INSTITUTE FOR INTEGRATIVE SCIENCE & HEALTH

www.integrativescience.ca

Major pedagogical emphasis in MSŀT 101-103 was placed on helping students "how to learn" rather than just "what to learn". A pattern approach was chosen to serve this pedagogical goal.

The pages that follow are examples of some of the pattern-based teaching materials created by Cheryl Bartlett in the early 2000s for in-class distribution to students (and as supplements to their ThoughtTraps manual).

Additional explanatory information about the use of "pattern" in Integrative Science
(from http://www.integrativescience.ca/Themes/ScienceKnowledge/. References cited can be found at this same location.

The Integrative Science pedagogical approach uses a broadened view of science, namely that "science" be viewed as "***dynamic, pattern-based knowledge".*** In choosing this view, we are enabled to acknowledge that different cultures may shape and share their science knowledge in different ways, using some or all our human "pattern smarts" to recognize, transform, and express patterns.

And, in saying that science is dynamic, we mean that our understandings – of patterns and their transformations – can and do change.

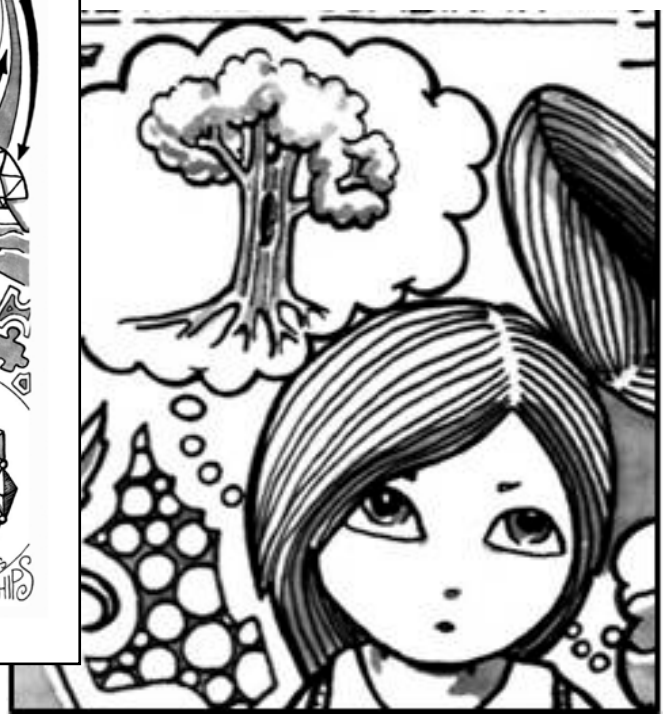
Of the 8-9 human intelligences (which we choose to refer to as "pattern smarts") recognized by developmental psychologist Howard Gardner at Harvard University (Gardner 1983, 1993, 1998), Western science tends to privilege logical-mathematical and linguistic intelligences. More holistic sciences, such as those of many Aboriginal and other Indigenous peoples, tend to enrich these by further drawing upon the interpersonal,

intrapersonal, musical, body-kinaesthetic, spatial, naturalistic, existential, and spiritual. We can readily understand, therefore, that different sciences can and do emerge in different cultures or worldviews.

We feel comfortable in using "pattern smarts" for the multiple intelligences (MI), in that MI Theory is a brain-based theory and that an overall understanding within cognitive neuroscience is that the human brain is a highly specialized, pattern seeking organ.

For a much richer understanding of "pattern" than that used in the Western cognitive sciences, we recommend the article by Sheridan and Longboat (2006). These authors speak to the sacred ecology of mind within the Haudenosaunee/Mohawk tradition. They do not necessarily use the word pattern but they explain that sacred ecology of mind is a consequence of long residence in traditional territory and enduring spiritual and intellectual relationships between people, clans, and landscape wherein animal and spiritual helpers manifest their presence in one's life.

visuals by
artist Basma Kavanagh



MSIT 101 Sense of Place, Emergence, and Participation … pattern

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Aoccdrnig to a rscheearch at Cmabrigde Uinervtisy, it deosn't mttaer in waht oredr the ltteers in a wrod are, the olny iprmoetnt tihng is taht the frist and lsat ltteer be at the rghit pclae. The rset can be a total mses and you can sitll raed it wouthit porbelm. Tihs is bcuseae the huamn mnid deos not raed ervey lteter by istlef, but the wrod as a wlohe. Amzanig huh?

