The Physiology of Learning & Behavior

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Objectives - Intention

- Experience how essential movement & mindfulness are to well-being, learning and social - emotional development.
- Experience how movement & mindfulness can easily and immediately shift State of Mind.
- Be inspired to use games and movement stories to integrate and model daily self-awareness and self-care skills.
- Discover new resources for movement & mindfulness activities.
Overview

- Pre-Activity, Adventure Skills, Post-Activity
- Research Samples & Adventure Skill Review
- Integration of Standards
- The Power of Hydration - Activity
- Triune Brain Theory Review
- March of Penguins - Tour of the Brain - Activity
- State of Mind - Game
- Pass the Message - Game
- Recap
- Question and Answer
Pre-Activity

• Turn head to left.
  – Notice how it feels.
  – Notice range of peripheral vision.

• Turn head to right.
  – Notice sensation and vision.

• Fold from hips into forward bend
  – Notice sensation and range of motion, touch your fingers lightly on your knees or shins to mark ROM

• Snap Test
  – Notice ease or difficulty.
• Adventure Skill # 1
• Adventure Skill # 2
• Adventure Skill # 3
• Adventure Skill # 4

*Ordered to coincide with Brain Gym®’s PACE
Post-Activity

• Turn head to left.
  – Notice how it feels.
  – Notice range of peripheral vision.
• Turn head to right.
  – Notice sensation and vision.
• Fold from hips into forward bend
  – Notice sensation and range of motion, touch your fingers lightly on your knees or shins to mark ROM
• Snap Test
  – Notice ease or difficulty.
Results

Most people (any age) experience:
• Greater range of motion
• Greater ease with cognitive tasks
• Greater enjoyment, confidence, relaxat

Notice what's true for you. Why?
• When you play more, you stress less.
• When you move more, you learn more!

Playful mind-body activities support an emotionally stable and learning-able state. Your “state” dictates what is possible for you and your children. When you teach/practice self-care, you help them be successful.
Play/Movement support
Being Well & Doing Well

• Over-rides the body’s physiological response to stress.
• Invites whole child participation. Organizes whole-brain function for optimal learning. (Dennison and Hannaford).
• Fuels the brain and body with oxygen and glucose.
• Raises positive chemical messengers levels that balance mind / body.
• Triggers BDNF, a neuro-tropic factor required for thinking. BDNF decreases after 20 minutes of sitting and is triggered again with movement.
• Strengthens key areas of the brain – basal ganglia, cerebellum and corpus callosum by building brain cells and connections. Improves mental focus and concentration (Caterino and Polk, 1999)
Bilateral Exercises - Decrease Off-Task Behaviors in Special-Needs Pre-schoolers

Dr. Jennifer Dustow, August 22 to September 30, 2005. Public school in Oahu, Hawaii.
Kristen age 8, case excerpt from “Envisioning a Bright Future” by Patricia Lemer. Original handwriting 2/18/03
After I went to school, my brother Michael would get up and get ready for school. Then my brother would go to school in the afternoon, while he was at school, my dad would be at work and my mom would be at home. After it was the end of the day, I would come home from school. I would do my homework.
Humming Breath*

Rub spots under collarbone with thumb and one finger while holding other hand over navel and tracking eyes horizontally. Deep breath and HUMMMMMMMMMM to calm and focus.

Stimulates:

- Flow of oxygen to the brain
- Hemispheric integration - eyes track across the midline
- Binocular vision - eye teaming
- Reticular Activating System - filter sensory info
Humming Breath Chant

One hand on my belly, I let it rest
I bring the other hand up to my chest
I find a pair of buttons beneath the shelf
And Huuuuuummmmmm
To calm myself
I move my eyes slowly
From the left to the right
Heart calm, mind clear
Body strong, eyes bright!

Humming Breath Video
http://vimeo.com/68339890
Monkey Wisdom

March in place, alternately touching hands to opposite knees to energize body & wake up brain.

Enhances:

- Crossing the visual/auditory/kinesthetic/tactile midlines
- Hemispheric integration
- Binocular vision
- Binaural hearing
- Left right coordination
- Stability in the walking gait

*Cross Crawl in Brain Gym®*
Monkey Wisdom Chant

I am healthy
I play every day
I drink lots of water
I don’t float away
I rest when I’m tired
I breathe when I’m mad
I eat fruits and veggies
’Cause they are rad
Red, orange, yellow & green
At every meal and in between!

Monkey Wisdom Video
http://vimeo.com/68339892
Deep Down Wisdom

Cross your ankles and wrists. Clasp hands and rest them at your sternum. Breathe and think of something or someone you love.

Supports:
- Emotional centering
- Activates the parasympathetic NS
- Grounding
- Respiration
- Self-control and boundaries

*Hook ups in Brain Gym®
Deep Down Wisdom Chant:
Feel your upset melt away
As your wisdom comes to play
Your heart will know what’s best to do.
Listen deep down and let it guide you.

Deep Down Wisdom Video
http://vimeo.com/68339891
Drink Water

Drink water regularly to sustain feel well, thinking clearly and being friendly.

