5-15-2013

Supporting the development of executive functioning skills in sixth grade students

Anne Davidson Anderson
Bank Street College of Education

Supporting the Development of Executive Functioning Skills in Sixth Grade Students

Anne Davidson Anderson

Bank Street College of Education

Mentor: Mayra Bloom

Abstract

This Integrative Master's Project explores how teachers can support the development of executive functioning skills in sixth grade students at the particular school where I am a learning specialist (though many of the findings and recommendations can be generalized to other settings). Sixth grade is a transitional and demanding year for students. Developmentally, sixth grade students are entering adolescence, a stage marked by puberty and significant physical, social, emotional, and cognitive changes. Academically, they leave behind elementary school and enter middle school, a change characterized by a shift from self-contained classes with one or two teachers to content-area classes that are taught by specialized teachers. Middle school teachers also tend to assign more homework, schedule more tests and quizzes, and expect students to bring more materials to and from class. How students respond to these new demands hinges largely on their executive functioning skills. However, few sixth grade students are strong in all executive function domains, and many experience severe deficits in one or more areas. As a result, teachers need to support executive functioning in the classroom.

This paper explores the academic impact of selected executive function skills, the developmental abilities and interests of sixth grade students, and the sixth grade experience and academic demands at my particular school. These discussions provide a framework for understanding where sixth grade students need targeted, executive function supports. A teacher toolkit with recommended classroom routines, practices, and interventions is then presented. Finally, future research and curriculum goals are outlined, and overarching conclusions are drawn.

Keywords: executive function, sixth grade

Table of Contents

Integrative Master's Project:

Supporting the Development of Executive Functioning Skills in Sixth Grade Students

Sixth grade is a transitional and demanding year for many students. Developmentally, many sixth grade students are entering adolescence, a stage marked by puberty and significant physical, social, emotional, and cognitive changes. Academically, they move from elementary school to middle school, a change characterized broadly by a shift from self-contained classes with one or two teachers who largely orchestrate the entire school day to class periods and content-area classes taught by specialized teachers. Middle school teachers also tend to assign more homework, schedule more tests and quizzes, and expect students to bring more materials to and from class. How a student responds to these new demands is dependent upon his or her self-regulation or executive functioning ability.

Executive function is an umbrella term that refers to the "mental control processes" (Denckla, 1994, p. 118) that facilitate self-regulation (Barkley, 1997a). There are an array of skills that contribute to executive functioning, including planning, organizing, and prioritizing tasks; managing time; shifting approaches and perspectives; maintaining attention; remembering task components; inhibiting distracting thoughts and actions; maintaining attention; monitoring progress; reflecting on work product and process; and regulating emotions (Denckla, 1996; Lerner et al., 2011; Meltzer, 2010; Moilanen, 2007; Terkeltaub, 2012). Each of these abilities is integral to academic success; however, few sixth grade students are strong in all executive function domains, and many experience severe deficits in one or more areas. As a result, teachers need to

support executive function skills in the classroom through explicit instruction, consistent routines and expectations, and targeted scaffolds.

The purpose of this paper is to explore how teachers can support the development of executive functioning skills in sixth grade students at the particular school where I am a learning specialist. Discussions of selected executive function skills, the developmental abilities and interests of sixth grade students, and the sixth grade experience and academic demands at my school provide a framework for understanding where sixth grade students need targeted support for executive functioning. A teacher toolkit with recommended classroom routines, practices, and interventions is then presented. Finally, future research and curriculum goals are outlined, and overarching conclusions are drawn.

Part I: Overview of Executive Functioning

Executive functions are the processes that allow individuals to self-regulate their actions and thoughts within a particular context (Barkley, 1997a). As Moilanen (2007) explains, self-regulation is "the ability to flexibly activate, monitor, inhibit, persevere and/or adapt one's behavior, attention, emotions and cognitive strategies in response to direction from internal cues, environmental stimuli and feedback from others, in an attempt to attain personally-relevant goals" (p. 835). Self-regulation is not automatic or constant; it must be developed by continually and actively synthesizing the demands of the environment, a particular task, and the desired outcome. By facilitating self-regulation, executive function processes allow an individual to think and act strategically in order to maximize personal achievement in a particular situation (Barkely, 1997a; Lerner et al., 2011).

Executive Function Skills

Self-regulation requires the mastery of an array of skills that are categorized as executive functions. Researchers and clinicians define these skills in a variety of ways because there is no specific, scientific definition for the executive function construct (Jurado & Rosselli, 2007; Elliot, 2003). It is beyond the scope of this paper to explore all skills that contribute to effective self-regulation and executive functioning. Instead, the following discussions focus solely on the contributions of metacognition, planning, organization, attention, and memory.

Metacognition. Metacognition is "the ability to think about one's own thinking and learning" (Meltzer, 2010, p. 8). It is the ability to reflect on how one's planning, organization, attention, memory, self-awareness, and emotional state affect a learning experience and outcome. Metacognition has been called the "cornerstone of independent learning" (Bagnato & Meltzer, 2010, p.160) because it allows students to take control of their own academic experiences and achievements. Metacognitive students are aware of how their conscious efforts contribute to the overall result (Bagnato & Meltzer, 2010). These students are able to explain how they accomplished a task as well as why the approach was effective (or ineffective) and what improvements could be made in the future. They are familiar with a range of strategies and understand when and how each can be used. Although learning and implementing new strategies can be challenging and time-consuming, metacognitive students realize the benefits and are motivated to reap the rewards of increased understanding and improved work product. Self-regulation and executive functioning are dependent on metacognition.

Student difficulties and deficits in metacognition can manifest in a variety of ways. For example, (synthesized from Bagnato & Meltzer, 2010; Meltzer, 2010; Terkeltaub, 2012):

- Student may not reflect on or monitor his/her planning, organization, attention, or memory.
- Student may not know his/her learning style or needs.
- Student may not know appropriate or sufficient strategies that meet his/her learning style or the demands of the task.
- Student may not be willing to use strategies to complete a task.
- Student may not recognize the correlation between effort, strategy use, and outcome.
- Student may not be interested in the task.
- Student may appear to lack motivation to thoroughly complete the task.
- Student may struggle to realize when a strategy is ineffective or inefficient.
- Student may not be willing to revise or abandon ineffective strategies.
- Student may not utilize past outcomes to inform future decisions.

Planning. Planning is the ability to anticipate the requirements of a task and set an agenda to successfully complete that activity within a prescribed period of time, a skill that is essential to self-regulation and executive functioning (Cox, 2007; Krishnan, Feller & Orkin, 2010; Meltzer, 2010). In order to plan, students also need to be able to set goals, anticipate the final product or outcome, break tasks down into component parts ("chunking"), prioritize activities, manage time, and monitor progress. Planning is integral to all academic tasks, including completing homework and projects on time,

studying, arriving to class punctually and with the necessary materials, and taking tests within a designated time period.

Student difficulties and deficits in planning can manifest in a variety of ways. For example, students who struggle with planning task execution may have the following difficulties (synthesized from Cox, 2007; Krishnan, Feller & Orkin, 2010; Meltzer, 2010; Terkeltaub, 2012):

- Student may routinely start tasks without conceptualizing the final product.
- Student may not be able to explain the desired outcome of a task.
- Student may struggle to initiate tasks; does not know where or how to start a task.
- Student may not be able to identify the steps required to complete a task.
- Student may struggle to complete tasks in a logical and sequential order; may jump around or have to back-track.
- Student may become easily overwhelmed by larger tasks.

Students who struggle with planning their time may experience the following difficulties (synthesized from Cox, 2007; Krishnan, Feller & Orkin, 2010; Meltzer, 2010; Terkeltaub, 2012):

- Student may not have any conception of time; easily loses track of time; struggles to estimate how long a task will take.
- Student may procrastinate.
- Student may routinely run out of time on assessments or hand in projects late.
- Student may spend too much time on one aspect of a task and not enough time on others.

- Student may consistently feel frustrated about not meeting personal goals and/or disappointing others.

Organization. Organization is the ability to arrange materials and information in an orderly way (Cox, 2007; Krishnan & Feller, 2010; Meltzer, 2010). The organization of materials requires students to physically position items in a logical place, making the items easily accessible when necessary but keeping them out of the way during unrelated tasks. Students need to organize papers, pens, pencils, and books in their bedrooms, desks, lockers, binders, and backpacks in order to maximize their academic achievement. As Cox (2007) emphasizes, "a messy desk is more than a trivial concern because it may be the difference between being able to perform up to one's true ability and languishing in personal chaos" (p. 141). Therefore, recognizing the need for organization and taking the time to organize can greatly increase a student's efficiency, productivity, and satisfaction as well as the quality of their work product. Students also need organizational strategies, tools, and habits that align with their personal learning styles, strengths, and needs.

Practice with organizing tangible materials provides a model for organizing more abstract concepts and ideas. The organization of information requires students to identify common themes, main ideas, and details; categorize ideas and facts; and structure responses. Students need to organize information when they are taking notes, reading critically, brainstorming, writing, and solving math word problems, among other academic activities. Similar to material organization, the successful organization of ideas is dependent on student buy-in, motivation, and knowledge of strategies that align with the student's unique learning style, strengths, and challenges.

Another important component of organization is the ability to recognize and take advantage of organizational systems that are externally generated. For example, the structure of expository text can help students to identify main ideas and supporting details, essential questions indicate major themes, study guides highlight the concepts that teachers deem most important for a test, and classroom routines and agendas prepare students for learning experiences. Krishnan and Feller (2010) maintain that such external or imposed structures free up mental energy so that students can learn new concepts:

> To become successful organizers in school, students must first recognize how their learning environment is structured… As students are afforded explicit opportunities to develop strong schemas for the organization of their learning, they will be able to allocate the needed cognitive resources efficiently as they engage in the lessons being taught. (p. 89)

Therefore, teachers must help students to understand the prescribed structure of learning experiences. Students also need time and opportunity to explore and analyze these imposed structures in order to deepen their understanding and ability to use the inherent organizational schemes.

