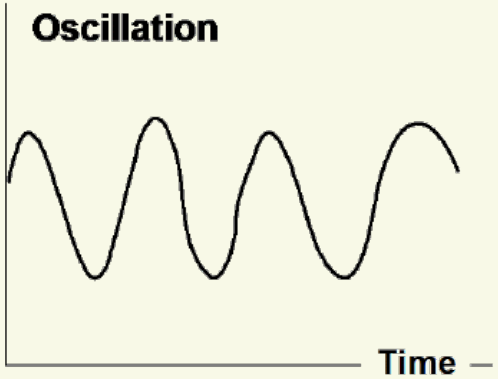
R Reinforcing feedback loops – more leads to more, or, less leads to less (unstable)

Introduction to causal loops. https://www.youtube.com/watch?v=tTo06jbSZ4M

How to read a system map

- Circular cause-effect
- Arrows indicate cause-effect relationships
- Two types of polarity
- Feedback loops





R Reinforcing feedback loops – more leads to more, or, less leads to less (unstable)

B Balancing feedback loops – more leads to less, or, less leads to more (stable and self-correcting)

——— + goes in the **same** direction

- - - - - goes in **opposite** directions

Introduction to causal loops. https://www.youtube.com/watch?v=tTo06jbSZ4M

Resources for causal loop diagrams

- https://thesystemsthinker.com/causal-loop-construction-the-basics/ - the Systems Thinker includes a range of articles to expand the use of systems approaches. This article describes how to create a causal loop 'story'.
- https://www.youtube.com/watch?v=tTo06jbSZ4M – YouTube video produced by CLExchange showing the basics of how causal loops can be used.

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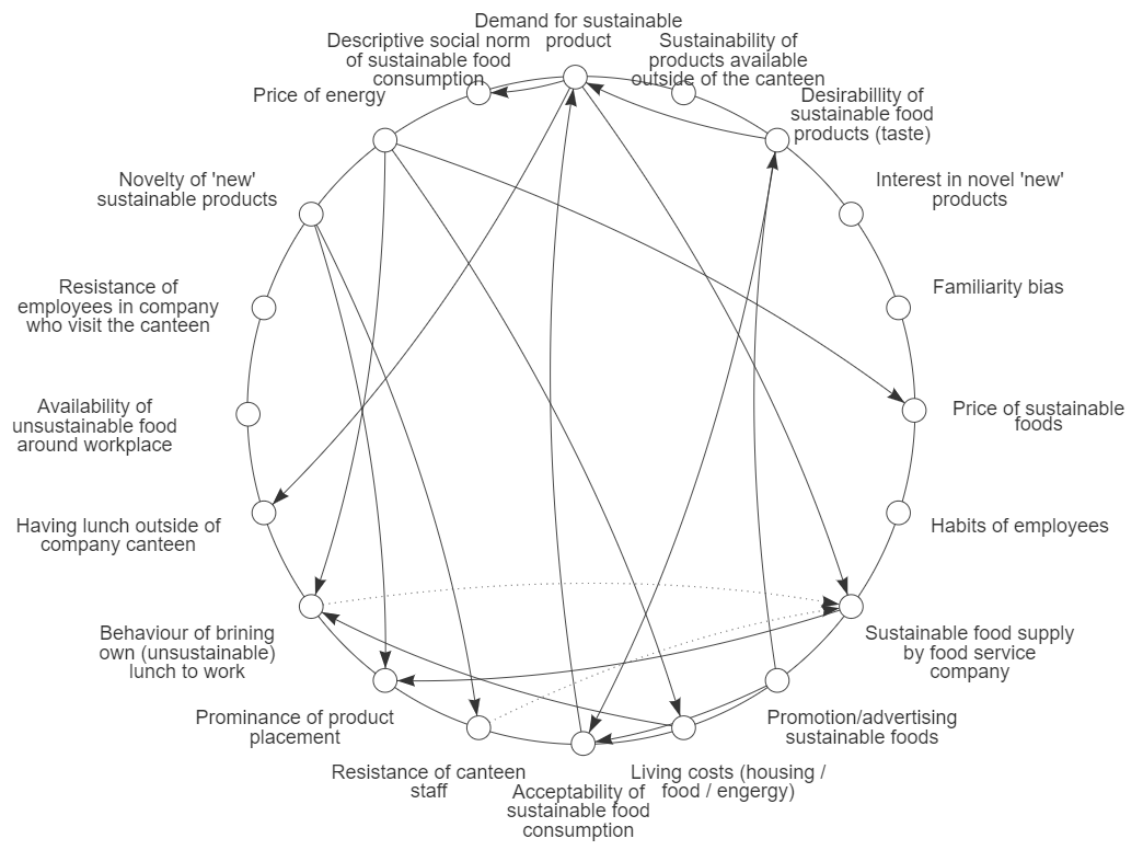
Workshop 1 - connection circles to system maps

Group activity connection circle

- In workshop 1 you worked on 1 of 4 problem scenarios to develop a connection circle with all the factors identified from the behaviour over time graphs.



