Introduction to Systems Thinking for Early Childhood Leaders

CEELO Leadership Academy
Washington DC

February 8 - 9, 2017

Facilitator: Tracy Benson Ed.D,
President/CEO- Waters Foundation, Systems Thinking Group

t.benson@watersfoundation.org

Systems Thinking in Education
Waters Foundation

www.watersfoundation.org

CEELO
Center on Enhancing Early Learning Outcomes

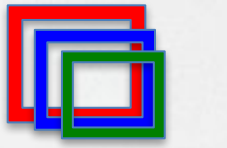
Introduce yourself and provide a response to one of the HW reflection questions:

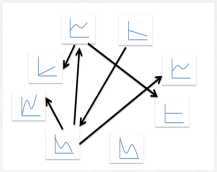
Reflect about yourself as a leader: How do your personal and professional qualities Align and connect with the concept of system leadership?

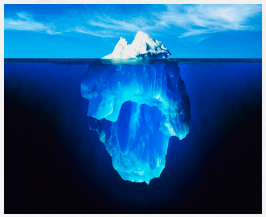
Synthesize your learning: What connection (e.g. similarities and differences) can you Identify between/among your Result Based Leadership learning, Heifitz's chapters in Leadership on the Line, and The Dawn of System Leadership article?

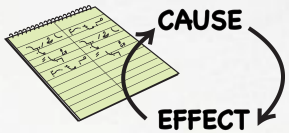
Core Capabilities of System Leaders

Seeing & building shared understanding the larger picture

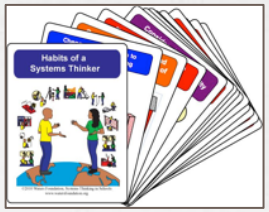


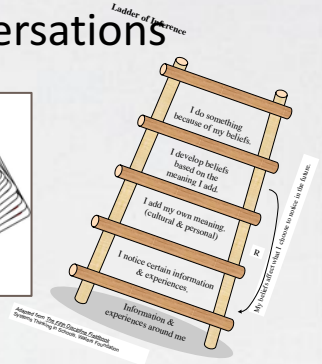


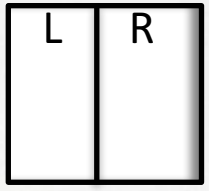




Reflection & Generative Conversations



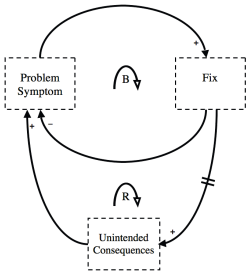




Co-creation & Problem-solving

Population Result(s)

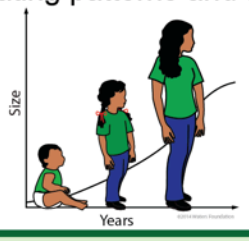
Program Result(s)



Habits of a Systems Thinker

Seeks to understand the big picture

Observes how elements within systems change over time, generating patterns and trends

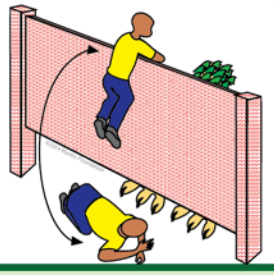


Recognizes that a system's structure generates its behavior

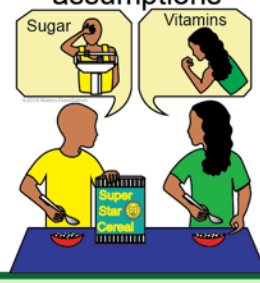
Identifies the circular nature of complex cause and effect relationships

Makes meaningful connections within and between systems

Changes perspectives to increase understanding



Surfaces and tests assumptions



Considers an issue fully and resists the urge to come to a quick conclusion

Considers how mental models affect current reality and the future

Uses understanding of system structure to identify possible leverage actions

Considers short-term, long-term and unintended consequences of actions

Pays attention to accumulations and their rates of change

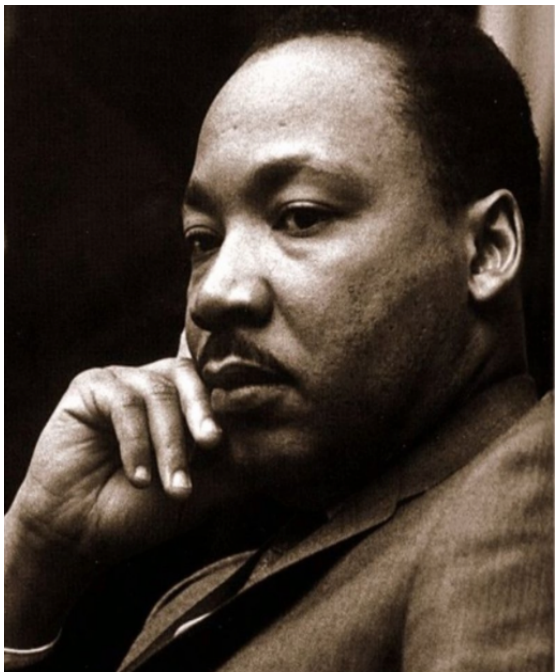
Recognizes the impact of time delays when exploring cause and effect relationships

Checks results and changes actions if needed: "successive approximation"

Systems Thinkers We Know

It really boils down to this: that all life is interrelated. We are caught in an inescapable network of mutuality, tied in a single garment of destiny. Whatever affects one directly affects all indirectly.

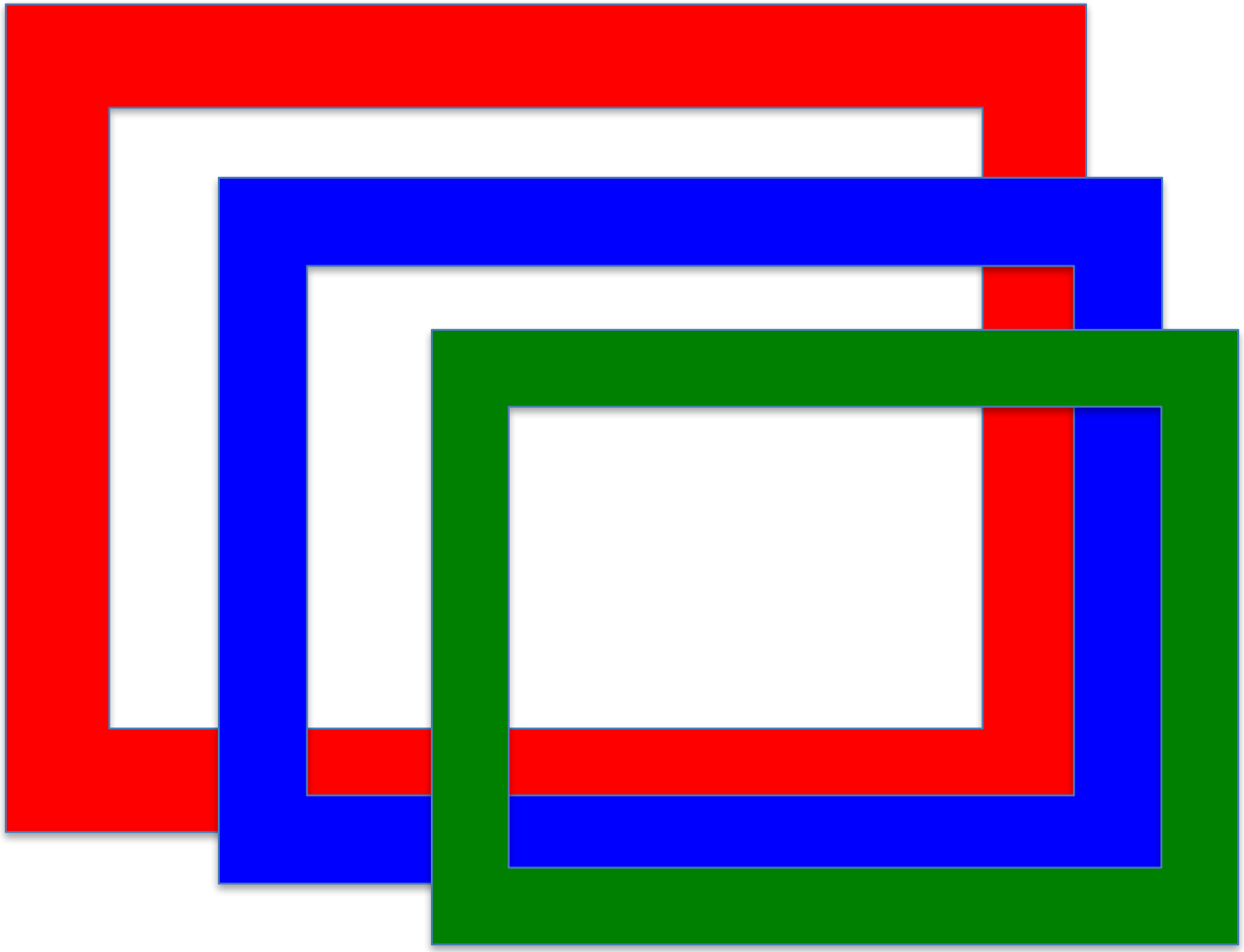
Dr. Martin Luther King, Jr.



What connections can you make between the **Habits of a Systems Thinker** and your experience with **Results-based Leadership**?

Which **Habits** are especially important to your **early childhood leadership work**?

Seeking the Big Picture



Your system…any system is perfectly designed to produce the results you are obtaining.

(Adapted from Carr, 2008)

If you want to see changes, view your system from an endogenous point of view.

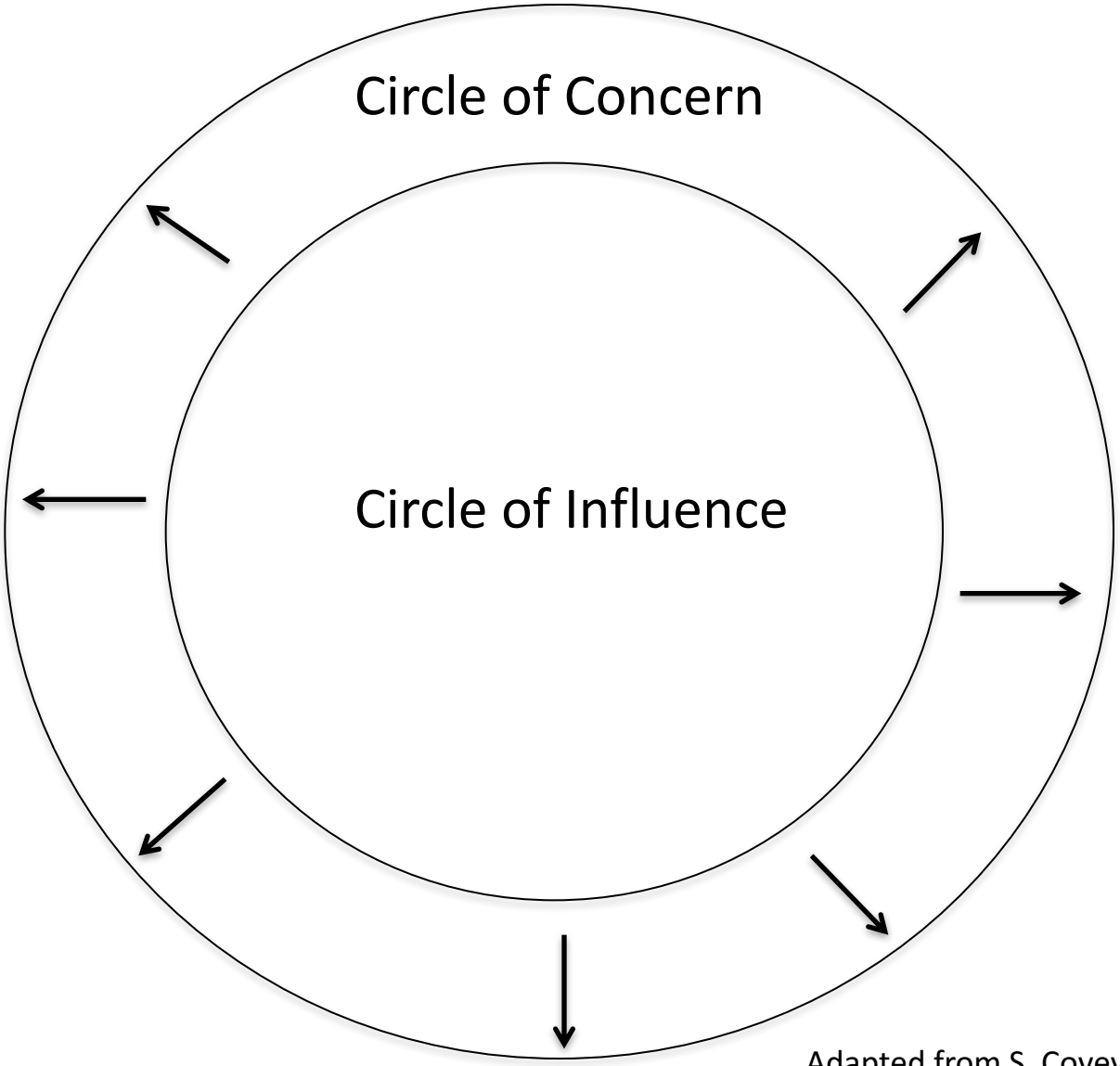
An Endogenous View

Produced, originated or growing from within; Having a cause internal to the system

That endogenous view (a system that can view itself internally) helps one see what influences the behavior of the system, and helps one avoid the blaming of others when things go wrong.

When things are not going well in systems, an endogenous view helps people fully examine the internal causes that influence the system's ill behavior.

This perspective creates a rich environment for productive decision-making and improvement.



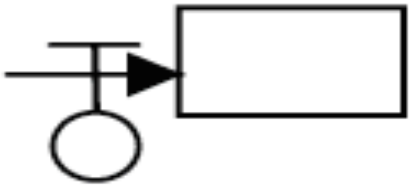
Adapted from S. Covey
The 7 Habits of Highly Effective People

How do your program result(s) inform and specifically impact your population results, and vice versa?

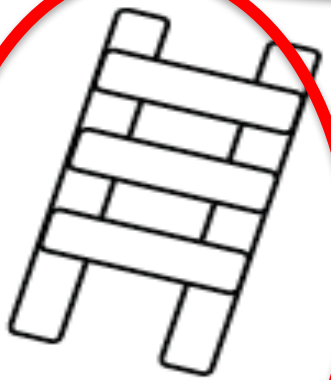
Seeing these connections is an example of seeing and understanding the larger system.