Pattern recognition and human consciousness

The human brain is a "pattern-recognition" organ, and Multiple Intelligences Theory suggests that patterns can be detected in a variety of domains and brought into consciousness (awareness). Howard Gardner, the author of the theory, suggests there may be up to nine intelligences. These are:

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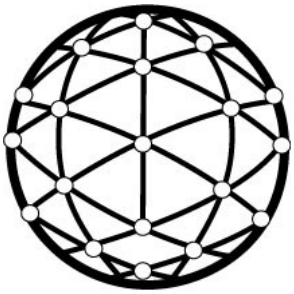
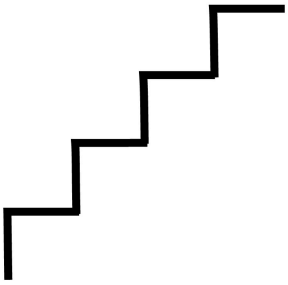




Pattern Recognition … and:

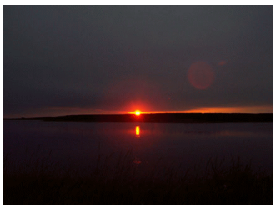
The Good We tend to remember patterns ... more easily than details.

The Bad We can encounter difficulty when wanting to revise our memory of a pattern already learned.

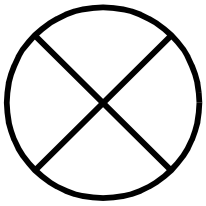
The Ugly We may not be able to see the "new" or "errors" because of our reliance on the "old" pattern that we already learned.

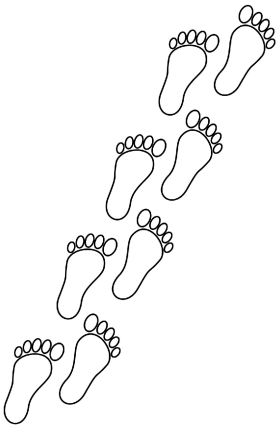
MSIT 101 Sense of Place, Emergence, and Participation

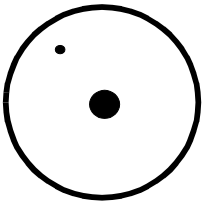
Natural Pattern



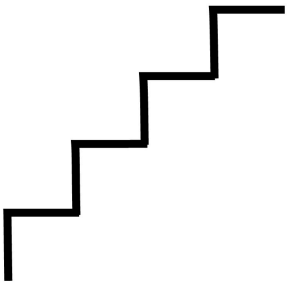
Ideal Pattern

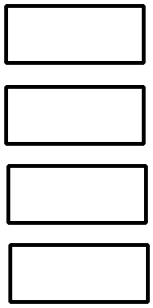


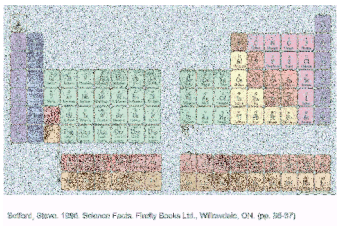




Abstract Pattern







MSIT 101 Sense of Place, Emergence, and Participation
topic: the "model"

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information from:
Heemskerk, M., Wilso, K. and Pavao-Zuckerman, M. 2003. Conceptual models as tools for communication across disciplines. Conservation Ecology 7 (3): 8 [online] URL: http://www.consecol.org/vol7/iss3/art8

A model is an abstraction or simplification of reality.

Scientists often use models to explore systems and processes they cannot directly manipulate.

Models can be more or less quantitative, deterministic, abstract, and empirical.

They help define questions and concepts more precisely, generate hypotheses, assist in testing these hypotheses, and generate predictions.

