

~ Building a culture of success through
hard work ~

Setting the Stage:

“Mark Twain once said that it was not ignorance that was so bad, but as he put it, ‘all the things we know that ain’t so.’ Nowhere is this more true than in American education today, where fashions prevail and evidence is seldom asked for or given. And nowhere does this do more harm than in the education of children.”

Thomas Sowell - Senior Fellow, Hoover Institution

Two Examples of Questions educators should ask:

- Do contemporary technological tools actually expand or limit the exercise and development of bodily organs, including the brain, in the lives of growing children?
- Why has Attention Deficit Disorder been diagnosed in children with such alarming frequency during the past decade?

Those who educate children should understand - the intellect is enriched by teaching to the hands and feet.

Educators should:

- ★ ... recognize children as physical, artistic and intellectual beings.
- ★ ... recognize the brain as a living, growing organism that gradually develops through distinct maturational stages.
- ★ ... answer the question, “How do we encourage the growth and development of the brain within the context of a developmentally appropriate educational curriculum?”

Snow
Dog

CJ
Schleuter

1st Grade

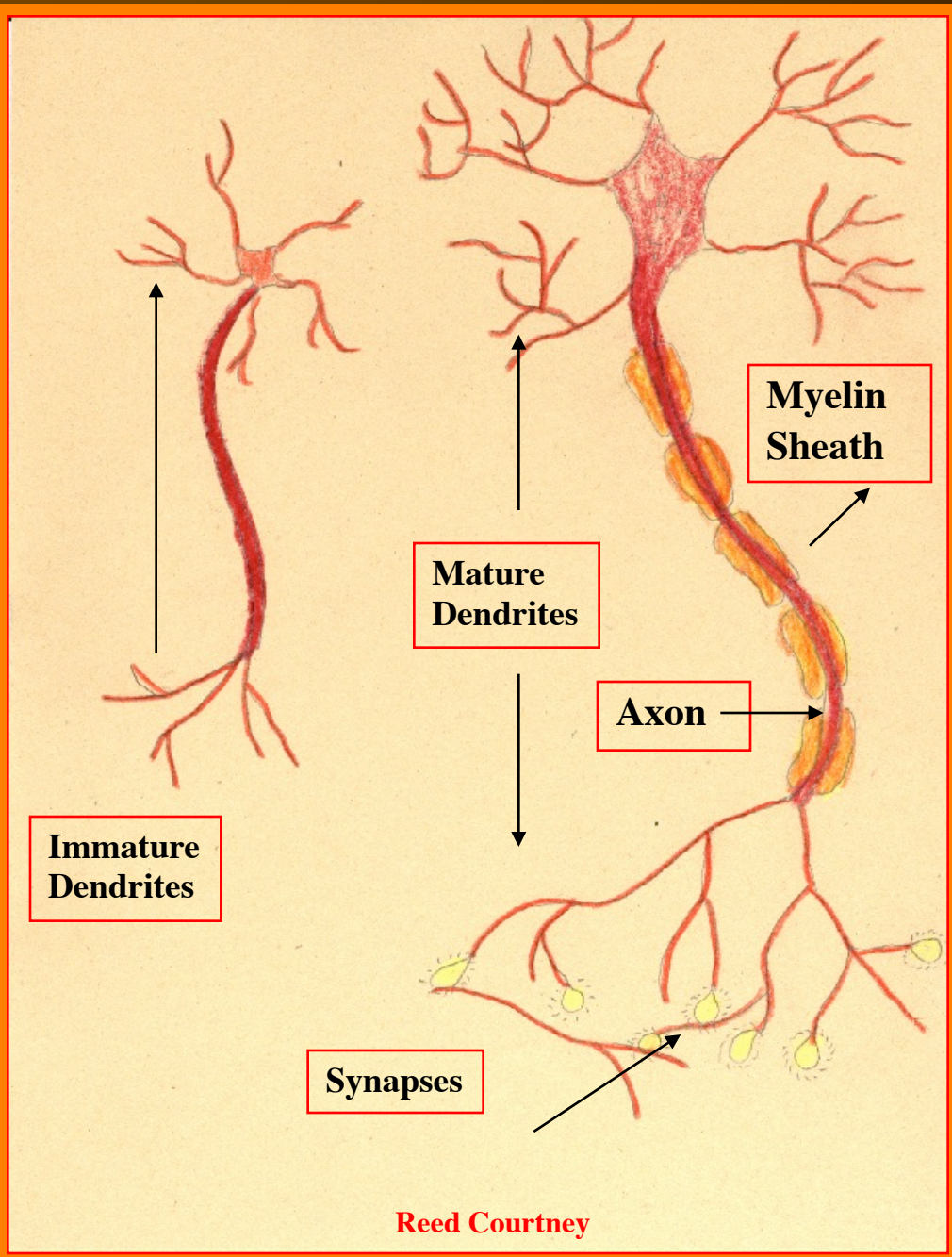




Introducing:

The Nifty Neuron

*Foundation of
Intelligence,
the thinking cells*





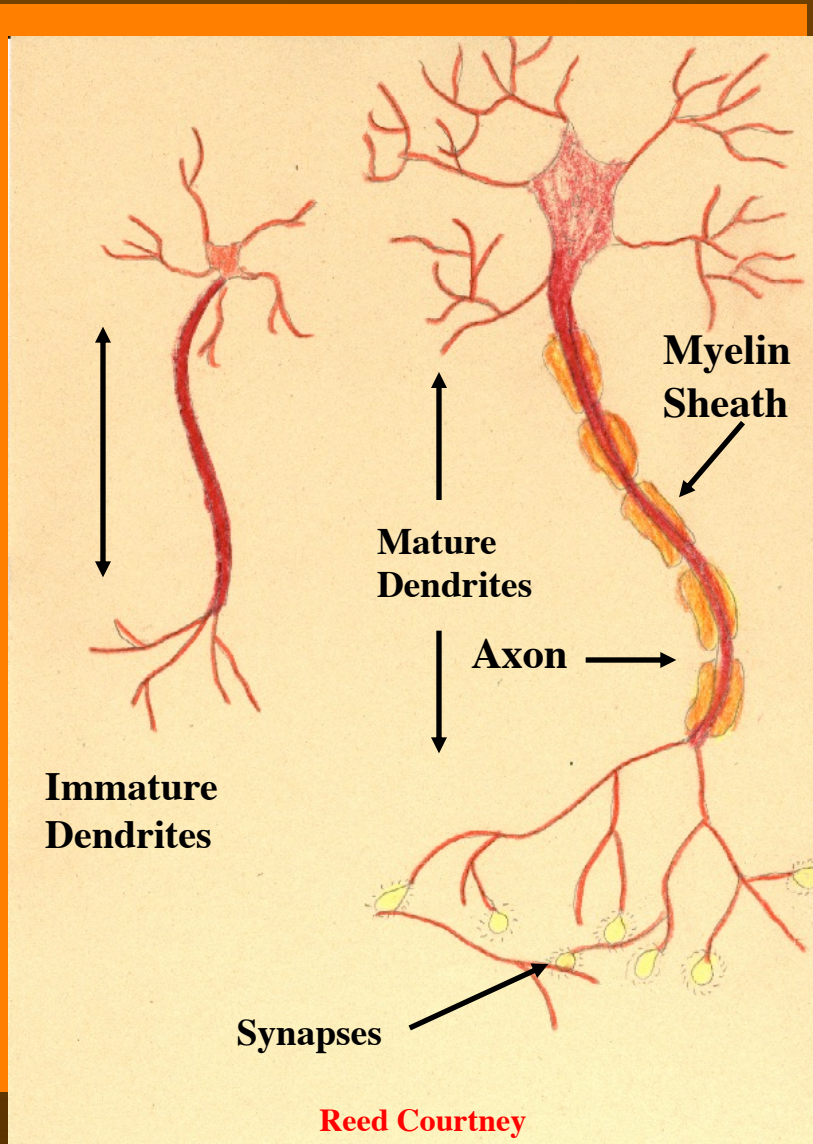
Chelsea Courtney Grade 5

Evening Flight

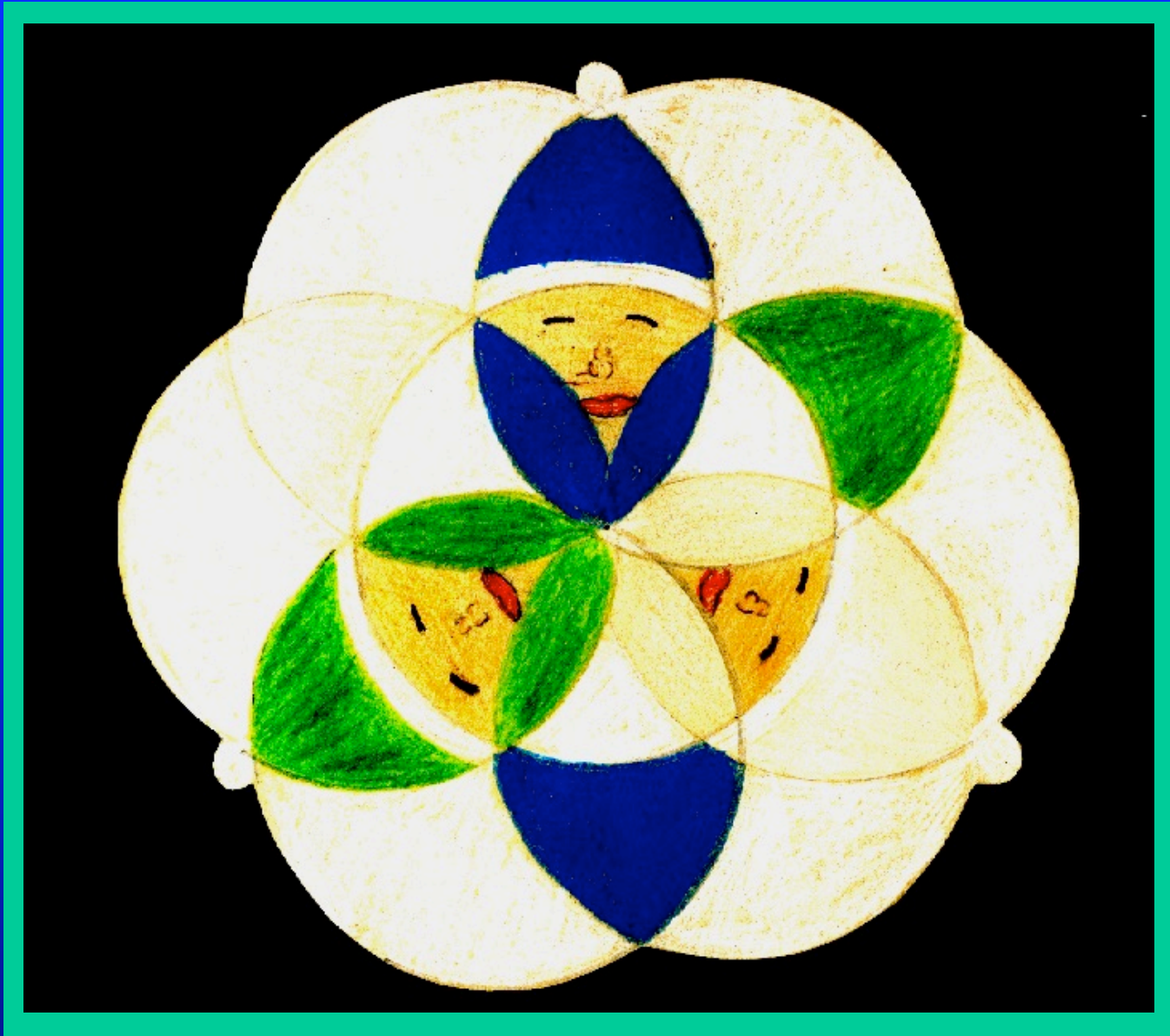
Reed
Courtney
5th Grade



Two Basic Ways That Brain Cells Grow



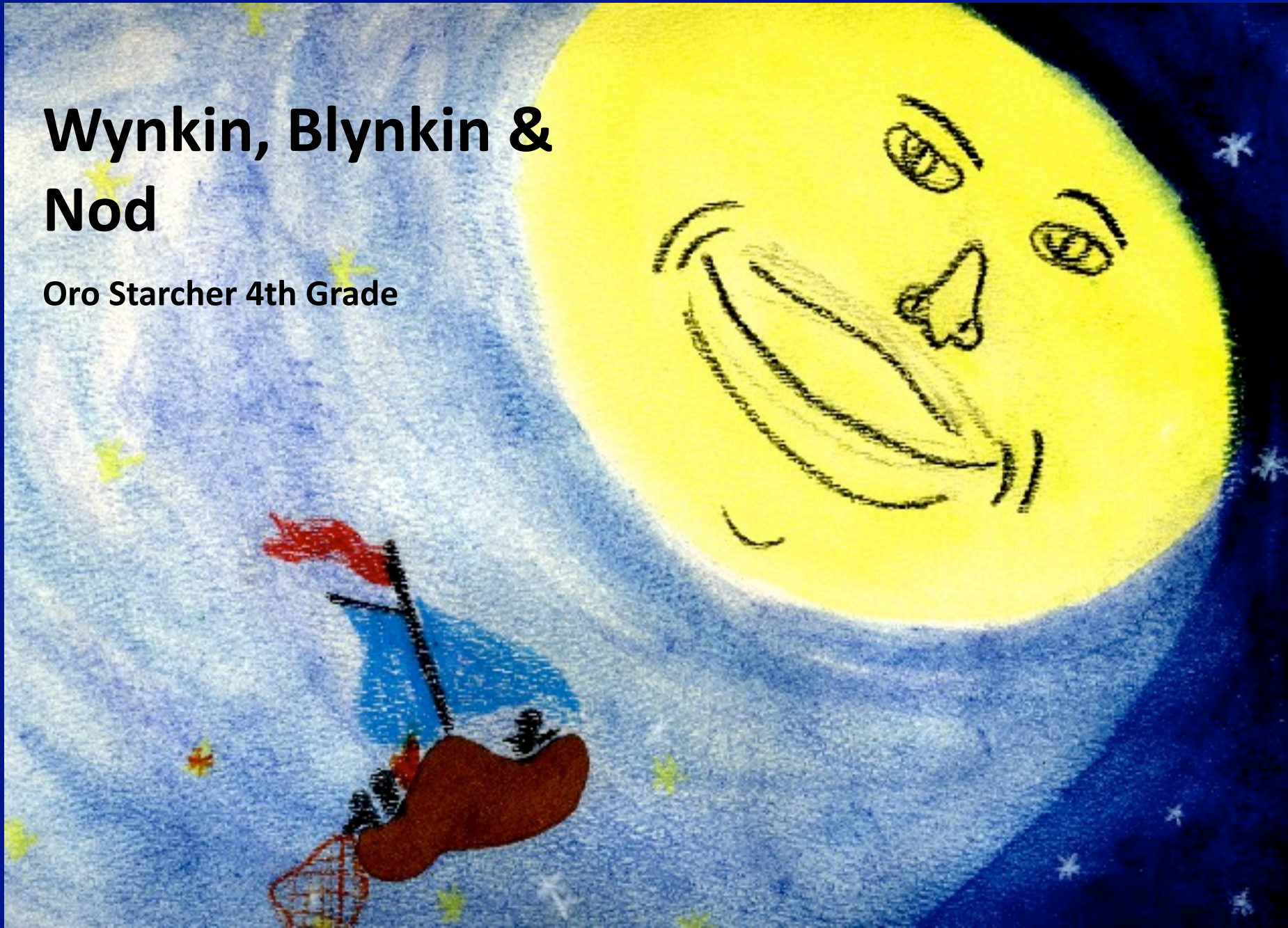
- ★ First, as neurons are stimulated (sensory experience), synapses grow stronger and message-receiving dendrites arborize, growing larger and heavier. Growth of synapses and dendrites provide the foundation for life long learning.
- ★ Second, the long axons over which messages travel to other cells develop protective coating of myelin which make chemical transmission more efficient. (There is little myelin present at birth, and it takes twenty or thirty years to finish the process.)



