

System Stories for Children

Linda Booth Sweeney

As Sir Geoffrey Vickers once said, “System is an old word. The Greeks were using it more than 2,000 years ago to describe `a whole composed of related parts.’” Story-telling, similarly, is the oldest form of systems simulation. Children, in particular, remember what they hear through stories.

But how many children’s stories embody systems principles? Over the past two years, I have been on a journey to answer to that question. I discovered that many stories embody linear event-and-reaction relationships; the characters’ actions never have unexpected changes, and the plot moves forward from beginning to end, as if “setting us up” for linear, non-ecological thinking. But I also found a growing number of stories that embody systems principles and archetypes. These are a few of my favorites.

If You Give a Mouse a Cookie

By Laura Joffe Numeroff, illustrated by Felicia Bond, HarperCollins 1985; picture book, fiction, targeted at ages 3-7.

Systems thinking concepts: Simple interconnectedness, circular feedback, unintended consequences, delays, selecting time horizons, solutions often create new problems.

This is the story of the unforeseen consequences of giving a hungry little mouse a cookie. Seem innocent enough? But the next thing you know, the energetic mouse will want a glass of milk. Then he’ll want to look in a mirror to make sure he doesn’t have

a milk moustache. Then he'll ask for a pair of scissors to give himself a trim, and a broom to sweep up. The mouse mischief tumbles on like dominoes throughout this adorable book, ending where it started, with the mouse requesting yet another cookie.

In real life, people tend to exclude side effects, feedback processes, and delays when making decisions. We all need practice. This is a good story to help older kids (ages 7-10) practice the skill of tracing cause and effect relationships to see how an event (giving the mouse a cookie) feeds back on itself. Ask them to consider and visually depict:

- What other types of chain of events situations can they think of that eventually feed back on itself?
- What are the possible unintended consequences of some everyday actions? (For instance, suppose city planners add an extra traffic lane to a crowded highway. Would this produce less traffic or more traffic?)

Other books by Numeroff which reinforce the notion of circular causality: [If You Give a Moose a Muffin](#), Laura Joffe Numeroff, Felicia Bond (Illustrator); [If You Give a Pig a Pancake](#); Laura Joffe Numeroff, et al; and [If you give a Bunny a Birthday Cake](#).

The Sneetches and Other Stories

By Dr. Seuss, Random House 1961; picture book, fiction, targeted at ages 4-8, but compelling to children of all ages.

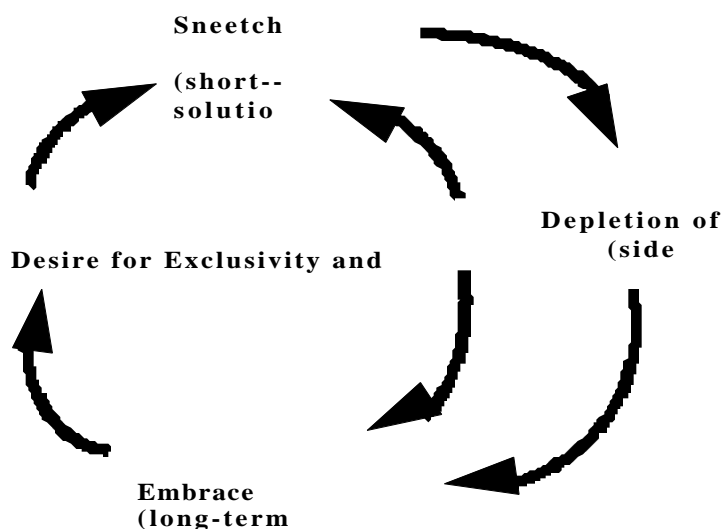
Systems thinking concepts: Simple interconnectedness, balancing feedback loops, systems cycles, oscillations, "unintended consequences," the way that structure drives behavior, shifting the burden.