Model building consists of determining system parts, choosing the relationships of interest between these parts, specifying the mechanisms by which the parts interact, identifying missing information, and exploring the behaviour of the model.

The model building process can be as enlightening as the model itself, because it reveals what we know and what we don't know about the connections and causalities in the systems under study.

Thus modeling can both suggest what might be fruitful paths of study and help pursue those paths.

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some different types of models:

1) conceptual

2) computer simulation

3) empirical

Creative Thinking

... seeing something for the first time

... requires moving from the "known", crossing the BARRIER OF FEAR and moving into the "known"

The pursuit of scientific knowledge is a journey from the known to the unknown ... and thus, filled with the need for creative thinking.

Douglas J. Cardinal, one of Canada's most renown architects and a member of the Order of Canada, says that in the Aboriginal world view "humans are magical beings" with the power of creativity. His thoughts:

☹ But a problem we humans face is how to bring out this **gift of creativity**.

We must look inward to unleash the gift and its power.

☹ But a problem we humans face is we are locked into our "human-ness". We operate too much from a perspective of fear tied to our immediate survival. We want to stay in the comfort zone ... which is a "domain of the known". Cardinal says this domain of the known is very small.

The power of creativity is found in the "domain of the unknown" ... which is very large ... it is the **Land of Eagle**.

How do we cross the BARRIER OF FEAR ... and enter the Land of Eagle?"

We must go outside our comfort zone of being too human, of clinging to our "human-ness" ... we must become a magical being, a shaman.

This leap into the unknown has no sense of security ... because there is total freedom, we feel we may fall out of the sky ... thus, we need a "comfort guardian" to come with us.

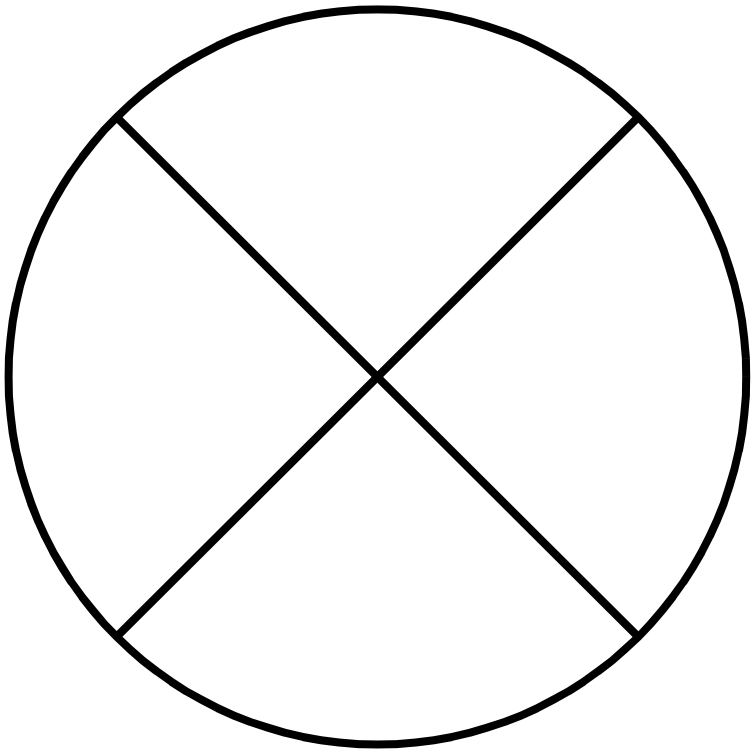
This guardian is a warrior, who is also a hunter and knows that all animals have patterns. The hunter must know these patterns, take them into himself or herself ... i.e. become "patternable".

The secret to crossing the BARRIER OF FEAR to enter the land of Eagle, i.e. the "domain of the unknown", is these patterns in Nature.