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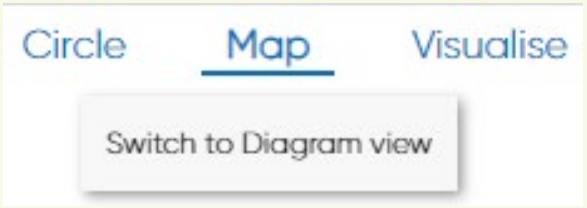
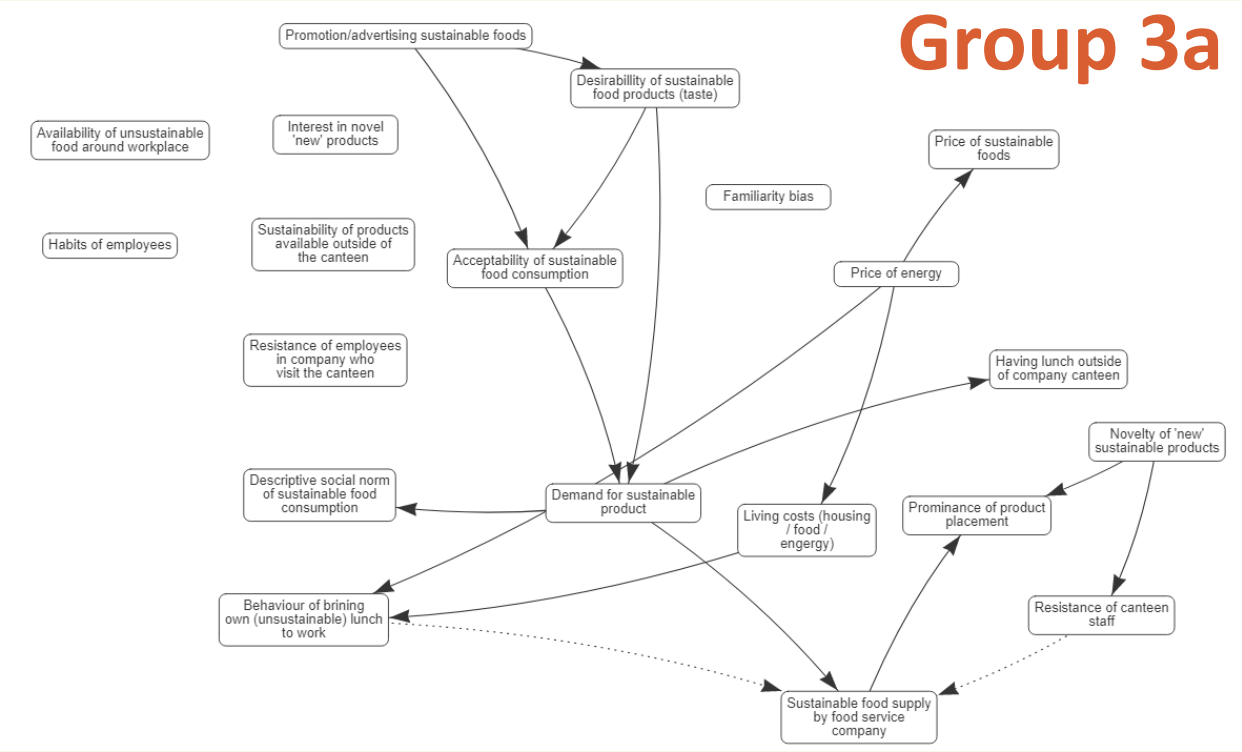
Workshop 1 - connection circles to system maps

Group activity system map

- If using pen and paper you will need to redraw the connection circle as a system map (causal loop diagram)
- In STICKE select ‘Map’ to switch to diagram view





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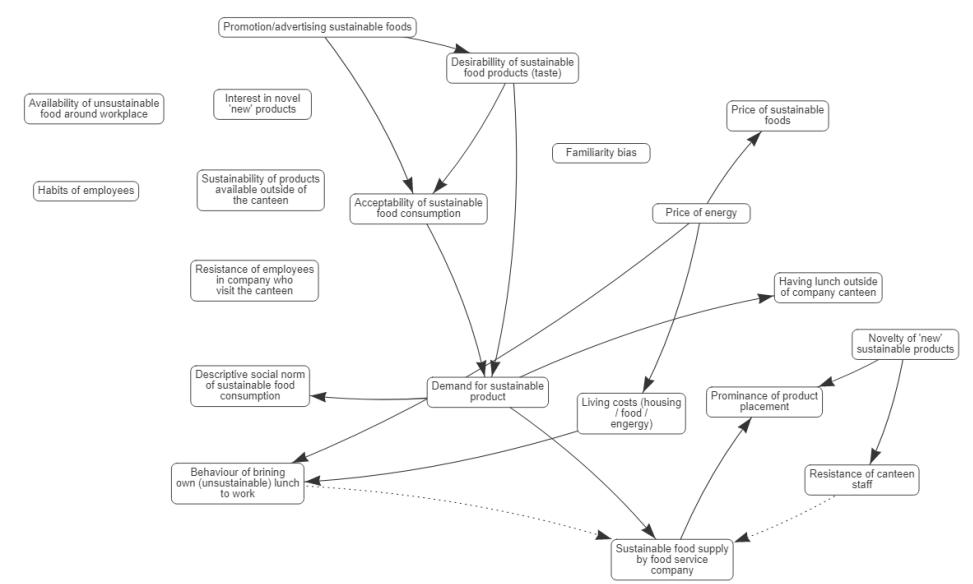
Workshop 1 - connection circles to system maps