Rachel Graville Grade 7

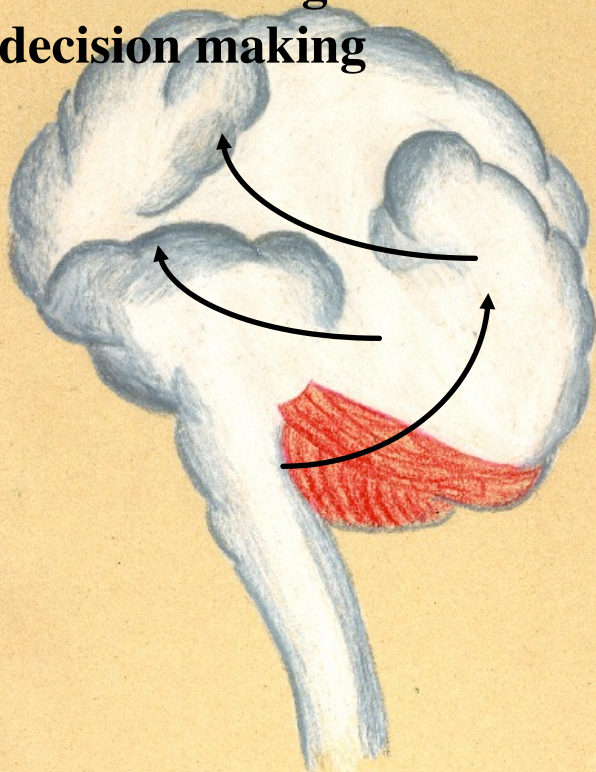
Wynkin, Blynkin & Nod

Oro Starcher 4th Grade



Myelination — It Takes Time!

Frontal Lobes —
abstract thought
decision making



Birth to early adulthood

The human brain matures from the bottom up and from the back to the front.

- ★ Myelin coatings move from lower structures and those responsible for motor programs (e.g., reaching, walking) to the highest centers for academic skills, abstract thought, and wise decision making. This process begins at birth and reaches the frontal lobes at about the age of sixteen. Until the frontal lobes become fully myelinated in young adulthood, abstract thinking is problematic for the developing child.