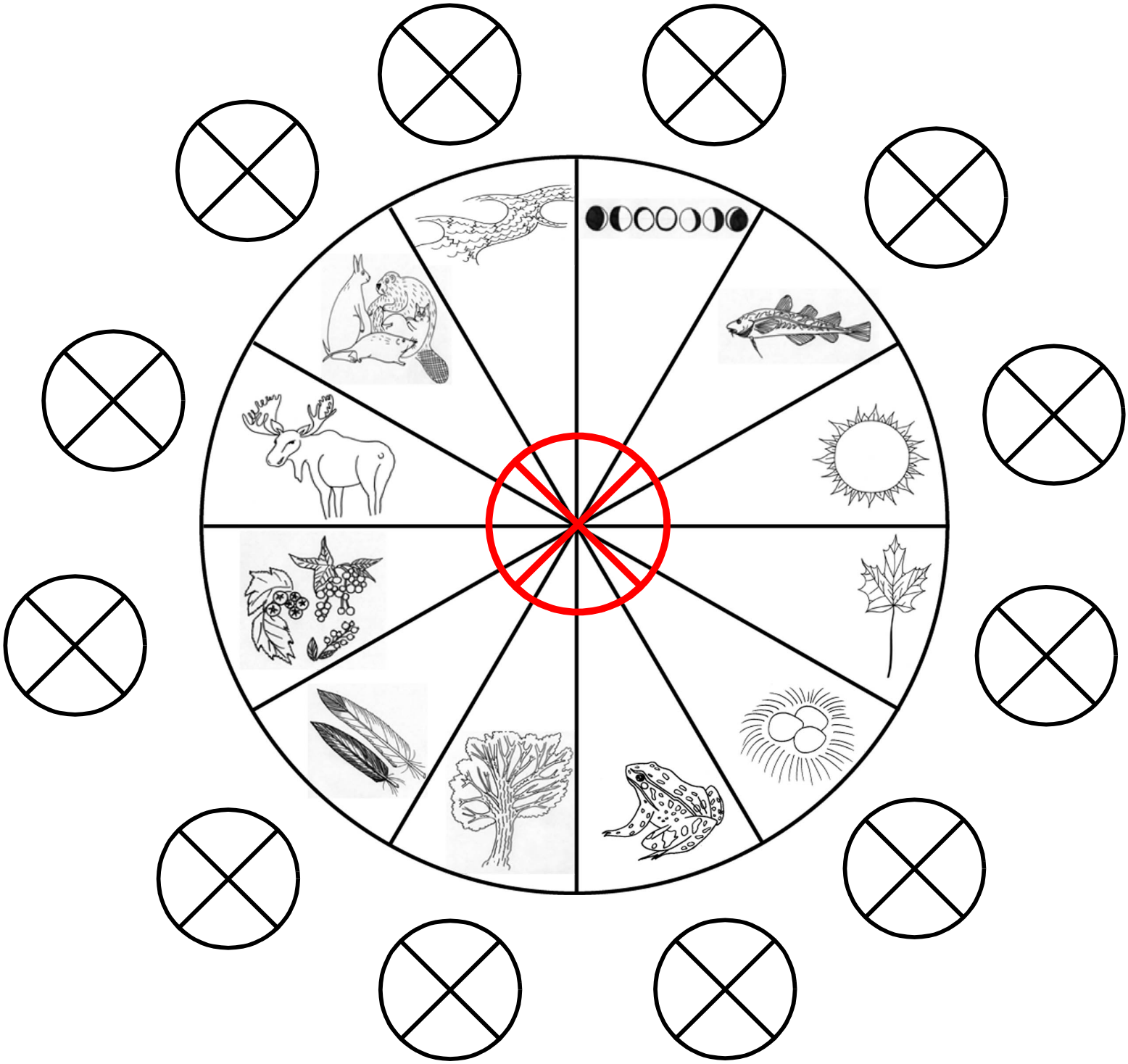
We must become patternable ... i.e. sensitive to the patterns of animals and all of Nature. We must learn these patterns ... make them part of our self, incorporate them into our being, adapt them to our own or our community's needs, as appropriate. And, use them!