Student difficulties and deficits in organization can manifest in a variety of ways, including (synthesized from Cox, 2007; Krishnan & Feller, 2010; Meltzer, 2010; Terkeltaub, 2012):

- Student may lose materials often.
- Student may have a chronically messy backpack, binder, locker, or desk.
- Student may not have a system for organizing academic materials.
- Student may struggle to sort information into categories.

- Student may not recognize the hierarchy of information; cannot identify common themes, main ideas, and supporting details.
- Student may become easily overwhelmed by the quantity of information; does not sifting through to determine the main ideas and important details; does not recognizing that some information is not important.
- Student may not utilize classroom routines and structures to assess academic requirements and expectations.

Attention. Attention is the ability to concentrate on a particular interaction or activity. Barkley (1996) details five behaviors that are critical to attention: focusing, initiating, sustaining, inhibiting, and shifting. Therefore, in order to properly utilize and regulate attention, an individual must attend (focus) to a single task, engage (initiate) in that task, and maintain (sustain) concentration until the task is complete while simultaneously blocking out (inhibiting) all external and internal distractions. The individual must also regulate (shift) attention to meet the demands of the task and environment. Self-regulation hinges on a student's facility with each of these behaviors, making attention a critical component of executive functioning.

Attention impacts academic experience and achievement. For example, students need to 'tune in' during class discussions in order to learn important concepts, pick up on teacher cues about important information, and hear about upcoming assignments and assessments. Assignment completion is also impacted by task initiation and impulse inhibition. Students who struggle to get started and are easily distracted tend to procrastinate. As a result, students may not complete assignments, or they may work hastily due to time constraints. Students must pay close attention to their own work

product in order to avoid inattentive-type (or 'silly') mistakes, such as confusing operations in a math problem, misreading a question, or skipping a question (or page) altogether. Furthermore, students must shift attention and think flexibly in order to assess situations and tasks, monitor comprehension, solve problems, synthesize information, develop nuanced understandings, and analyze information. Cognitive shifting and flexible problem-solving become increasingly important as students move up the academic ladder because critical, analytical, and original thought become more important. Overall, inattention can have an extremely detrimental effect on a student's academic experience and achievement.

It is important to note that a student's attention difficulties may be a reflection of his or her interest in the subject. A student with strong executive functioning skills can sufficiently regulate his or her behavior in order to attend to seemingly tedious or difficult tasks as long as he or she foresees a personally-relevant outcome. However, if the goal of the assignment is unclear or irrelevant to the student, then he or she is more likely to experience lapses in attention – or give up entirely. Teachers can narrow the gap between expectations and student behavior by designing learning experiences that appeal to student interests.

Students' attention difficulties and deficits can manifest in a variety of ways. Below are examples of struggles that students may have with each of the five components of attention (synthesized from Barkley, 1996; Cox, 2007; Levine, 2001; Meltzer, 2010; Meltzer & Bagnato, 2010; Terkeltaub, 2012):

- Focusing:

    - Student may struggle to focus on a task or listen during class discussions.
    - Student may struggle to ‘remember’ assignments and assessments; however, in actuality, the student may not hear assignment details in class due to inattention.
    - Student may find excuses to take a break from a task for a sustained period of time (i.e., going to the nurse, talking on the phone, eating a snack, playing basketball).
    - Student may not realize when attention fades and he/she needs to reinitiate a task or re-engage in an activity.
    - Student may struggle to form peer relationships due to inattention during peer interactions.
- Initiating tasks:
    - Student may struggle to initiate a task; prone to procrastination.
    - Student may struggle to identify a starting point.
    - Student may not have a consistent routine.
- Sustaining attention:
    - Student may struggle to sustain concentration through the duration of a task.
    - Student may make ‘silly’ or inattentive-type mistakes on assessments and tasks; poor attention to detail and self-monitoring.
    - Student may move from one task to the next without completing either; easily sidetracked and distractible.

- Inhibiting distractions:
    - Student may struggle to inhibit distractions; cannot tune out or ignore distractions.
    - Student may struggle to discriminate between external stimuli and determine which should be the focus of attention.
    - Student may struggle to inhibit physical movement; may fidget or seem restless.
    - Student may struggle to control impulses (i.e., calls-out or stands up in class).
- Shifting attention:
    - Student may struggle to shift attention when a task or situation requires.
    - Student may struggle to check his/her work.
    - Student may struggle with physical transitions, including changing classes, activities, or tasks.
    - Student may struggle with mentally shifting gears, including transitioning between question topics; question formats (i.e., essay, short answer, fill-in-the-blank, multiple-choice, matching); mathematical operations; numbers and words; reading, thinking, and writing; etc.
    - Student may struggle to understand different perspectives.
    - Student may struggle to see alternative interpretations or meanings.

- Student may tend to get ‘stuck;’ unable to adjust approach or modify strategy.
- Student may struggle to shift between big picture and detail-oriented thinking.
- Student may struggle to adapt to changes in the daily routine.

Memory. Memory is the mental capacity to receive, process, store, and retrieve information. There are four primary types of memory: short-term memory, working memory, long-term memory, and automatic memory (Kincaid & Trautman, 2010; Levine, 2001). Information that is received through the senses enters short-term memory where the brain decides whether it is needed for an immediate task, a future task, or not at all. Inconsequential information is discarded, while information that is needed for a future task is consolidated in long-term memory (after sufficient repetition, rehearsal, and review). Information that is needed for a current or ongoing task is stored in working memory. Important facts that require rapid recall (i.e., math facts, colors, numbers, letters, sight words, etc.) are stored in automatic memory (after significant practice). All memory functions contribute to self-regulation and executive functioning, but working memory is the most critical.

Goldman-Rakic describes working memory as “the capacity to hold events in mind so as to use them to control a response” (as cited in Barkley, 1997a, p. 164). This capacity is believed to be dependent on three essential processes: visualization, self-speech, and the manipulation of information (Barkley, 1997a). Visualization is the practice of creating a mental image in order to better understand real or imagined visual and spatial information. Self-speech is the process of mentally talking through problems

or activities in order to direct behavior. Finally, the manipulation of information is the ability to recall similar past experiences (retrospective memory), envision hypothetical future outcomes (the anticipatory set), develop plans for attaining the desired result, and acting according to those plans (prospective memory). Visualization and self-speech are often integral to manipulating information in working memory. Together, these three processes allow working memory to dictate human behavior. Some researchers have even argued that working memory is the central executive because of the role it plays in mediating all other executive function processes and governing self-regulation (Barkley, 1997a; Kincaid & Trautman, 2010).

Student difficulties and deficits in memory can manifest in the following ways (synthesized from Barkley, 1997a; Cox, 2007; Kincaid & Trautman, 2010; Meltzer, 2010; Terkeltaub, 2012):

- Student may forget to complete tasks, assignments, or activities.
- Student may struggle to remember multi-step processes; forgets components of a task.
- Student may struggle to mentally manipulate several pieces of information at the same time.
- Student may struggle to remember information that has multiple parts.
- Student may not remember classroom routines or expectations.
- Student may struggle to consolidate or retrieve information in long-term memory.
- Student may struggle to automatize rote facts (i.e., math facts, spelling patterns).

- Student may 'overload' working memory with too much information.
- Students may forget to bring materials (i.e., homework, binder, pencil, paper, book, etc.) to class.
- Student may try to store too much information in long-term memory at a particular time; cramming.
- Student may try to remember too much information; cannot prioritize major themes and main ideas over details and examples.

Executive Functions, Intelligence, Academic Achievement, and Motivation

Executive functions are skills that facilitate the execution of tasks. These skills can have a significant impact (positive or negative) on a student's academic achievement, but they are not a reflection of that student's intellectual functioning or IQ (Barkley, 1997a; Cox, 2007; Dawson & Guare, 2009; Meltzer, 2010). There has been extensive research that illustrates the independence of executive functioning and intelligence. Barkley (1997a) cites research studies of patients who have suffered injuries to the prefrontal cortex (the region of the brain largely responsible for directing and coordinating executive functions). These individuals showed little or no change in IQ but did show impairments in executive function, specifically planning, working memory, impulse control, cognitive flexibility, and concept formation. Barkley also explains research studies that prove specific executive functions (i.e., working memory, behavioral inhibition, and response flexibility) are dissociable from intelligence. He concludes that executive function differences "are not primarily explained by differences in general intellectual ability" (p. 152); however, executive functions can contribute to an individual's performance on measures of intelligence. In other words, a person with

executive function difficulties may be more intelligent than he or she presents which highlights the importance of alternative and authentic forms of assessment when teachers suspect that a student's executive functions are impaired.

Meltzer (2010) agrees with Barkley (1997a). She points out the production struggles faced by students with executive function difficulties:

> Students with executive function difficulties often experience an overload of information, so that input exceeds output. They struggle to plan, organize, and prioritize… these students cannot process this information rapidly enough and cannot shift approaches flexibly… therefore, their conceptual reasoning abilities may be stronger than their output and productivity (p. 7).

Meltzer goes on to explain that, despite the distinctions between executive functioning ability and intelligence, executive functions have a profound impact on academic achievement. Students with executive function difficulties struggle to initiate writing assignments, take notes, study, complete assignments on time (particularly long-term projects), remember to submit completed assignments, and sustain attention, among other academic tasks. As a result, such students work inefficiently and unproductively, underperform on assessments, and receive grades that do not reflect their intellectual abilities or understanding of the material. Meltzer (2010) highlights that executive function difficulties become more pronounced in middle school (and high school) "due to the mismatch between [students'] skills and the curriculum demands" (p. 7). Dawson (2010) echoes these findings and explains that students with poor executive functioning skills can be successful in elementary school due to teacher and parental supports; however, these same students buckle under the pressures of middle school, particularly

due to the added stress of changing classes, remembering the expectations of various teachers, and receiving less support from teachers and parents.