Combine system maps for each problem scenario



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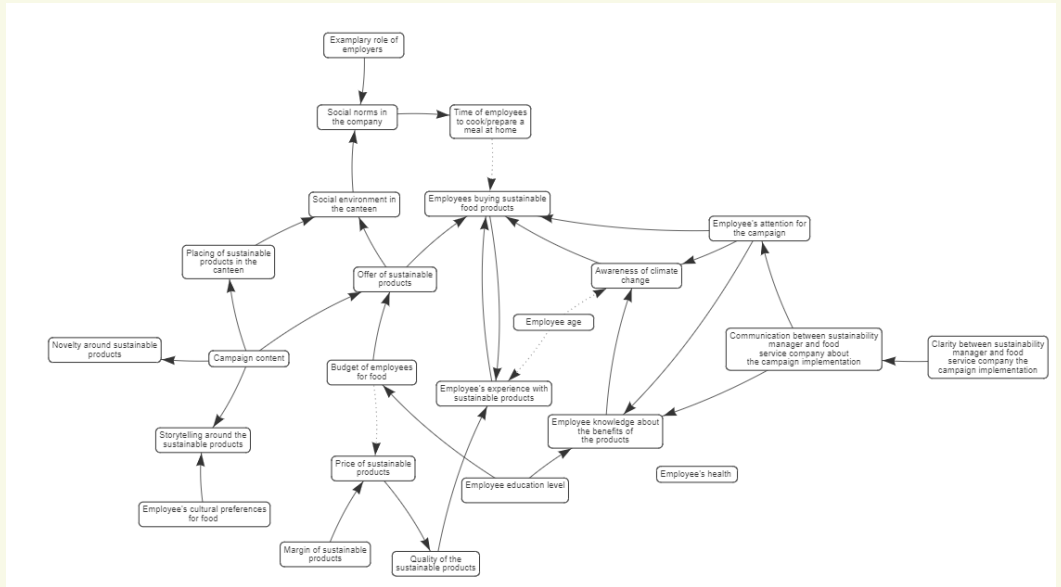

Group 3a

Group 3b

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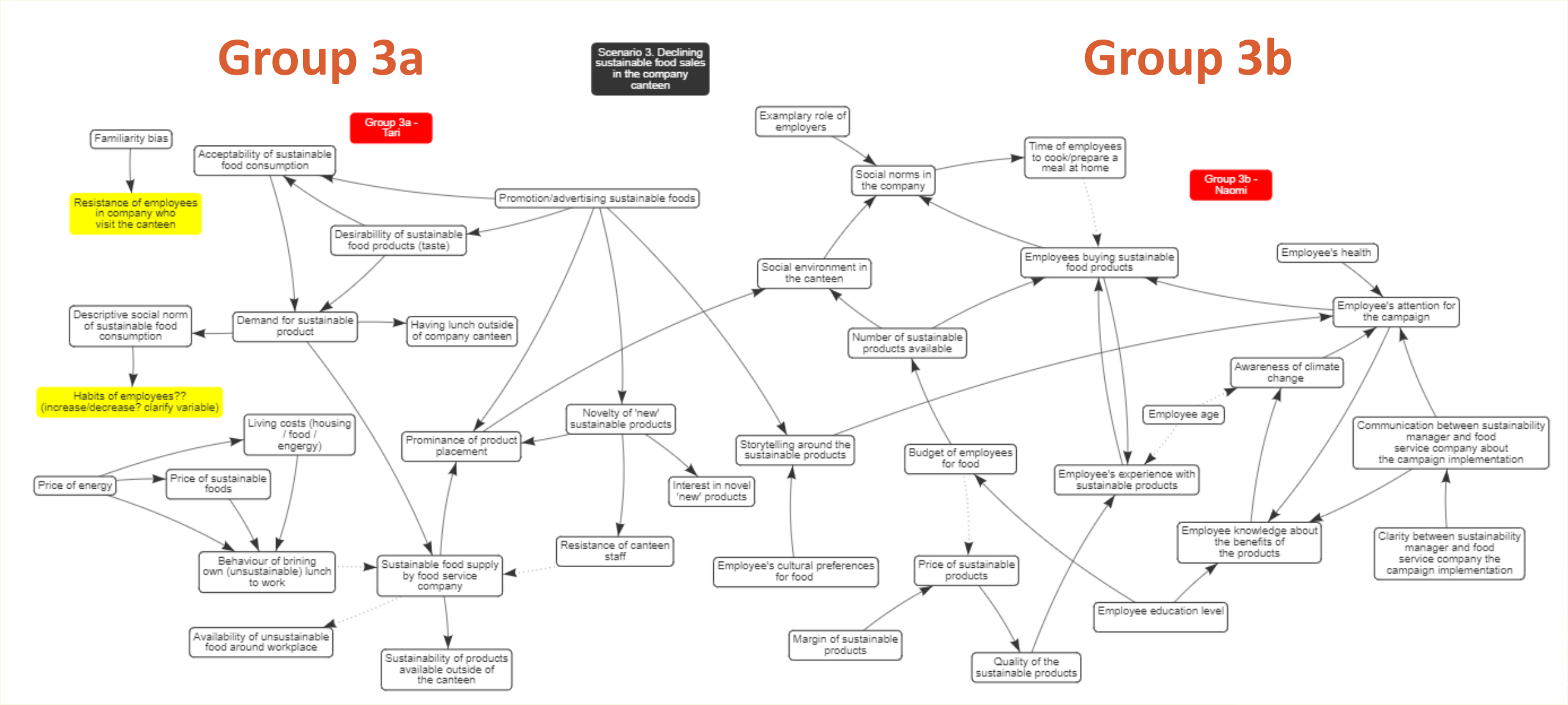
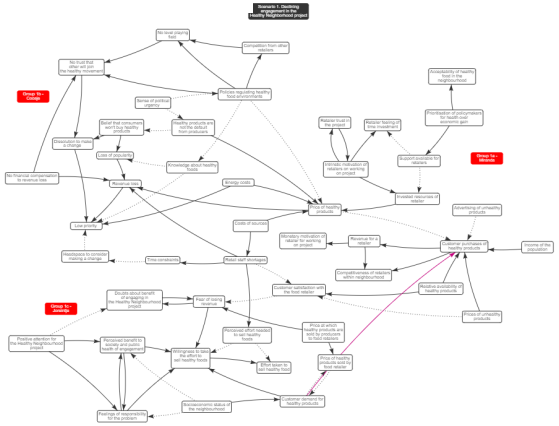
Workshop 1 – combined system map

