# Three Strategies for Using the Arts to Build Student Executive Functions (Part 5 of 7)

January 16, 2012 | [Judy Willis MD](http://www.edutopia.org/user/19536)

Before information can be processed through executive functions, it must reach the prefrontal cortex (PFC), where higher order thinking occurs. The pathway to the PFC has potential roadblocks in the form of an information intake filter and an emotional switching station that determines if input reaches the PFC or is diverted to the lower, reactive brain. Embedding the arts into instruction and assessment promotes flow through these filters, builds [growth mindset (1)](http://mindsetonline.com/whatisit/about/index.html), and strengthens the actively developing executive functions.

## 1) The Arts Get Past the Brain's Attention Filter to Promote and Sustain Attention

All learning enters the brain as sensory input, but not all sensory input is allowed in through the brain's attention filter. The brain admits only about one percent of the sensory input available to it each second. It therefore behooves teachers to be sure their instruction "makes the cut."

This involuntary filter is in the low brainstem, and is called the reticular activating system (RAS). It gives priority to novel, unusual, curious sensory information. Listening to lectures and doing drills and worksheets are not novel or curiosity-evoking sensory experiences. That said, you can still snag students' attention by incorporating the types of sensory input that is favored for RAS selection. Here are ways you can incorporate some of the stimuli that get priority admission to the brain:

* Use color
* Use movement (through your own actions and with students)
* Incorporate music
* Incorporate changes in your voice
* Include curious objects
* Create positive anticipation of an activity that has previously been associated with pleasure

### Strategy 1 in the Classroom

You've seen professional speakers engage an audience by starting off with humor or a question that promotes curiosity. Starting a lesson with something to immediately engage students is equally important. You can promote attentive intake with curious or compelling photographs, drawings, music, video clips of scenes of from theatrical productions, or by reading a book using different voices for different characters. Once the intake filter opens to your novel, unusual or curious sensory information, it is likely that the academic information following and *relating* to these openings will be "selected" by this involuntary attention filter.

## 2) Use the Arts to Advertise, Build Curiosity and Predict *in Advance*

There are some standards or units of instruction to which students are particularly resistant, especially when their previous experiences with the topics have been negative. When these units of instruction are coming up, curiosity promoting art, photos, objects, paintings, etc. previewed in the weeks or days leading up to the unit can promote interest as students predict what might be coming.

You can prime student interest by using the research from the billion dollar advertising industry to increase the likelihood that their intake filters will select the sensory input of coming unit. Build anticipation and interest with visual arts as "coming attraction" hints.

### Strategy 2 in the Classroom

You can reveal new parts of a covered poster, photograph or other curiosity-building symbolic representation every few days leading up to the unit as students enjoy making and changing their predictions as they interpret new clues.

## 3) Make Sure You Get Through the Emotional Filter to the PFC

As I have written before, a low stress, positive emotional climate is needed to open the pathways to the prefrontal cortex and ignite the most powerful neural networks therein.

The amygdala is a switching station deep in the brain's emotional limbic system that determines if information will be conducted to the higher PFC where long-term retrievable memories are developed, or to the lower brain that "reacts" but does not "learn." When stress is high, the increased metabolic activity in the amygdala directs incoming information down to the lower brain.

Boredom and frustration, when sustained or frequent, are stressors that promote the amygdala's hypermetabolic state and block input to the executive functions housed in the prefrontal cortex. Similarly, when input does not reach the PFC and its emotional control centers, the reactive lower brain will control behavior output. The involuntary reactive behavior outputs are then limited to those of animals when they perceive possible threat: fight/flight/freeze in the wild -- acting out or zoning out in class.

The arts can reduce the stressors of boredom or frustration and help rebuild a growth mindset for students with a history of frequent academic failures. Because most children have experienced pleasure from the arts, either from active creative participation or pleasurable listening or viewing, incorporating these sources of past pleasure in a lesson reduces the brain's need for find its own engagement by the self-stimulation of "acting out," such as disturbing classmates or defacing desks and books, or the internal self-stimulation provided by their imaginations that gives the appearance of "zoning out."

Indeed, we've all seen students act out (or zone out) while passively listening to classmates' reports or during a shared, whole-class reading. This is the behavior of all mammal brains when there is sustained boredom or frustration.

To promote engagement and effort, students need early opportunities to find personal pleasure and relevance in the material they must learn.

### Strategy 3 in the Classroom

Creating art, instrumental music, dance moves or skits can be strong strategies to teach with engagement and can promote memory and executive function across the curriculum, such as fractions, patterns in science cycles, or historical and literature time/event progressions.

You can promote increased attention by giving students the opportunity to create personal representations of the material they're hearing. One example would be to have them sketch while listening, creating visual representations of the content. Instead of passive inattention (and the associated behavioral problems and failure to make memory links), making diagrams, mindmaps and other symbolic representations will focus active listening and the greater likelihood of memory links.

*Preparation Note: As with all new approaches, students may need guided practice, models, frequent formative assessment and guiding feedback when these alternatives are used in place of traditional note-taking, particularly when the information includes important content knowledge and critical foundational information.*

Children's brains need to acquire memory associations that link pleasure with learning. The creative arts can provide this link through associations with the pleasures of creative experiences enjoyed during early childhood.

In my next blog, I will cover the arts and the neuroscience of joyful learning.