Woodstock's Daydream

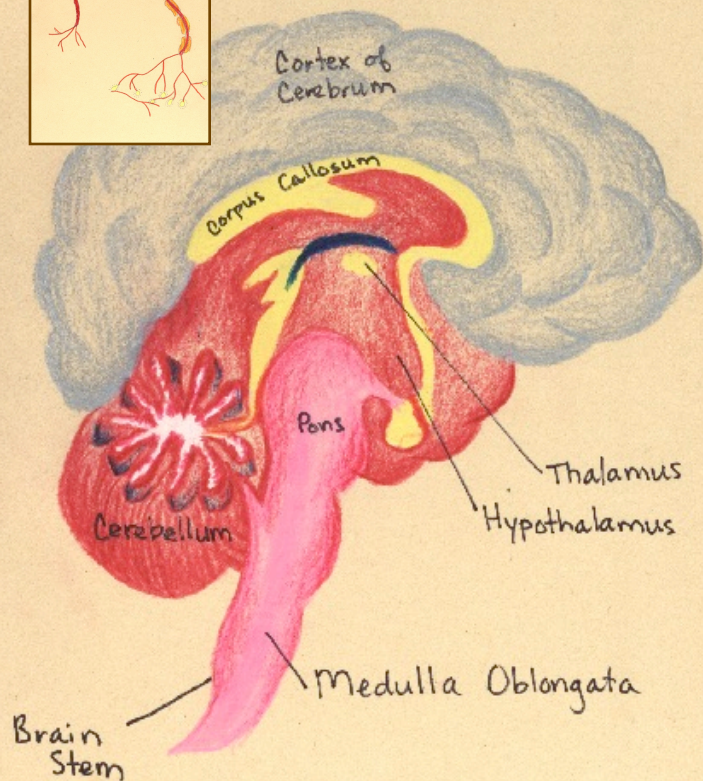
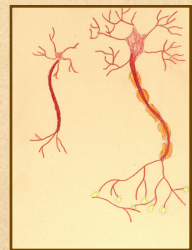
Seth
Williams

6th
Grade



Environmental Enrichment

Exercising Dendrites and Synapses



Chelsea Courtney

- ❖ “With increasing amounts of **environmental enrichment**, we see brains that are larger and heavier, with increased dendritic branching. That means those nerve cells can communicate better with each other. With the enriched environments we also get more support cells because the nerve cells are getting bigger. Not only that, but the junction between the cells - the synapse - also increases its dimensions. These are highly significant effects of differential experience.” 47

What constitutes “environmental enrichment?”

Owen Barnhart 4th Grade



Building Dendrites & Synapses

Physical Interaction or Visual Observation?

- Dr. William Greenough — “It appears that active interaction with the environment is necessary for the animal to extract very much appropriate information. Merely making visual experience of a complex environment available to animals unable to interact with it has little behavioral effect.” 72
- “Physical play is one of the main ways in which children interact with experience,” points out Dr. Bernstein. “The most characteristic thing about the human is that we go looking for problems to solve, or in other words, playing. In fact, we usually worry about significant emotional issues in youngsters who are unable to look for problems to solve.” 80
- “Whenever touch is combined with the other senses, much more of the brain is activated, thus building more complex nerve networks and tapping into more learning potential.” *Smart Moves*, Carla Hannaford, pg. 41