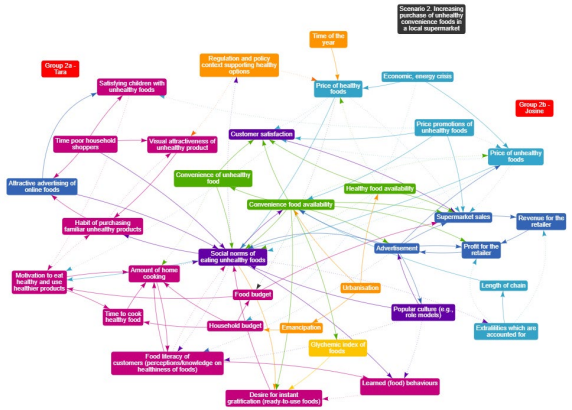


Workshop 1 – combined system map

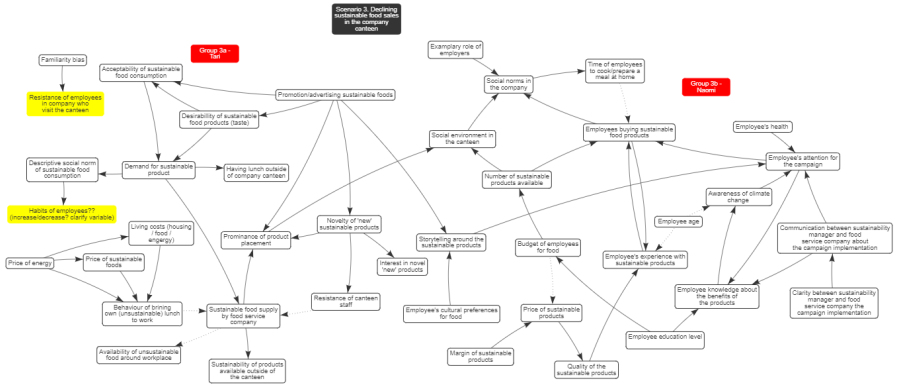
Scenario 1



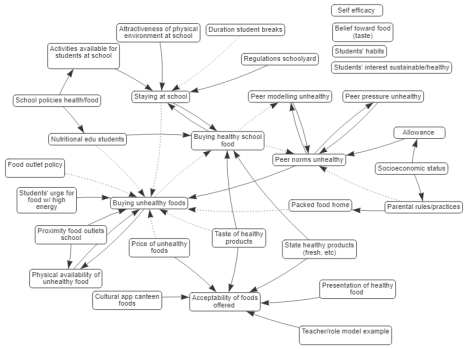
Scenario 2



Scenario 3



Scenario 4



Combined system map

- Combined duplicate variables
- Edited variables for neutrality

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Activity: The system map

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Activity Objectives & Output

Objectives: Participants gain confidence in reading a system map and further developing the connections and questioning relationships.

Output: An agreed upon system map that is representative of participants knowledge of the problem.

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Activity Instructions

1. Review the combined system map, discuss how the different maps have been combined
2. As a group, address any requests for detail / clarification
3. As a group, continue to build the system map by confirming relationships between factors and identifying new factors / relationships. Ask:
    - What are the stories of these relationships?
    - Are the polarities correct?
    - What is missing?
    - Where are the reinforcing / balancing loops?

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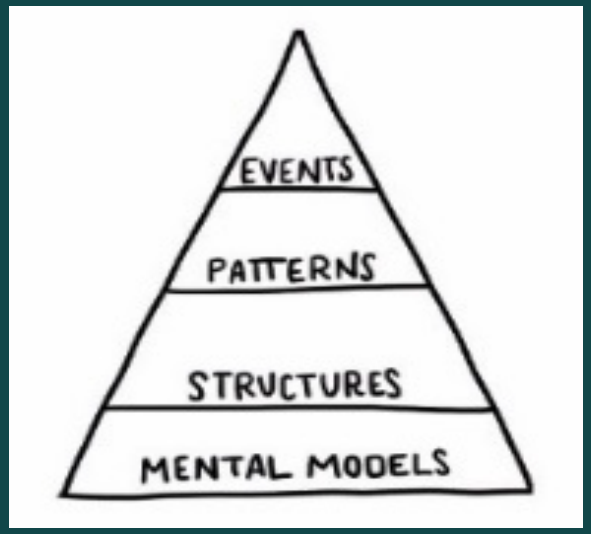
Tool 4

