



Denver Green School

Denver Public Schools

Educating for Sustainability

Our Story!

By Mimi Diaz and Craig Harrer



Outcomes:

Participants will learn about sustainable systems by participating in the Fish Game

Participants will develop an understanding of the Education for Sustainability Standards

Participants will develop and understanding of the DGS model



Mission

In partnership with our diverse urban community, DGS will provide a hands-on, brains-on experience that includes all students, staff, families and community, preparing all learners to lead the way toward a sustainable, bright green future.



Vision

The Denver Green School is a national beacon for real-world learning. We strive to integrate a flexible student-driven approach to curriculum and instruction, where diverse learners of all ages:

Achieve at a high level academically,
Partner with their teachers to engage in relevant, student-directed learning,
Build leadership capacity by embracing a democratic decision-making model,
Use service-learning as a way to become community stewards,
Create mind-body connections as well as community connections,
Use our school building and our neighborhood as laboratories for the study and implementation of carbon footprint reduction and sustainable living.



What is the Denver Green School?

Denver Public School

Performance School

Innovation School

Shared Leadership

Emphasis on Service Learning

Education for Sustainability Standards



Education for Sustainability Standards:

Cultural Preservation and Transformation

Responsible Local/Global Citizenship

The Dynamics of Systems & Change

Sustainable Economics

Healthy Commons

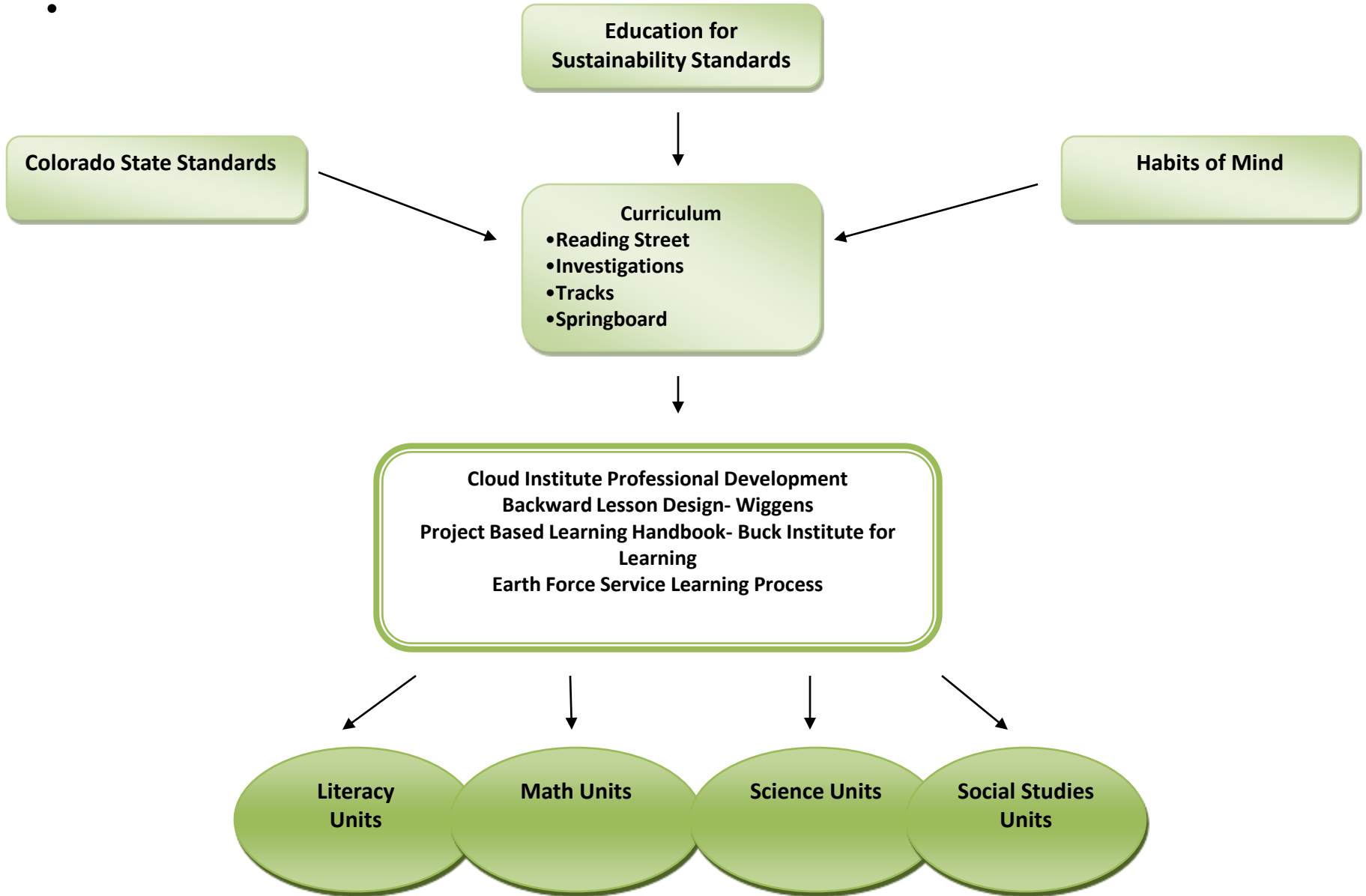
Natural Laws and Ecological Principles

Inventing and Affecting the Future

Multiple Perspectives

A Sense of Place

Denver Green School Educational Design Model



Curriculum Mapping

	Trimester 1												Trimester 2												Trimester 3																			
	Aug				Sept				Oct				Nov				Dec				Jan				Feb				March				April				May							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Literacy																																												
EFS	Sense of Place, Responsible Local/Global Citizenship Dynamics of System and Change, Multiple Perspectives Commons, Sense of Place Multiple Perspectives												Dynamics of Systems and Change, Sense of Place Natural Laws, Dynamics of Systems and Change												Responsible Local/Global Citizenship Cultural Preservation and Transformation Sense of Place, Cultural Preservation and Transformation Commons, Multiple Perspectives																			