Enhances:

• Electro-chemical activity in Central Nervous System
• Processing speed
• Stress release

DRINK WATER!
Think Drink Chant:
I’m a water drinker
All day long
I’m a water drinker
So I stay strong
Sip, sip, sip
Gurgle, swig, chug
I’m a water drinker
Glug, glug, glug
English Language Development

The ten domains above apply to all children. One domain, English Language Development, applies only to children who are dual language learners (DLLs). These children speak a language other than English at home.
Head Start/Common Core Early Learning Framework

- Physical Development & Health (PDH)
- Social & Emotional Development (SED)
- Approaches to Learning (AtL)
- Logic and Reasoning (LR)
- Language Development (LD)
- Literacy Knowledge & Skills (LKS)
- Mathematics Knowledge & Skills (MKS)
- Science Knowledge & Skills (SKS)
- Creative Arts Expression (CAE)
- Social Studies Knowledge and Skills (SSKS)
- English Language Development (ELD)
The Power of Hydration

**Purpose:** To reinforce the principle that water is the most easily accessed and frequently needed Adventure Skill, to demonstrate that water is a powerful conductor of electricity and that the human body, consisting of between 60%-75% water, needs to remain well-hydrated in order to deliver its millions of electrochemical messages.

**Materials:** Dehydrated green plant, energy ball*, cup of water

**Standards Addressed:** Atl, LR, LD, SKS, PHD
# Triune Brain Theory

<table>
<thead>
<tr>
<th>Lizard Brain</th>
<th>Mammal Brain</th>
<th>Human Brain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brain stem &amp; cerebellum</td>
<td>Limbic System</td>
<td>Neocortex</td>
</tr>
<tr>
<td>Fight or flight</td>
<td>Emotions, memories, habits</td>
<td>Language, abstract thought, imagination, consciousness</td>
</tr>
<tr>
<td>Autopilot</td>
<td>Decisions</td>
<td>Reasons, rationalizes</td>
</tr>
</tbody>
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The Triune Brain in Evolution, Paul MacLean, 1960
March of the Penguins

A Bus Tour of the Brain

Brain Area - Dimension

Neocortex - Communication (Laterality)
  “The Robot”
  Shoulders/Neck

Limbic - Coordinating (Centering)
  “The Swimmer”
  Chest/Stomach

Reptilian - Focus (Forward-Backward)
  “The Penguin”
  Back/Calfs
Movements

Penguin

Swimmer

Robot
State of Mind Game

Purpose: To understand the 3 levels of cognition / “states of mind” and to develop the ability to intentionally shift our state of mind/self-regulate

Materials: dice, sidewalk chalk

Standards Addressed: PDH, SED, ATL, LR, LD, LKS, MKS, SKS, CAE, ELD
How to Shift - Decrease Stress for Greater Access

• Embodied Self-Care and Regulation
• Play & Games
• Slow Intentional Coordinated Movement: Yoga, Karate, Thai Chi, Gymnastics
• Music & Story
Pass the Message

Purpose: To demonstrate that learning new tasks is easier and faster with repetition, to show, kinesthetically, how the brain prunes what isn’t used, in order to become more efficient and strengthen what is being used, to develop higher level thinking such as: cooperation, teamwork, and decision making.

Materials: Paper, timer

Standards Addressed: PDH, SED, ATL, LR, LKS, MKS, SKS, ELD
To Enhance SR & Learning

• Support BEING /optimal state before DOING / taking action. Use PACE/SR/Yoga/Play/Rest daily & as needed

• Set intention to lay a foundation for well-being/health by modeling & practicing mindfulness & SR

• Encourage reflection:
  • Notice thoughts, feelings, sensory/motor function before self-care/movement/play.
  • Notice the changes in thoughts, emotions, and/or sensory/motor functions after.

• Acknowledge kids’ when they SC, SR & shift themselves.
Research Highlights

EMBODIED SELF-REGULATION SKILLS

• Decrease off-task behavior in preschool age children (Dr. Jennifer Dustow, Autism Project, 2009)

• Improve creative problem solving, language skills, and memory (Gwen Dewar, Ph.D., The Cognitive Benefits of Play: Effects on the Learning Brain, 2008)

• Increases attention span & ability to ignore distractions & concentrate


MINDFULNESS

• Focus attention and engage participant in an empathic response, creating a significant physiological effect on the body and on behavioral choices. (Paul Zak, 2013)

• Activate episodic memory and light up the whole brain for learning (Dr. John Medina, Brain Rules, 2010)
• Unifies and integrates mind/body experience (Journal of Cognitive and Behavioral Practice 2009)

• Organizes whole-brain function for optimal learning (Dennison & Hannaford, 1999)

• Improves executive functions (Science 2011)

• Concentrates BDNF in the hippocampus, enhances long term memory retention (Ratey, 2008)

CARDIO EXERCISE

• Over-rides the body’s physiological response to stress

• Stimulates the release of BDNF, which grows the brain (Ratey, 2008)

• Improves the cognitive control of attention

• Enhances academic performance (Hillman, CH, Pontifex, MB, Raine, LB, Castelli, DM, Hall, EE, Kramer, AF, 2009)