Educators, particularly sixth grade teachers, need to be mindful of the fact that executive functioning is independent of intelligence yet hinders academic performance. Students who appear "lazy" (Dawson, 2010) or "scattered" (Dawson & Guare, 2009) and consistently fail to meet expectations may presently lack the requisite executive skills. If such students are not taught appropriate strategies and are instead punished or chastised, they may lose hope in their own abilities and develop a poor self-concept (Meltzer, 2010). Self-concept is critical to academic achievement and motivation. As Meltzer explains, "at the middle school level, differences in academic self-concept [influence] students' judgments of themselves as good or poor students, as strategic learners, and as hard workers who [are] willing to make the effort to learn" (p. 26). Students who see themselves as "good students" are more likely to put forth the effort to learn new strategies in hopes of maintaining a record of strong academic achievement. However, students who condemn themselves as "poor students" lose motivation and fail to see how their personal efforts contribute to overall success; they give up because they believe that they have nothing to lose – or gain. Students need to experience success in order to develop self-efficacy and self-confidence. Embedding executive function supports and training within the classroom facilitates successful experiences, motivates students to work hard, and allows students to demonstrate their intellectual abilities instead of their executive function shortcomings.

Executive Function and Learning Disabilities

Executive Function Disorder (EFD). Most individuals have strengths and weaknesses within the executive functioning realm, but some experience pervasive difficulties with most processes. Such individuals are commonly said to have Executive Function Disorder (EFD). EFD is not a formal psychiatric diagnosis that is included in the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (DSM-5; 2013). This manual is still in its infancy, so it is unclear how diagnosticians will document executive functioning deficits. The most probable diagnoses are Intellectual Disability, mild (DSM-5 317 or F70; American Psychiatric Association, 2013) or Attention-Deficit/Hyperactivity Disorder, predominantly inattentive presentation (DSM-5 314.00 or F90.0; American Psychiatric Association, 2013). It is beyond the scope of this paper to discuss the specific diagnostic criteria of these neurodevelopmental disorders. Interested parties should refer to the DSM-5.

Denckla (1996) explains that there are three theoretical models supporting a formal EFD designation. First, an individual may have EFD if the frontal lobes of his/her brain develop atypically or are damaged by trauma or disease. Because executive functions are largely orchestrated in the frontal lobes, specifically the prefrontal cortex, such individuals tend to struggle with executive function processes. Second, EFD may explain why individuals are "unable to function as 'good students'" (Denckla, 1997, p. 264) despite strong results on standard psychometric measures of intelligence and academic knowledge. Further neuropsychological and behavioral-neurological evaluations can be used to reveal that these individuals have weak executive functions. Finally, developmental changes from childhood to adolescence to adulthood can be

described in terms of the evolution of executive function skills. Students who do not gain such skills in a developmentally typical or expected way may have EFD. Each of these constructs suggests that EFD should be recognized as a legitimate disability.

EFD and Attention-Deficit/Hyperactivity Disorder (ADHD). There is significant research about the relationship between EFD and ADHD. Barkley (1996, 1997a, 1997b) argues that ADHD is a disorder of executive function. He proposes a model for ADHD that centers on weak response inhibition which impacts overall self-regulation. Brown (2002) similarly prescribes to the theory of ADHD "as a developmental impairment of the brain's executive functions" (p. 910). Conversely, Cox (2007) points out that "there are many individuals with executive control deficits who do not have ADHD" (pp. 13-14). Lambek et al. (2010) reference several studies that conclude only 30-50% of students with ADHD also have EFD. Therefore, more research is necessary to determine the relationship between ADHD and EFD.

Part II: Developmental Abilities and Interests of Sixth Grade Students

Sixth grade students are typically eleven or twelve years old. It is beyond the scope of this paper to discuss the intricacies of adolescent development or the full range of developmental stages that a class of eighty students is bound to span. Instead, this discussion provides an overview of physical, social, emotional, and cognitive characteristics that impact executive functioning and are shared by "typically" developing eleven and twelve year olds. Because development happens along a continuum, some students will reach certain milestones before or after their peers.

Physical Development of Eleven and Twelve Year Olds

Adolescence generally begins at around age eleven with the onset of puberty (Wood, 1997). During this time, students become more aware of their own physical appearance and become self-absorbed and self-conscious as they compare themselves to peers. Physical insecurity can cause anxiety in the classroom and beyond. For example, some students may avoid presenting to the class or participating in individual activities such as swimming, gymnastics, and dance for fear of being criticized or scrutinized for their physical appearance. While excessive self-consciousness can lead to serious medical problems (such as eating disorders), it is developmentally appropriate for sixth grade students to compare themselves to others and consider how they are perceived by others (Cox, 2007; Wood, 1997).

Pubertal changes also cause physical discomfort (Wood, 1997). Students often feel aches and pains when they are going through a growth spurt. Sitting at a desk, in a hard chair, throughout an entire class period, can exacerbate growing pains. Therefore, within the confines of a typical middle school classroom, the physical development of sixth graders makes attention quite difficult. Specifically, students must maintain focus on the lesson and inhibit the urge to stretch and move during class despite their physical discomfort.

Social and Emotional Development of Eleven and Twelve Year Olds

Throughout sixth grade, students become more and more consumed by the growing desire to be with their friends (Wood, 1997). School becomes a place where students can socialize with peers. Lunch periods, walks between classes, and even classroom activities provide the backdrop for meaningful interactions and relationships. Eleven and twelve year olds enjoy working in groups and competing as teams. Social

groups become tight cliques, particularly among girls, and students strive to 'fit in' and belong. Cliques can lead to very close bonds among those who are included, but they can also lead to cruelty towards those others who are excluded and marginalized. Alliances change rapidly and seemingly unpredictably, creating social anxiety and the fear of missing out on an event.

Sixth graders become preoccupied with their public appearance and perception. They are motivated by the desire to fit in as well as present themselves as more adult-like and less child-like (Wood, 1997). As a result, eleven and twelve year olds gradually assimilate to cultural norms by, for example, spending more time on the telephone, on social networking sites, and in front of the mirror. Wood (1997) explains that sixth graders begin to "define themselves by jackets, hairstyles, shoes, [… music…], movies, videos, TV preferences, sports teams, the mall, the dance rage, what older kids are doing" (p. 133). They carefully observe and gradually imitate the clothes and behaviors of older students and pop culture icons.

Eleven and twelve year olds are easily embarrassed due to their longing to 'fit in' and appear more grown up. Seemingly inconsequential comments about – or a lack of approval for – their appearance, behavior, or work product can have deep impacts on a student's confidence and motivation. Therefore, sixth graders are quick to put up their defenses and 'save face' when they feel attacked or have done something wrong (Wood, 1997). When teachers need to talk to a student about his or her performance on an assignment, behavior in class, or another sensitive matter, it is important that those conversations take place away from the student's peers and preferably at a time somewhat removed from the incident (Curwin, Mendler, & Mendler, 2008; Wood, 1997).

Such accommodations will help to preserve the student's dignity and increase his or her receptiveness to feedback.

As sixth graders struggle with forming their identity and finding their niche in the social arena, they become increasingly self-absorbed. Egocentrism makes adolescents appear rude, impulsive, and moody (Wood, 1997). They are quick to cast judgment and act without considering the consequences or feelings of others. At the same time, they are highly sensitive to perceived criticisms and actions against themselves. They struggle to make good decisions and tend to challenge rules and test limits, particularly when they are among peers. Arguments abound as eleven and twelve year olds strive to justify their actions and stick up for themselves.

These social and emotional characteristics of sixth graders highlight some of their executive functioning difficulties. Most obviously, eleven and twelve year olds struggle to self-monitor. They display some self-awareness through their egotistical thoughts and actions but show little emotional regulation or impulse inhibition. Furthermore, sixth graders tend to get stuck in their own experience or perspective and have difficulty making sound decisions. These trends illustrate weaknesses in shifting mindsets and working memory. Cliques are an attempt to organize social interactions; however, this structure is neither a productive nor efficient strategy for forming mature relationships. The desire to spend time with friends also impacts students' priorities and often leads to procrastination on academic obligations.

Cognitive Development of Eleven and Twelve Year Olds

Sixth grade marks the transition from elementary school to middle school. As discussed in Part IV of this paper, the academic demands increase significantly with the

advent of more frequent tests and quizzes, long-term assignments, departmentalized classes, and greater independence on campus. Many eleven and twelve year olds welcome these changes as an indication of their ability to handle more mature responsibilities. Teachers can capitalize on students' desire to do grown-up work by pointing out the advanced nature of a task; however, teachers should also emphasize that sixth grade is a time to learn and grow. Teacher attitude, tone, and sense of humor are critical to preventing students from taking themselves, and their studies, too seriously (Wood, 1997).

Sixth grade students can become deeply invested in school projects, issues, and activities (Wood, 1997). They are interested in current events, politics, social justice, pop culture, and materialism. Units that explore these topics in meaningful ways appeal to adolescents' desire to take on more grown-up issues and see themselves as consequential members of the greater society. Similarly, students enjoy intellectually challenging activities and opportunities to display new knowledge. Though they may openly complain about translating sentences in a foreign language, studying for tests, conducting research, writing papers, and reading novels, eleven and twelve year olds actually enjoy these advanced academic tasks that provide a sense of mastery and maturity.

Most sixth graders still learn best through hands-on activities. They are motivated by projects that will be publicly shared with others, but they need help planning and executing these assignments (Wood, 1997). Intermediary steps and due dates help to break long-term projects into more manageable chunks. When provided this scaffold, students are able to set short-term goals for a class period or weeknight assignment, but they struggle to set realistic goals and complete work over longer periods of time (such as

weekends). Sixth grade students also struggle with revising their work and will typically prioritize new tasks. The importance of revision should become better understood and appreciated by the end of the year, but teachers need to provide explicit instruction on how to edit work and incorporate feedback as well as why revisions are an important part of any learning experience.