Examples of Systems Thinking Tools

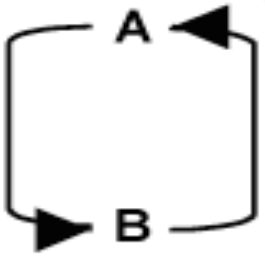
Behavior-over-time graphs



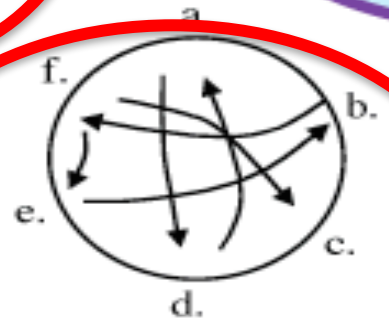
Stock/flow maps and computer models



Ladder of inference

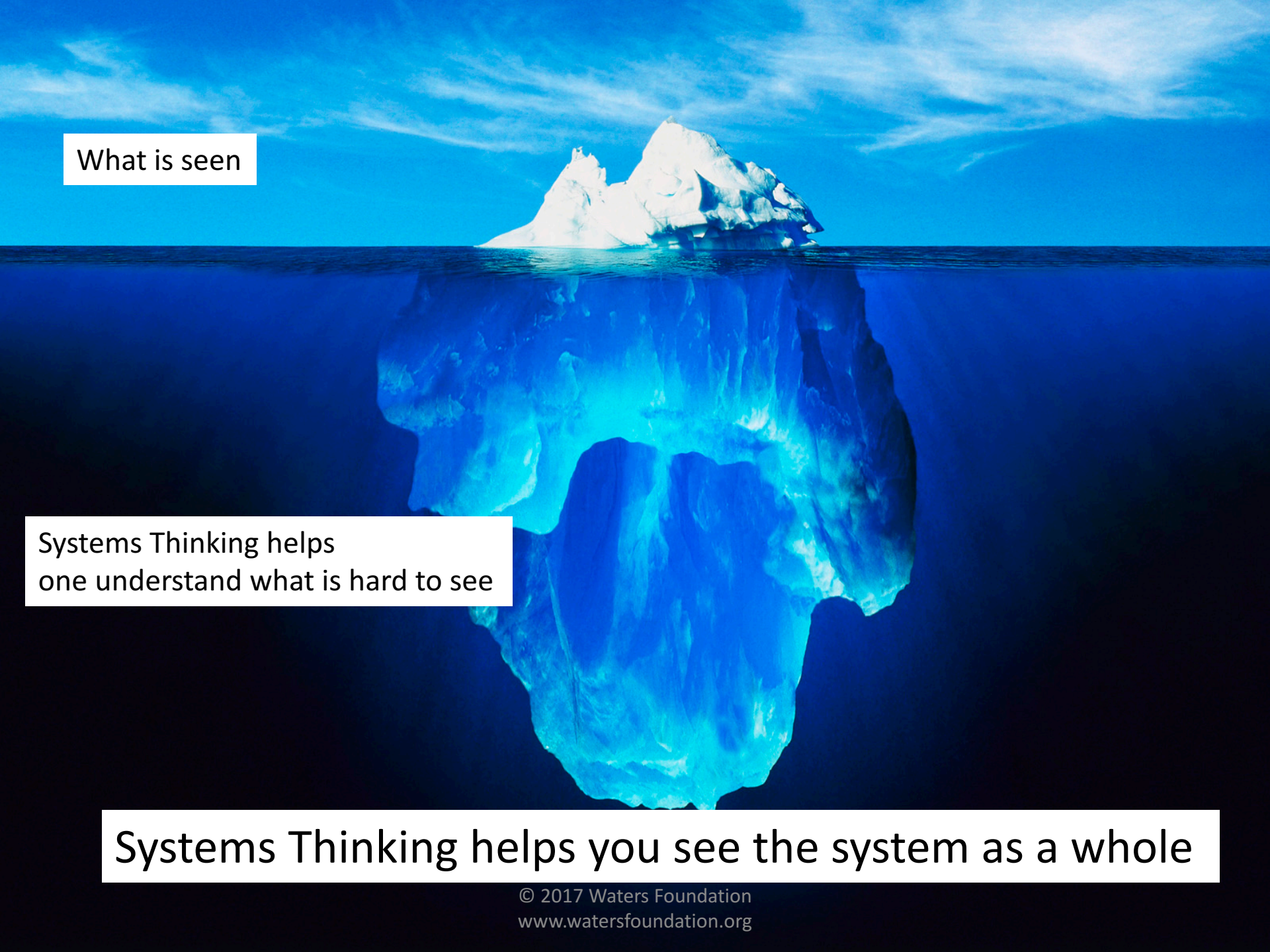


Causal loops



Connection circles

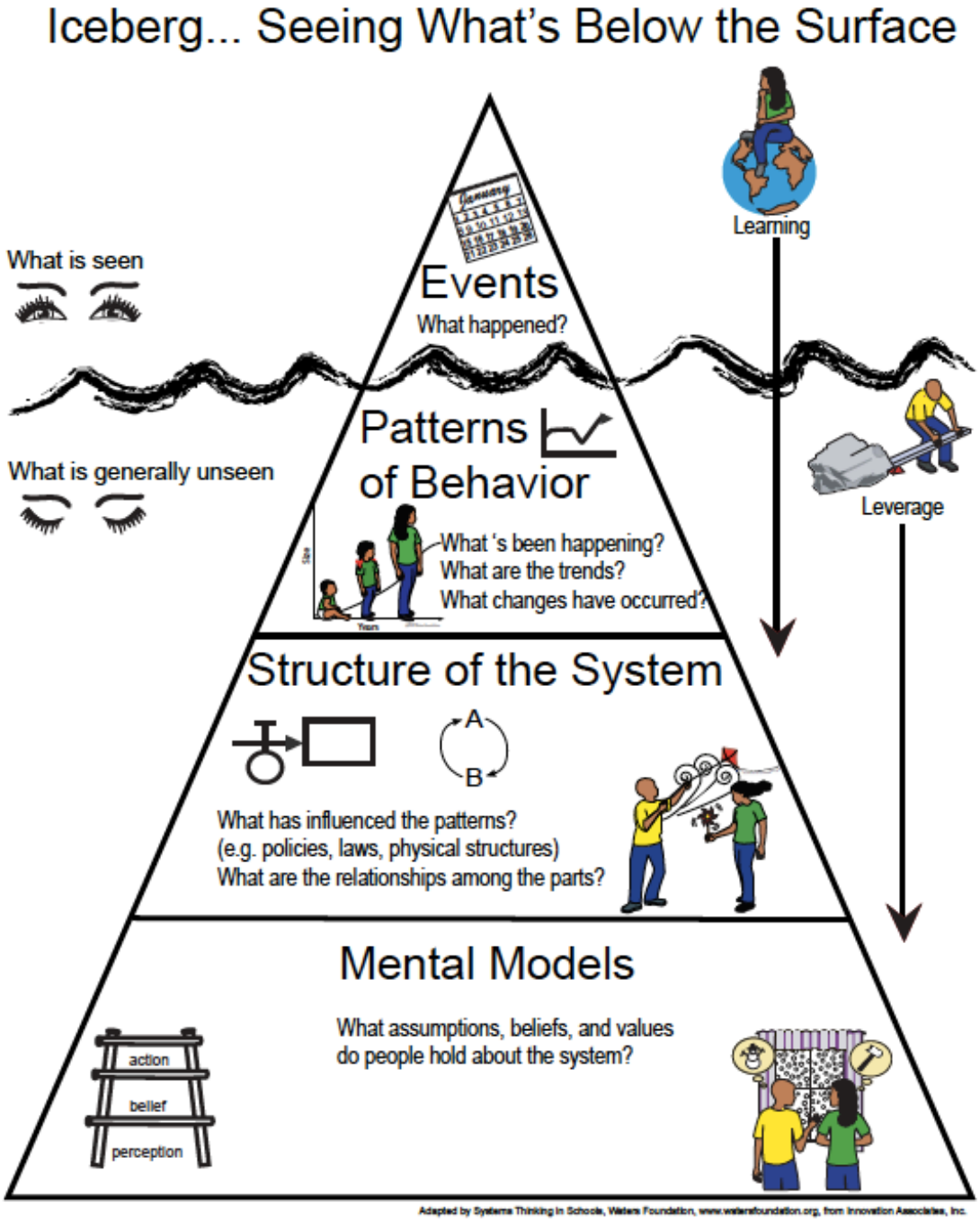
Iceberg



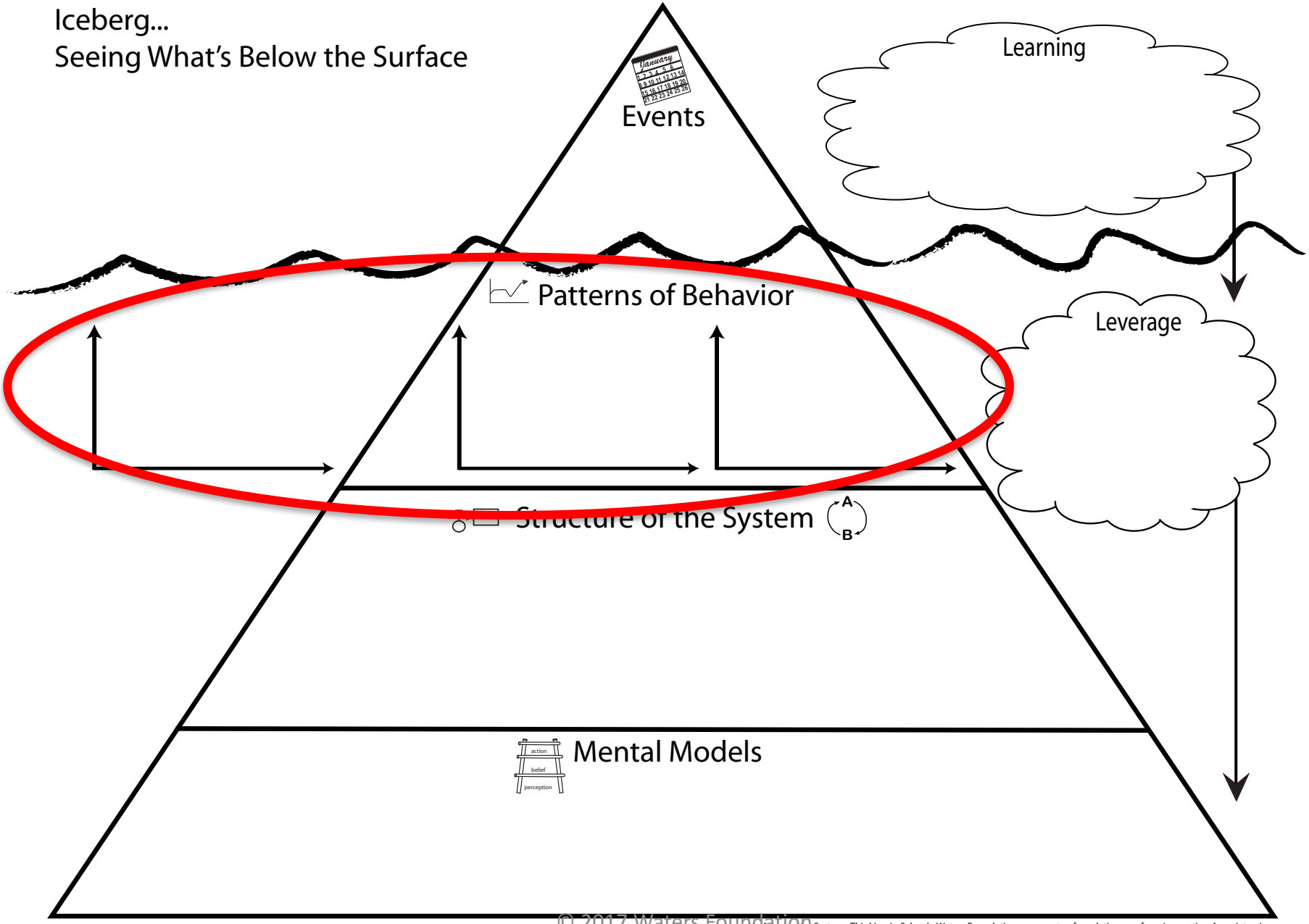
Systems Thinking helps you see the system as a whole

The Big Picture

Seeks to understand the "big picture"



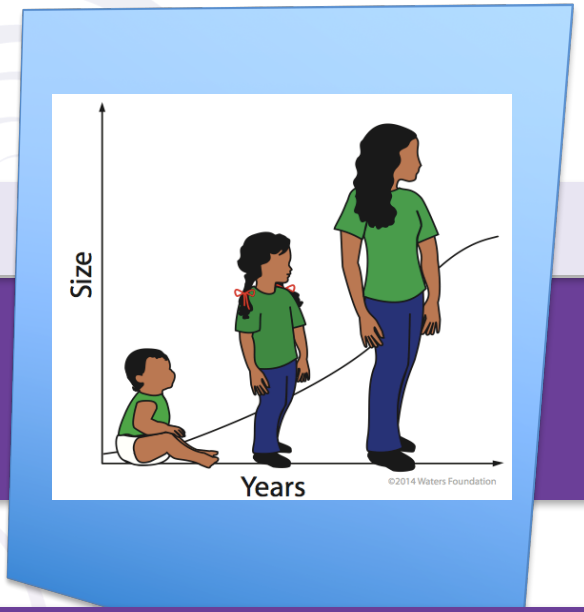
Iceberg...
Seeing What's Below the Surface

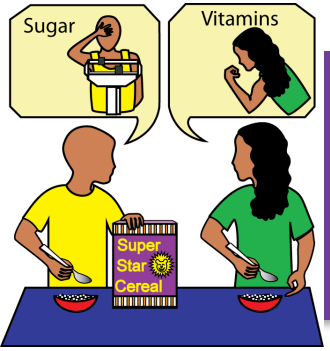


Adapted by Systems Thinking in Schools, Waters Foundation, www.watersfoundation.org, from Innovation Associates, Inc.

Recognizing Patterns and Trends

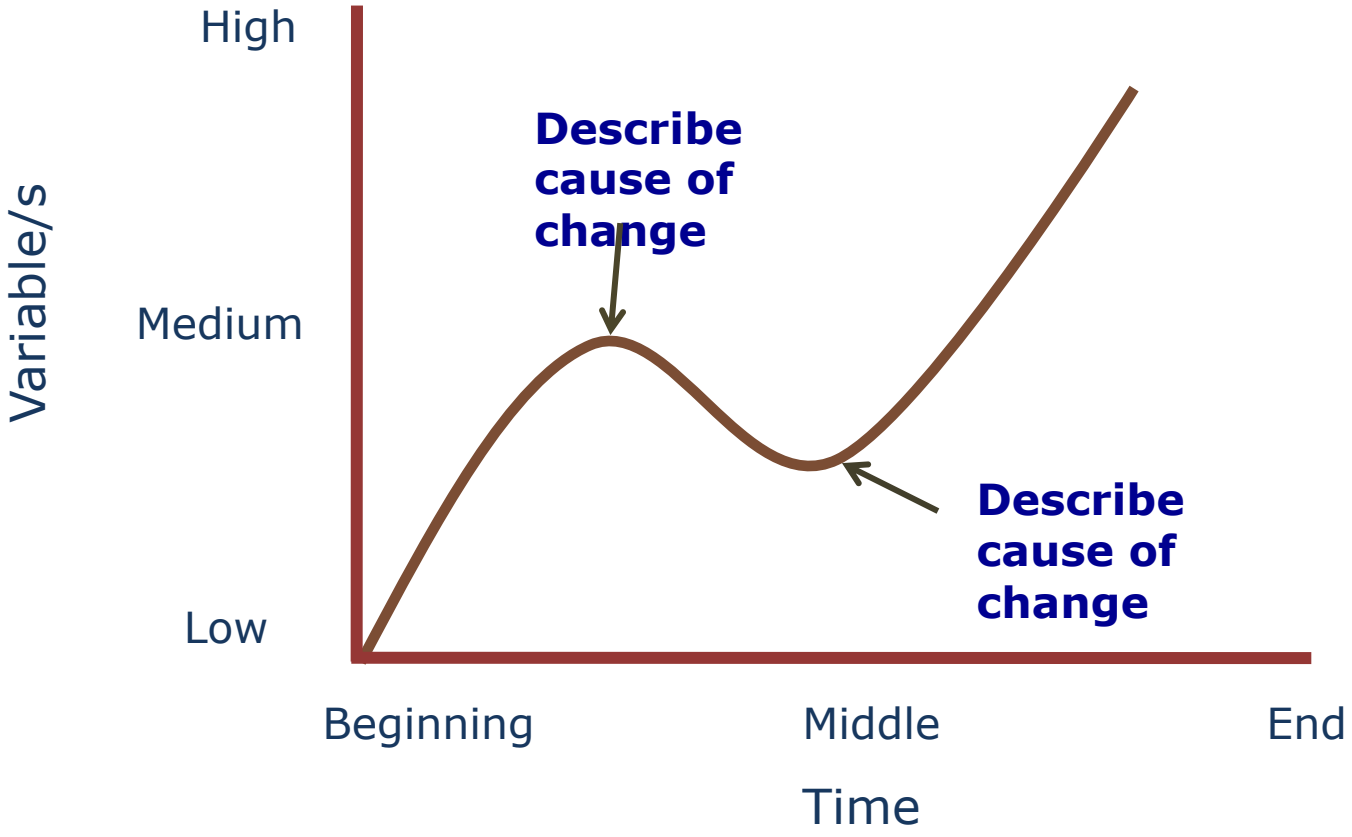
What patterns and trends do you need to be aware of as you pursue desired results of your job-embedded project?





Graphs help tell the story.
They also help surface and test assumptions.

BOTG Basics

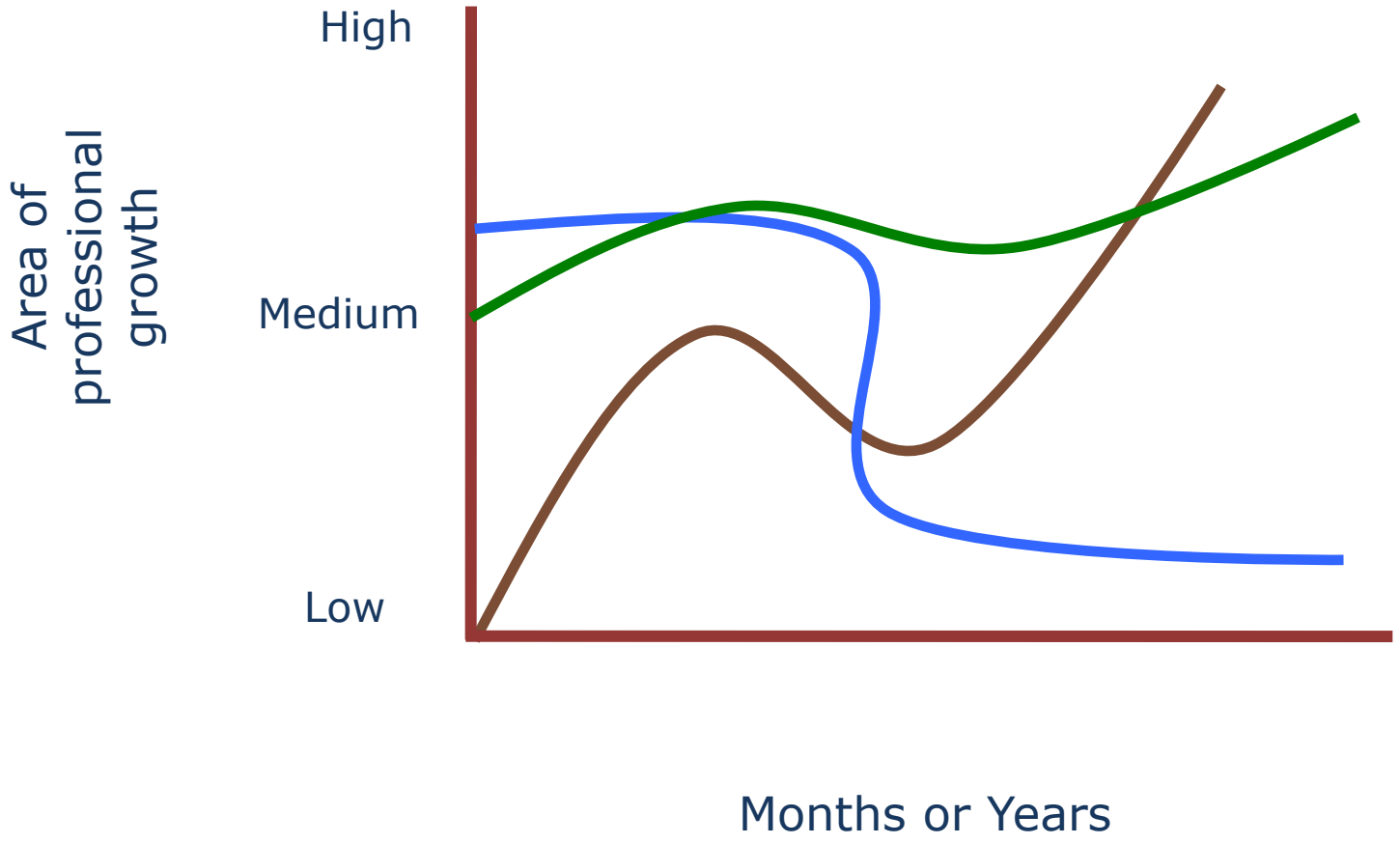


Collaborative efforts help

surface patterns and trends of current reality and aspirations for the future

Image courtesy of smarnad at FreeDigitalPhotos.net

BOTG Practice



Think about your program result(s) and make a list of variables related to your project that change over time.