Colorado Standards	1. Oral Expression and Listening 2. Reading for All Purposes 1. Writing and Composition 2. Research and Reasoning												1. Oral Expression and Listening 2. Reading for All Purposes 1. Writing and Composition 2. Research and Reasoning												1. Oral Expression and Listening 2. Reading for All Purposes 1. Writing and Composition 2. Research and Reasoning																			
Units	Exploration Working Together Personal Narrative Expository Writing Stories												Creative Ideas Our Changing World Biographies How To Test Taking Personal Narrative												Responsibility Traditions Poetry Letters Expository Stories																			
Essential Questions	What can we learn from exploring our environment? How does exploration help us find answers? How can we benefit from working together? How can I use my writing to describe myself? How can I convince someone with my writing? What are the characteristics of a story?												How can we communicate our creativity? How do we creatively collaborate? How do things change? What causes things to change? How do you research and reason the contributions of an important person? How can you use writing to convey a procedure to someone? What type of writing is specific to tests? How can I use my writing to describe myself?												How can we be responsible community members? How are traditions and celebrations important to our community? What is the structure of a poem? What is the format and purpose of a letter? How can I use writing to record and analyze community history? How can I record my experiences in writing? How do I structure a story?																			

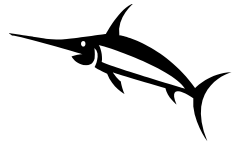


Inspiring young people to think about the
world,
their relationship to it,
and their ability to influence it
in an entirely new way.

Jaimie P. Cloud
President

www.cloudinstitute.org

Fish Game Guide



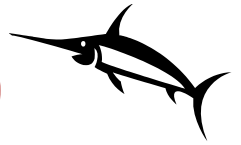
We are going to run a swordfish fishing industry! Each person in the group will be fishing for swordfish in the same ocean. Assign the envelope to a banker (“nature”) in the group of players. The banker will put 20 fish in the middle of the table. The fish can be found in the envelope. Twenty fish is this ocean’s *carrying capacity* for swordfish.

In each round, each person can fish for a certain number of swordfish. Traditionally, people fish for swordfish in the three following ways:

- 1) Harpoon fishing: take one fish
- 2) Long-line fishing: take two fish
- 3) Free-for-all long-line fishing: take three fish

Each turn, each person can take up to three fish, depending on the instructions for that game.

Fish Instructions (cont'd)



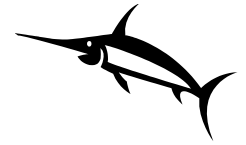
After each round when all players have taken their fish, the banker (“nature”) will count the number of swordfish left and add 25% to the pot, up to, but not exceeding, 20 fish (round up if you need to).

