15th Annual

Hawker Brownlow Thinking & Learning Conference

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TAMRA STAMBAUGH

SUNDAY 20 MAY
Session 3

Designing Concept-Based Curriculum to Integrate Instruction within and across Content Domains

MELBOURNE

DR TAMRA STAMBAUGH

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UNIVERSAL CONCEPTS AND GENERALIZATIONS

CONCEPTS

1. Change
2. Conflict
3. Exploration
4. Force or Influence
5. Order vs Chaos
6. Patterns
7. Power
8. Structure
9. Systems
10. Relationships

CONCEPTS AND GENERALIZATIONS

1. Change

- Change generates additional change
- Change can be either positive or negative
- Change is inevitable
- Change is necessary for growth
- Change can be evolutionary or revolutionary

2. Conflict

- Conflict is composed of opposing forces
- Conflict may be natural or human made
- Conflict may be intentional or unintentional
- Conflict may allow for synthesis and change

3. Exploration

- Exploration requires recognizing purpose and responding to it
- Exploration confronts "the unknown"
- Exploration may result in "new findings" or the confirmation of "old findings"

4. Force

- Force attracts, hold or repels
- Force influences or changes
- Force and inertia are co-dependent
- Force may be countered with equal or greater force

5. Order vs Chaos

- Order may be natural or constructed
- Order may allow for prediction
- Order is a form of communication
- Order may have repeated patterns
- Order and chaos are reciprocals
- Order leads to chaos and chaos leads to order

6. Patterns

- Patterns have segments that are repeated
- Patterns allow for prediction
- Patters have an internal order
- Patterns are enablers

7. Power

- Power is the ability to influence
- Power may be used or abused
- Power is always present in some form
- Power may take many forms (chemical, electrical, political, mechanical)

8. Structure

- Structure have parts that interrelate
- Parts of structures support and are supported by other parts
- Smaller structures may be combined to form larger structures
- A structure is no stronger than its weakest component parts

9. Systems

- Systems have parts that work to complete a task
- Systems are composed of sub-systems
- Part of systems are interdependent upon one another and form symbiotic relationships
- A system may be influenced by other systems
- Systems interact
- Systems follow rules

10. Relationships

- Everything is related in some way
- All relationships are purposeful
- Relationships change over time

Adapted from: Curriculum Guide for the Education of Gifted High School Students, Texas Association for the Gifted and Talented, 1991

Universal Themes in Mathematics

Change
Change is necessary for growth
Change generates new change
- Integers (+/-)
- Graphs (Growth over time)

Conflict
Conflict creates change
Conflict is composed of opposing forces
- Decisions on how to approach problems
- Problem solving
- Errors/mistakes

Order
Order has a purpose
Order may allow for prediction
Order may have repeated patterns
Order is everywhere
Order is a form of communication
- Signs/symbols
- Mathematical Laws
- Order of operations
- Number sets
- Number lines
- Place Value
- Compare/order decimals, etc
- Division
- Chance/statistics
- Problem solving
- Mean/median/mode

Patterns
Patterns have segments that are repeated
Patterns allow for prediction
Patterns are enablers
Patterns can be ordered internally or externally
- Multiplication/division
- Factoring algebra (x+1)(x+2)
- Equals added to equals/ multiplied by equals
- Exponents/Power of 10
- Symmetry
- Pythagorean theorem

Power
Power is the ability to influence
- Decision Making
- Statistics/Data analysis
- Graphs/data collection & representation

Structure
Structure have parts that interrelate
Parts of structures support & are supported by other parts
Smaller structures may be combined to form larger structures
- Prime/composite numbers
- Factors
- Fractions/Decimals
- Geometry/Measurement
- Area and perimeter
- Symmetry
- Coordinate grid
- Graphs/data analysis

Systems
Systems have parts that work together
Systems are composed of subsystems
A system may be influenced by other systems
Systems follow rules
Systems interact
- Number systems
- Number line
- Factors
- Decimals/fractions
- Coordinate grids
- Statistics/Data analysis
- Measurement
- Time
- Money