Graphs Tell the Story of What is Important in Systems

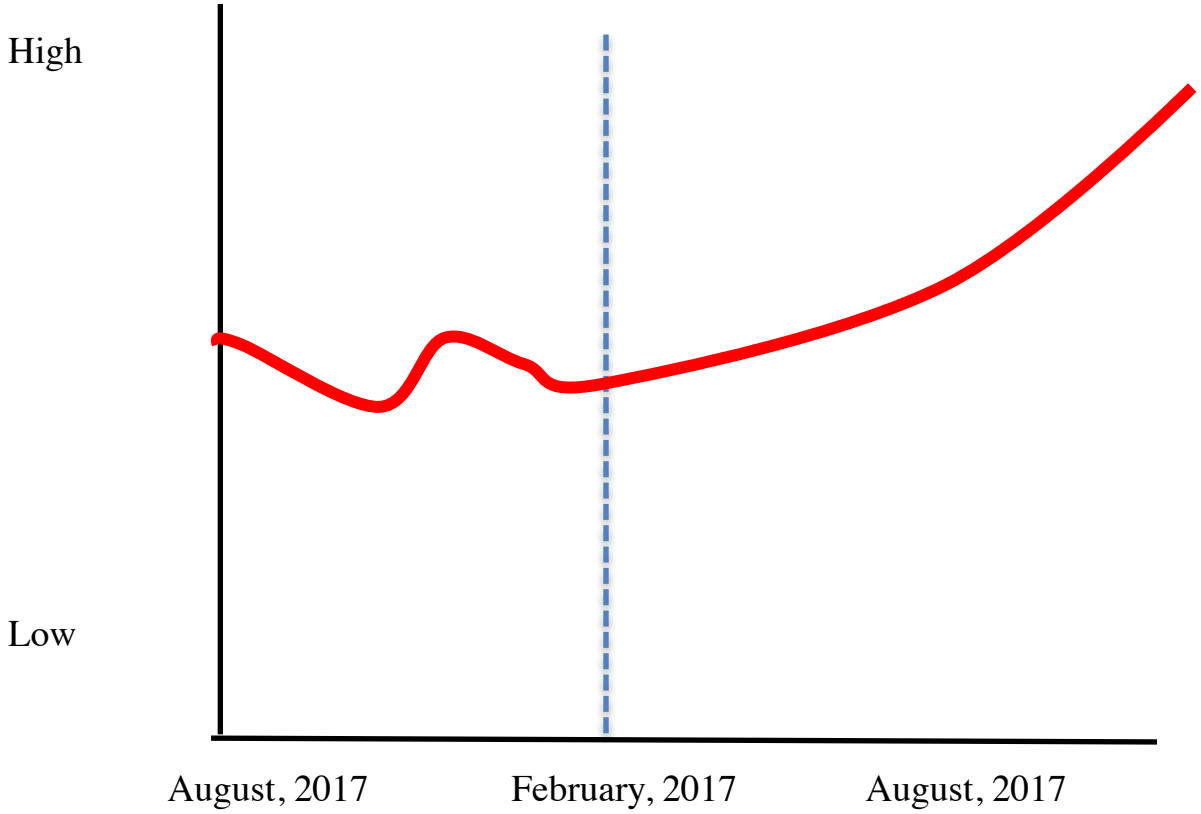
Possible examples of trends to graph

- Hard data:
  - Leaders with EC credentials
  - # of children in certified preschools
  - % of high quality preschools
  - 3rd grade state standardized achievement measures
- Perceptual data:
  - Legislative support for EC
  - Level of commitment to DAP
  - Quality of early childhood professional development

Other examples

- Quality of cross-sector communication
- Access to professional learning opportunities
- Awareness and skill related to DAP
- Willingness to try new things
- Commitment to children
- Attention to data

Using BOTGs to identify current and desired trends



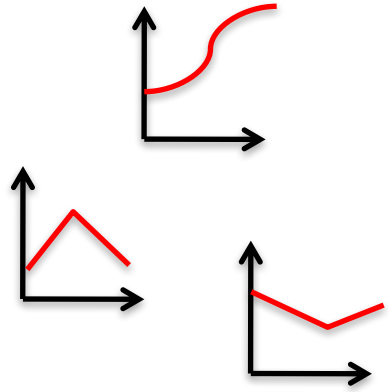
Practice Field

Decide on a system of interest most closely related to your Population Result(s).

Choice 1: A system where **all children** are valued, healthy and thriving and ready to succeed in school.

Choice 2: A system where **all schools and the adults who serve children** are prepared to meet the needs of all children.

small groups



Directions:

1. Make a list of variables that change over time and are important to your population result(s).

2. Choose your top 8 by taking turns choosing. No need to come to a consensus.

3. Divide the variables up and individually use the half sheet BOTG templates to graph your changing elements over a specific period of time. Refer to data wall if necessary. But remember, these are trend lines and not exact data point graphs. The shape of the line is most important.
4. Take turns telling the stories of your graphs. Make changes as needed.

How could you use BOTGs in your leadership position to gather information you currently do not have? And, how could you use BOTGs in your work?

Iceberg...
Seeing What's Below the Surface

Events

Learning

Patterns of Behavior

Leverage

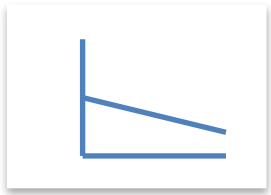
Structure of the System

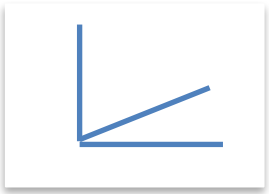
The use of mapping tools like connection circles and causal loops help define system structure and make it visible to others.

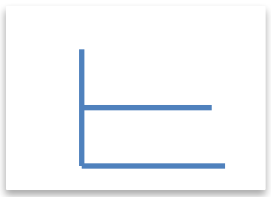
Mental Models

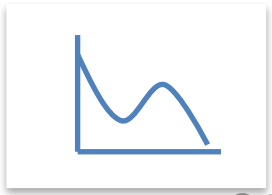
Adapted by Systems Thinking in Schools, Waters Foundation, www.watersfoundation.org, from Innovation Associates, Inc.

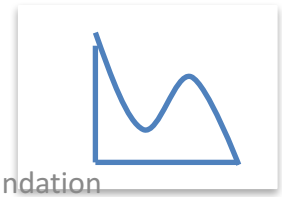
Arrange your BOTGs in a circle



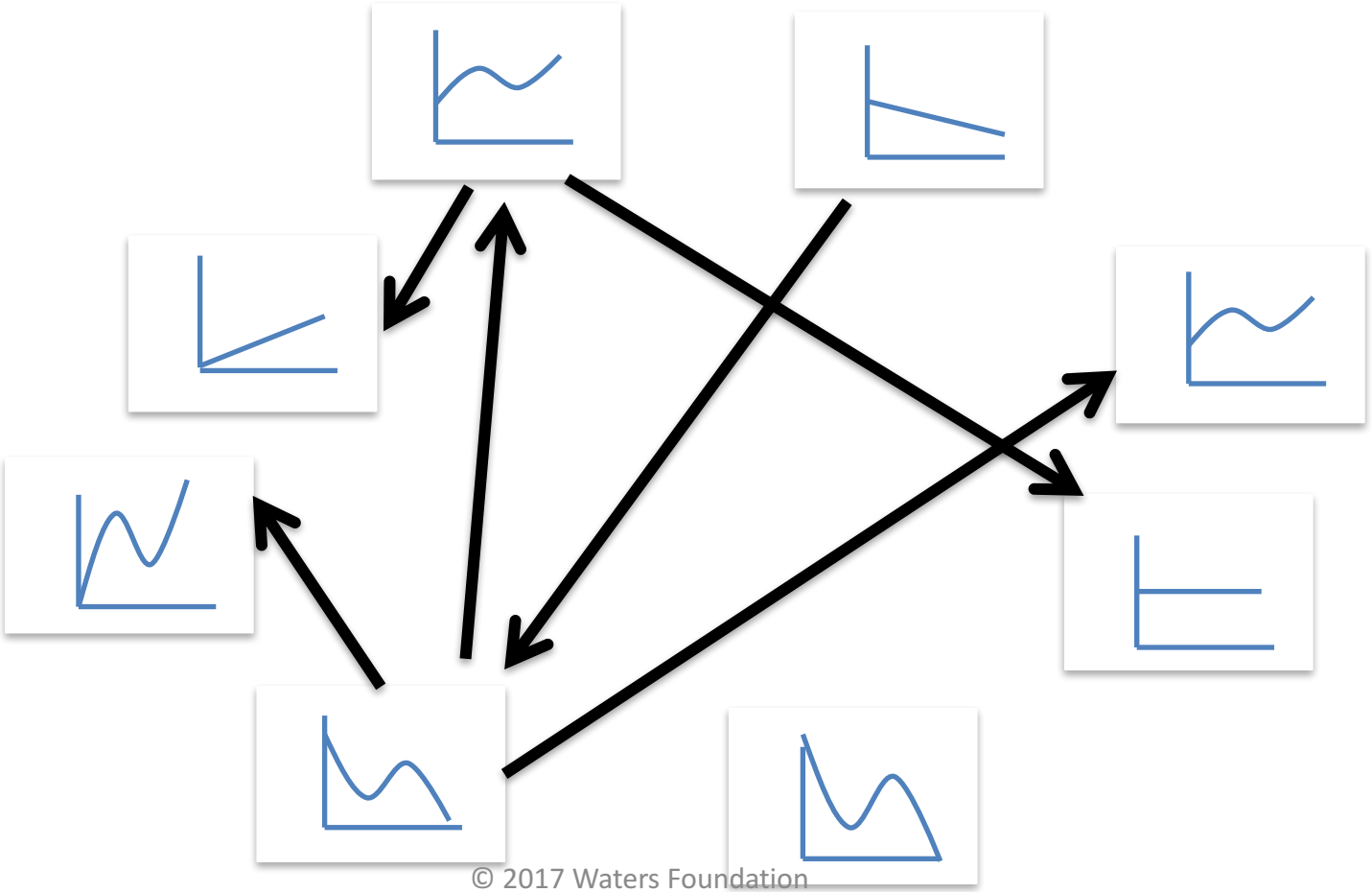




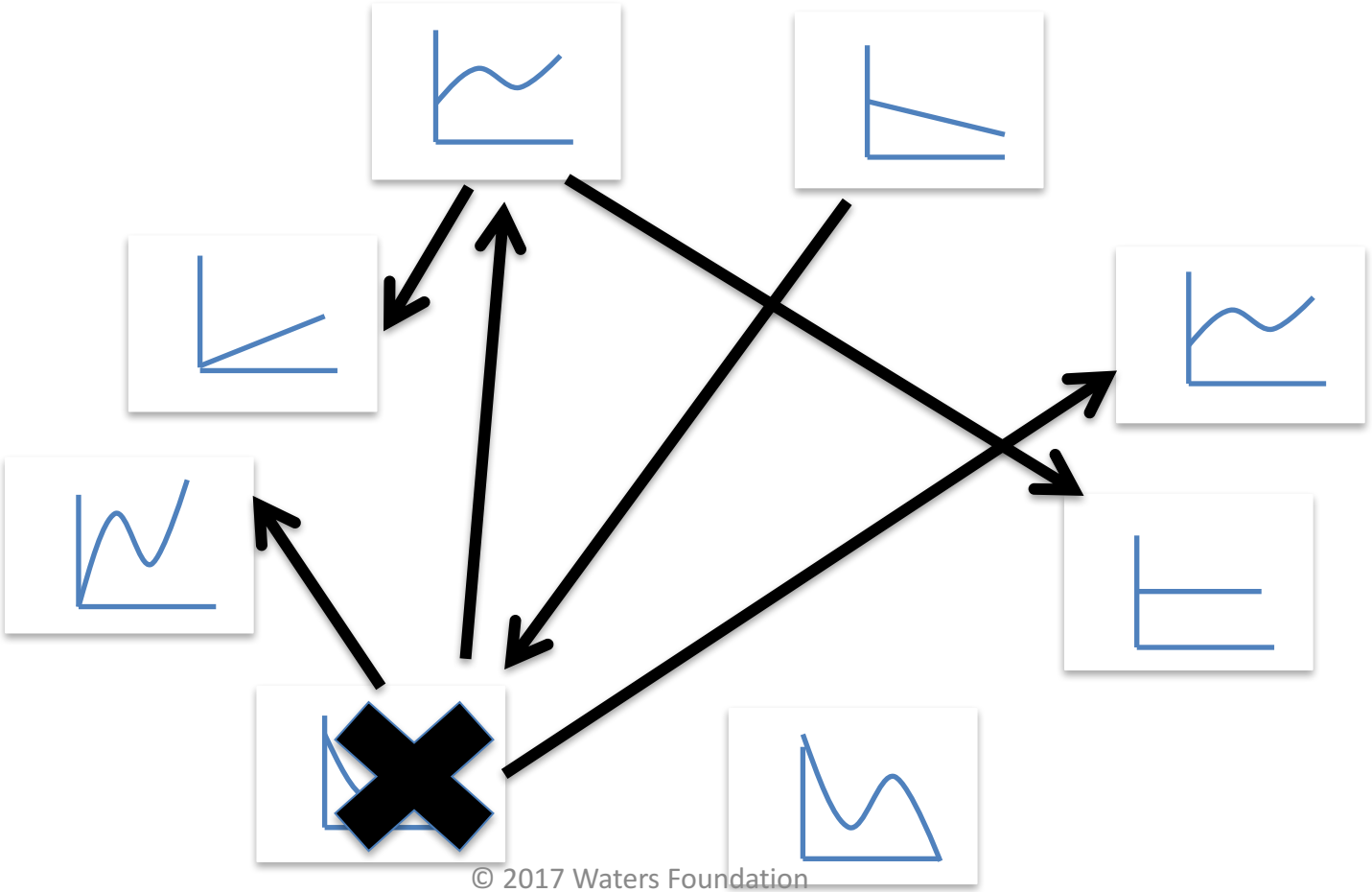




Use the arrows to connect pairs of BOTGs that have cause and effect relationships: When one element causes a change in another element



Eliminate the bottom left hand element.
"What impact does elimination or significant change in one element have on the rest of the system?"

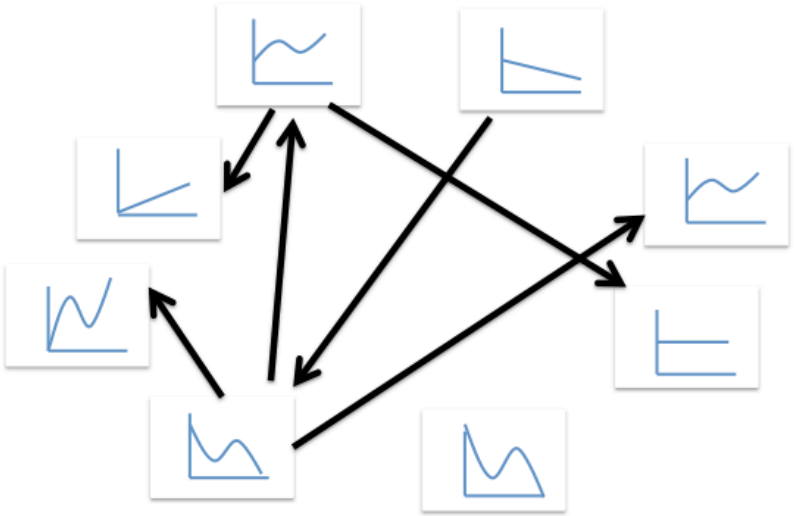


What insights did you gain from your system map? Which changing element could serve as a leverage focus?