Materials management is not inherently important for sixth graders. As Wood (1997) explains, "keeping track of things like assignments, books, papers and sweat shirts isn't a priority" (p. 134). Student binders, backpacks, and lockers are often quite messy. Additionally, sixth graders tend to leave their personal items strewn across the public areas of the school. Teachers need to set clear expectations and establish rational consequences in order to help sixth graders to take more responsibility for their materials.

Eleven and twelve year olds tend to be interested in rules (Woods, 1997). They regularly challenge teachers and test limits. In the process, they develop ideas about classroom policies and operations. Teachers should honor these sentiments by providing opportunities to discuss student ideas and incorporating *reasonable* requests into class routines and practices; however, it is also important that rules are consistent throughout the grade and teacher authority is clearly and calmly maintained. 'Fairness' is very important to sixth graders.

In contrast to their self-absorption in social situations, students will show an "increased ability to de-center and see the world from various perspectives" (Wood, 1997, p. 125) during class discussions. Students enjoy debating, developing and testing hypotheses, analyzing language, making inferences, and drawing conclusions. Sixth

graders particularly like playing word games and solving riddles. Each of these activities helps to advance abstract thinking and build cognitive flexibility.

Neurological Development of Eleven and Twelve Year Olds

Sixth graders typically display limited executive functioning skills, but this observation is developmentally appropriate. The brains of most eleven and twelve year olds have not yet developed the ability to plan ahead, organize information and materials, prioritize activities, think flexibly, simultaneously consider various pieces of information, monitor behavior and emotions, or reflect on experiences and work product. These capabilities develop throughout adolescence as the brain undergoes significant structural and functional changes (Blakemore & Choudhury, 2006; Choudhury, Charman, & Blakemore, 2008; Meltzer, 2010; Steinberg, 2011).

The science of brain development. The brain consists of approximately 100 billion cells called neurons that carry information as electrical charges (Blakemore & Choudhury, 2006; Steinberg, 2011). As the brain matures, two significant structural changes impact cognitive functioning. First, white fatty tissue called myelin coats the neurons in a process called myelination (Blakemore & Choudhury, 2006; Choudhury, Charman, & Blakemore, 2008; Steinberg, 2011). Myelin improves information transfer between neurons by speeding up electrical impulses in the cells. Second, the connections – or synapses – between neurons become more efficient and streamlined (Blakemore & Choudhury, 2006; Choudhury, Charman, & Blakemore, 2008; Steinberg, 2011). Synapses facilitate the transfer of information (electrical charges) from one neuron to others. A single neuron may have several thousand synapses. Some synapses are genetic while others form as a result of an individual's experiences. As Steinberg (2011)

explains, "the development of new synapses continues throughout life as we learn new skills, build memories, acquire knowledge, and adapt to changing circumstances" (p. 44). However, not all synapses are needed. A process called synaptic pruning eliminates unused and unnecessary synapses, "[making] the brain more efficient by transforming an unwieldy network of small pathways into a better organized system of superhighways" (Steinberg, 2011, p. 44). Different regions of the brain undergo myelination and synaptic pruning at each developmental stage. Therefore, as a particular region of the brain matures, the cognitive functions controlled by that region also evolve (Blakemore & Choudhury, 2006; Choudhury, Charman, & Blakemore, 2008; Steinberg, 2011). The eleven or twelve year old brain is still developing. As discussed in the following sections, sixth graders often struggle with executive functioning skills due to an immature prefrontal cortex, an over-reliance on the amygdala, and the presence of excess dopamine.

The prefrontal cortex. Executive function processes are primarily controlled in the frontal lobes of the brain, specifically the prefrontal cortex (Blakemore & Choudhury, 2006; Choudhury, Charman, & Blakemore, 2008; Havasy, n.d.; Meltzer, 2010; Steinberg, 2011). Some sixth grade students show facility with one or more executive function processes because they have developed efficient neural pathways in the prefrontal cortex as well as between the prefrontal cortex and other regions of the brain (Havasy, n.d.). However, the prefrontal cortex is underdeveloped in most sixth graders and undergoes significant changes throughout adolescence.

Studies using functional magnetic resonance imaging (fMRI) of living human brain, as well as analysis of postmortem human brain, indicate that the density of neural

synapses in the prefrontal cortex peaks in early adolescence with the onset of puberty (Blakemore & Choudhury, 2006; Choudhury, Charman, & Blakemore, 2008). At the same time, studies have shown that young adolescents show lower performance on executive function tasks that require working memory and decision-making than younger children, older adolescents, and young adults (Blakemore & Chudhury, 2006). Therefore, researchers hypothesize that the high density of synapses in young adolescents' brains actually prevents the prefrontal cortex from functioning efficiently; there is too much brain activity or 'noise' drowning out and complicating the actual signals (Blakemore & Chudhury, 2006). These findings indicate that sixth grade students need additional support with executive function processes because they lack the skills that facilitate self-regulation. Furthermore, researchers speculate that these findings also indicate that direct instruction in executive functions may have a significant impact on brain development.

After puberty, the prefrontal cortex undergoes significant synaptic pruning and myelination which gradually lead to improved executive functioning skills (Blakemore & Choudhury, 2006; Choudhury, Charman, & Blakemore, 2008; Havasy, n.d.; Steinberg, 2011). FMRI images indicate that adolescents begin to use more focused regions of the prefrontal cortex when performing specific executive function tasks (Blakemore & Choudhury, 2006; Choudhury, Charman, & Blakemore, 2008; Steinberg, 2011). This finding suggests that synaptic pruning results in the specialization of specific regions of the prefrontal cortex (Blakemore & Choudhury, 2006; Choudhury, Charman, & Blakemore, 2008; Steinberg, 2011). At the same time, fMRI studies show that adolescents become more adapt at simultaneously coordinating activities between

specific regions of the prefrontal cortex and other parts of the brain (Steinberg, 2011). This capacity is the result of increased myelination of the prefrontal cortex and its connections to other regions of the brain which allows individuals to better monitor their actions and emotions (Steinberg, 2011). These changes to the neural circuitry in and around the prefrontal cortex lead to improved executive functioning; however, the maturation process lasts for the duration of adolescence. Executive function processes do not fully develop until early adulthood when an individual is in his or her mid-twenties (Blakemore & Choudhury, 2006; Choudhury, Charman, & Blakemore, 2008; Meltzer, 2010; Steinberg, 2011).

Adolescence is a 'sensitive period' for the prefrontal cortex during which synaptic pruning and myelination are highly influenced by experiences. Blakemore and Choudhury (2006) compare the sensitive period for executive function development during adolescence to the sensitive period for sound categorization during the first twelve months of life. Prior to a child's first birthday, he or she is able to distinguish subtle differences between all speech sounds across all languages; however, in the second year, babies lose the ability to detect novel speech sounds. This specialization in phonemic awareness is due to synaptic pruning and myelination during the highly sensitive period of early childhood. This phenomenon helps to explain why it is much more difficult to learn a foreign language later in life. Because the prefrontal cortex undergoes similar synaptic pruning and myelination during puberty, executive function training may influence the development of neural circuitry and thereby have a deep impact on the trajectory of a person's later facility with executive function processes. Steinberg (2011) points out that "assignments that require [students] to think ahead, make a plan, and carry

it out may stimulate the maturation of brain systems that enable more mature self-regulation" (p. 46). Furthermore, Blakemore and Choudhury (2006) present a more dire case for executive function training in sixth grade: they believe that "experience with executive functions… might be much more difficult to incorporate into brain networks [if] they are established after puberty" (p. 207). Although this hypothesis is highly speculative and still needs to be studied, the idea is noteworthy in an examination of executive skills training in the sixth grade due to the potential implications that such a program could have on the students' brain development and later executive functioning abilities.

The amygdala. Sixth graders also struggle with executive functioning because of the way their brains process sensory information (e.g., what the body sees, smells, hears, touches, and tastes). Such information is received by a region in the brain called the thalamus. The thalamus then relays the information to either the prefrontal cortex or the amygdala (Jones, 2013; Sylwester, 1995). As discussed above, the prefrontal cortex is largely responsible for self-regulation. When sensory information is processed by the prefrontal cortex, individuals tend to respond rationally (Havasy, n.d.; Jones, 2013). In contrast, the amygdala is the emotional center of the brain, and individuals tend to respond impulsively when sensory information is processed in this brain region (Jones 2013; Sylwester, 1995).

Eleven and twelve year olds naturally process sensory information through the amygdala because the prefrontal cortex does not fully develop until early adulthood (the amygdala is fully developed at birth; Havasy, n.d.; Jones, 2013; Sylwester, 1995). Adults, on the other hand, process most sensory information in the prefrontal cortex.

Havasy (n.d.) notes that "since the prefrontal cortex is where the brain is able to look at its own processes, this added step affords adults more cognitive mediation about feelings, helping to diffuse emotional reactivity and outbursts" (p. 4). Without the rational filter of the prefrontal cortex, sixth graders lack the presence of mind to think before responding, a critical prerequisite of metacognition. Therefore, they fail to plan their actions, remember past experiences, consider likely outcomes, or inhibit irrational behaviors.

Dopamine. Another development that impacts the executive functioning skills of sixth graders is an increase of dopamine in the brain (Steinberg, 2011). Dopamine is a chemical that is responsible for feeling happiness. Enjoyable experiences trigger the release of dopamine, giving the sensation of pleasure. There is more dopamine in the brain during early adolescence than at any other stage of life (Steinberg, 2011). During this time, enjoyable experiences, therefore, trigger the release of high doses of the chemical, making those experiences especially pleasurable and motivating young adolescents "to go out of their way to seek rewarding experiences" (Steinberg, 2011, p. 45). From an executive functioning standpoint, dopamine is a double-edged sword. Students who experience "success" in school will be motivated to work hard in order to continue to achieve the pleasure of academic fulfillment. However, those students who struggle in school and continually receive disparaging feedback on their work may give up and pursue more enjoyable (and potentially risky) activities. Furthermore, dopamine hinders all students' prioritization, task initiation, and impulse inhibition skills. Sixth graders are far more likely to procrastinate by socializing with friends, playing video games, or joining a pick-up basketball game than they are to tackle academic tasks. Long-term assignments, such as writing a paper, doing research, or studying for a test, are

particularly difficult for sixth graders because there is no near-term reward for accomplishing these activities. Therefore, dopamine has a significant impact on the decision-making skills of young adolescents.