The Sun

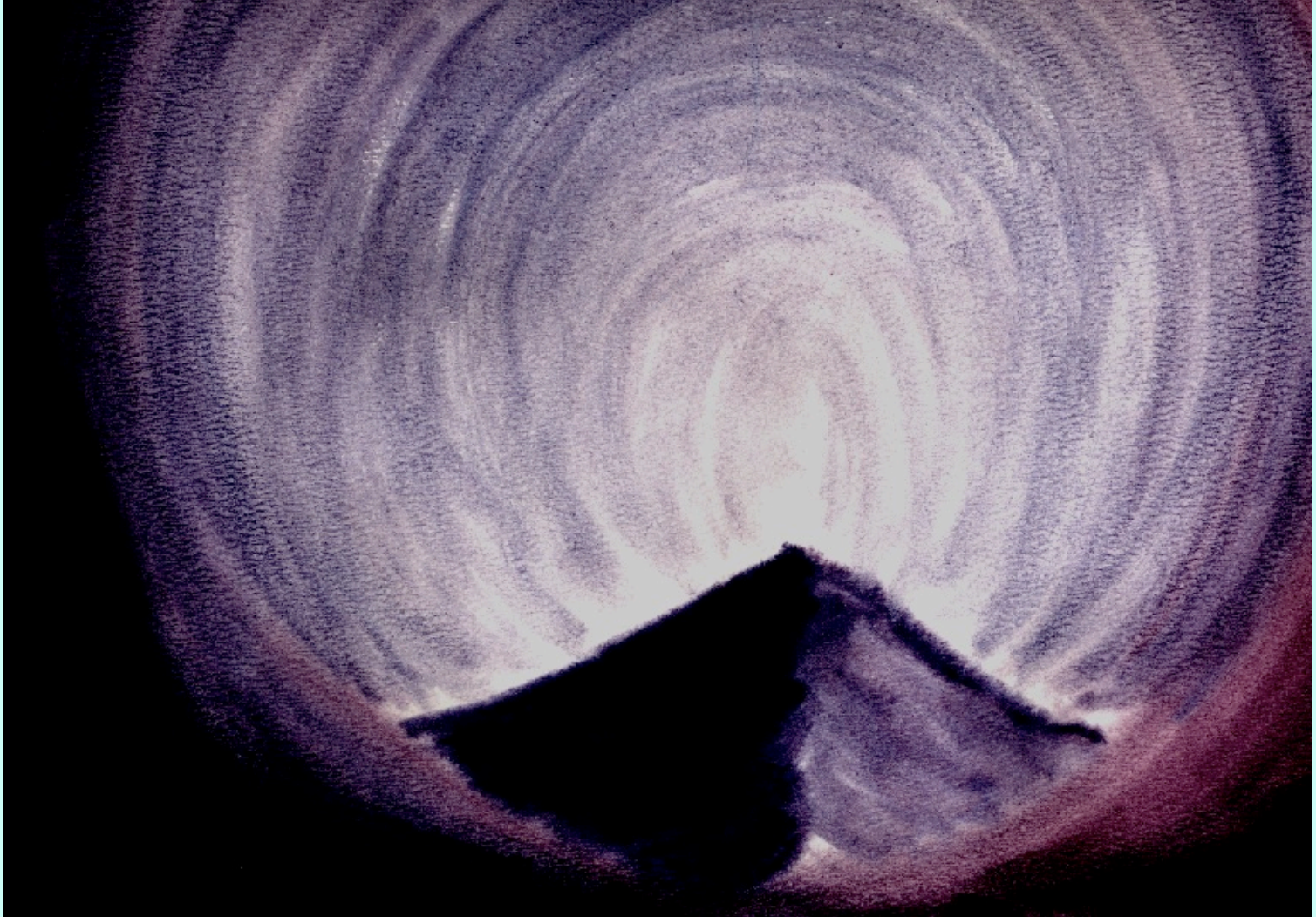
Brenna
Stonum

Readiness



Pyramid

Forest
Woodward 7th



Building Dendrites & Synapses

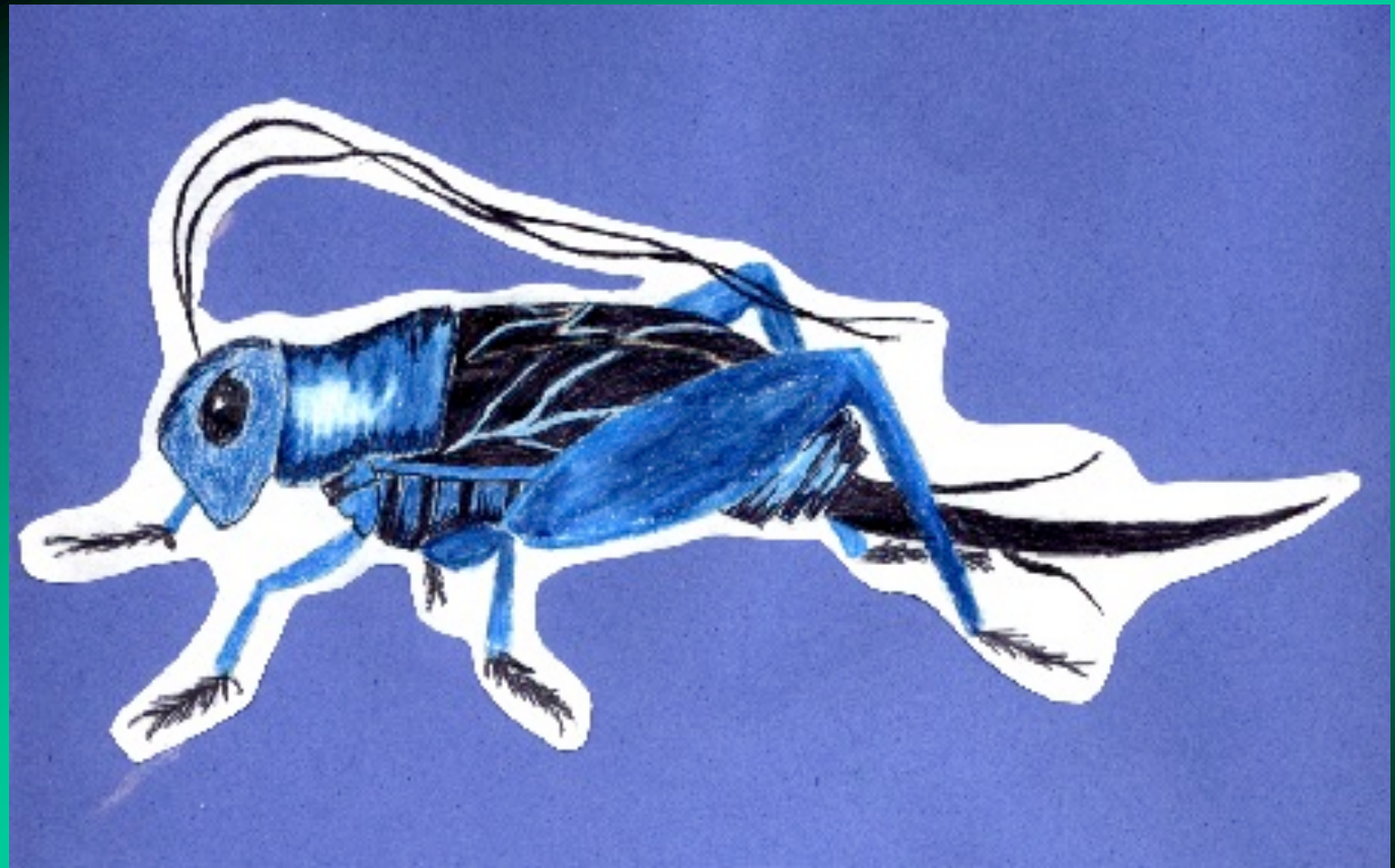
Hemispheric Balance



Chelsea Courtney

◆ “The more that both hemispheres and all lobes are activated by use, the more dendritic connections form and extend across the corpus callosum and mylinate.” Smart Moves 79

“The type of input growing brains receive is undoubtedly important for its final hemispheric **balance**. Learning that builds both analytic and holistic abilities is doubtless good for the brain, but many schools, unfortunately, focus heavily on stuffing in fragments of information at the expense of more general comprehension.” 127