The system pyramid & leverage points



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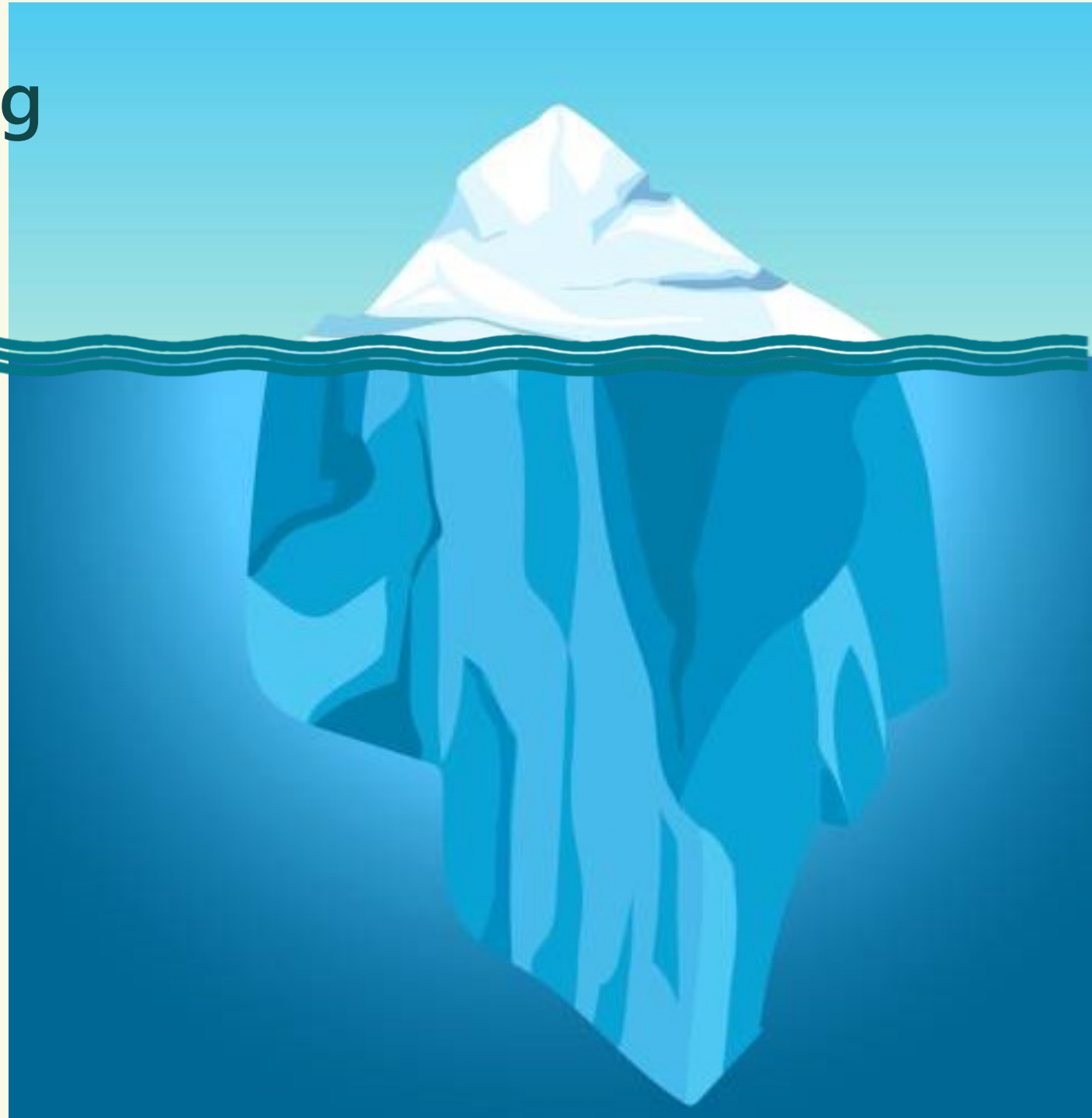
Levels of Systems Thinking

Iceberg model / System pyramid

The systems pyramid is often referred to as the iceberg model.

The part that you see above the surface represents a very small part of the whole.

The part that sits below the surface forms the structure that underpins the system.