Conclusions and Implications of the Development of Sixth Grade Students

It is developmentally appropriate for sixth graders to struggle with self-regulation because the prefrontal cortex is underdeveloped and sensory information is processed through the amygdala. Further, eleven and twelve year olds may display weaker executive function controls than younger children or experience degradation of self-regulation skills due to an overabundance of neural synapses in the prefrontal cortex which interfere with thinking processes. Excess dopamine in the brain also motivates students to pursue enjoyable experiences and often causes procrastination on academic obligations. Self-regulation improves over time as the prefrontal cortex develops. Experiences are particularly important to the formation of effective neural pathways which control executive functioning processes. Some students are able to reflect on personal experiences, strengthen the neural pathways in and around the prefrontal cortex, and independently develop strong executive functioning skills. Other students, however, need explicit instruction and targeted supports in order to internalize thinking processes, develop efficient neural circuitry, and achieve self-regulation. These research findings on brain development have several implications for sixth grade teachers.

The adolescent brain is wired differently than the adult brain, creating a natural disconnect between adult expectations and adolescent behavior. Adults benefit from a fully-developed prefrontal cortex that is able to coordinate thinking and behaviors in order to achieve self-regulation. For example, when faced with a problem, adults can

analyze the situation, select a strategy, reflect on past experiences, plan an approach, organize ideas, monitor progress, and shift approaches as needed. Adults tend to assume that adolescents think about actions in the same way, but the eleven and twelve year old brain works differently. Sixth graders do not have a mature prefrontal cortex, and they rely on the amygdala to process sensory information, making actions more emotional and impulsive. Teachers need to recognize that the seemingly irrational and illogical behaviors exhibited by sixth graders are a result of the neural circuitry in the students' brains. Dopamine also "rewards" adolescents for pursuing enjoyable activities, so school work is not typically a priority. As Terkeltaub (2012) concludes, "it is scientifically unfounded to expect students to be as organized, forward-thinking, metacognitive, and 'on-track' as most adults" (p. 7). However, teachers can teach and support executive functioning skills by developing learning activities that take advantage of students' current abilities while guiding them toward more mature functioning.

Teachers need to clarify sixth grade expectations and ensure that students understand these expectations. Therefore, executive functioning skills should be taught explicitly across the curriculum, and students need sufficient supports and practice with regulatory strategies. Consistent routines and common practices can be particularly helpful to sixth graders because such provisions facilitate and reinforce habitual thinking processes and behavior patterns. This repetition helps to establish a foundation for independent self-regulation.

Finally, teachers should recognize that sixth grade students may experience diminished executive control due to the proliferation of neural synapses in the prefrontal cortex that are preventing efficient thought (Blakemore & Chudhury, 2006). As a result,

students may need reminders of classroom procedures and expectations. Additionally, eleven and twelve year olds may not show progress or even regress on tasks that require executive functioning skills. For example, a student who previously wrote a coherent paragraph with a topic sentence, three supporting sentences, and a conclusion may submit work that lacks these components and overall focus. This student needs to be reminded of strategies for organizing ideas as well as the steps in the writing process. It is natural for students to take a "step backwards" in self-regulation. Teachers need to recognize the neurological basis for this degradation and summon the patience to re-teach executive functioning skills and strategies. Such interventions are critical to the development of students' brains as well as the students' future capacity to self-regulate.

Part III: Sixth Grade Experience and Academic Demands

The purpose of this project is to explore how educators at my particular school can support the development of executive functioning skills in sixth grade students. Therefore, the following discussion focuses solely on the academic demands experienced by sixth grade students at the school where I teach. While the experiences and expectations may be applicable to other settings, it is beyond the scope of this paper to discuss the general or overarching academic demands on all sixth grade students.

I am a learning specialist at an independent, coeducational, day school for students in prekindergarten through twelfth grade. The school is located in New York, New York and divided between two campuses. One campus is home to the Lower School (prekindergarten through grade five), while the other campus is home to the Middle School (grades six through eight) and Upper School (grades nine through twelve). The sixth grade transition from the Lower School to the Middle School is both exciting

and stressful for students. In order to better understand this transition, overviews of the fifth, sixth, and seventh grade experiences and executive function demands are provided below.

Fifth Grade Experience and Executive Function Demands

At the Lower School, students experience a relatively sheltered learning environment. Each grade level has about sixty students that are divided into three classes (or "homebases") with one or two teachers per homebase. The homebase teachers teach language arts, mathematics, social studies, and science; therefore, students typically have one content-area teacher and only venture from their homebase classrooms for foreign language, gym, art, music, drama, lunch, recess, and other activities. The only times when students receive content-area instruction from teachers other than their homebase teacher is pull-out reading for struggling readers, pull-out math for advanced math students, and fifth grade science when homebase teachers rotate for each unit. Because the homebase teachers are largely in control of students' entire school experience, they are able to closely manage and monitor the students' overall academic performance, work load, and organization.

Fifth grade students receive a homework packet on Monday that details all of the assignments that are due on Friday. Assignments typically include independent reading four times each week for twenty minutes, a math worksheet, and a short writing assignment (such as writing a paragraph from an outline). Most other work is completed during the school day. Permission slips and parent notices are also included in the homework packet. Students transport their homework to and from school in a homework

folder. Homebase teachers ensure that homework folders are regularly cleaned out on Fridays.

The materials that fifth grade students need to manage include their homework folder, an independent reading log, and individual binders for math, science, and reading/writing. As mentioned above, students bring their homework to and from school in their homework folder, and homebase teachers help to keep the folder organized. Homebase teachers are similarly involved in the maintenance and organization of each student's independent reading log, but teachers do not help students to organize their subject binders. The subject binders are merely a place where students keep their work. These binders are stored in cubbies at school and never travel home with students. Each binder has organizational tabs, but there is no teacher-directed organizational scheme. Students may organize the subject binders any way they want.

Homebase teachers use graphic organizers to help students to organize ideas. Fifth grade students are accustomed to taking notes in two-column note format with teacher-generated questions in the left cue column, student responses in the right column, and a student-generated summary at the bottom of the page. This structure helps students to distill main ideas from supporting details, examples, and elaboration. For writing assignments, students use a variety of graphic organizers to help them brainstorm and outline, including T-charts, concept webs, and indentation or quick outlines. T-charts are particularly helpful when brainstorming two sides of an argument while concept webs are useful for brainstorming ideas about a specific topic or concept. Indentation or quick outlines allow students to organize their ideas for writing by separating main ideas from details and examples. Homebase teachers guide students in using each of these tools.

Sixth Grade Experience and Executive Function Demands

Sixth grade marks a symbolic transition from the Lower School to the Middle School as well as a physical transition to a new campus. Additionally, about twenty new students join the sixth grade class, increasing the total class size by about a third. These novel changes make sixth grade exciting but stressful for students. The biggest challenges that sixth graders face are navigating the Middle and Upper School campus, juggling the academic schedule, adapting to a variety of teachers, managing an increased work load, organizing more materials, and navigating new social relationships.

While the Lower School campus is relatively compact and largely populated by familiar younger students, the Middle and Upper School campus is sprawling and populated with many intimidating older students. Sixth graders interact with older students while moving between classes and buildings. Sixth graders can have classes in up to four buildings. Students travel as homebase groups (similar to those in the Lower School) to history, English, science, math, study hall, health, and gym classes, but they move independently throughout the campus to foreign language and arts classes. Transitioning between classes can be daunting and distracting for students.

Sixth graders not only need to learn where their classes meet, but they also need to learn when their classes meet. The middle school calendar is on a two week cycle. Within each rotation, academic classes meet four times each week (eight times over two weeks) at various times during the school day, and there is no bell or signal that indicates when classes begin or end. Students and teachers alike need to constantly check their schedules in order to make sure they are in the right place at the right time.

Having a separate teacher for each class is also challenging for sixth graders. Most sixth graders have nine or more teachers, including teachers for history, English, math, science, foreign language, art, music, gym, and health. Previously, the students' school day was largely orchestrated by one or two homebase teachers who taught most academic subjects. Students naturally formed a tight bond with their fifth grade homebase teachers because they spent most of the school day together. In sixth grade, students have an assigned homebase teacher, but students only spend one or two periods a day with that teacher. As a result, students lose the sense of comfort and security that comes from spending most of the day with their specific advocate. Instead, sixth graders need to build relationships with many teachers. They also need to learn and remember distinct classroom routines and expectations for each teacher.

The work load increases significantly from fifth to sixth grade. Homework, projects, and assessments are typically announced in class at the beginning or end of each class period. Students are expected to record these assignments in their personal planners. Teachers also post assignments online through a system called moodle. All teachers use moodle differently, so students must learn to navigate each class moodle in order to find pertinent information, such as homework assignments, project rubrics, study guides, readings, and more. Middle school teachers tend to assign 20 to 30 minutes of homework per class, which adds up to about two to two and a half hours of homework per night. Some of this homework can be completed during study hall periods, but the work load still far exceeds that of fifth grade.

The onset of tests and quizzes is also challenging for students. Teachers coordinate the due dates for major assignments so that students do not have more than

one test, paper, or project due on a particular day or more than two major assignments due within a given week. Nonetheless, sixth grade students do not know how to study, nor do they know how to manage their time in order to complete daily homework in addition to studying and/or working on long-term projects. Efforts to manage time effectively are often thwarted by the fact that sixth graders seldom control their own after-school schedules. As a result, students tend to get overwhelmed by the quantity of schoolwork in sixth grade.

