

DEVELOPING A SCHOOLWIDE APPROACH
TO SYSTEMS THINKING AND DYNAMIC MODELING
Harriet Tubman Middle School
Waters Foundation - Systems Thinking and Dynamic Modeling

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“To simplify complications is the first essential
of success.”

(George Earle Buckle)

- “Out of intense complexities intense simplicities emerge.”
- (Winston Churchill)

AGENDA

- Introductions
- Evolution of a School Wide Approach to SD/DM
- A Walk Through SD/DM in the Sixth Grade
- Next Steps
- Questions

INTRODUCTION

- What is a school wide approach?

- Why are using a school wide approach?
- How are we implementing a school wide approach?

EXPONENTIAL GROWTH - SIXTH GRADE

One Grain Of Rice

- A Mathematical Folktale by Demi
- Simple, graphic illustration of exponential growth
- Use as interest building and awareness building activity
- Add math activities to develop/check understanding

ACTIVITY

- Draw a behavior over time graph that represents what's happening in the story.
- Create a table that represents what's happening in the story.
- Draw a stock/flow diagram that represents what's happening in the story.

Math Lessons

- Linear Growth - water in tub, money in piggy bank, $D = RT$
- Exponential Growth - money doubling, bacteria growth, rumors spreading, bank account interest, population growth
- STELLA use taught in context of math applications

LA/SS Lessons

- Introduction to systems thinking - Characteristics of a Dynamic System
- Systems thinking vocabulary - Behavior Over Time, Change Over Time, Structures, etc.

Math Centers

- Culminating Activity - check for understanding
- Characteristics of Systems - Hoberman sphere and Bridge Building: interdependence, structure creates behavior
- Dynamic Modeling - “Rose Garden” problem: exponential growth, limits

Next Steps

- Evaluate and refine existing applications: Check for gaps in content, conceptual understanding, appropriate use of tools, etc.
- Develop additional applications for 6th and 7th grade.
- Develop applications for 8th grade.
- Refine assessment rubrics, techniques

The Beauty and Practicality of Simple Ideas:
interdisciplinary, constructivist approach
through the understanding of the generic
characteristics and structures of dynamic system

SIMPLE, ELEGANT, UNIVERSAL

- “The ability to simplify means to eliminate the unnecessary so that the necessary may speak. (Hans Hofmann)”
- “A complex system that works is invariably found to have evolved from a simple system that works.” (John Gall)
- “Things should be made as simple as possible, but not any simpler.” (Albert Einstein)