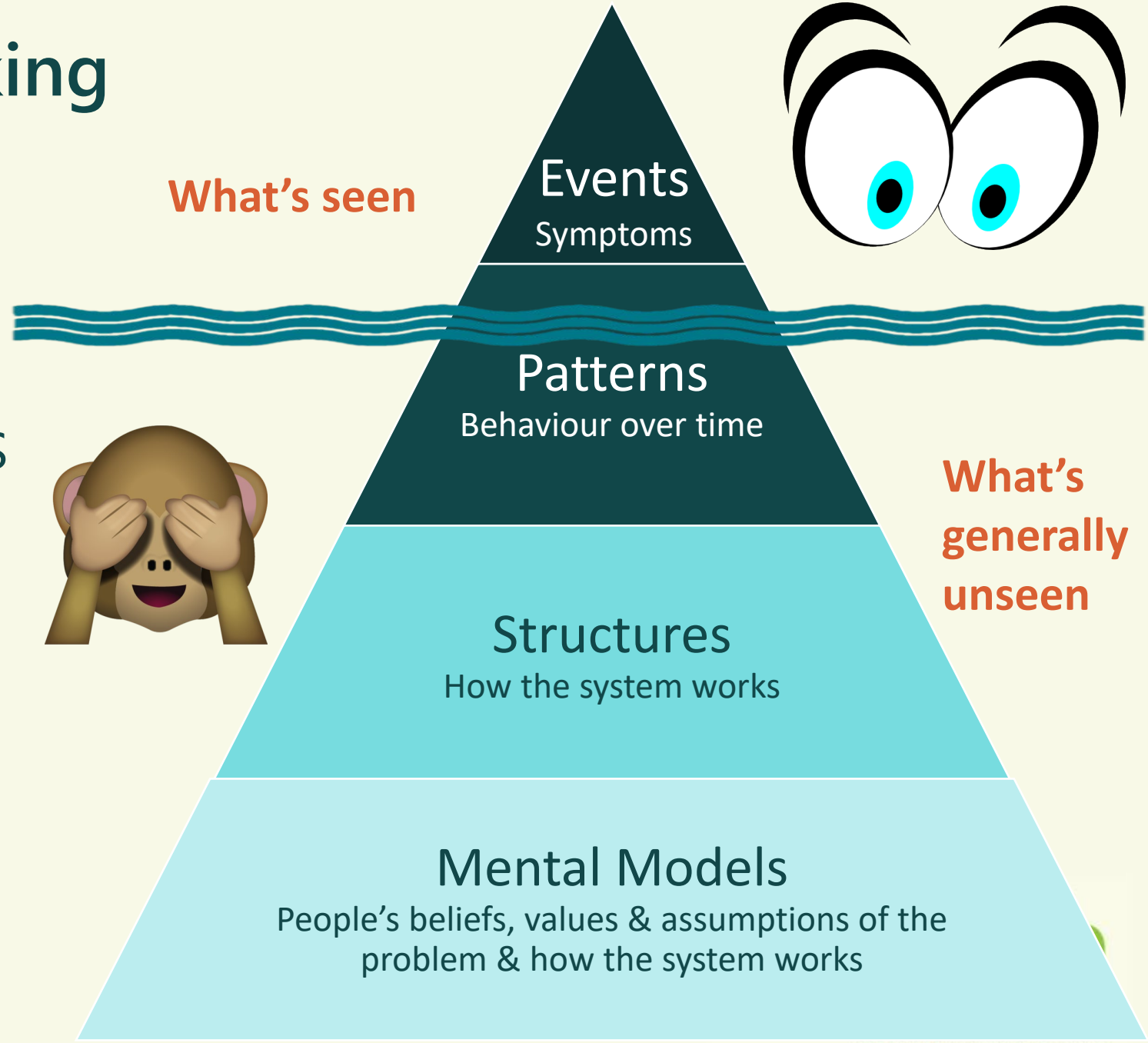


Levels of Systems Thinking

Iceberg model / System pyramid

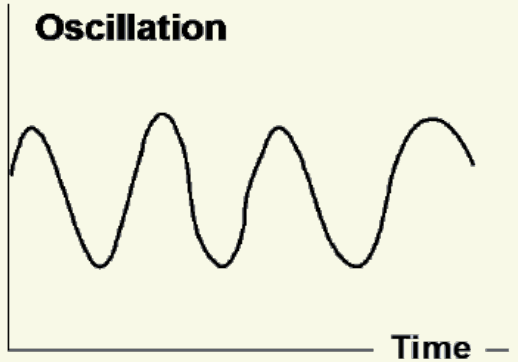
What is happening –
Events and some patterns

Why it's happening –
Structures and mental models



Levels of Systems Thinking

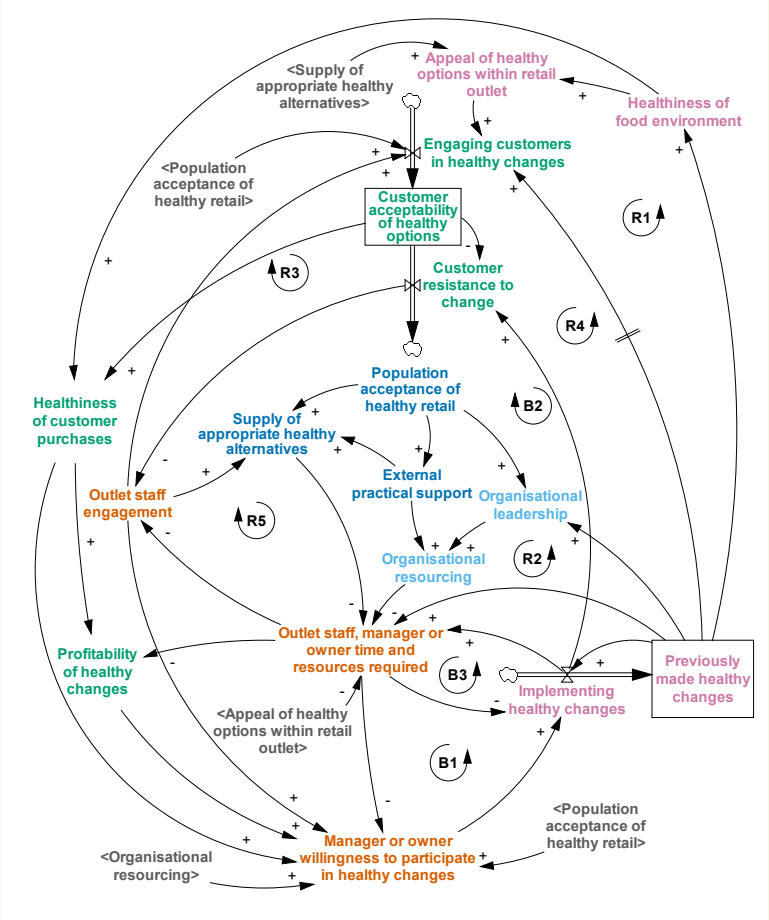
Iceberg model / System pyramid



What we see

What is happening –
Events and some patterns

Why it's happening –
Structures and mental models



What's actually happening

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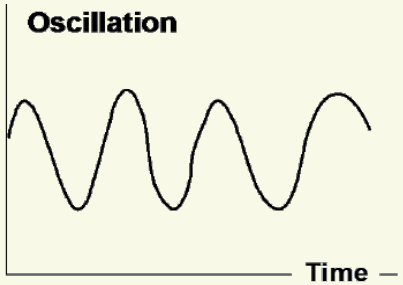
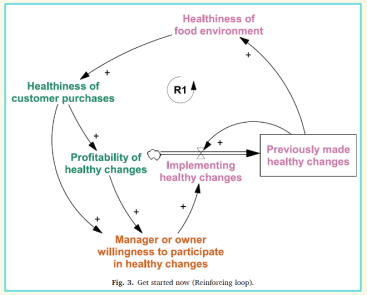
Decision type