In addition to managing more assignments, sixth graders need to manage more materials. Books, binders, and other materials are not kept in the classroom as they were in fifth grade. Students now store their materials in backpacks and lockers and transport the items between their classes, lockers, and homes. Managing these materials places significant demand on working memory because students must remember which materials are needed for each class, when that class meets, when materials can be dropped off or picked up from a locker, and what materials are needed for homework assignments. Binder organization systems also tests students' organizational and working memory abilities. Students are given the option to organize all papers for history, English, math, science, and foreign language in one large three-ring binder with individual sections for each class or five one-subject three-ring binders. Within the class section or binder, each teacher asks students to organize notes, handouts, assignments, assessments, and other papers in a specific way. Binder organization is not consistent across classes; therefore, sixth grade students need to learn a different organizational scheme for each class. Few teachers take the time to help students maintain or clean out their binders, so some students have very messy binders while others carry around old

papers all year long. Fifth grade teachers did not have prescribed organizational systems for binders, so this requirement is novel and often challenging for students.

The organization of ideas is supported in various ways in each sixth grade class. Several teachers use note-taking templates during class discussions to help students identify important information. These templates are typically fill-in-the-blank or chart style. Students rarely need to take notes while reading a homework assignment, but students do learn how to annotate text. Annotations are slightly different in each class. When reading expository text in History, students circle key terms, people, and events; underline supporting details; and summarize the main idea in the margin. When reading narrative text in English, students box new characters; underline character traits, common themes, and critical moments; and record text connections, questions, and ideas in the margin. When solving word problems in math, students circle key numbers, underline operation words and write the operation above the phrase, and underline the question. These annotation practices help students to identify the main ideas, supporting details, and other key information in text. History and English teachers also support the organization of ideas through the use of writing templates, but there is no common, grade-wide template.

Overall, there are significant and novel academic demands that are placed on sixth graders. As Wood (1997) explains, sixth graders "caught up in the world of lockers and fifty minute classes are often lost and confused, scared and alone" (133). Teachers strive to support individual students who struggle with transitions between classes, time management, materials management, and assignment completion, but there is a need for grade-wide executive skills training and supports in order to ease the transition from fifth

grade to sixth grade and the Middle School. The teacher toolkit in Part IV of this paper presents a plan for supporting select executive functioning skills within the sixth grade curriculum.

Seventh Grade Experience and Executive Function Demands

Seventh grade is similar to sixth grade in many ways, but there are some noteworthy and novel executive functioning demands. Overall, teachers have higher expectations and provide less scaffolding for learning experiences and assessments. Teachers expect students to know how to: smoothly transition between classes; track, complete, and hand in assignments on time; follow a binder organization system; take notes in class without a note-taking template; take notes while reading; and study for assessments. Many of these skills are extensions of those taught in sixth grade, but the expectations of seventh grade teachers typically exceed the abilities of most seventh grade students. These skill gaps are supposed to be addressed in an academic skills class that meets once each week throughout the first semester as well as the two weeks prior to final exams. However, students rarely buy into the skills class because the course is pass/fail and replaced by a free period in the second semester. Additionally, there is poor communication between the learning specialists (myself included) who teach the skills class and the content-area teachers. Therefore, the skills are not explicitly reinforced in seventh grade classes. The academic skills class will be taught for the last time during the 2013-2014 school year. Subsequently, there will be heightened attention to teaching academic and executive skills across the curriculum. The teacher toolkit presented in Part IV of this paper outlines the skills that will be emphasized in sixth grade in order to better prepare students to meet the demands of seventh grade.

Part IV: Teacher Toolkit for Supporting Executive Functioning Skills in Sixth Grade

It is beyond the scope of this paper to provide a comprehensive plan for supporting the development of executive functioning skills in sixth grade. Instead, an initial plan with several specific recommendations is presented and general strategies are then listed. One of the most glaring omissions in this plan is the need for curricular revisions that better align the content with the developmental abilities, needs, and interests of sixth grade students. While these changes are necessary for narrowing the gap between teacher expectations and student skills, they also require approval of the department chairs and curriculum coordinator. It is unrealistic to assume that such changes would be implemented during the 2013-2014 academic year. The initial grade-wide plan focuses on teaching and classroom management strategies that can be reasonably instituted.

Initial Grade-wide Plan to Support and Promote Executive Functioning Skills during the 2013-2014 Academic Year

A majority of the sixth grade teachers met at the end of the 2012-2013 school year to discuss the sixth grade curriculum. During these meetings, teachers responded to a questionnaire (see Appendix A) about select executive function demands in their classrooms, including classroom routines, homework management, binder organization, academic skills, and problem solving. Teachers who were not present at the meeting were also asked to respond to the questionnaire. The differences between the fifth and sixth grade programs were then discussed which led to a conversation about how the sixth grade team could better support student success, particularly in the executive

functioning domain. In the end, the sixth grade teachers who were present agreed to use more consistent classroom management strategies and routines. The increased consistency will lessen the overall executive functioning burden for students while simultaneously reinforcing key skills. Below are explanations of the systems and practices that teachers agreed to implement during the 2013-2014 school year as well as recommendations that address common themes and concerns from the teacher questionnaire.

Consistent routines at the beginning of class support attention and memory. Transitioning between classes, refocusing attention at the beginning of a class period, and remembering individual classroom routines are all novel executive skills that are demanded of sixth grade students. Teachers report that classroom routines are mostly communicated through verbal instruction and practice while some teachers also post a daily agenda. The beginning of class routines have historically varied within a single class as well as throughout the sixth grade.

During the 2013-2014 academic year, most sixth grade teachers will institute a consistent beginning of class routine so that students do not need to remember several different patterns and expectations. Krishnan and Feller (2010) highlight how consistent routines facilitate executive functioning as well as learning: “When classroom routines are predictable, and students become self-sufficient in navigating these routines, they can allocate more cognitive resources to learning the content” (p. 92). Therefore, as students develop behavioral patterns for the beginning of class, they will be able to engage more fully in the lesson because they will not be preoccupied with the procedural aspects of class.

Students will not immediately master the beginning of class routine; instead, teachers need to make time to explain and practice the routine with students. Additionally, the grade-wide transition plan will be printed on poster board, laminated, and displayed within each classroom, further supporting the students' ability to efficiently, productively, and independently enter each classroom. Lamination will allow teachers to write on the posters with dry-erase markers so that some customization is achieved. Below is an image of the poster that details the beginning of class routine.

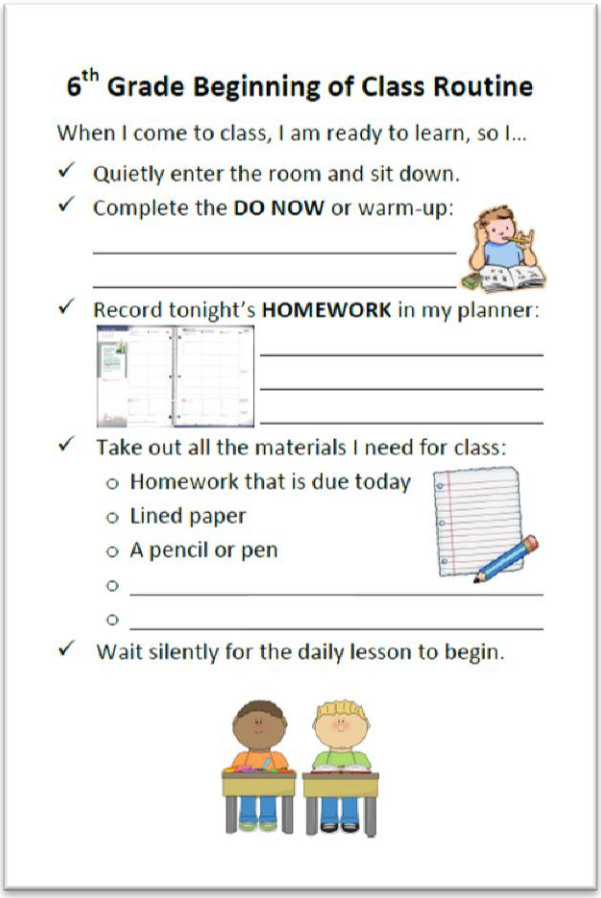

Figure 1. 6th Grade Beginning of Class Routine. This poster will be laminated and displayed in each sixth grade classroom.

Student planners support planning and memory. Sixth graders are provided planners at the beginning of the school year. These planners contain space where students can record nightly homework assignments, plan after-school time, and track long-term projects and assessments, among other things. Sixth grade is the first year when students receive a planner and are expected to record assignments and assessments on their own; therefore, it is critical that planner usage is explicitly taught at the beginning of sixth grade and routinely supported and reinforced throughout the school year.

There are several key features of the student planner that support executive functioning. Weeks are outlined across two pages, as seen in the image below.