MSIT 101 Sense of Place, Emergence, and Participation

... using the Medicine Wheel pattern as a “thinking tool” or “knowledge organization tool”



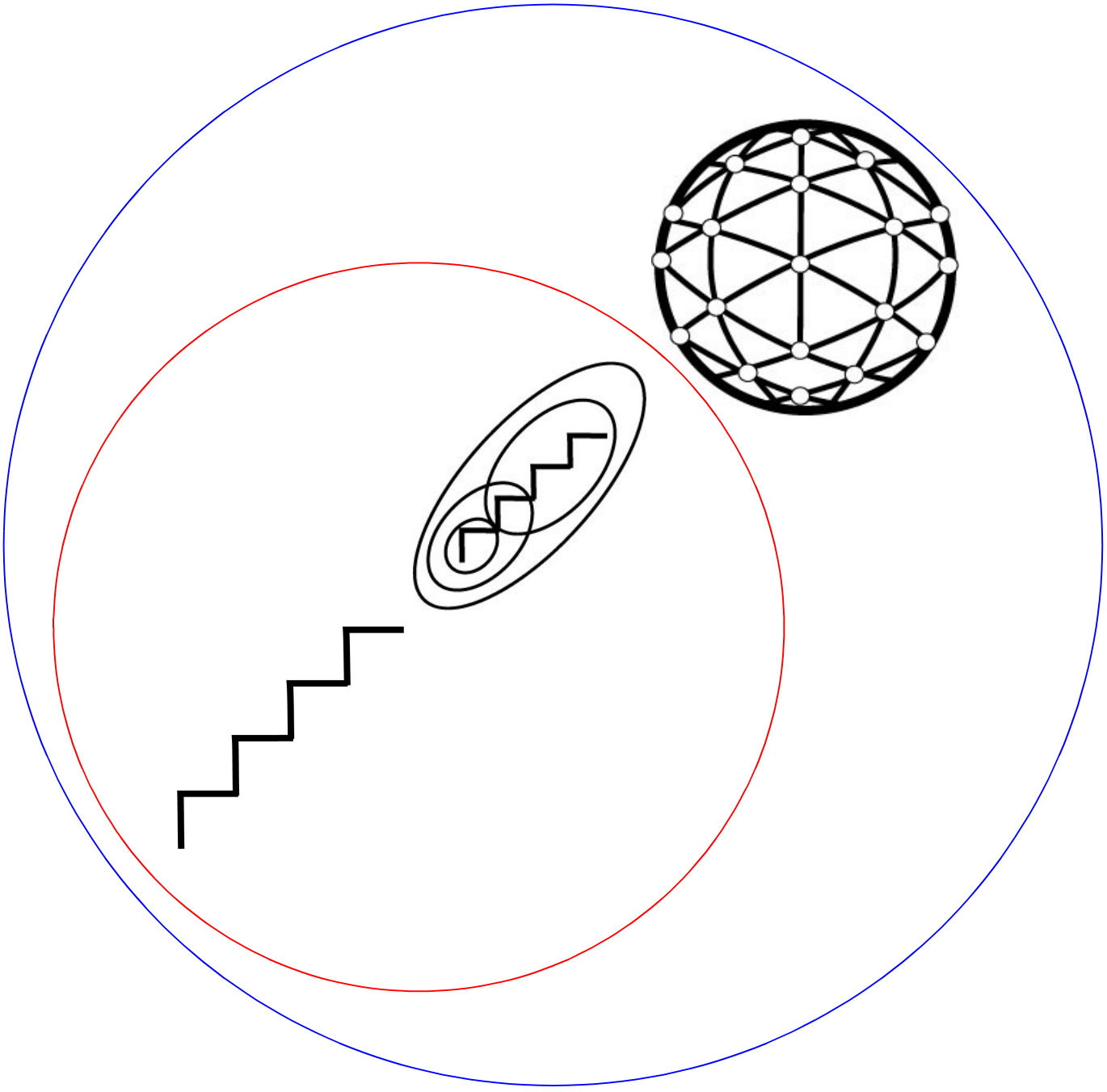
MSIT 101 Sense of Place, Emergence, and Participation



Our Universe
... visualizing more than one perspective
... or, thinking "outside-the-box"

- reductionist: focus on
  - levels of organization of matter
  - fundamental forms of energy
  - causality