Example: If there are 12 fish left, 3 fish (25% of 12) will be added to the pot, bringing the total up to 15. (In real life, swordfish produce far fewer than 25% new offspring each year — they are like humans in that they have few children over the course of their lifetimes.)

The added fish represent the number of baby swordfish made by the swordfish that were left after everyone has taken their fish (the ones that were left in the ocean to reproduce).

The object of each game: To have as many fish as possible after playing all 10 rounds.

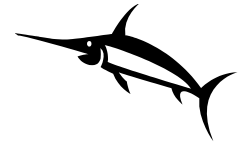
Fish Game Instructions



We will play the game four times, each a different way:

- Game 1:** Everyone chooses a fishing technique at the beginning of the game and sticks with it until the end of the game
- Game 2:** Everyone chooses a fishing technique, but can change technique each turn during the game
- Game 3:** Everyone is a harpoon fisher, and can take no more than one fish each round
- Game 4:** Everyone can choose any fishing technique and can change that technique each turn. At the end of each round, add 10% instead of 25%. (You still can't exceed the carrying capacity of 20 fish.)

Fish Game

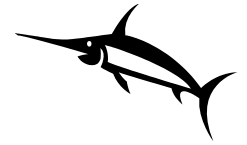


Game Recorder

Round	Consumption (# Fish You Took)	Accumulation (Total # Fish You Have)	Fish Stock (# Fish in the Ocean <u>After Restocking</u>)	
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

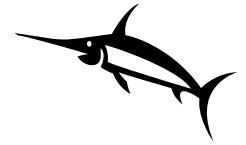
What were you thinking?

**Thinking Drives Behavior
and
Behavior Causes Results**



How Many of You

**Made it through all 10 rounds
in every game you played?**



What happened?

If your group ran out of fish before you were able to play 10 rounds, then the number of Fisher folk fishing the way you did resulted in more fish taken from the ocean faster than the ocean was able to replenish them.

We call that unsustainable.

We wouldn't need Education for Sustainability if there was no such thing as un-sustainable

What were you thinking?



Now that you know that
something you did
or didn't do
contributed to “crashing the system.”

Why did you do it?