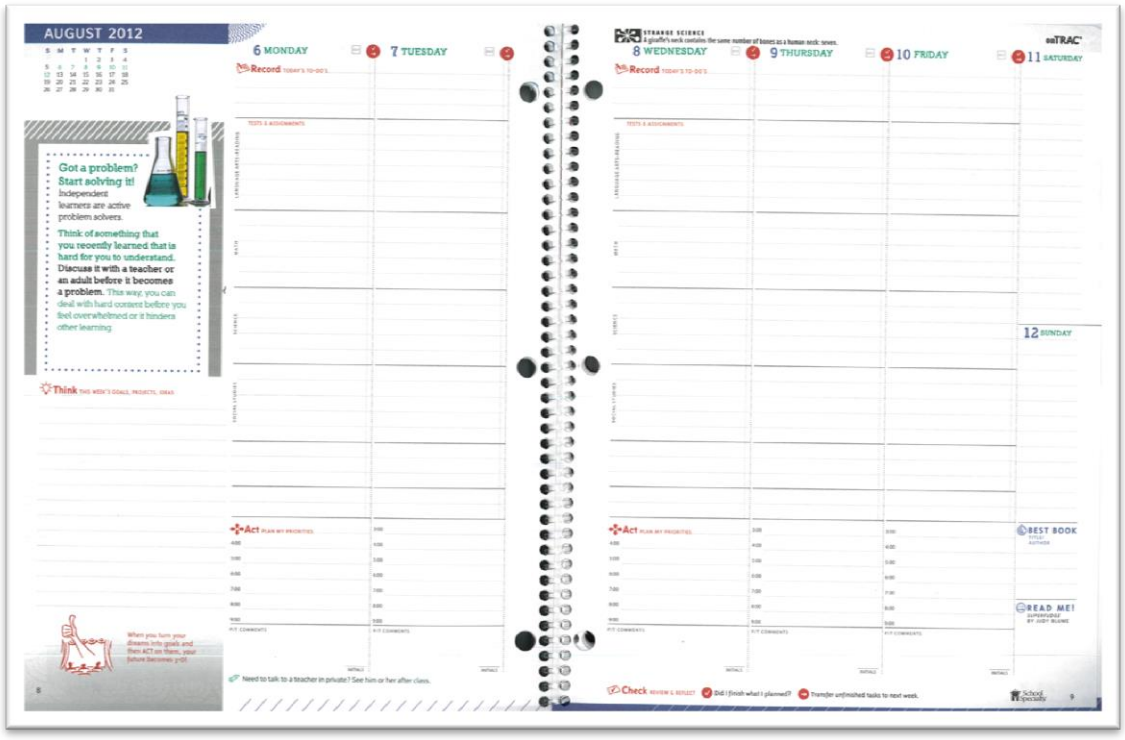

Figure 2. Weekly calendar. This image illustrates how each week is outlined in the student planner. Reproduced with permission from School Specialty (publisher).

Source: *OnTRAC planner: The 101, middle level, 2013-2014* (2012). Bellingham, WA: School Specialty.

Each individual day has a separate column. The image below provides a close-up of one daily column.

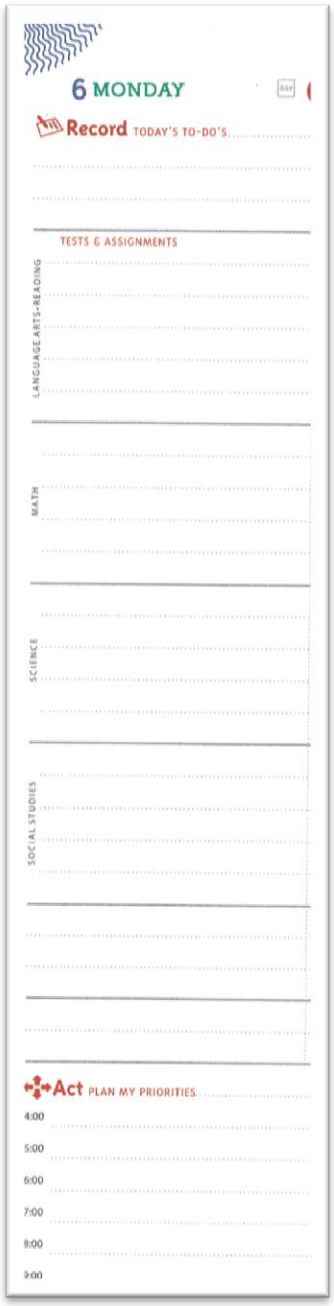

Figure 3. Daily agenda. This image illustrates the format of the daily columns within the student planner. Students record assignments and tasks in "Record of today's to-do's" and schedule after-school activities and homework in "plan my priorities." Reproduced with permission from School Specialty (publisher). Source: *OnTRAC planner: The 101, middle level, 2013-2014* (2012). Bellingham, WA: School Specialty.

As seen above, the daily columns include designated areas to record a to-do list. Students compile the daily to-do list by recording nightly homework assignments for each class as well as other tasks that need to be completed (e.g., practicing a musical instrument, having a parent sign a permission slip, baking cookies for a bake sale, etc.). Writing lists is an effective strategy for supporting memory for some people. Sixth grade students tend to assume that they will simply remember their homework; however, as memory demands increase throughout sixth grade, middle school, and beyond, students will need strategies for remembering assignments, obligations, tasks, and materials. Some sixth grade students forget to bring the appropriate materials home from school and consequently cannot complete homework assignments, study for upcoming assessments, or work on long-term projects. Before going home at the end of the school day, students should review their daily to-do list to ensure that they bring home all the requisite materials (e.g., binders, books, etc.). Creating to-do lists in a planner is one memory strategy that students should learn and utilize.

The student planner is also an effective tool for initiating tasks. Many sixth grade students become overwhelmed by the quantity of work they are expected to complete. Anxiety and not knowing where to start can lead to procrastination, a hasty work process, divided attention, careless mistakes, and incomplete assignments. Daily to-do lists itemize tasks so that students know what they need to accomplish. Students should be instructed to pick one assignment on the list and complete that task thoughtfully and thoroughly before moving on to the next. Choosing to start with a short, straight-forward assignment will help students to feel productive, gain confidence, and build momentum. Time-consuming tasks, such as long-term projects and studying, should generally be

completed last because students may lose track of time, spend too much time on ‘big’ tasks, and not have sufficient time to do other assignments. Finally, students should track their progress by checking or crossing off completed items.

The schedule at the bottom of each daily column in the student planner helps sixth graders to prioritize tasks and manage time. When using this feature, students should first note any mandatory after-school activities, such as family dinner, sports practice, play rehearsal, and Hebrew school. Students should then estimate how long each homework assignment will take and decide the order in which the tasks will be accomplished. Finally, the homework plan can be recorded on the schedule, and students can get to work. Most sixth graders struggle to judge and manage time; therefore, it is helpful if students track how long each assignment actually takes and amend their homework schedule accordingly. This practice can also prevent some students from spending too little or too much time on a particular task. With practice, students will develop a better sense of time, become more capable of scheduling homework, and feel more control over their nightly work load.

Long-term projects and studying are often the most challenging and overwhelming assignments for sixth graders. Lacking the ability to break tasks down into small components that can be spread out over several days, some students may leave the entire assignment to the last day while others may complete it on the day it is assigned. Neither strategy is effective because both generally lead to hastily competed work that lacks reflection, revision, and refinement. Students should use their planners to manage their time for larger assignments.

Monthly calendars in the student planner are an effective way of tracking assessments and project due date. Below is an image of a monthly calendar.

Figure 4. Monthly calendar. This image illustrates what the monthly calendars look like in the student planner. Reproduced with permission from School Specialty (publisher). Source: *OnTRAC planner: The 101, middle level, 2013-2014* (2012). Bellingham, WA: School Specialty.

When a project or assessment is assigned, students should write the event on the designated due date. Students must then determine how many days are available to prepare, the components of the task, and the plan for completing the activity on time.

The act of breaking a task into its component parts, planning its execution, and completing it on time are all important executive function skills; however, they are beyond the scope of this paper due to time and space constraints. Developmentally, it is appropriate for teachers to assist sixth grade students with the chunking and planning of long-term, multi-dimensional tasks. Students should be challenged to determine short-term goals for each day, but they may require help in determining if the daily activities as a whole will satisfactorily meet the final expectations by the established deadline. Recording daily activity goals on the monthly calendar helps students to see if and how their incremental efforts result in the desired outcome, while writing the daily activities in the daily to-do lists ensures that students remember to complete these tasks. Pencil is the preferred writing utensil for charting long-term assignments because daily goals and activities change often.

Because there are so many components to the planner, students would benefit from learning how to use one feature at a time. Initially, teachers should only encourage students to use the daily agenda to record nightly homework assignments and track completion. Students can then learn how to use the daily schedule to manage their time after school. Most sixth graders lack the skills necessary to estimate and plan time, so lessons on how to use the schedule will need to be coupled with instruction on time-management, planning, prioritizing, and goal-setting. Exercises that challenge students to outline their daily routines or estimate and track the time they spend on each homework assignment may provide the essential foundation for using the daily schedule. After students are comfortable with the daily agenda and schedule, the monthly calendar should be introduced. Learning how to use the monthly calendar will require additional

instruction and practice with long-term time-management, planning, prioritizing, and goal-setting. More tangible experiences, such as planning one's outfits for a vacation or meals for a camping trip, may help students to grasp the benefits of an extended outlook and develop the requisite skills for accomplishing longer tasks. This instructional timeline can be compressed or extended depending on the needs of each individual student.

Overall, the student planner supports executive functioning in the sixth grade. By using a planner, sixth graders practice essential planning, prioritizing, time management, and goal-setting skills. Krishnan, Feller, and Orkin (2010) highlight that "calendars provide visual reminders of due dates, as well as schemas for setting and achieving short-term goals that contribute to the successful attainment of the larger, final goal" (p. 63). This tool encourages students to become more independent learners who are responsible for recording, completing, and tracking their own assignments, an essential skill that students need to master prior to seventh grade. For these reasons, sixth grade teachers have agreed to focus on planner usage during the 2013-2014 academic year. In order to do so, these teachers must make time during each class period for students to record homework, assessments, and goals on the daily to-do lists and monthly calendars. It is unrealistic to report that one teacher each day will set aside time for students to create an after-school schedule; however, this strategy should be practiced and encouraged during study hall periods.

Alternatives to the school-issued student planner. Some students may struggle to use the planner. These students would benefit from an alternative method of tracking assignments and assessments. There are many computer programs and device

applications that fulfill the functions of the planner, including the Google, Alta Ipsum, myHomework, and iStudiez Pro. Unfortunately, sixth grade students at my school do not have personal computers and are not allowed to use cellular telephones. Low-tech solutions may include the following:

- A piece of scrap paper at the beginning of each binder on which the student can record nightly homework;
- A laminated reminder in the student's locker that cues the student to bring home materials required to complete the math, science, history, English, and language homework;
- A laminated reminder above the student's desk at home that cues the student to complete assignments for math, science, history, English, and language classes; and
- A large paper calendar or whiteboard posted above the student's desk at home on which the student can plan nightly and longer term assignments.