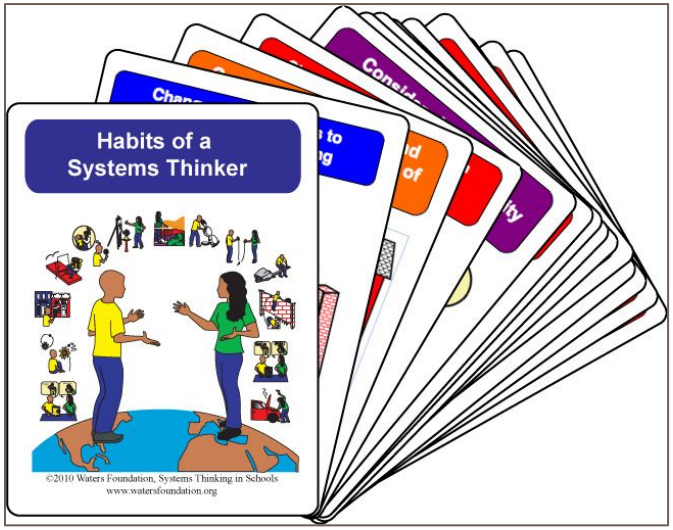
Independent work

- Choose to work on your population result(s) or your program result(s)
- Repeat the process that you just did with BOTGs and a connection circle.
- Draw in your journal or use available blank paper.

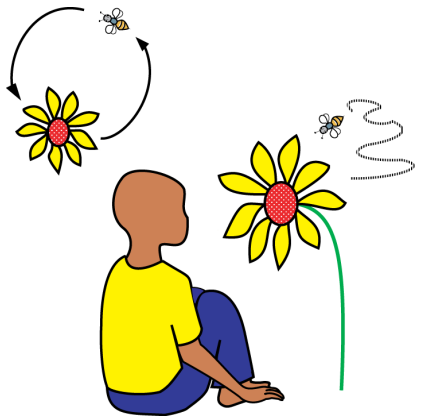
When you are finished, share your connection circle with a Fellow or Coach. In your connection circle, which elements seem to have the most arrow tails and thus could be considered leverage areas?



Which habits did we practice today?

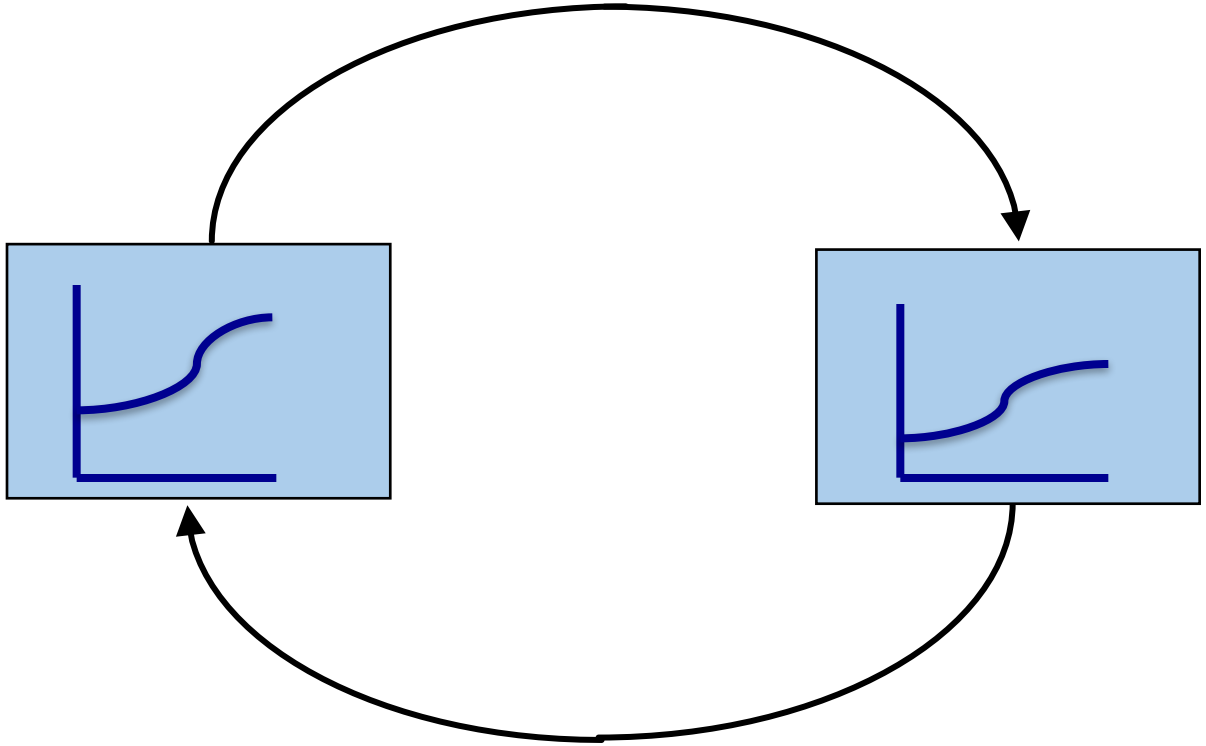


Causal Loop Diagrams (CLDs) aka Feedback Loops



Can you find a loop in your connection circle map?
If so, draw it on a blank piece of paper and be ready to share.

Feedback: As different parts of a system affect each other, causes become effects which in turn become causes.



Causal Loop Diagrams (CLDs) show circular causal relationships (feedback) within a system. CLDs can show "how" and "why" a system operates the way it does.

There are 2 types of feedback loops:
Reinforcing Loops and Balancing Loops.

Today, I learned…

Tomorrow, I hope to learn...

Good Morning Everyone!

Welcome to Day 2 of Systems Thinking!

Facilitator: Tracy Benson Ed.D,
President/CEO- Waters Foundation, Systems Thinking Group

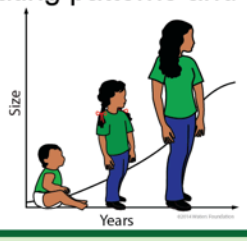
t.benson@watersfoundation.org

What is one connection you can make between last night's bowling celebration and a Systems Thinking Habit(s), BOTGs, connection circles or causal loops?

Habits of a Systems Thinker

Seeks to understand the big picture

Observes how elements within systems change over time, generating patterns and trends

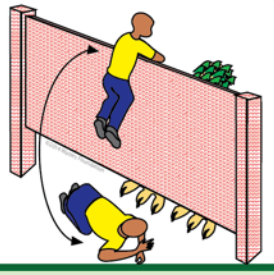


Recognizes that a system's structure generates its behavior

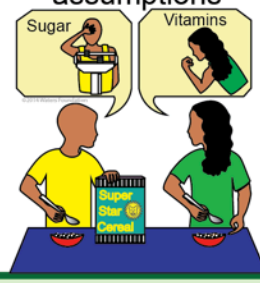
Identifies the circular nature of complex cause and effect relationships

Makes meaningful connections within and between systems

Changes perspectives to increase understanding



Surfaces and tests assumptions



Considers an issue fully and resists the urge to come to a quick conclusion

Considers how mental models affect current reality and the future

Uses understanding of system structure to identify possible leverage actions

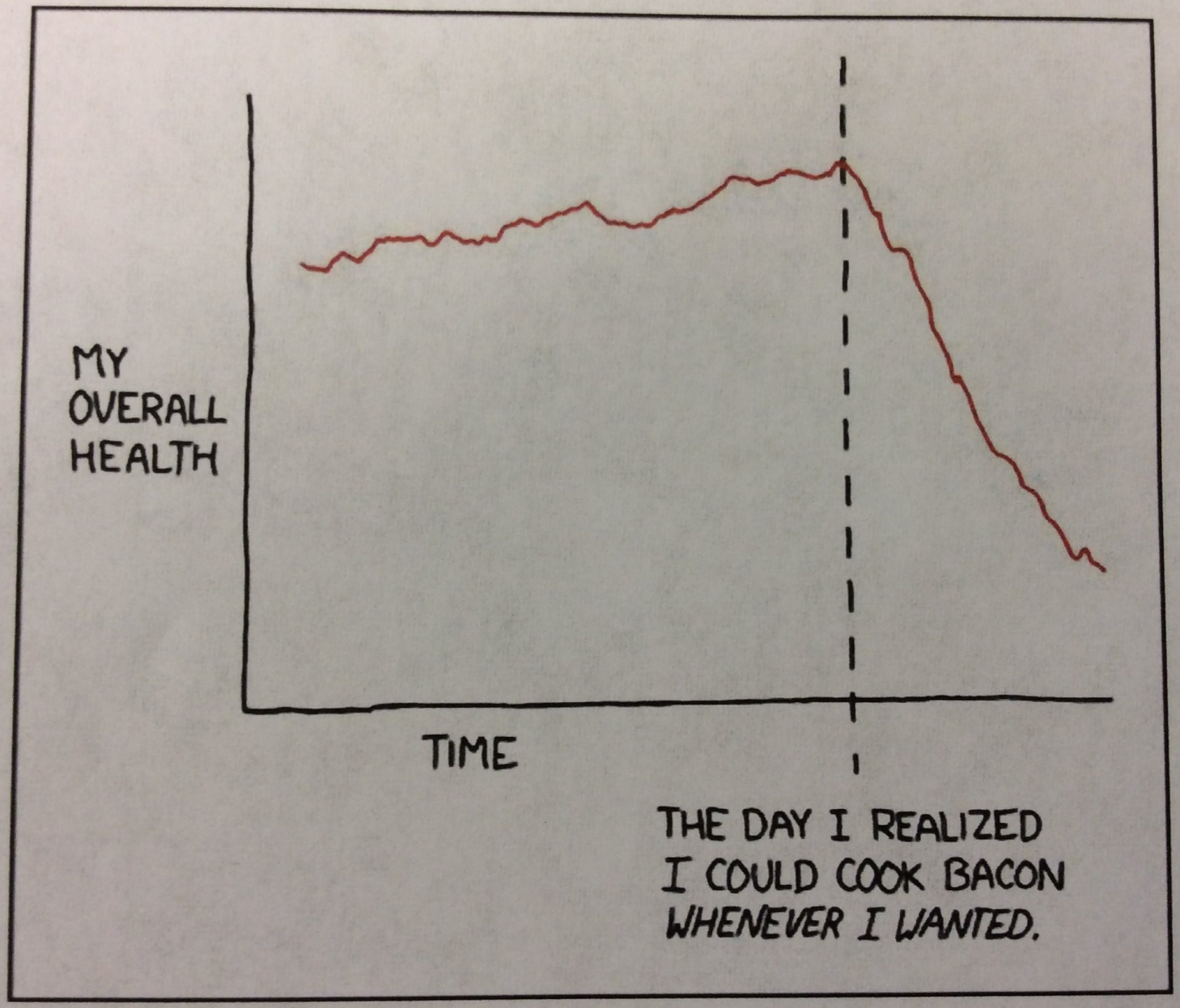
Considers short-term, long-term and unintended consequences of actions

Pays attention to accumulations and their rates of change

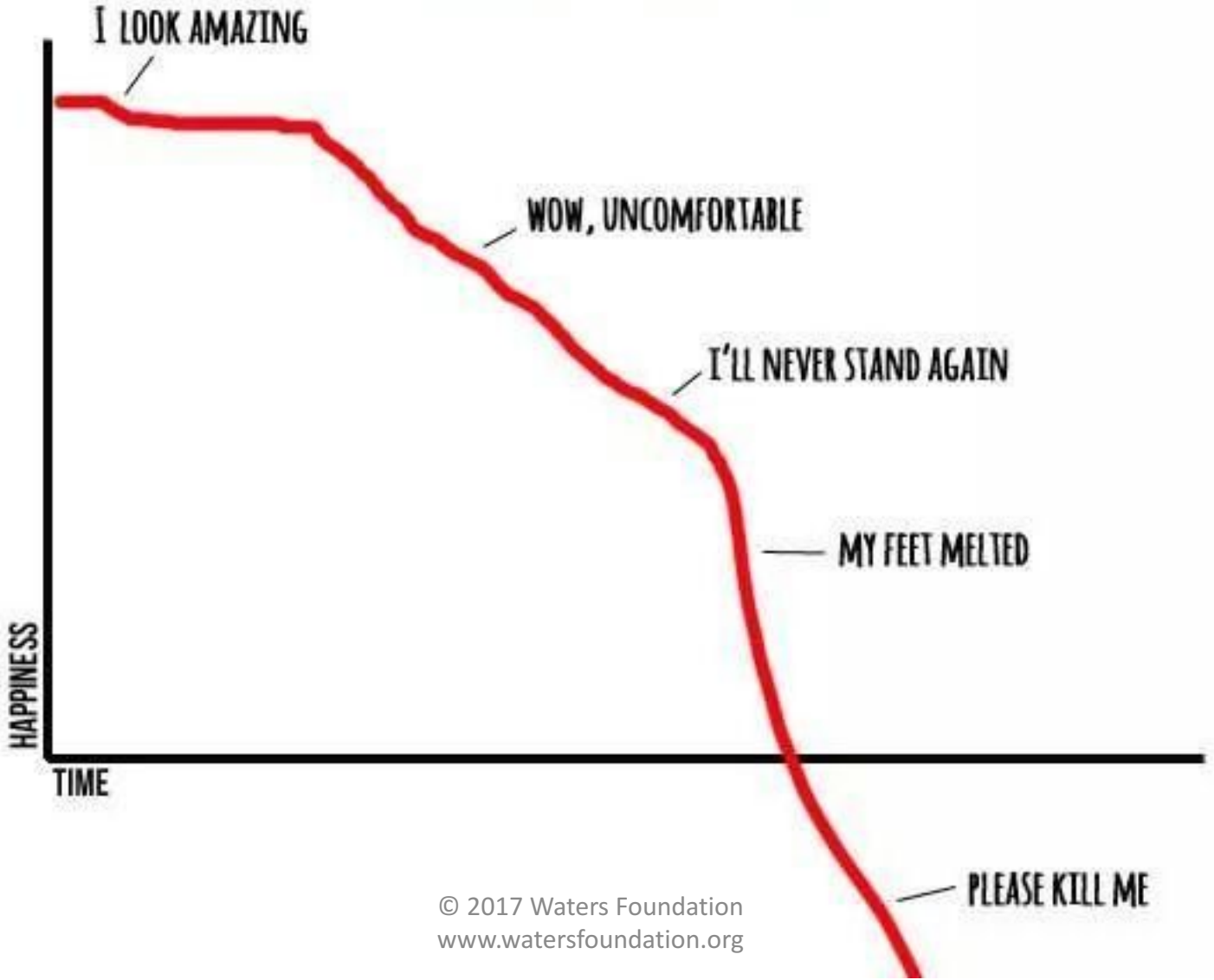
Recognizes the impact of time delays when exploring cause and effect relationships

Checks results and changes actions if needed: "successive approximation"

Square Wheels

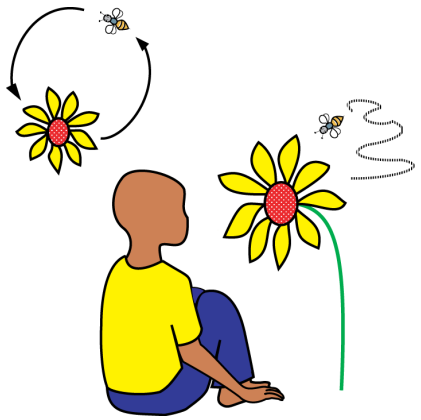

MY OVERALL HEALTH
TIME
THE DAY I REALIZED I COULD COOK BACON WHENEVER I WANTED.

WEARING HIGH HEELS



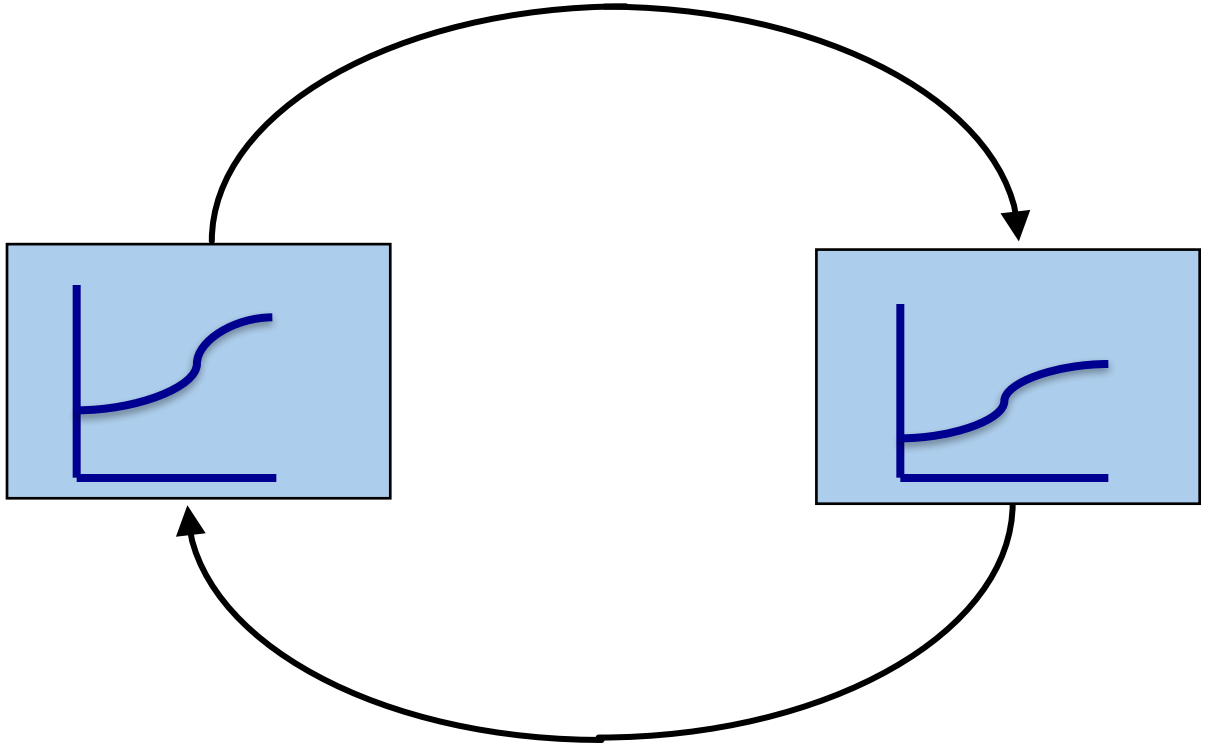
Tap the deck to draw a challenge card and spin the spinner.