Mental Models

React

Events

Respond

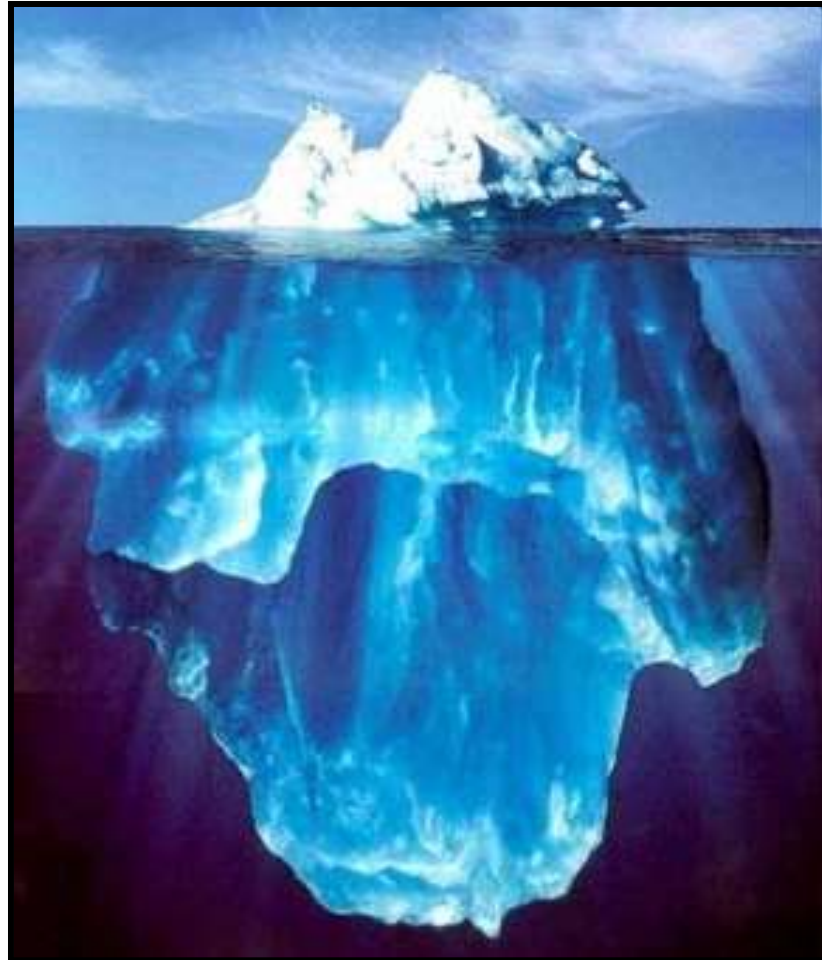
Trends/Patterns

Design

**Structures/
Behaviors**

Transform

**Mental Models/
Worldview**



The Titanic

A classic mental model



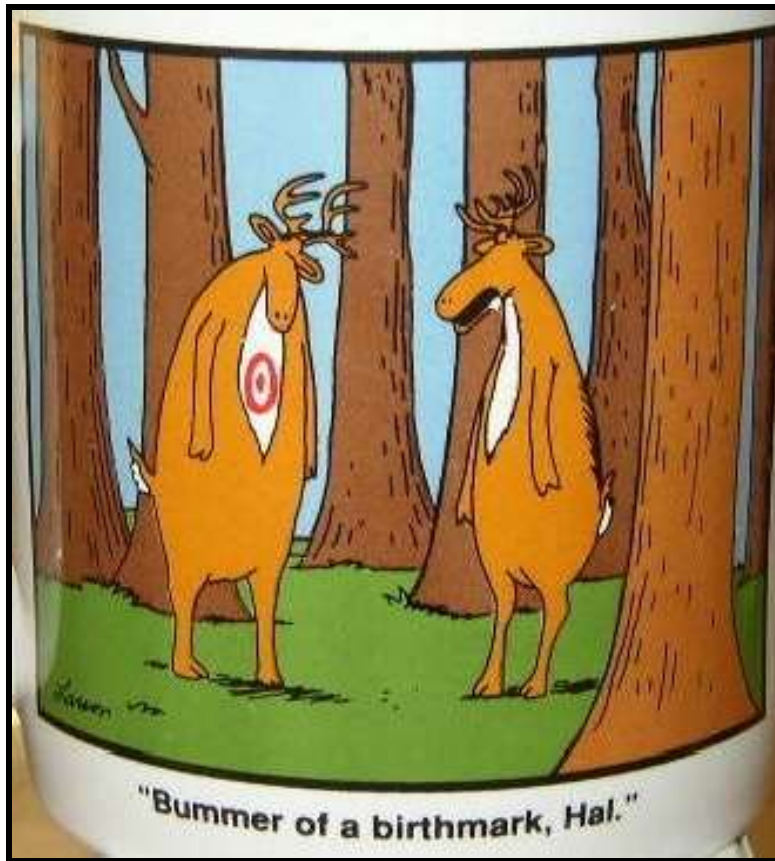
There isn't enough
to go around.

(Assumption of
Scarcity)

We're going down,
SO...

The Bummer

A classic mental model



Things are the
way they
are and there is
nothing
I/we can do
about it.

Social Trap

A classic mental model



If others do it, I may
as well.....

If no one else does it,
why should I?

What is true if one
person does it
is not true if everyone
does it.

Maximizing Gains for Self

A classic mental model



The invisible hand leads all individuals, **in pursuit of their own self-interests**, to produce the greatest benefit for society as a whole (and vice versa)