- holistic: focus on
  - participatory consciousness
  - change
  - relationship



Visible Matter in the Universe
levels of organization
• staircase pattern (simple)•

- Universe
- super clusters **(Local)**
- clusters **(Local Group)**
- galaxies **(Milky Way)**
- star systems **(Sun)**
- planet Earth
- ecosystems
- communities
- populations
- organisms
- organ systems
- organs
- tissues
- cells
- organelles
- molecules & minerals
- atoms (natural elements #1-92; artificial elements #93and higher)
- baryons (neutrons and protons)
- fundamental particles (quarks and leptons)

Visible Matter in the Universe: levels of organization

• staircase pattern (with divisions) •

- Universe
- super clusters **(Local)**
- clusters **(Local Group)**
- galaxies **(Milky Way)**
- star systems **(Sun)**

- planet Earth
- ecosystems
- communities
- populations

- organisms
- organ systems
- organs
- tissues
- cells
- organelles

- molecules & minerals
- atoms (natural elements #1-92; artificial elements #93and higher)

- barvons (neutrons and protons)
- fundamental particles (quarks and leptons)

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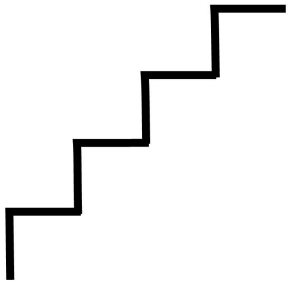
divisions

- space
- life
- sub-atomic



Visible Matter in the Universe (levels of organization)

- Universe
- super clusters **(Local)**
- clusters **(Local Group)**
- galaxies **(Milky Way)**
- star systems **(Sun)**
- planet Earth
- ecosystems
- communities
- populations
- organisms
- organ systems
- organs
- tissues
- cells
- organelles
- molecules & minerals
- atoms (natural elements #1-92; artificial elements #93and higher)
- baryons (neutrons and protons)
- fundamental particles (quarks and leptons)

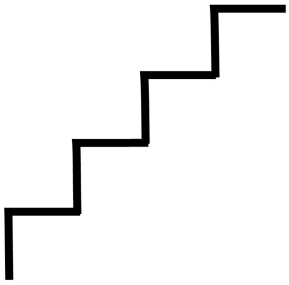
CONTEXT example: Doctors tout traditional remedies

plants		infections	
herbs		skin	
symptoms		depression	
doctors		HIV	
continent		CD4	
disease		immune system	
pharmaceuticals		cohort	
health		oral thrush	
antiretrovirals		chemical	
antibiotics		skeptics	

Visible Matter in the Universe
- levels of organization -

- Universe
- super clusters
- clusters
- galaxies
- star systems
- planet Earth
- ecosystems
- communities
- populations
- organisms
- organ systems
- organs
- tissues
- cells
- organelles
- molecules & minerals
- atoms (different types = elements)
- baryons (different types = neutrons and protons)
- fundamental particles (different types = quarks and leptons)

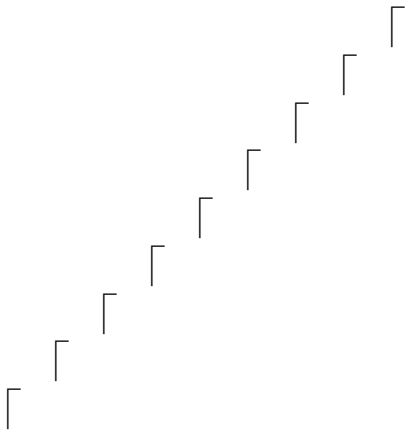
MSIT 101
SENSE OF PLACE, EMERGENCE, AND PARTICIPATION



pattern sensed by? eyes, ears, nose, tongue, or touch
pattern category? shape, sound, smell, taste, or feel
pattern label? _____
pattern suggests relationships such as?
_____
_____
_____
pattern origin? natural, artificial, or both
pattern found where? _____

COMPARE: pattern above and below

- **differences:**
  1. _____
  2. _____
  3. _____
- **similarities:**
  1. _____
  2. _____
  3. _____