Causal Loop Diagrams (CLDs) aka Feedback Loops



Can you find a loop in your connection circle map?
If so, draw it on a blank piece of paper and be ready to share.

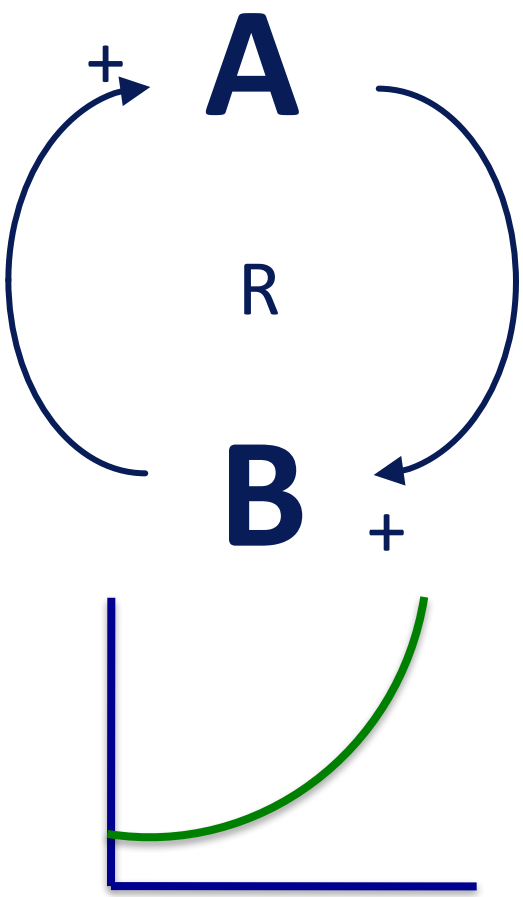
Feedback: As different parts of a system affect each other, causes become effects which in turn become causes.



Causal Loop Diagrams (CLDs) show circular causal relationships (feedback) within a system. CLDs can show "how" and "why" a system operates the way it does.

There are 2 types of feedback loops:
Reinforcing Loops and Balancing Loops.

Reinforcing Feedback



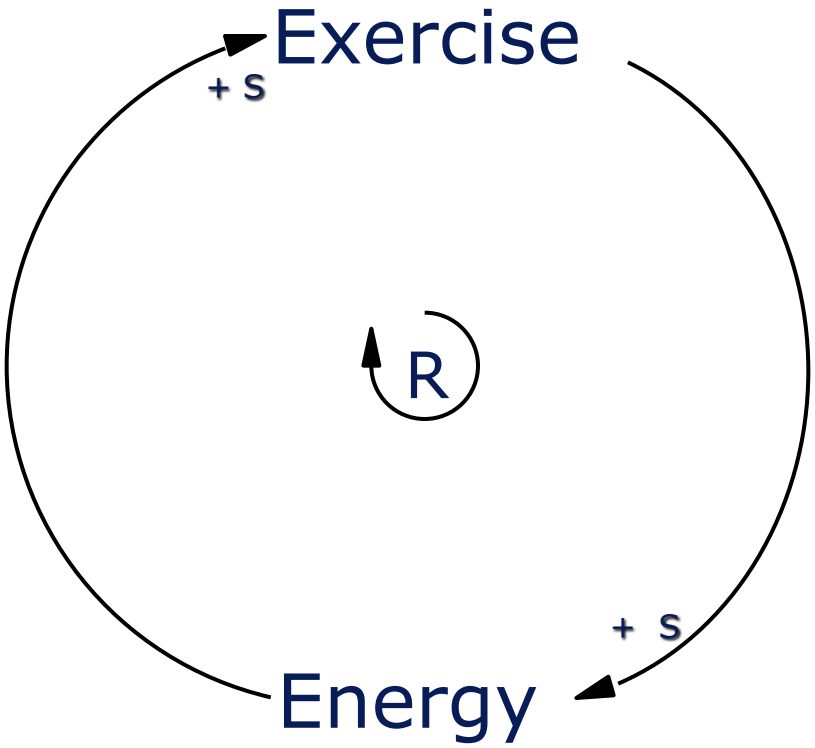
- "Things are getting out of control!"
- "I can't keep up!"
- "We are really on a roll now!"
- "It's spreading like wild fire!"

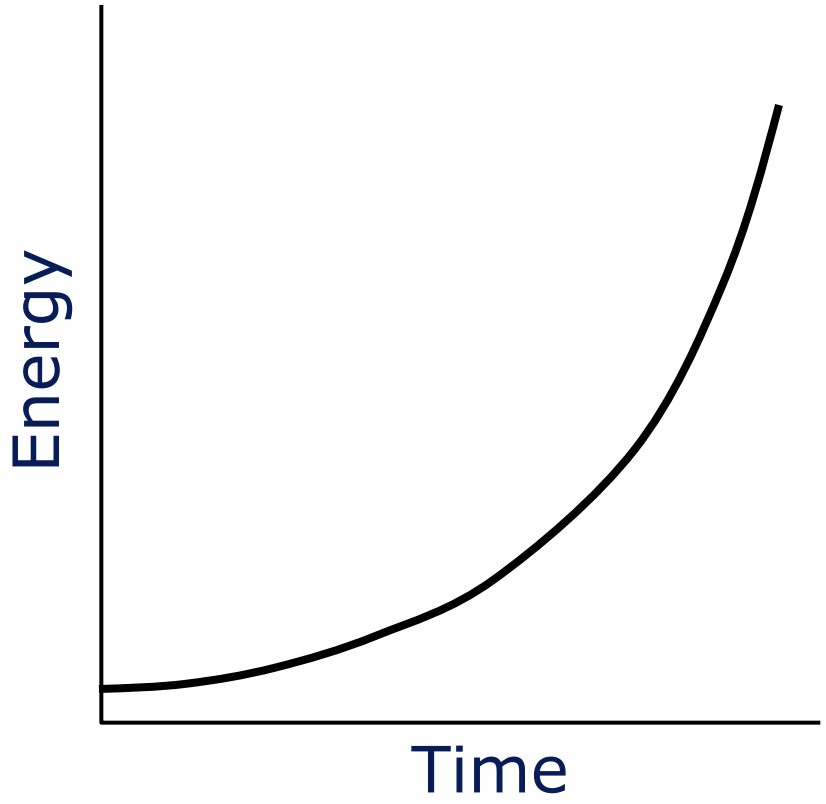
R-Reinforcing Loop
B-Balancing Loop
+/s – adds to or same direction
-/o – subtracts from or opposite direction

Reinforcing Feedback

- Creates a reinforcing or compounding effect
- Examples of reinforcing feedback:
  - Rumors: “I told only one person, but soon everyone knew!”
  - Virus: “Only few had the virus at first, but soon it became an epidemic.”
  - Fads: “That fashion fad caught on quickly because soon everyone had to have it.”

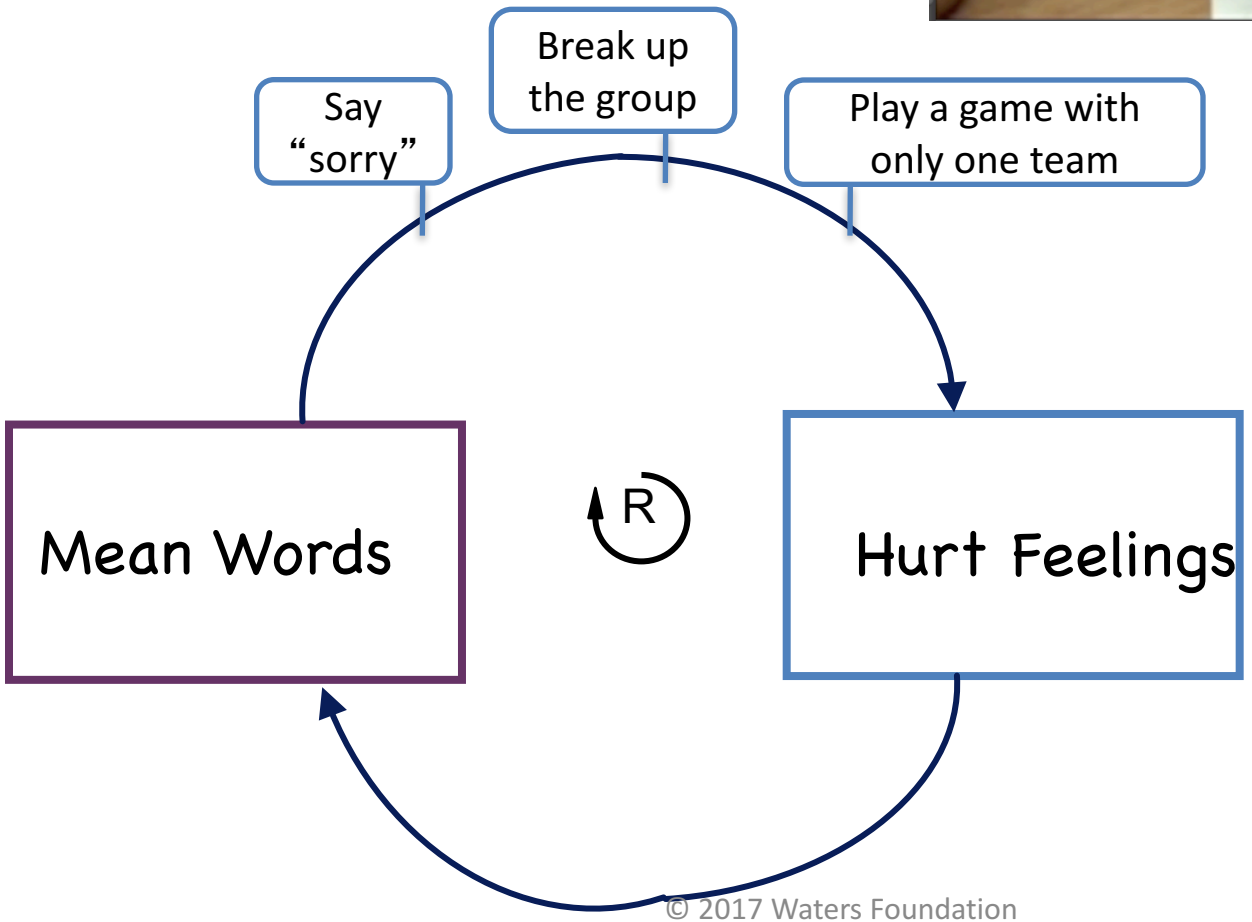
Reinforcing Feedback
Causal Loop Diagram