-Idea presented by Adam Smith 1776

Theory of Confidence

A Classic Mental Model

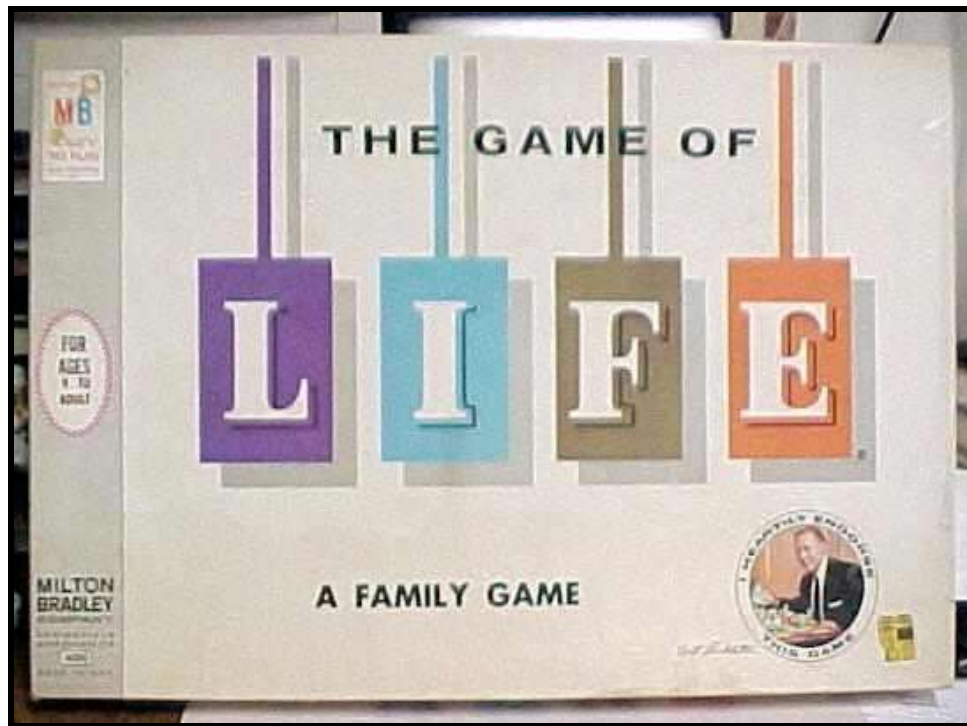


The market,
technology or
someone/something
will take care of it

It's Just a Game

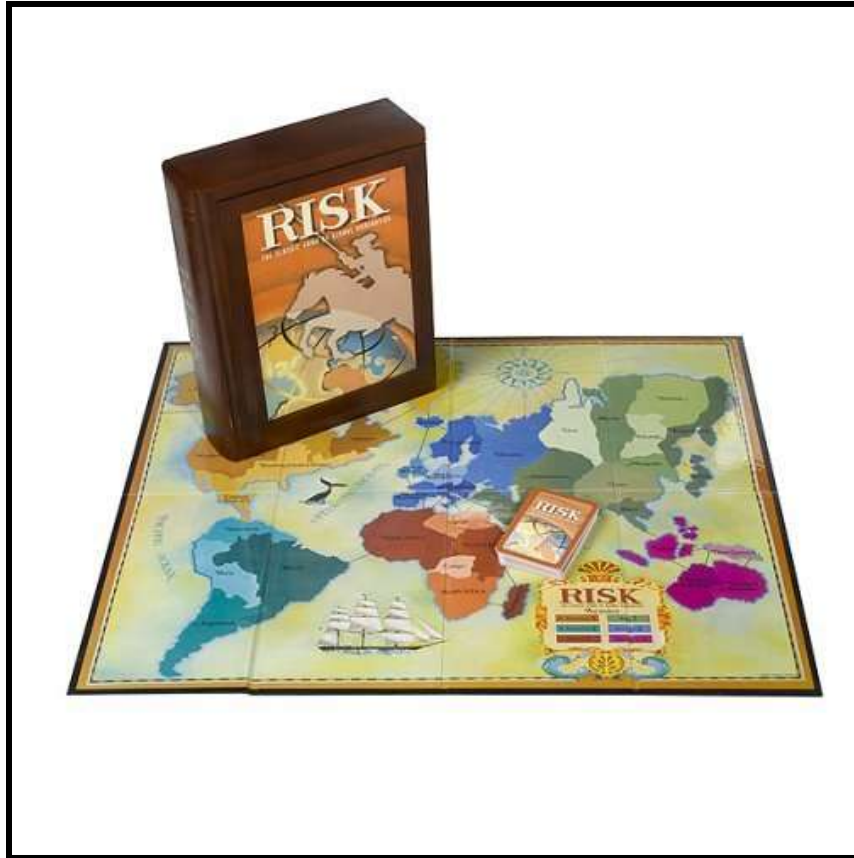
A Classic Mental Model

Let's play
and see
what happens



I play to win

A Classic Mental Model



Zero Sum Game

VS

Non-Zero Sum Game

In order for anyone to win
everyone has to win because
the players are
interdependent upon one
another

<http://www.youtube.com/watch?v=l0ywiYboCLk>

Greed

A Classic Mental Model



I want a lot and
I don't care about
the consequences

Characteristics of Mental Models

- Incomplete and Constantly Changing
- Not accurate
- Uncertainty about their validity *does not* prevent them from being used even if incorrect.