In this gem from Dr. Seuss, we see how prejudice and the drive for exclusivity result in wasted energy and depleted resources. Star-Belly Sneetches are fuzzy green

animals with neon green stars in the middle of their stomachs. Plain-Belly Sneetches have no star. Just as bell-bottoms, mini-skirts, Izod shirts, and Tommy Hilfigger have (at various times) made students feel superior, so the small, green star allows some Sneetches to brag, “We’re the best kind of Sneetch on the beaches.” Eventually, an enterprising imp cashes in; for a pretty penny, he adds stars to the Plain-Belly Sneetches with his peculiar machine. Suddenly green stars are everywhere; to remain distinctive, the Star-Belly Sneetches go through the imp’s “Star-Off Machine.” The cycle continues until every last cent of their money is spent. Finally, outwitting the imp, the Sneetches learn to accept their differences and themselves.

The Sneetches, in short, are “shifting the burden” from a fundamental but difficult solution (learning to accept and embrace their differences) to an easier but devastatingly expensive “quick fix” (tattooing themselves with stars). See Figure 1 below:

Figure 1: Shifting the Burden



In addition, there is a reinforcing process created by the “side effects” of the quick fix – the accelerating depletion of all the Sneetches’ resources.

In real life, when this happens, the side effects often make it even more difficult to implement the fundamental solution.

Some questions to consider:

- What other consequences or side effects might occur that would make it more difficult (or easier) for the Sneetches to see what’s going on?
- If you were going to visit the Sneetches, in the middle of their troubles, would you try to break the cycle? How would you do it?

Anno’s Magic Seeds

By Mitsumasa Anno, Philomel, 1992; picture book, fiction, targeted at ages 5-8.

Systems thinking concepts: Exponential growth, delays, boom and bust cycles, limits to growth

In this folk tale, a magic wizard gives a farmer named Jack two mysterious golden seeds. He instructs Jack to eat one, which will sustain him for a full year, and to plant the other. Jack obeys, and the plant grows bearing two seeds. The following year, Jack plants both seeds – and the plant bears four. He eats one seed and plants the other three – and reaps six the following year. As the years go by, he continues to plant all but one seed, and his crop of seeds doubles annually. He marries, raises a family, plants many crops, endures a flood, and saves enough seeds to feed his family and start planting again.

On one hand, this is a story about exponential growth – where the doubling time is constant. As system dynamics professor John Sterman of MIT explains, “It takes the

same length of time to grow from one unit to two as it does to grow from one million to two million.” But nothing grows forever, and the story also shows the process of boom and bust; inevitably, some kind of limit (such as a flood) will cut off growth and even cause a near collapse.

Some questions to consider:

- What would have happened to Jack if he had followed the wizard’s instructions, and planted only one seed?
- What would have happened if the flood had never come? How long would it have been before the world was overrun with seeds?
- Where else do you see this type of explosive growth?

Who Speaks for Wolf?

(A Native American learning story), by Paula Underwood, illustrations by Frank Howell, A Tribe of Two Press, San Anselmo, CA.

Systems thinking concepts: Simple interconnectedness, consideration of unintended, long-term consequences, effect of rational behavior on macro results, multiple cause and effects, thinking about the whole as well as the parts.

This story powerfully conveys several principles of systems thinking: the need to ask questions regarding the unintended consequences of actions, viewing diversity of the natural and social world as a source of learning, the power of dialogue to help understand complex systems and the importance of looking at both short- and long-term effects.

Who Speaks for Wolf is the story of an eight year old boy who asks his grandfather to explain how their family came to live with the wolves. Told from the grandfather’s

perspective, we hear of the dilemmas and unintended consequences that occur when the tribe moves into wolves community's "Center Place".

This touching tale encourages us to look at a seeming problem from many different perspectives. In another book (Three Strands in the Braid: A Guide for Enablers of Learning), Underwood describes her grandfather's "rule of six:" For every perceivable phenomenon, devise at least six plausible explanations. "There will probably be sixty," her grandfather said, "but if you devise six, this will sensitize you to the complexity of the Universe, the variability of perception. It will prevent you from fixing on the first plausible explanation as `the Truth.'"

Some questions to consider:

What do you think the boy learned from this story of Wolf-Looks-at-Fire?

Why do you think the community did not listen to Wolf's brother?

How might the boy and his community have considered the wolf community in their decision?

Author's note: This is an abridged version of a longer piece I have been working on as part of my studies at the Harvard Graduate School of Education. The longer version will include an analysis, from a systems thinking perspective, of fifteen children's stories. I am in the process of turning this paper into a booklet for parents and educators. If you have comments or other stories you would add, please do get in touch.

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