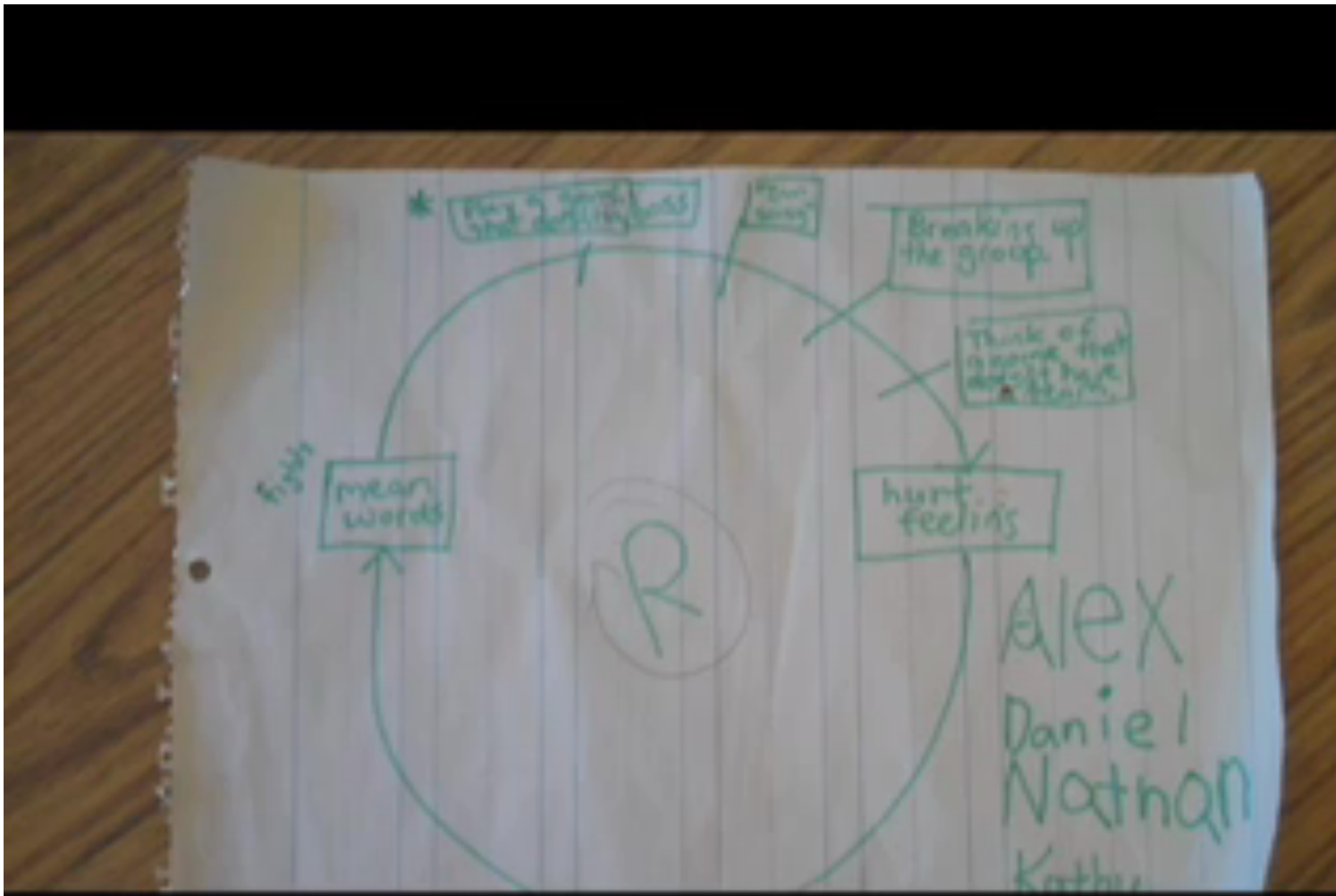




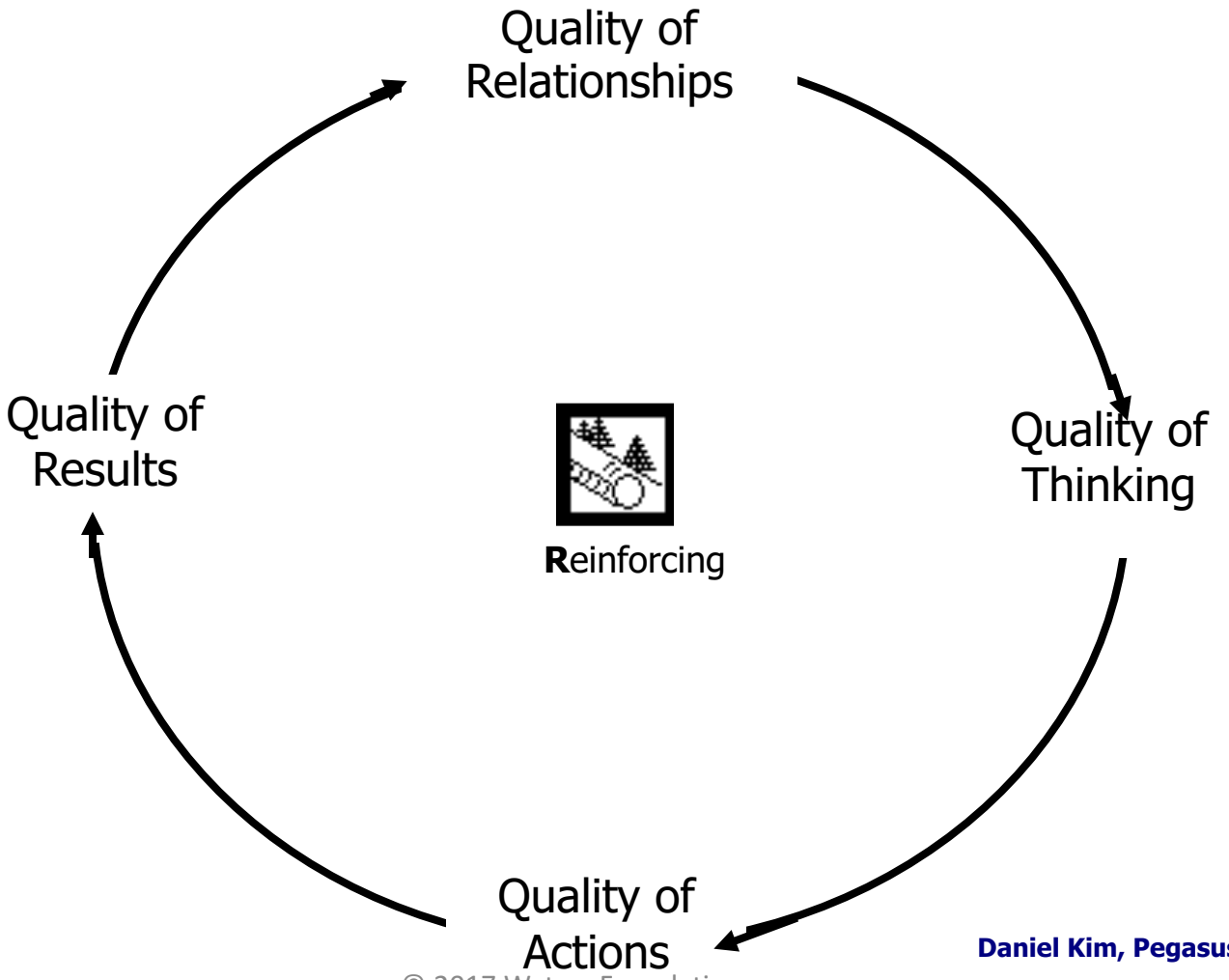
First Grade

Problem-solving





Core Theory of Success



Daniel Kim, Pegasus Communications

Finding and feeling the balance

Steadiness

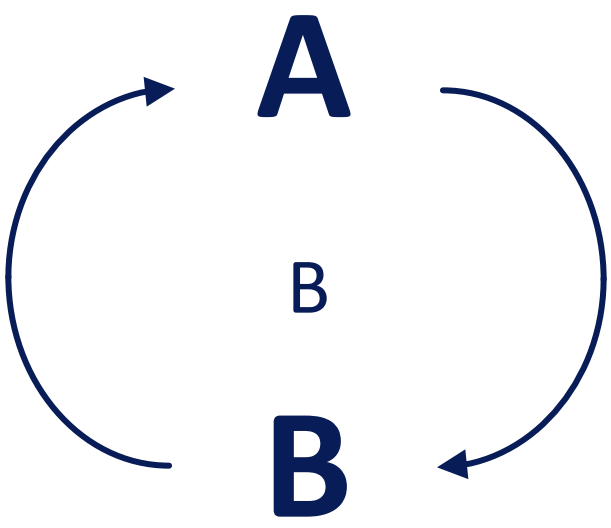
Homeostasis

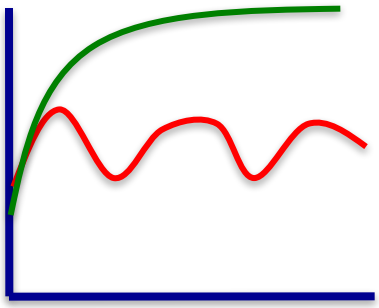
Stability

Sustainability

Equilibrium

Balancing Feedback

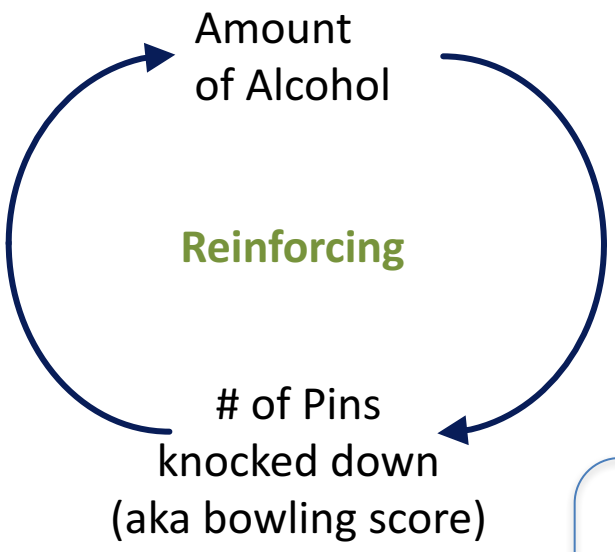




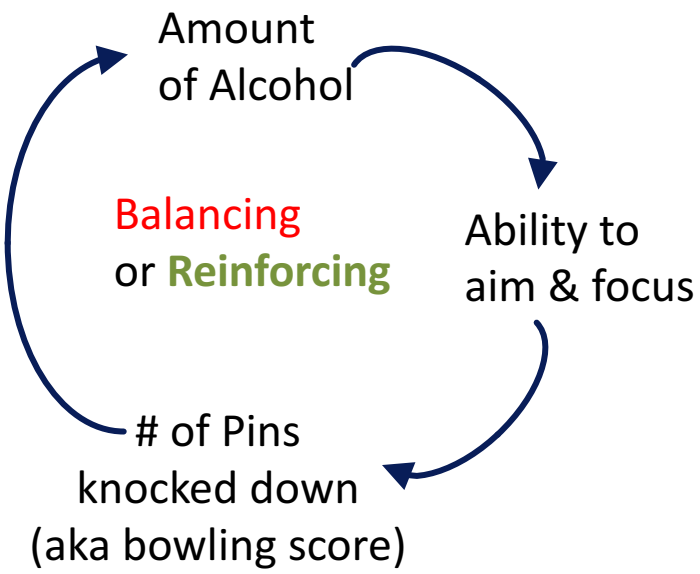
- “We are experiencing some subtle ups and downs.”
- “I can sense that things are beginning to settle down.”
- “We seem to be achieving balance and stability.”
- “Our system is close to reaching our goals.”

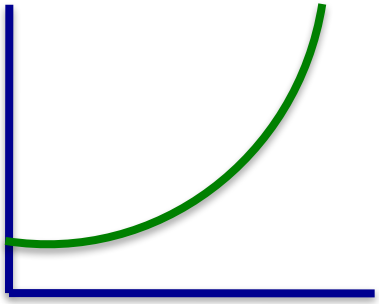
Balancing Feedback

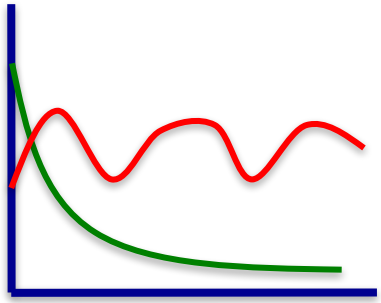
- Creates an equalizing or oscillating effect
- Examples of balancing feedback:
  - Room temperature: "When the thermostat is working, the room temperature tends to be constant when it is hot outside."
  - Exercise: "When I play basketball, my cardiovascular system and muscles are working very hard. I appreciate timeouts that give me short rest, and then I am able to get back in the game and play hard again."
  - Supply and demand: "When fewer items are available, the price can be high, but when many are available, they tend to go on sale."
  - Television volume: "Sometimes I have to turn the volume down during commercials to keep the volume at a constant level."



Nothing
In this world
can grow
forever!







Systems think

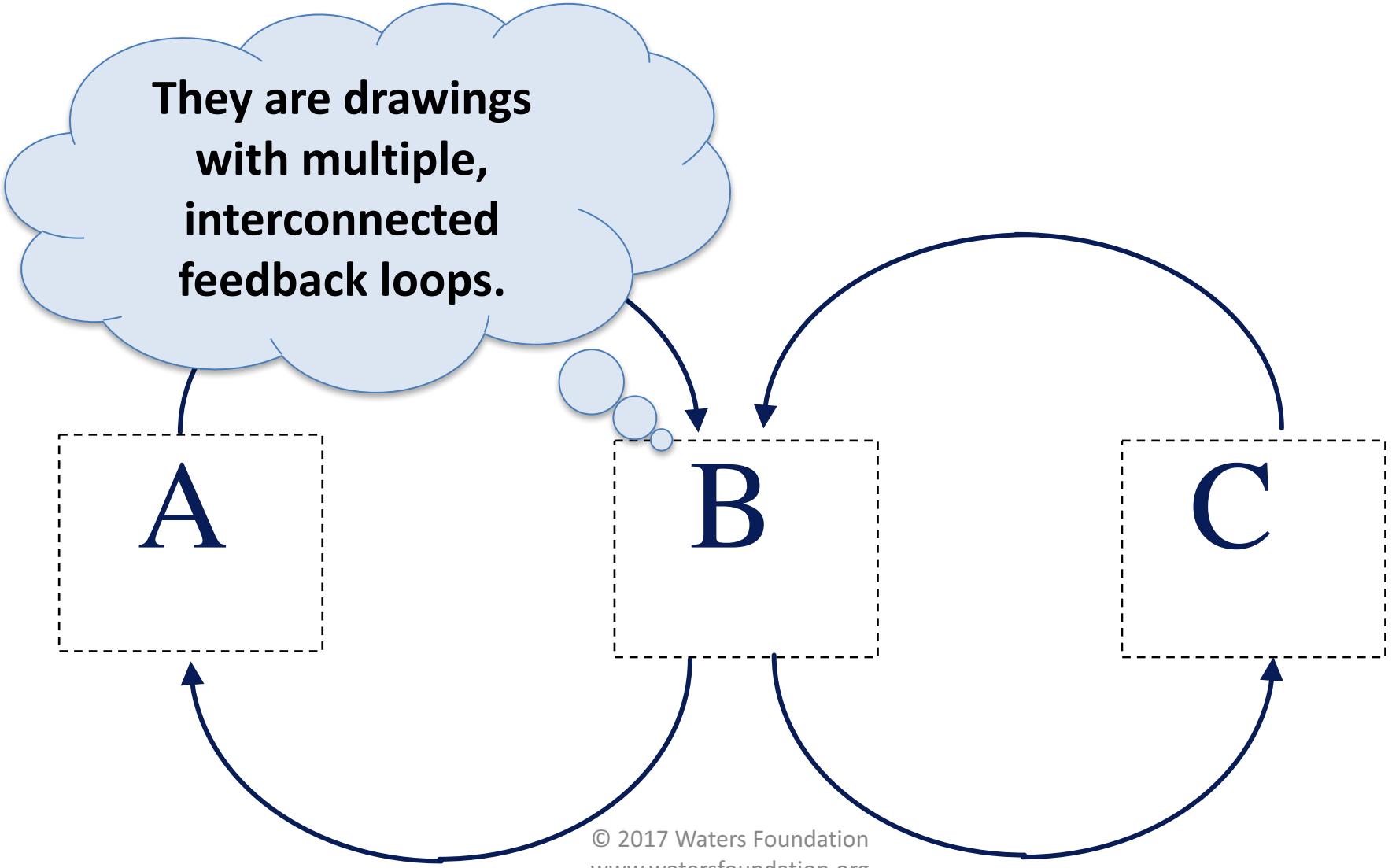
Choose one element in your connection circle.
See if you can use it to create a simple loop.

Is your loop reinforcing or balancing?
Be prepared to tell the story of your loop.

Causal Loop Archetypes

Archetypes capture **“common stories”** that occur repeatedly in diverse settings.

What do they look like?



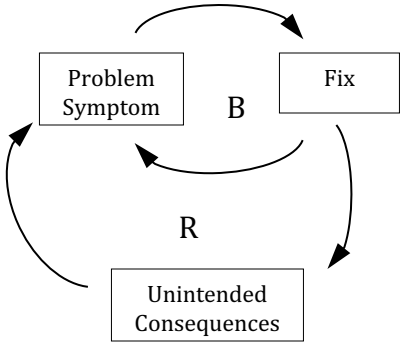
They help you see and understand systems.

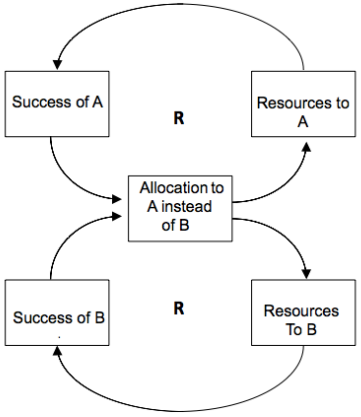
Archetypes are **lenses** or **perspectives** from which to see causal connections that create system behavior.

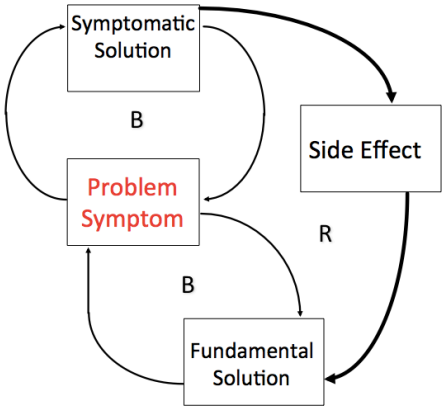
And, they help you anticipate possible problems before they occur.

We will learn and focus on 3.

- **Fixes that Backfire**
- **Shifting the Burden**
- **Success to the Successful**
- Drifting Goals
- Escalation
- Accidental Adversaries
- Tragedy of the Commons
- Growth and Underinvestment
- Limits to Success
- Revolution
- Story Structure





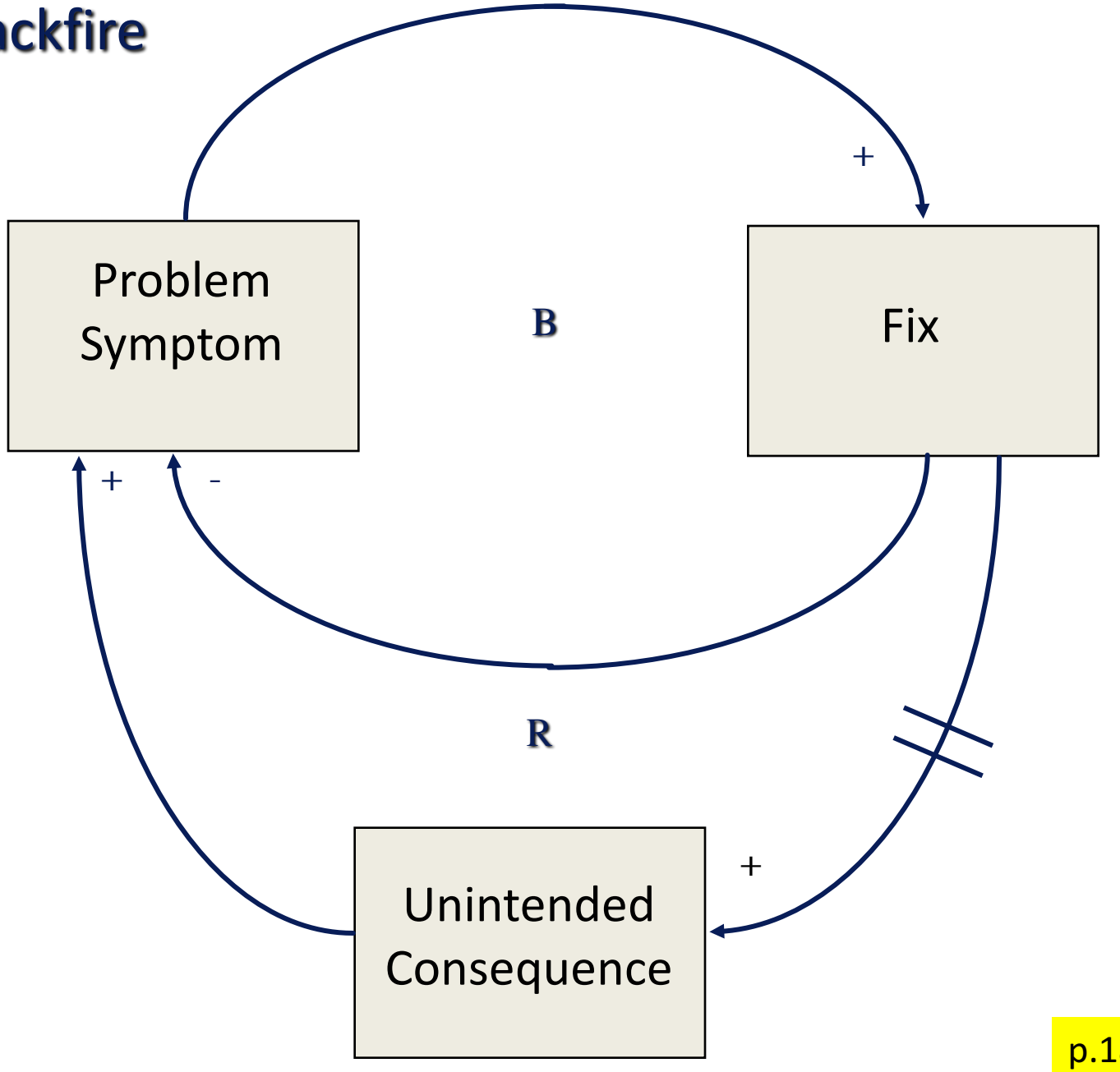


Fixes that Backfire Questions

Has the need to respond quickly to a problem been greater than the importance of investigating potential unintended consequences?