What's behind what people say

- I'm anthropocentric
- Resources are unlimited and everything is substitutable
- We are in Control

- I wasn't thinking at all

Characteristics of Mental Models

- Incomplete and Constantly Changing
- Not accurate
- Uncertainty about their validity *does not* prevent them from being used even if incorrect.

How Do They Affect Us and the World Around Us?

Everything is internally consistent
within the frame we are operating.

(Senge)



The Result of these Classic Mental Models

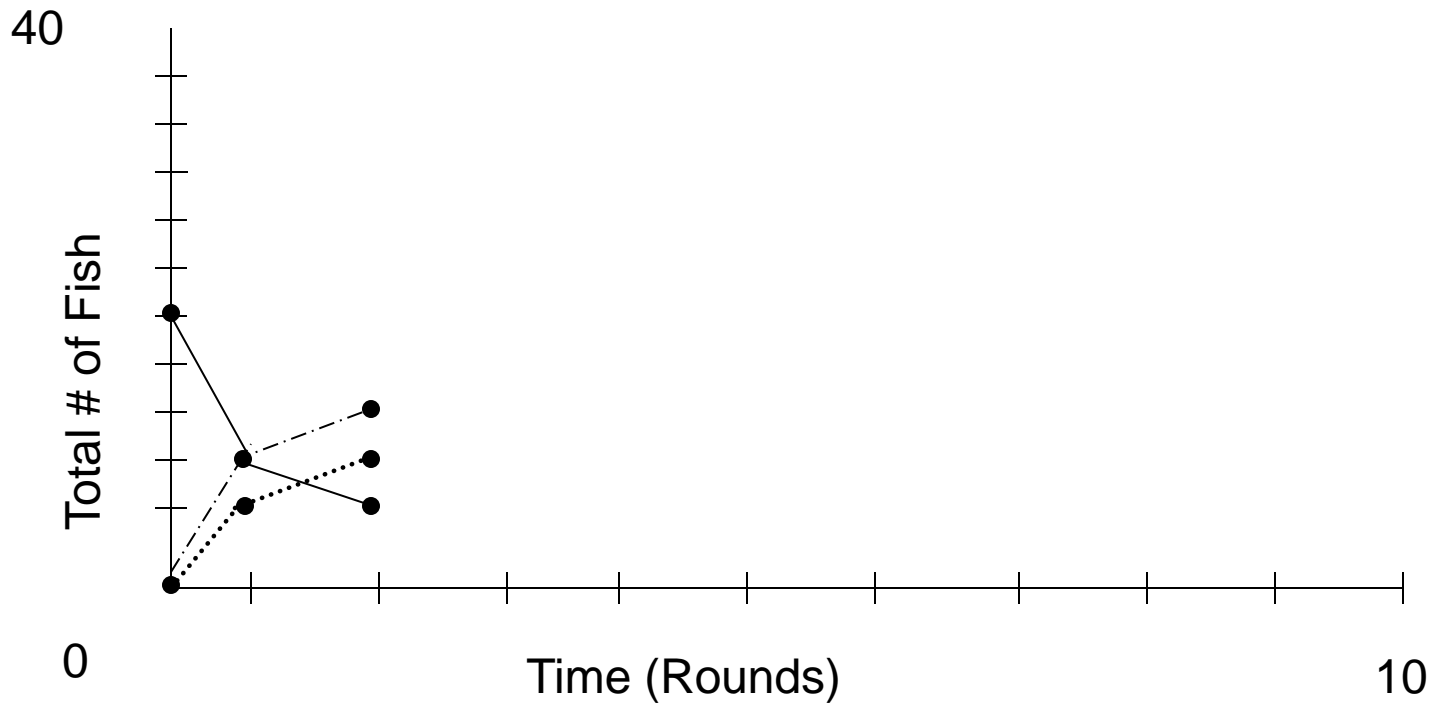
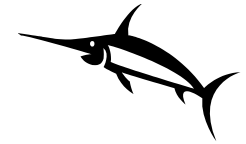