REACT

ANTICIPATE



DESIGN



TRANSFORM

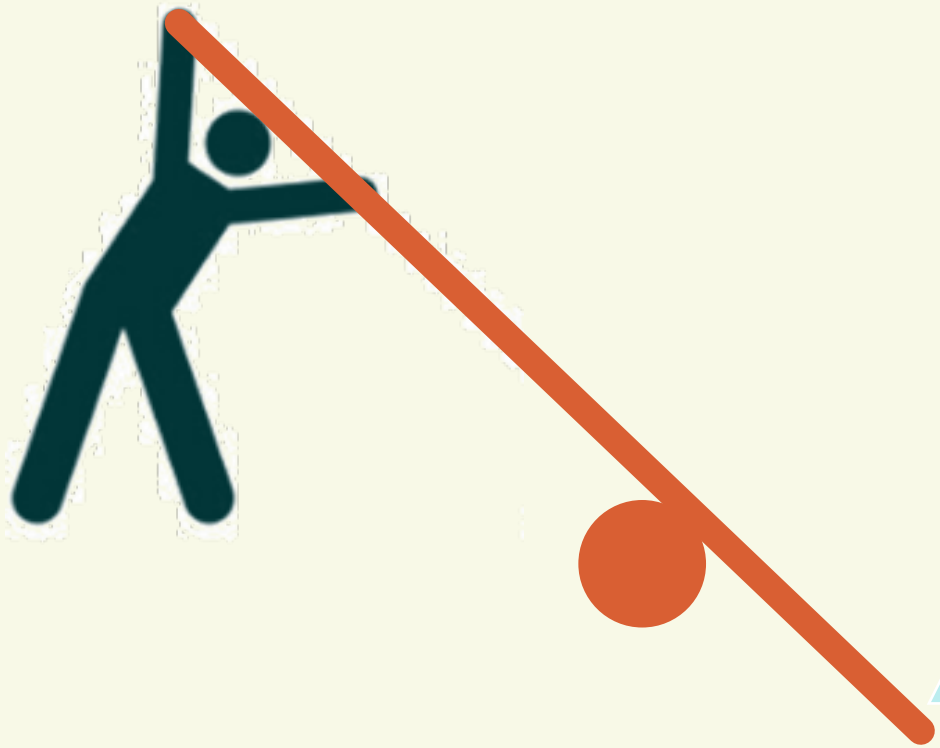
Events
Symptoms

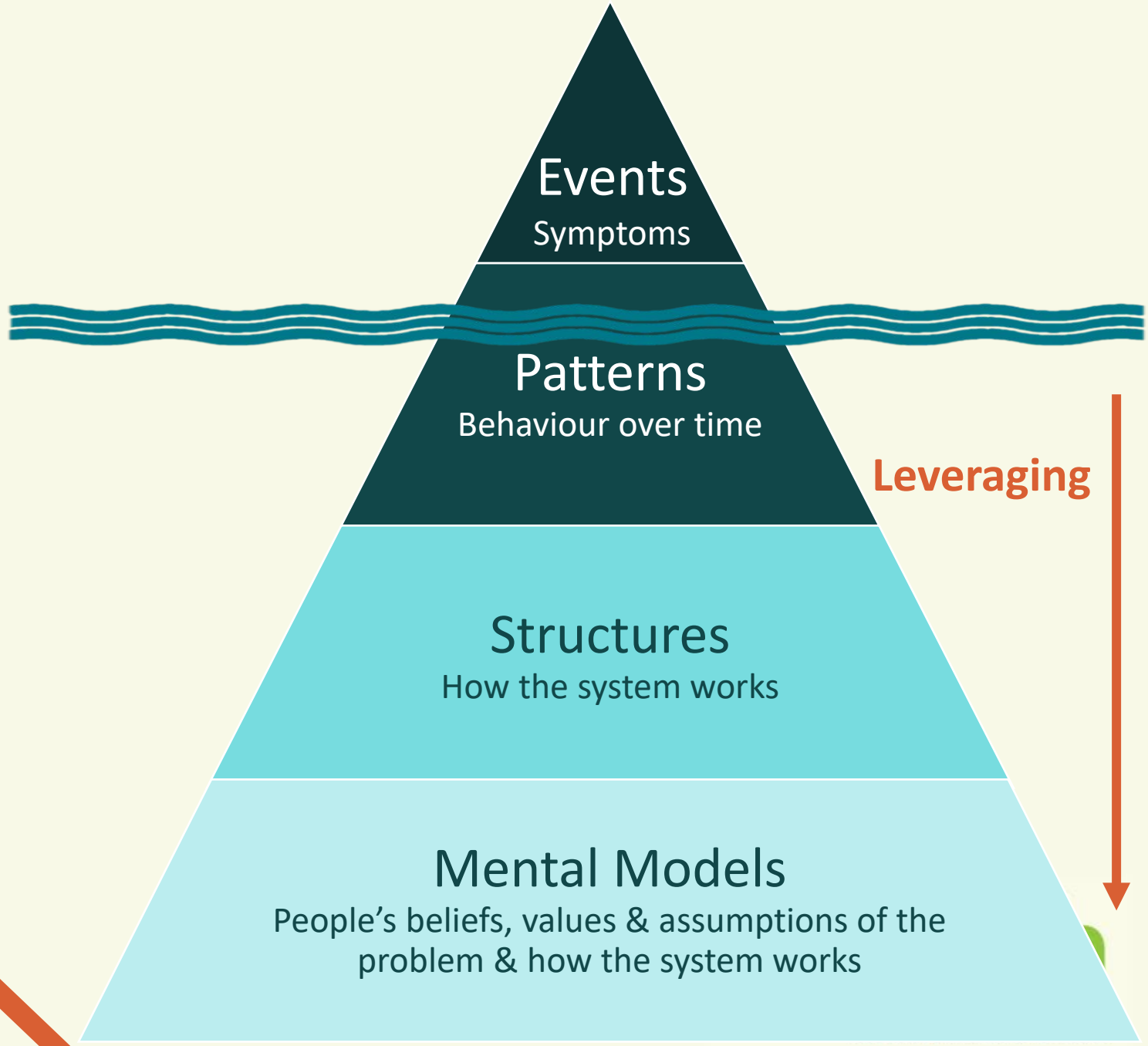
Patterns
Behaviour over time

Structures
How the system works

Mental Models
People's beliefs, values & assumptions of the problem & how the system works

Leverage points





Activity: Using the system map

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Activity Objectives & Output

Objectives: Demonstrates how a system map can be used in combination with the systems pyramid to dig deeper into a problem and identify potential leverage points within the system where interventions may have a significant and sustained impact.