Did the response help to reduce the problem in the beginning, but overtime, did consequences actually contribute to the original problem?

Fixes that Backfire



Fixes that Backfire - “I Love Lucy”

+

Keeping up with the packaging line

B

Eat and hide chocolate

+

-

R

Supervisor’s belief that workers can go faster

“Speed it up!”

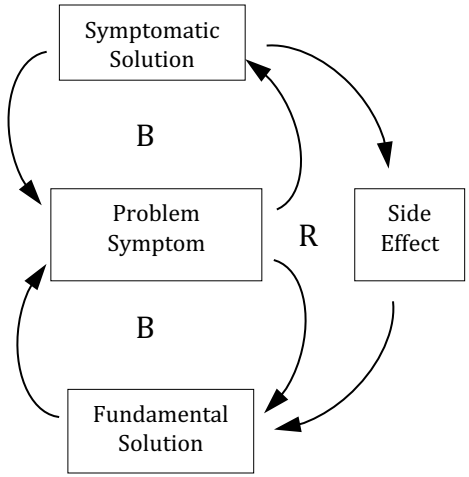
+

Second archetype for today is

- Fixes that Backfire

Shifting the Burden

- Success to the Successful
- Drifting Goals
- Escalation
- Accidental Adversaries
- Tragedy of the Commons
- Growth and Underinvestment
- Limits to Success
- Revolution
- Story Structure



Ever have days like this?

Systems thinking habits and tools can help.

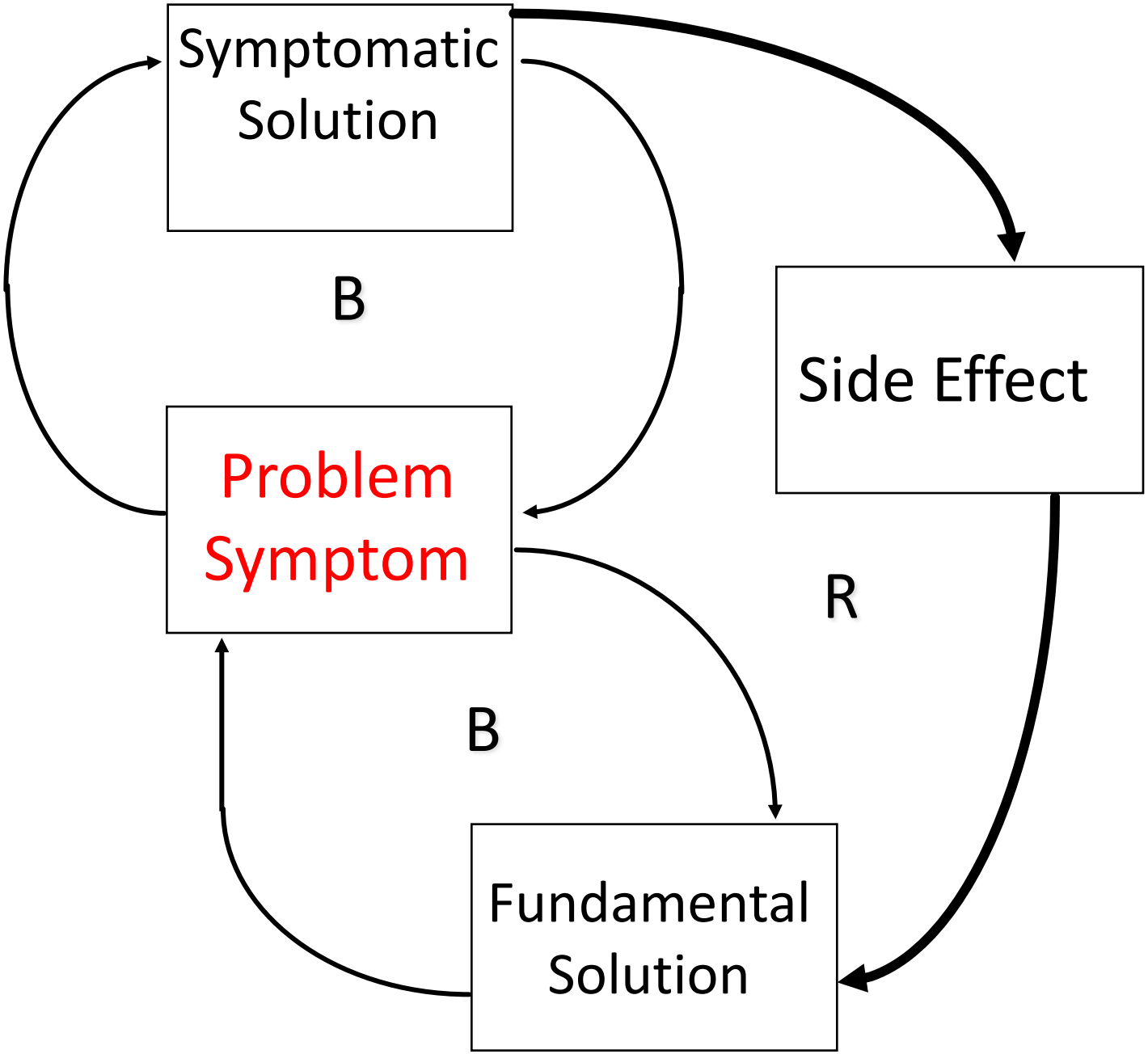
Shifting the Burden Questions

How can we address problems that continually pop up no matter what we do to try and solve them?

What happens when we develop dependencies on short-term, quick-fix solutions to problems?

How can we focus on more long-term fundamental solutions?

Shifting the Burden



Symptomatic Solution: Use of caffeine

B

Problem Symptom: Fatigue

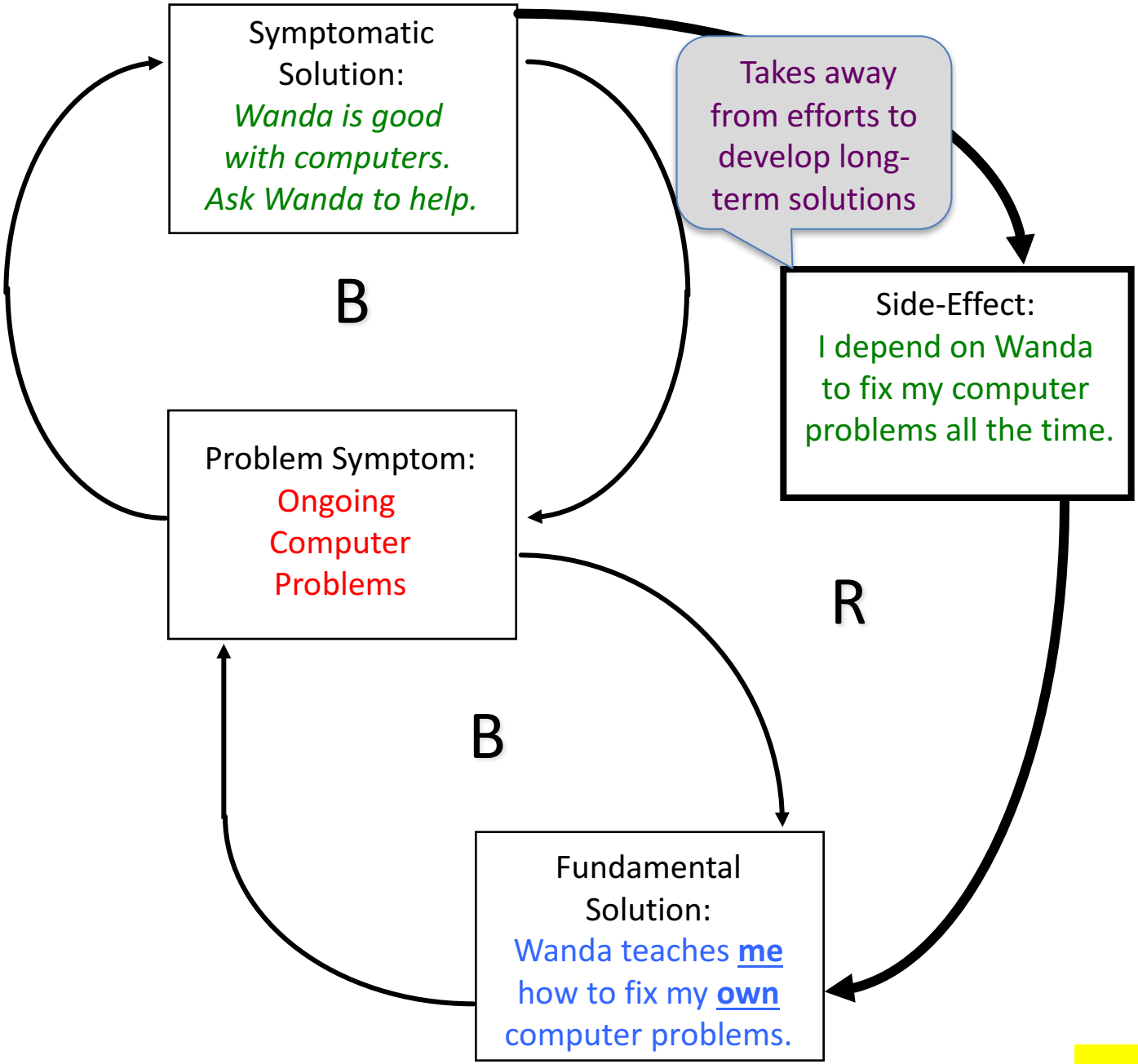
B

Side Effect: Dependency on caffeine

R

Takes away from efforts to develop long-term solutions

Fundamental Solution: Energy-enhancing activities


Symptomatic Solution:
Wanda is good with computers. Ask Wanda to help.
Takes away from efforts to develop long-term solutions
Side-Effect:
I depend on Wanda to fix my computer problems all the time.
B
Problem Symptom:
Ongoing Computer Problems
R
B
Fundamental Solution:
Wanda teaches **me** how to fix my **own** computer problems.

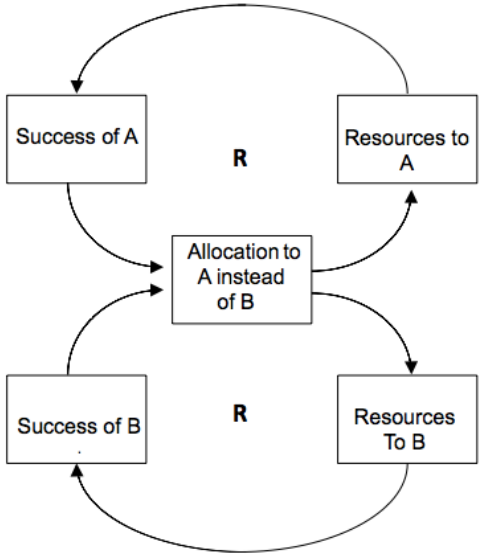
Scrabble Challenge

Third archetype for today is

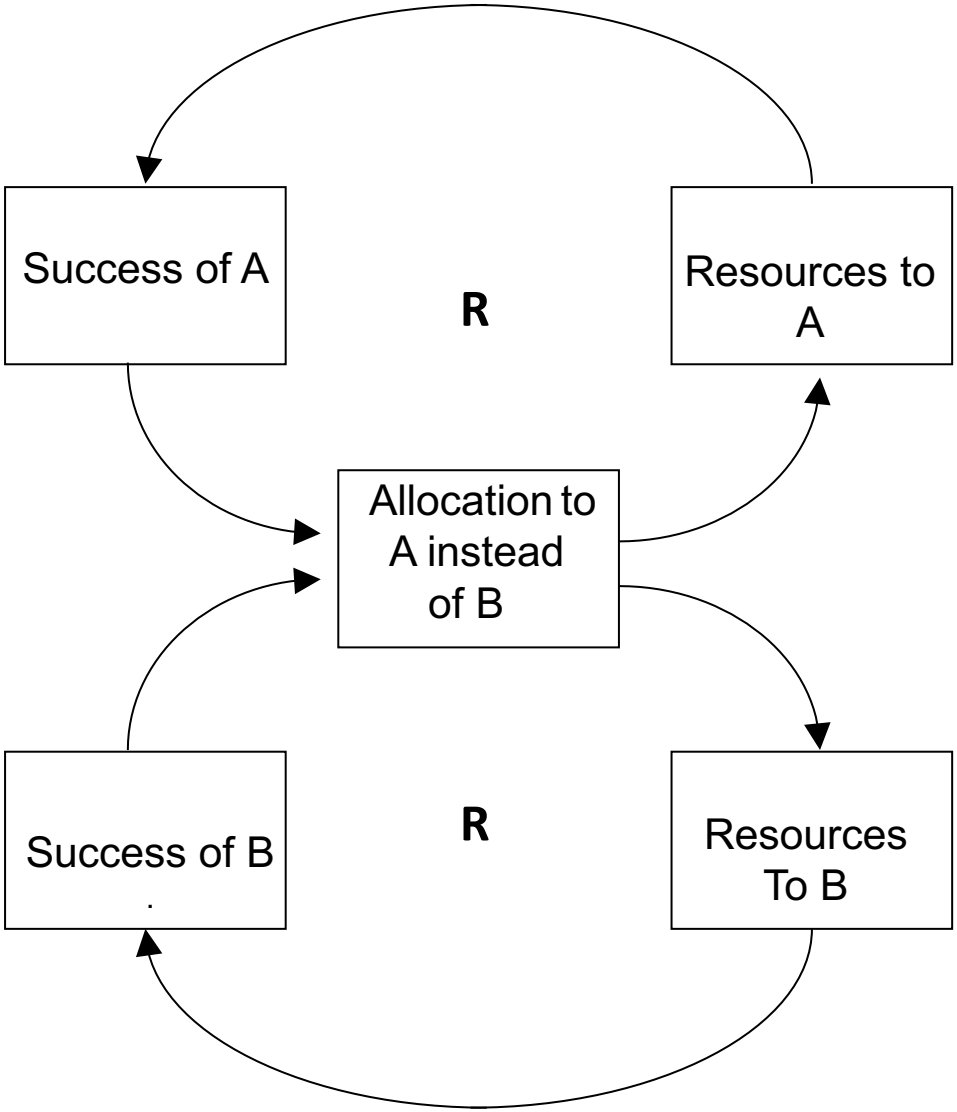
- Fixes that Backfire
- Shifting the Burden

Success to the Successful

- Drifting Goals
- Escalation
- Accidental Adversaries
- Tragedy of the Commons
- Growth and Underinvestment
- Limits to Success
- Revolution
- Story Structure



Success to the Successful



Mental Models

Mental models are deeply ingrained assumptions, generalizations, or even pictures or images that influence how we understand the world and how we take action.

Peter Senge, *The Fifth Discipline,* 1990

Slumber

Pillow

Dream

Night

Bed

Blanket

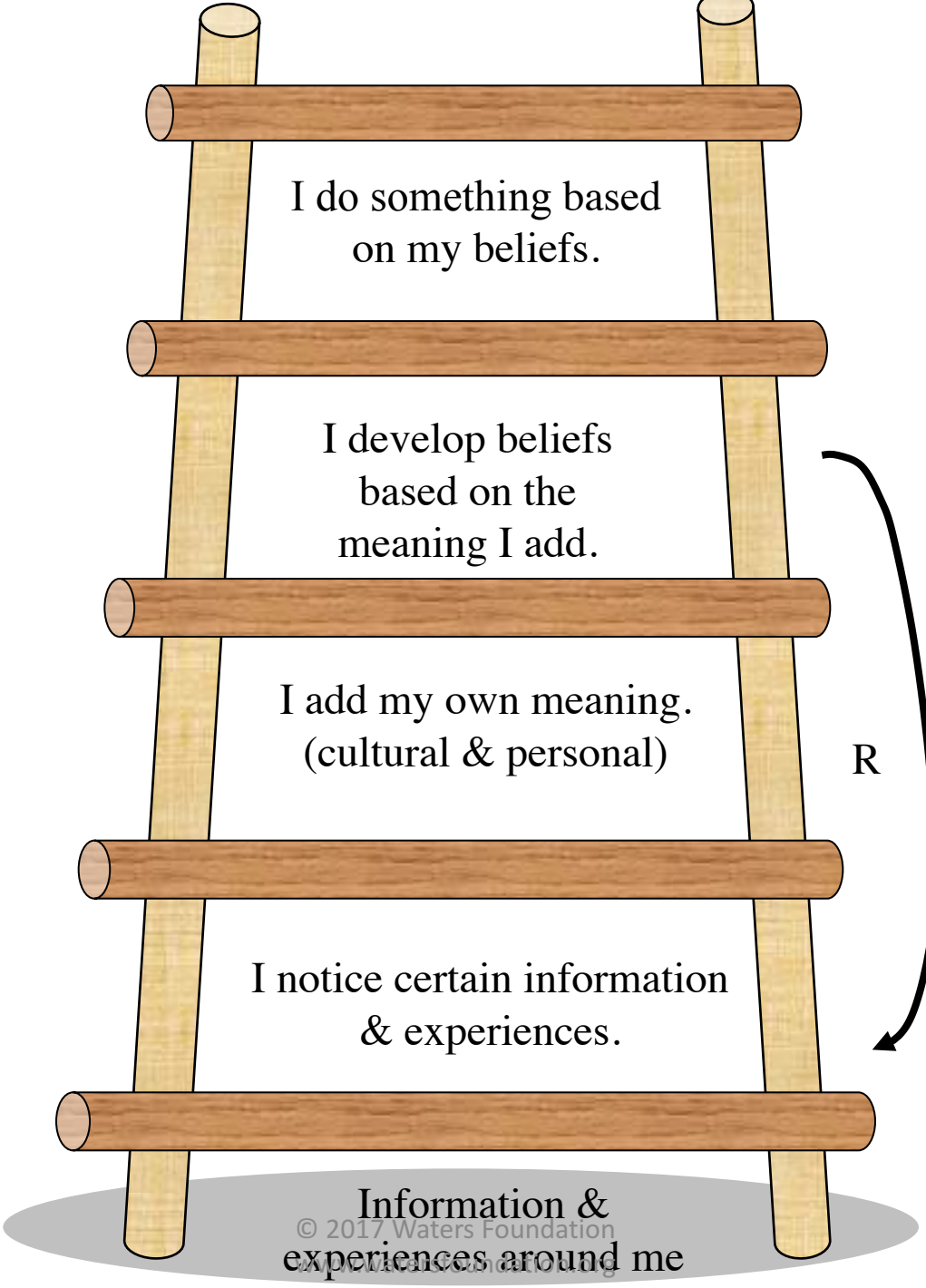
Quiet

Pajamas

Nap

Snooze

Ladder of Inference



My beliefs affect what I choose to notice in the future.