- We often operate without the information we need
- We ignore/can't see the feedback (believing is seeing)

If we cannot hear or see feedback-we cannot perceive relevant data for our brains to filter

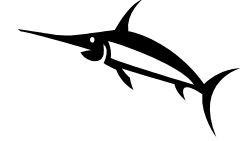
- We exhibit characteristics of insanity
- Our “fixes” backfire on us or we shift the burden

Behavior Over Time

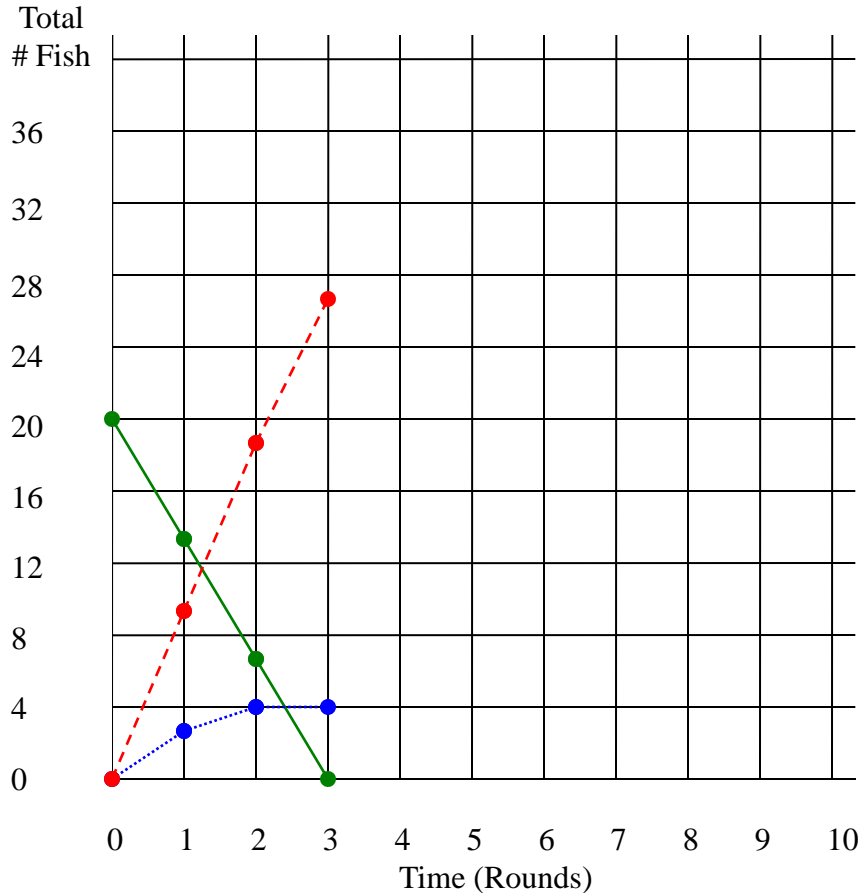


..... Individ Accumulation —— Fish Stock -.-.-.-.- Group Accumulation

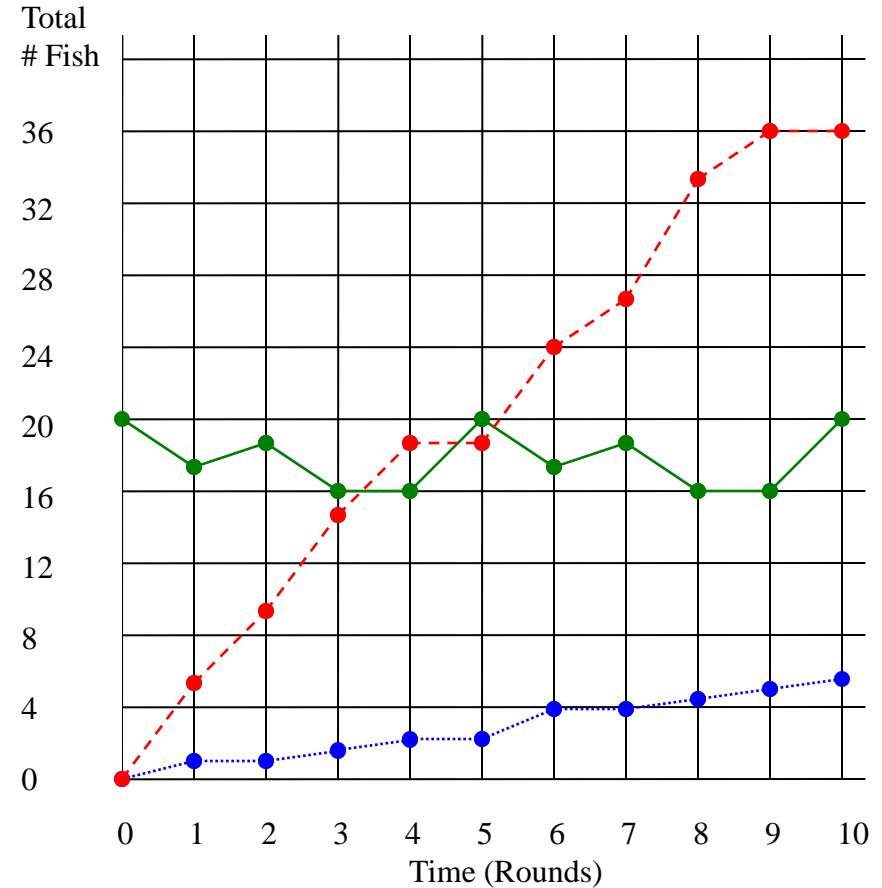
Behavior Over Time



Unsustainable Example



Sustainable Example



..... Individual Accumulation — Fish Stock - - - - Group Accumulation

**“All systems are perfectly
designed to get the results
they get.”**

(Richmond)

Mental Models for a Sustainable Future

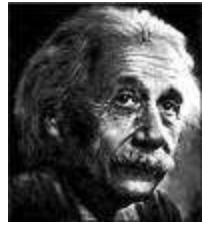
Live by the Natural Laws

We must operate within natural
“laws” and principles rather
than attempt to overcome them.



It's non-negotiable.

Mental Models for a Sustainable Future

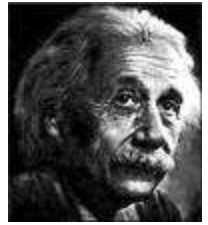


Healthy Systems Have Limits

Tap the power of limits

Note: Please do not confuse the mental model of scarcity with the reality of limits.

Mental Models for a Sustainable Future

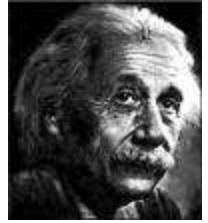


We Are All In This Together

We are all interdependent on each other
and on the natural systems upon which all
life depends



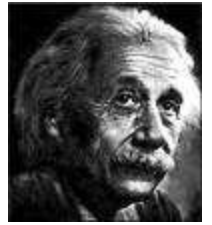
Mental Models for a Sustainable Future



Reciprocity is not Optional

In the context of interdependence
self interests are best served through
the development of mutually beneficial