Clovis Point and Sea Shells

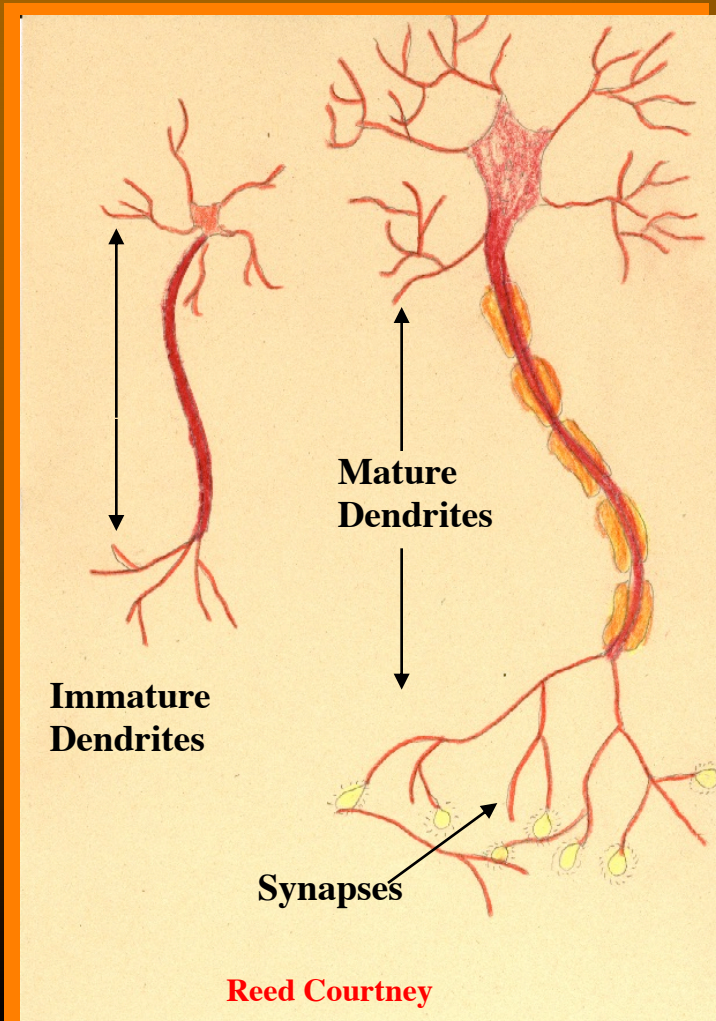
Huuti Scutt
5th



Ben Allison 5th

Building Dendrites & Synapses

“Use Them or Lose Them”



- “It may take many years—perhaps even a lifetime—for each brain’s complement of synapses to form and become strengthened by repeated use. Particularly during the early years, the ones that get used are the ones that are strengthened and will survive.” 74
- “Adults’ main task is to make a variety of stimulation available, at the same time considering carefully the choices their children are encouraged to make. Brains of youngsters who spend lots of time in front of a TV set, for example, may be expected to develop differently from those who pursue the physical, interpersonal, and cognitive challenges of active play.” 74



Abraham Lincoln's Axe

Form Drawing

Yamuna Stewart



Handmade Paper Scene

The Triune Brain

Developmental Maturation

Three Areas of the Triune Brain:

- ***Introductory***

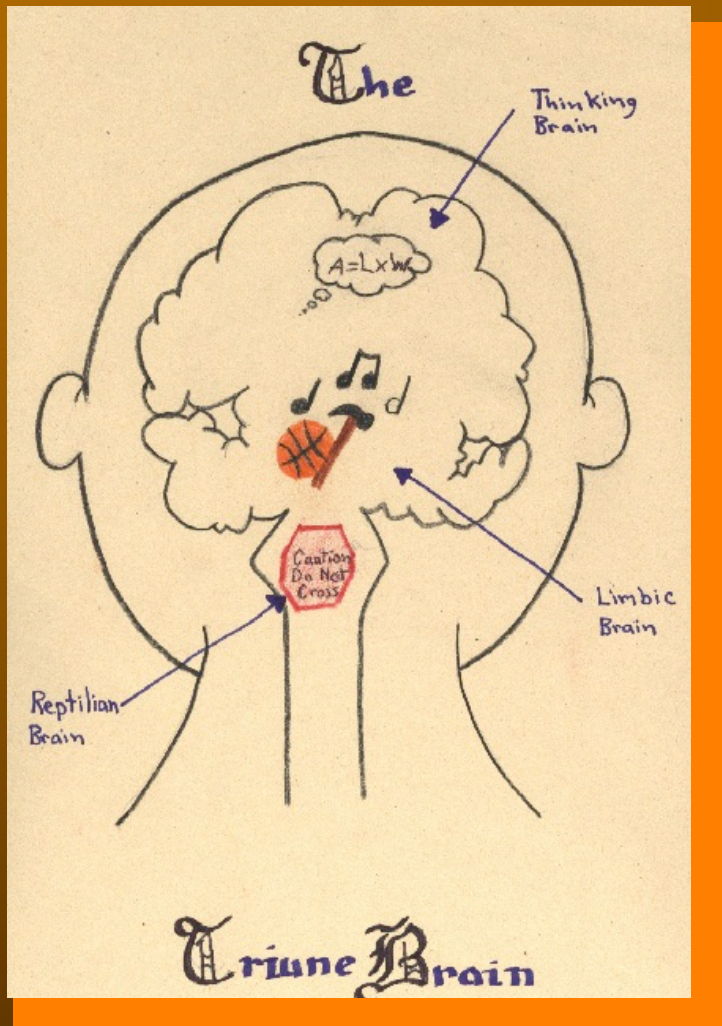
Physical, territorial, survival

- ***Limbic***

A developmental stage for becoming interested in music and color, etc. Association of feelings with physical fact leading to intellectual activity.

- ***Higher Level Thinking***

Capability of doing intellectual work such as complex math and critical interpretation that involve a higher degree of thinking than before.