Relationships
Relationships serve a purpose
Everything is related in some way
Relationships can be chosen or imposed
- Signs/symbols
- Geometry/Measurement
- Positive/negative numbers
- Absolute value
- Fractions/decimals
- Ratios
- Graphs
- Decimals/percents/degrees
- Equals added to equals/equals multiplied by equals
- Order/compare (whole #, decimals, fractions, etc)
- Place value (word, standard, expanded forms)
- Perimeter and area
- Linear relationships
- Real life applications

Taken from:
http://www.ggusd.us/assets/files/departments/Gate/TeacherResources/UniversalThemes/Universal-Themes-in-Math.pdf

Generalizations – What are some universal statements I can make that would be true based on the facts and concepts I have listed? Would these same generalizations be true in other disciplines?
Concepts – How might I organize the facts into concepts? Which concepts are most relevant?
Facts – What facts do students need to know?

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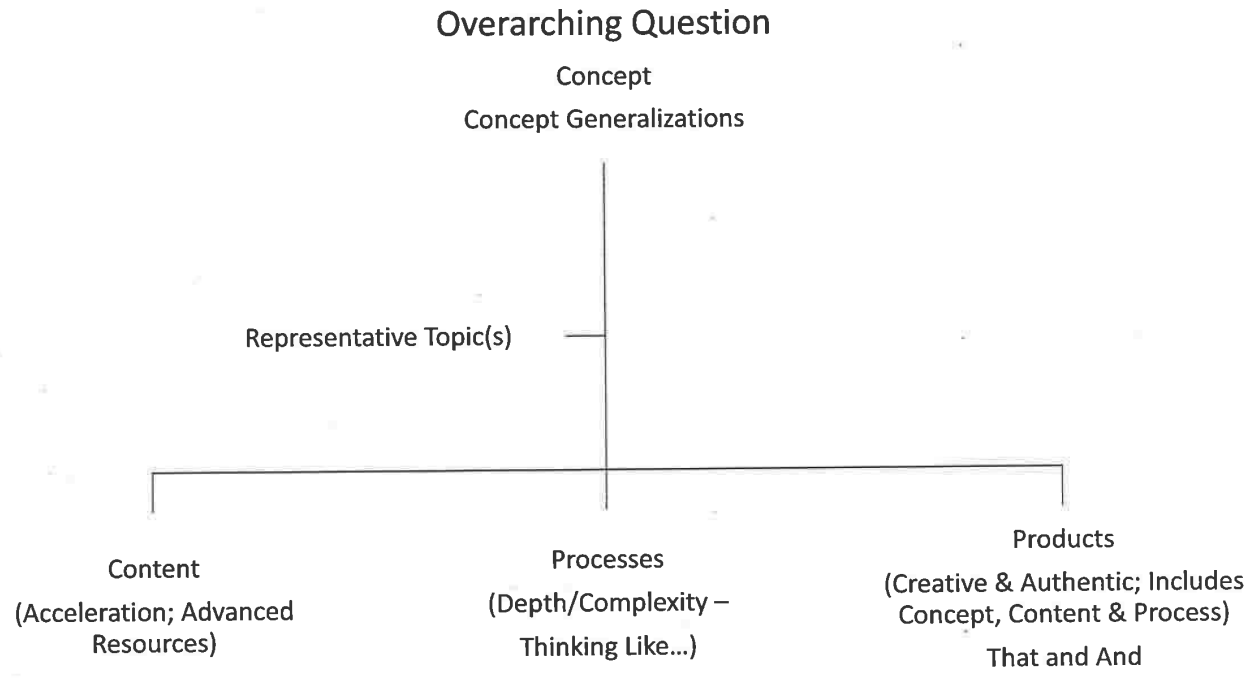
Concepts – How might I organize the facts into concepts? Which concepts are most relevant?
Facts – What facts do students need to know?

Unit Plan – Concepts



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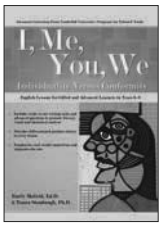

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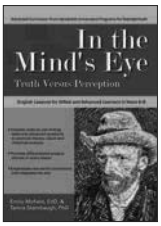

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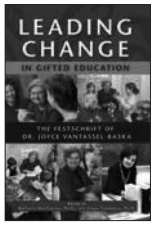

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