Output: A detailed system map overlayed with at least one policy/intervention, identified areas for potential intervention, and a better understanding of how different tools within system dynamics can be applied to address a complex problem.

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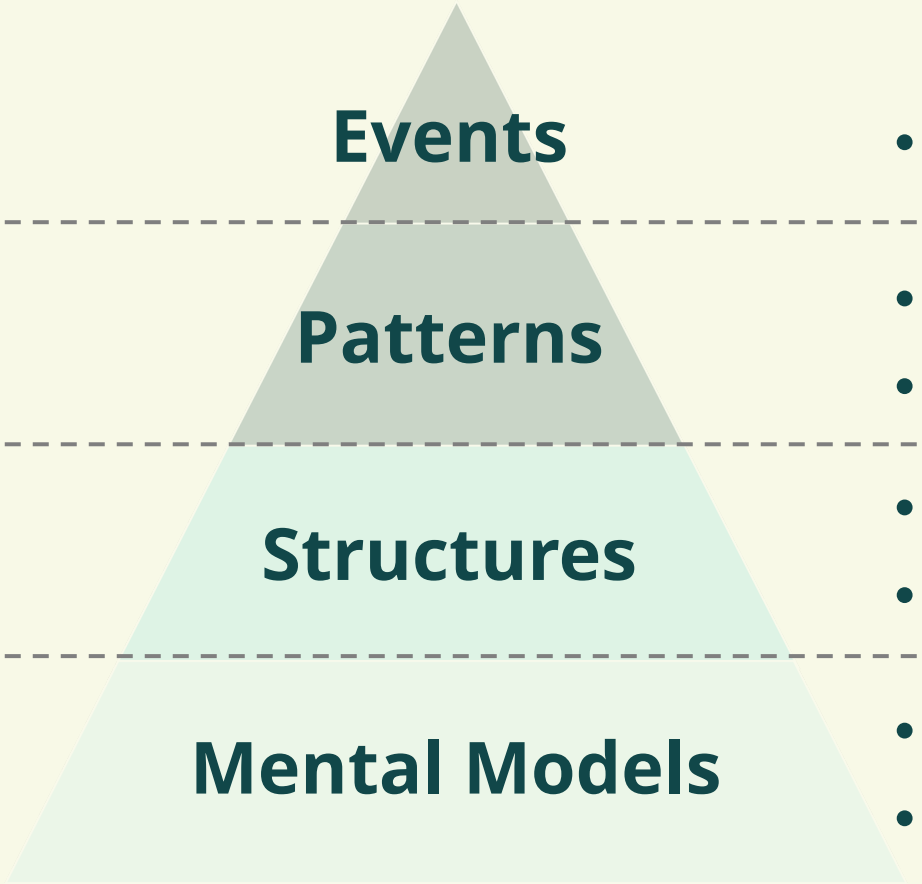
Activity Instructions

For your problem scenario, identify the following:



Events

- What is happening right now?

Patterns

- What has been happening over time?
- What are the trends?

Structures

- What could be influencing these patterns?
- Where are the connections between patterns?

Mental Models

- Who are the key stakeholders?
- What are their values, assumptions or beliefs?

Debrief & reflect

- How confident do you feel in developing and reading a system map?
- Is your system map representative of participants knowledge of the problem?
- Were the levels of the system pyramid useful in helping you to better understand the problem and identify potential leverage points?

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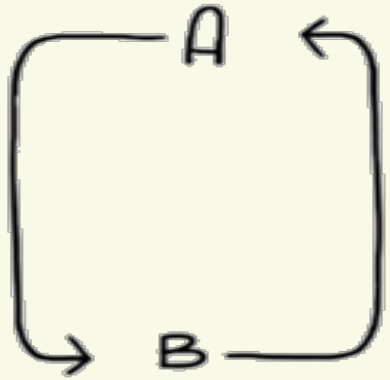
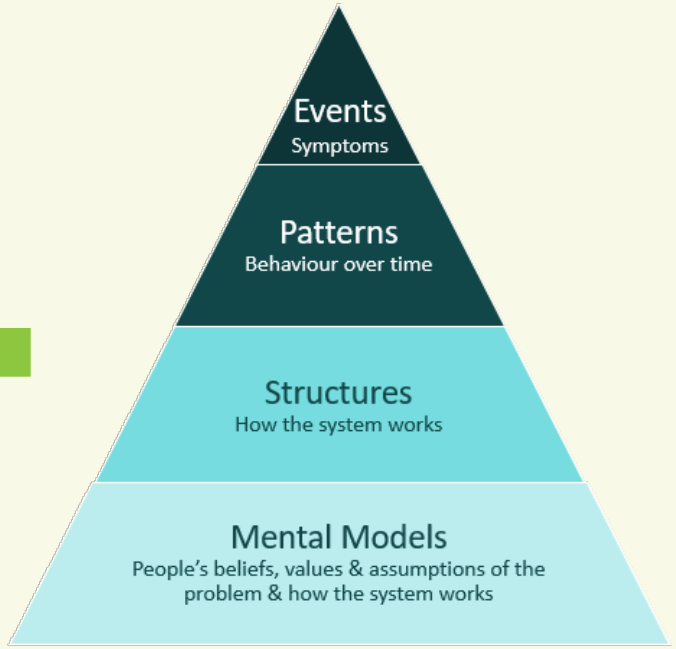
Summary – how can you use these tools?

- Comprehensive planning
  - Seeing the bigger picture
  - Plan for a range of issues
  - What steps to take next
- Identifying key challenges
  - Patterns of behaviour
  - Pre-empt, prepare, adapt
- Understanding system context and stakeholder perspective
  - Mental models
  - Leverage points





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