relationships.

Mental Models for a Sustainable Future



We are all Responsible

Everything we do
and everything we don't do
makes a difference.

Shifting Mental Models

- Mental models shift **through experience**, by asking **different questions, story telling & the creative process**
- Some mental models are easier to shift than others.
(ask Copernicus)
- The mental models of children and young people change over time with new knowledge and applied insight
- Do the mental models of adults change over time with new knowledge and applied insight?

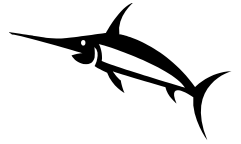
So What Kind of Future do we want?

What do we want to sustain?

For whom?

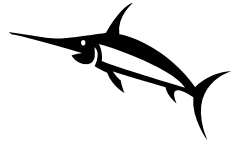
For how long?

and what does education have to do with it?



IMAGINE

There is a shared understanding that schools have a responsibility to contribute to our individual and collective potential, and to that of the living systems upon which all life depends.



IMAGINE

Schools are learning
organizations.

IMAGINE

The potential of having all our children in school with their teachers and mentors during the *most favorable time* for learning...

IMAGINE

...and that we honor them with transformative learning experiences that prepare them to participate in, and to lead with us the shift toward a sustainable future.

THINK ABOUT IT

Every sector

food, buildings, business, government,
higher education, urban and rural planning...

*is making the shift toward sustainability
and even regeneration.*

Where do they think they are going without all the
children, young people and their teachers?