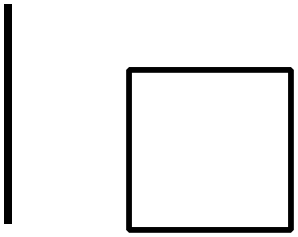


Human Brain: regions ... general anatomy

* = parts that collectively form the *limbic system*
RF = parts that collectively form the *reticular formation*

1) FOREBRAIN

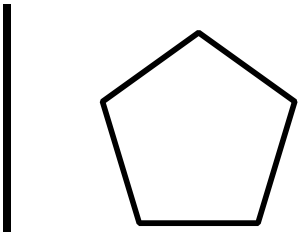
- *telencephalon* (**cerebrum** ... with L and R hemispheres)
  - cortical matter (gray matter, cerebral cortex)
  - subcortical matter (white matter)
  - basal ganglia
    - corpus striatum
      - globus pallidus
      - striatum
        - putamen
        - caudate nucleus
    - amygdala*
  - hippocampus*
  - cingulate gyrus*
  - septal region*
  - fornix*
  - olfactory bulb
- *diencephalon* (**diencephalon**)
  - epithalamus
  - thalamus
  - subthalamus
  - hypothalamus* (... and attachment to pituitary gland)



Naming:
based on adult brain
... 4 regions

2) MIDBRAIN (*mesencephalon* ... part of **brain stem**)

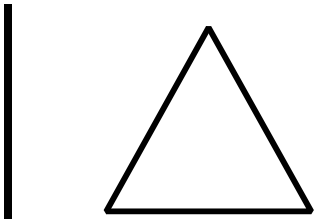
- tectum
  - pretectal region
  - corpora quadrigema
    - superior collicus
    - inferior collicus
- central peduncle
  - substantia nigra
  - midbrain tegmentum
    - occulomotor nucleus
    - midbrain RF
    - red nucleus
    - central gray
    - raphe nucleus



Naming ...
based on embryonic development 7th week
... 5 regions

3) HINDBRAIN

- *metencephalon*
  - pons (part of **brain stem**)
  - **cerebellum**
- *myencephalon* (medulla oblongata ... part of **brain stem**)
  - vestibular nuclei
  - cochlear nuclei
  - medullary RF
  - raphe nuclei
  - solitary nucleus
  - olivary complex



NAMING ...
BASED ON EMBRYONIC DEVELOPMENT 5TH WEEK
... 3 REGIONS

MSIT 103

Sense of Place, Emergence, and Participation

☺ brain, mind, consciousness, spirit

Reading Materials: from Child Trauma Academy http://www.childtraumaacademy.com/

1. The Amazing Human Brain and Brain Development
    1. Beginning with the human brain
    2. Brain organization and function
    3. The brain's building blocks
    4. Communication and defense
    5. Plasticity, memory, and cortical modulation in the brain
    6. Resources

2. Surviving Childhood: an introduction to the impact of trauma
    1. Introduction to childhood trauma
    2. The psychology and physiology of trauma
    3. After the trauma: the costs of coping
    4. Finding resources and getting involved

3. The Cost of Caring: secondary traumatic stress and the impact of working with high-risk children and families
    1. Introduction to secondary trauma
    2. Post-traumatic stress disorders and secondary trauma
    3. Self-care strategies for combating secondary trauma

MSIT 101 Sense of Place, Emergence, and Participation

element name	atomic number	number of protons	number of ↑↑↓ baryons	number of electrons (in balanced atom)	atomic mass	atomic mass - atomic number	number of neutrons	number of ↑↓↓ baryons	total number of ↑ quarks	total number of ↓ quarks
	1									
	2									
	3									
	4									
	5									
	6									
	7									
	8									
	9									
	10									
	11									
	12									
	13									
	14									
	15									
	16									
	17									
	18									

MSIT 101 Sense of Place, Emergence, and Participation

element name	atomic number	number of protons	drawing, showing all protons as the ↑↑↓ combination of quarks	number of neutrons	drawing, showing all neutrons as the ↑↓↓ combination of quarks
	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	10				
	11				
	12				