Adapted from *The Fifth Discipline Fieldbook* .
Last modified 5/05

Using the Ladder of Inference

- **Reflection**
  - Try to suspend judgment
  - Become more aware of your own thinking and broaden your observations

Using the Ladder of Inference

- **Reflection**
  - Try to suspend judgment
  - Become more aware of your own thinking and broaden your observations
- **Inquiry**
  - Inquire into other's thinking and reasoning
  - Ask open-ended questions that seek clarification

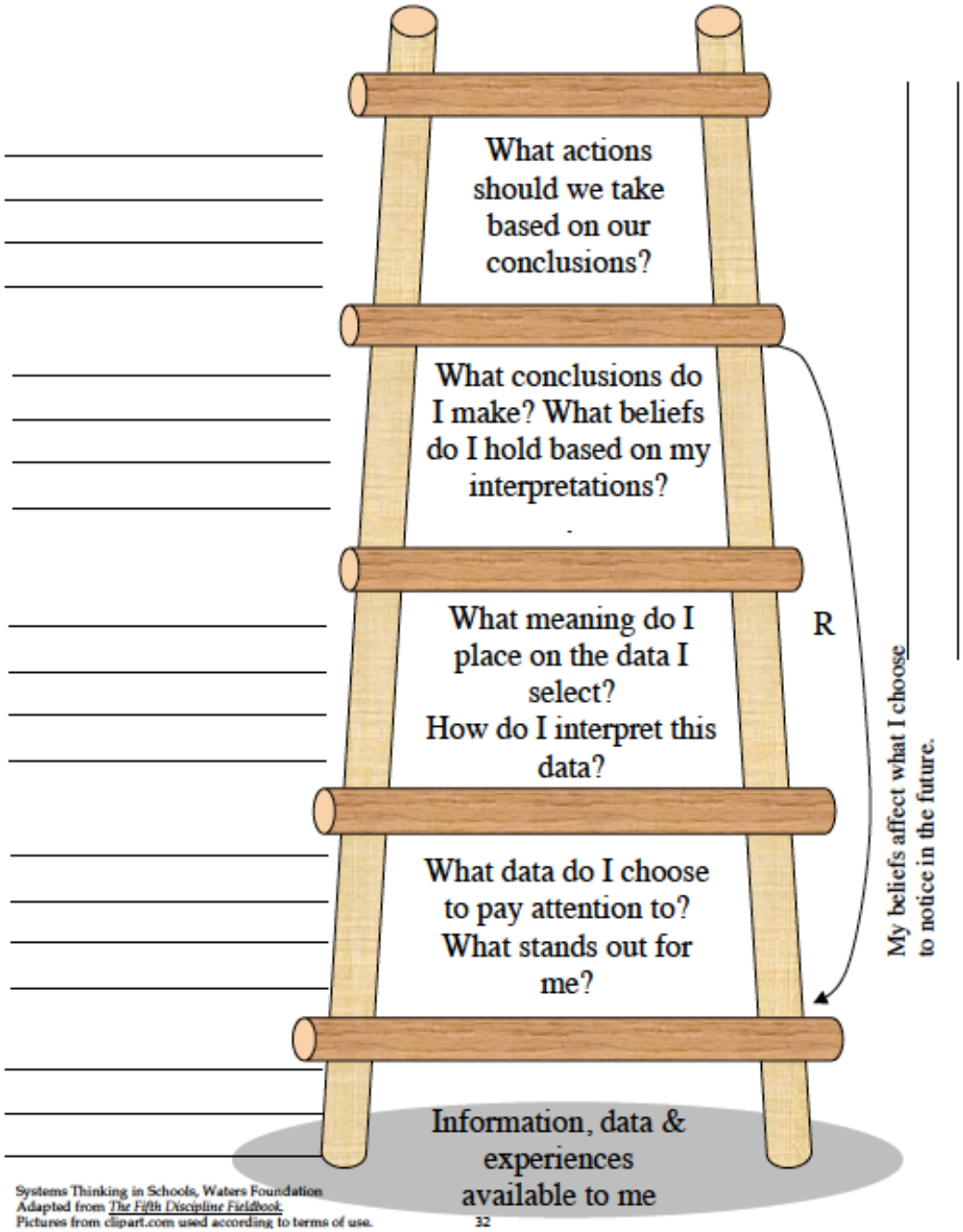
Using the Ladder of Inference

- **Reflection**
  - Try to suspend judgment
  - Become more aware of your own thinking and broaden your observations
- **Inquiry**
  - Inquire into other's thinking and reasoning
  - Ask open-ended questions that seek clarification
- **Advocacy**
  - Make your thinking and reasoning visible to others by describing what influenced your thinking and your actions

Left-Hand Column Exercise

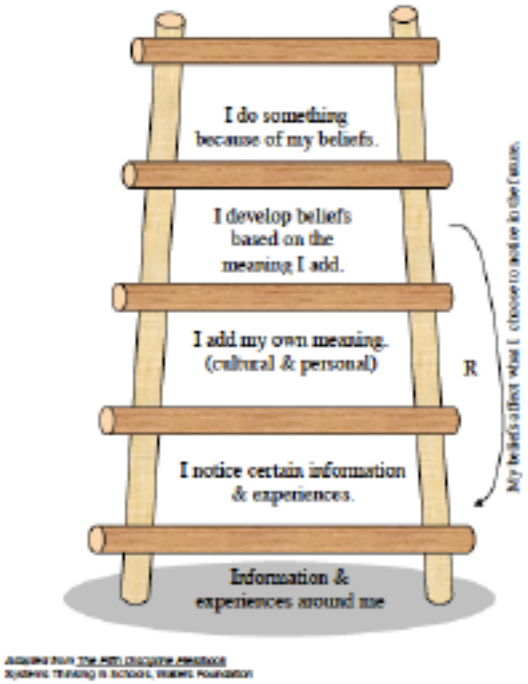
Left: What you were thinking	Right: What was said

Applying the Ladder of Inference to the Interpretation of Data



Systems Thinking in Schools, Waters Foundation
Adapted from *The Fifth Discipline Fieldbook*.
Pictures from clipart.com used according to terms of use.

Ladder of Inference as Tool for Debrief or Reflection



Information & Experiences:

Based on my previous experiences what was I expecting?
What did I notice? What did I pay attention to?
How did my mental models influence what I noticed, heard and saw?
Was I aware of my perceptions / mental models?

Personal & Cultural Perspective:

How did I interpret this experience – what are my assumptions?
What influenced my experience of this event?
Do others share my perceptions?
What questions do I have?

Beliefs:

What do I believe based on my interpretation of my experience?
What information led me to develop my beliefs?
Did my beliefs affect what I noticed?
Have I any of my perceptions or beliefs changed?
What actions will I take?

NOTES:

Iceberg...
Seeing What's Below the Surface

Events

Learning

Patterns of Behavior

Leverage

Structure of the System

Mental Models

What are some of the current mental models you see as you are working On your job-embedded project? Provide quotes or phrases to capture The different points of view you recognize that are at play.

Adapted by Systems Thinking in Schools, Waters Foundation, www.watersfoundation.org, from Innovation Associates, Inc.

Systems think

What role do mental models play as you work on your job-embedded project?

What are some **mental models** you may be holding (about the system, about others) that may be **barriers to achieving your desired outcomes**?

Iceberg Sharing Protocol

Peer Coaching: Adapted Tuning Protocol

Choose who will be the first presenter (each fellow will take a turn being the presenter and when not presenting, will serve as a peer coach).

5 minutes	One fellow shares his/her Iceberg by describing each level of analysis: events, patterns and trends, structure and mental models. The levels can be described in any order, and the presentation will include the learning and leverage actions.
3 minutes	The peer coach(es) pose questions of clarification with the presenting fellow responding to those questions.
3 minutes	The peer coach(es) provide feedback "I really like..." "I wonder if..." "Have you considered..." Other
4 minutes	General discussion as to how the clarifying questions and feedback will help increase learning and identify leverage actions related to the job-embedded project
Switch Roles and Repeat Process	

Notes:

Rubric for the Iceberg Visual

	System Boundaries	Patterns & Trends	System Structure	Perspectives/ Mental Models	Leverage Actions	Explanation
4	Defines a clear focus for the iceberg and articulates relevant system boundaries.	Selects most significant patterns and trends and creates BOTGs that offer an accurate representation of those trends. BOTGs include both actual and perceptual data, as appropriate.	Presents an in-depth understanding of the structure of a system.	Reflects a wide diversity of perspectives and mental models relevant to the issue.	Identifies key leverage points and cites compelling evidence for each	Explanation of the iceberg includes a set of well- articulated learnings or insights that reflect thoughtful analysis of, are congruent with, and are strongly supported by information in the iceberg diagram.
3	Defines a focus and articulates a reasonable set of system boundaries.	Selects relevant patterns and trends and creates BOTGs that offer an accurate representation of those trends. BOTGs include both actual and perceptual data, as appropriate.	Presents a basic understanding of the structure of a system, identifying interdependencies.	Reflects multiple perspectives and mental models relevant to the issue.	Identifies one or more key leverage points and cites evidence for each.	Explanation of the iceberg includes a set of learnings or insights that are congruent with and supported by information in the iceberg diagram.
2	Attempts to define a focus of the system.	Selects patterns and trends and creates BOTGs that are related to the system. BOTGs may be poorly constructed or contain clear errors.	Presents a limited understanding of the structure of a system with little or no reference to interdependencies.	Reflects limited perspectives and mental models relevant to the issue.	Identifies a leverage point but fails to offer support as to the reasoning behind its selection.	Explanation of the iceberg is tangentially related to the information in the diagram.
1	Fails to define or describe the system to be analyzed	Creates BOTGs that are unrelated to the system, inaccurate or fails to create graphs at all.	Presents little understanding of the structure of a system.	Presents no mental models or ones that are unrelated to the issue.	Identifies no leverage points or ones that are not germane or supported.	Explanation of the iceberg is unclear or inadequate.

What did you learn from your iceberg peer coach?

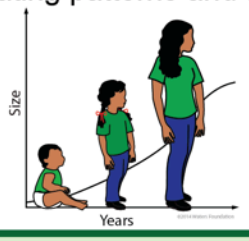
Reflecting on your iceberg, what might you see as leverage actions that you may not have considered before?

Mind Full, or Mindful?

Habits of a Systems Thinker

Seeks to understand the big picture

Observes how elements within systems change over time, generating patterns and trends

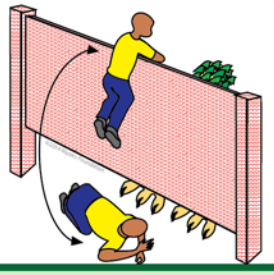


Recognizes that a system's structure generates its behavior

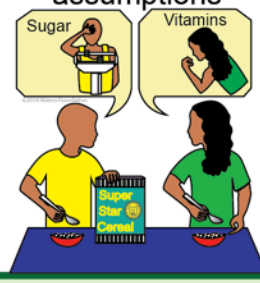
Identifies the circular nature of complex cause and effect relationships

Makes meaningful connections within and between systems

Changes perspectives to increase understanding



Surfaces and tests assumptions



Considers an issue fully and resists the urge to come to a quick conclusion

Considers how mental models affect current reality and the future

Uses understanding of system structure to identify possible leverage actions

Considers short-term, long-term and unintended consequences of actions

Pays attention to accumulations and their rates of change

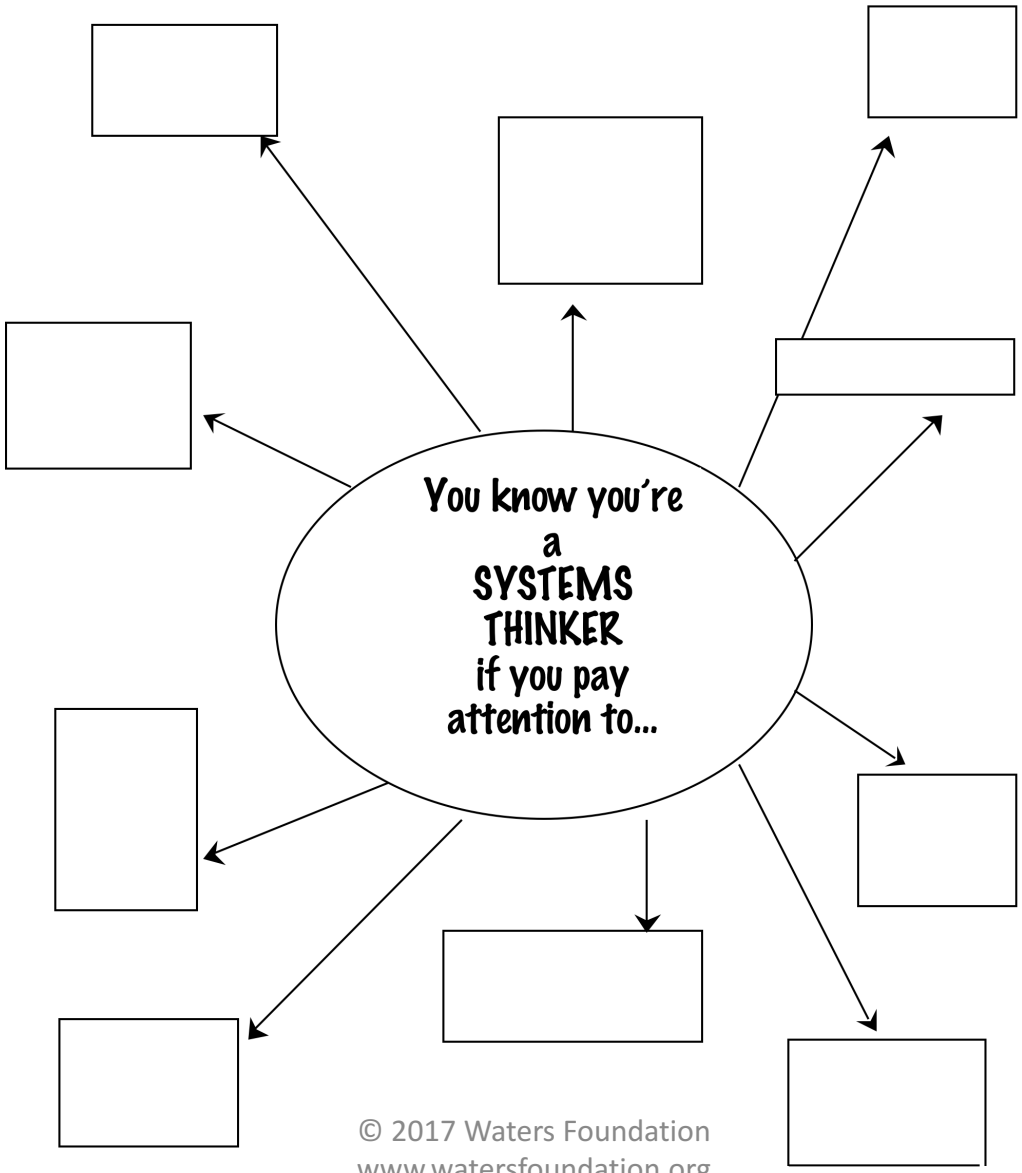
Recognizes the impact of time delays when exploring cause and effect relationships

Checks results and changes actions if needed: "successive approximation"

Systems think

Based on what you have learned and experienced during this 2-day session, how do you plan to practice the Habit of a Systems Thinker that you identified as a growth area during Day 1?

Habits of a Systems Thinker



What approaches, exercises or strategies will you plan on using for our 2-day session to intentionally practice and continue your development as a Systems Thinker?