Sea of Faces

Rosie Weagant 7th Grade





**Six
Division
Circle**

Trilliums

Stages of Development

A variety of opinions

...but everyone agrees

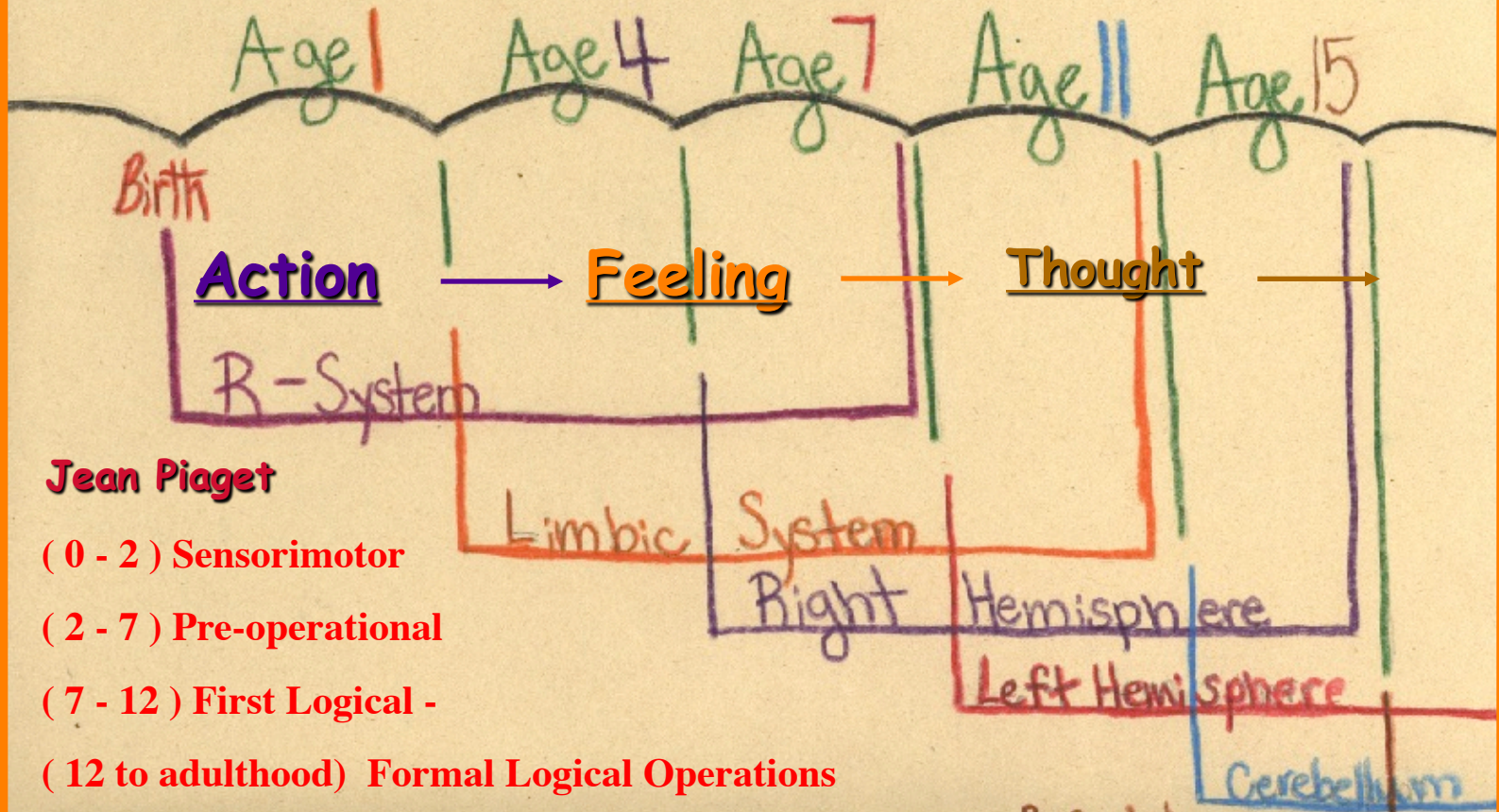
they exist.

There is no question – the developmental space between a seven-year-old and a far more conscious fourteen-year-old is dramatic. Through this period of considerable transition, a curriculum designed to exercise organic growth: eyes, ears, hands, feet & speech of the developing child, also supports the growth and development of the child's developing brain.

We see it and know it and
sometimes forget it.

Developmental Stages

The Triune Brain



Jean Piaget

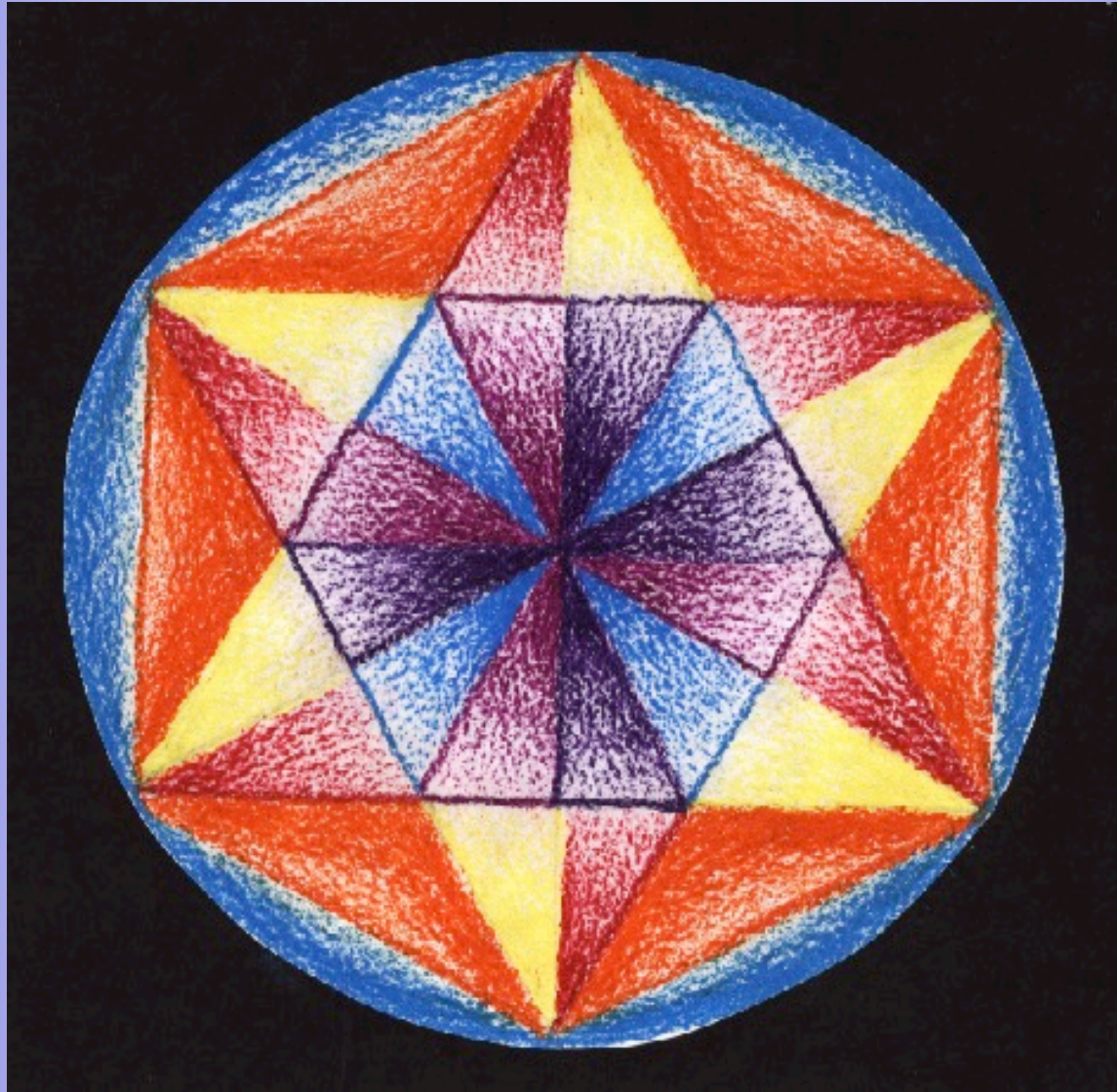
(0 - 2) Sensorimotor

(2 - 7) Pre-operational

(7 - 12) First Logical -

(12 to adulthood) Formal Logical Operations

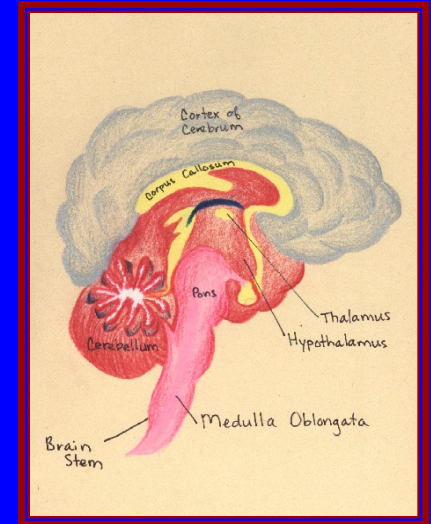
Six Division Circle



Jesse Sanders 7th Grade

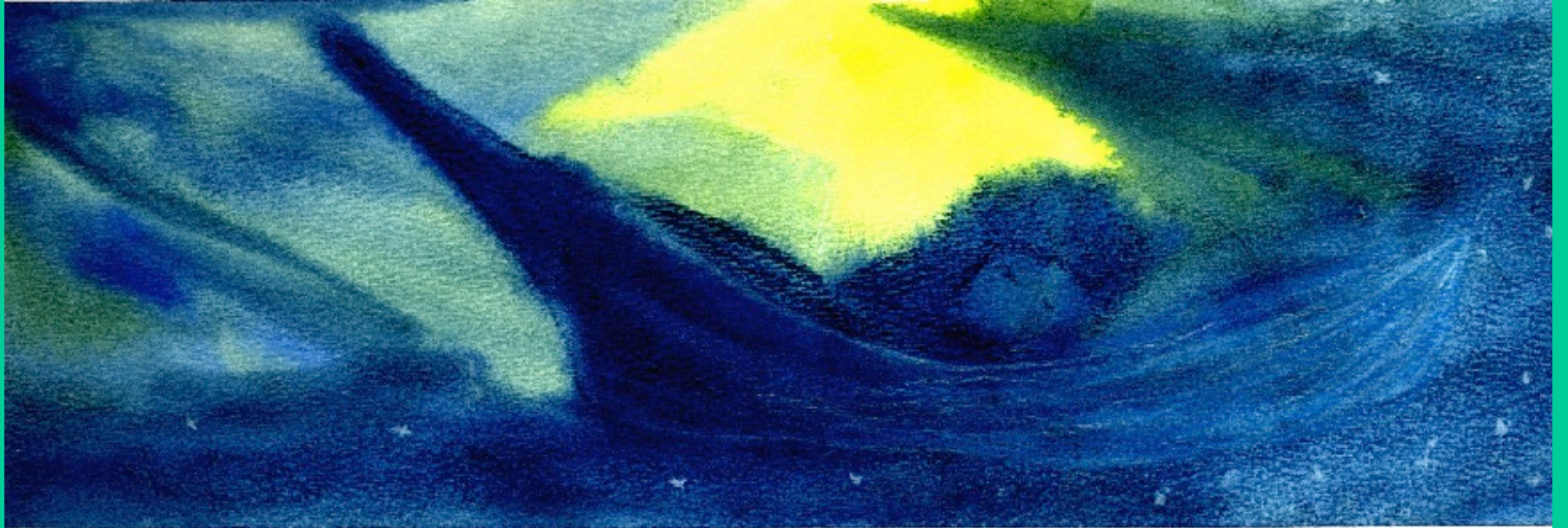
Summary of Brain Research

- ✦ Neurons are stimulated by sensory experience (interactive vs. visual)
- ✦ Growth of synapses and dendrites provide the foundation for life long learning.
- ✦ A protective coating of myelin makes chemical transmission more efficient. *Time and exercise.*
- ✦ Myelin coatings move from lower structures — those responsible for motor programs — to the highest centers for academic skills, abstract thought, and wise decision making. *Developmental priorities*
- ✦ With increasing amounts of environmental enrichment, we see brains that are larger and heavier, with increased dendritic branching. *Quantifiable measurements*
- ✦ Merely making visual experience of a complex environment available to animals unable to interact with it has little behavioral effect. *Physical activity*
- ✦ Whenever touch is combined with the other senses, much more of the brain is activated.



It's time to bring the brain to school!

Cradle Dreams



Enrichment:

Elements of Stehekin School's Educational Program —
Building synapses, dendrites, and human relationships



Drawn By Charlie Bretz

- ☆ Integrate all educational disciplines into unified thematic units;
- ☆ Involve children in practical activities calling for intense concentration thereby developing intellectual stamina;
- ☆ Invite community members into school to share a wide variety of skills;
- ☆ Seek beauty in all school work - we do less more fully;
- ☆ Inspire confidence, creativity and curiosity in children;
- ☆ Actively engage children in listening, speaking and *doing* activities throughout the day, as well as, leave spaces for focused, quiet concentration;
- ☆ Inspire students to pursue life-long learning.

**“Without art there is
no education.”** Margaret Mead

*“Learning is experience. Everything else
is just information.”*

— Albert Einstein