Student buy-in is essential to ensure the efficacy of the alternative planning tools and systems. Therefore, students should help to develop the routines and all instruments should capitalize on the student's learning style.

Moodle supports working memory and the organization of ideas. Moodle is an online course management system. Each class has its own website on which teachers post assignments, announcements, information, resources, and more. The school mandates that teachers use moodle and highly recommends that homework assignments are posted by 5pm; however, there are no guidelines for formatting or structuring moodle

sites. As a result, there is great variation. Sixth graders not only need to learn how to use moodle but also how to navigate each class website.

During the 2013-2014 school year, the sixth grade teachers will be dedicated to making their class moodles more consistent and useful for students. Content will be organized chronologically by unit, though past units may be hidden or minimized to avoid confusion. Additionally, the majority of information will be presented on the homepage instead of in subfolders or subpages. This structural decision will lessen navigational demands and help to contextualize as much information as possible within the overall unit of study. The goal is to have teachers add material to the moodle in outline form with overarching topics, essential questions, major themes, main ideas, and supporting details clearly delineated and related assignments, readings, and resources noted. Essentially, the moodle site should become the study guide for the unit. Such a structure will provide students with a schema for tracking their learning and organizing ideas (Krishnan & Feller, 2010).

One moodle feature that teachers have elected not to use is the calendar. In the past, teachers assigned a due date for each assignment, and that task subsequently appeared on the calendar of enrolled users. Students can log into moodle and go directly to the calendar, bypassing each individual class site and missing important information. Additionally, the moodle calendar undermines planner usage because the program aggregates and lists tasks by due date, thereby making the planner seem redundant and pointless to students. By not using the calendar function, teachers hope that students will: utilize planners to make to-do lists, manage time, and track progress; take advantage of the resources posted on each class moodle site; and become more independent learners.

Binder systems support the organization of materials. Teachers ask sixth grade students to organize binders in a variety of ways. Some differences are due to the nature of the content area. For example, foreign language teachers often prefer that students have designated sections for vocabulary and grammar while science teachers request that students have a section for laboratory experiments. These structural variations are appropriate; however, teachers need to be explicit about where papers are filed. Additionally, when more than one topic or skill is addressed during a class period, teachers need to make sure that the notes from each activity are placed in the appropriate binder section. For example, if the English binder has grammar and literature sections and both topics are discussed during class, then students need to take separate notes for each activity and store the notes in the corresponding binder section; confusions arise when students have grammar and literature notes on the same piece of paper. Overall, maintaining binder sections requires the executive function skills of categorizing and sorting materials. Teachers need to support the development of these skills by providing explicit organizational instruction at the beginning of the school year and gradually releasing responsibility to students. Students will be expected to organize binders in seventh grade as well, but teachers will not provide as much organizational support.

Despite the fact that content-area binders may have different sections, the organization within each section should be consistent. All notes and handouts should be dated and placed in chronological order with the oldest material at the front and the newest material at the back. In the past, some teachers have instructed students to organize papers in reverse-chronological order with the newest material easily accessible at the front. However, this organizational scheme does not work in higher-level classes

when students take several pages of notes during one class period and discussions span more than one meeting. Students need to be able to track their learning and read their notes like a book.

Most sixth graders also need explicit instruction and support for cleaning out their binders. At the end of each unit, teachers should make time to remove older notes, worksheets, and handouts from binders. Students should file these documents in a manila folder that can be stored in the classroom or at home. This system ensures that student binders stay light and transportable while information still remains accessible. It is important that sixth grade students get in the habit of saving their work because this practice is critical in seventh grade when students take final exams.

Alternative binder solution. Some students may struggle to maintain a binder system. These students can be given the option to use an accordion file to store papers throughout the week. During one of the study hall periods, those students can then sit with a learning specialist and put the papers into the binder. Learning specialist support should wane as the year progresses and students become more proficient with the organizational system.

Writing structures and routines support attention, planning, and the organization of ideas. In fifth grade, students do a considerable amount of writing, but their essays are typically summative reports. Sixth grade marks the transition to more argumentative writing which requires students to choose a position and present supporting evidence. Sixth grade History and English teachers focus primarily on the fundamentals of an argumentative paragraph, including a topic sentence that clearly takes a stance and answers the given question, the presentation of sound reasoning, and a

closing statement that summarizes the argument. Students typically have to outline their responses before writing, but there are no consistent writing tools or strategies. As a result, I have developed a series of five "Paragraph Writing Structures" that support the writing process as well as the organization of ideas (see Appendix B). These templates can be used across the curriculum and provide for differentiation based on each student's writing ability.

The Paragraph Writing Structures reinforce a consistent writing process. The templates prompt students to summarize the question that needs to be answered, brainstorm ideas, choose the best ideas, outline the argument, write the paragraph, edit and revise the draft, and then publish a final draft. Students can remember this process through the mnemonic QUIC-O-WERP: QUestion, Ideas, Choose, Outline, Write, Edit, Revise, and Publish. There are several important features to this writing process. First, the clear delineation of sequential steps helps students to initiate writing tasks. Students also have to prioritize ideas in order to create a strong and coherent argument. Additionally, the process ensures that students actually organize their ideas prior to writing, a step that most students choose to skip when left to their own devices. Similarly, students are reminded that writing does not end when the first draft is complete; instead, students need to shift their attention to editing and revising their work before turning in a final, publishable piece.

In addition to helping students to organize ideas, the outline section of the Paragraph Writing Structures helps teachers to differentiate writing assignments and incrementally support student growth in writing and executive functioning. Paragraph Writing Structure #1 asks students to create a simple outline for a five-sentence

paragraph that consists of a topic sentence, three reasons, and a closing sentence. When a student has mastered the skill of organizing ideas and writing a coherent five-sentence paragraph, he or she can move on to the second template. Paragraph Writing Structure #2 prompts students to elaborate on each reason with an example, a skill that requires students to access working memory. Upon mastering the second template, students can utilize Paragraph Writing Structure #3 which requests evidence in the form of quotations, statistical data, images, or other concrete information. Students will have to use working memory to remember possible evidence and then sift through relevant course materials in order to find the desired information. Finally, Paragraph Writing Structure #4 challenges students to interpret the meaning of evidence and analyze how the information supports the overall argument and Paragraph Writing Structure #5 tests students' ability to think flexibly to consider and contest an opposing perspective, both of which rely on the students' ability to think flexibly and shift mindsets. Students will need teachers to explicitly teach and model how to use these structures, but subsequent exploration and practice will facilitates student growth in writing as well as the requisite executive functioning skills.

Sixth graders are not expected to master all of these writing structures; however, all students should master the first and second stages, become comfortable with the third, and attempt the fourth and fifth. Additionally, all students should memorize QUIC-O-WERP. This foundation is critical for seventh grade when students are expected to write analytical paragraphs and essays.

Daily grades support metacognition. Daily grades are a means of supporting self-awareness because students rate their classroom behavior at the end of each period.

Several sixth grade teachers already use daily grades and report an overall improvement in student engagement, preparedness, and adherence to classroom routines. Additionally, daily grades are a way of calculating classroom participation for quarter and semester grades. It is recommended that all teachers incorporate daily grades into classroom routines.

By implementing the daily grade system and a consistent grading rubric across all classes, students will gain a better understanding of the behavioral expectations of the Middle School. Below is the proposed daily grade rubric that details classroom expectations and possible student behaviors on a one to five scale.

Classroom Expectation	**Daily Grades**				
	5	**4**	**3**	**2**	**1**
Beginning of Class Routine	• Arrived on time and quietly. • Immediately began do-now. • Took out all necessary class materials. • Quietly waited for lesson to start.	• Arrived on time. • Began the do-now. • Took out all necessary class materials. • Waited for the lesson to start.	• Arrived on time. • Received one reminder to be quiet, begin the do-now, take out all necessary class materials, or wait patiently.	• Arrived on time. • Received two reminders to be quiet, begin the do-now, take out all necessary class materials, or wait patiently.	• Arrived late. • Did not do the do-now. • Did not take out all class materials. • Did not wait patiently for the lesson to start.
Preparation	• Had *all* necessary class materials. • Finished HW	• Borrowed paper or pen/pencil, but had all other class materials. • Finished HW	• Left the classroom to get necessary class materials. • Finished HW	• Forgot one class material at home. • Started HW but did not finish.	• Forgot several class materials at home. • Did not do HW.
Participation & Listening	• Engaged in *all* class activities and discussions. • Actively listened and responded to others' ideas.	• Participated in *most* class activities and discussions. • Listened throughout class.	• Participated in *some* class activities and discussions. • Mind wandered once or twice.	• Participated in *few* class activities and discussions. • Daydreamed for part of class.	• Did not participate in class activities or discussions. • Did not listen.
Social Intelligence	• Was respectful and helpful to	• Was respectful to others.	• Made *one* disrespectful gesture (ex:	• Made *one* disrespectful comment.	• Made *two or more* disrespectful

Classroom Expectation	Daily Grades				
	5	**4**	**3**	**2**	**1**
	others.		eye-roll, smirk).		gestures or comments.
Self-Control	• Remained on task during class. • Promptly and safely followed all instructions. • Did not disrupt class.	• Received *one* reminder to stay on task, follow instructions, or stop disrupting class.	• Received *two* reminders to stay on task, follow instructions, or stop disrupting class.	• Received *three* reminders to stay on task, follow instructions, or stop disrupting class.	• Was regularly off task and disruptive. • Did not follow instructions. • Was not safe.

HW = homework

Figure 5. Daily Grade Rubric. This rubric explains the grading criteria for student behavior within the classroom. Students use the rubric to reflect on and assess their overall performance during class. A larger version of the rubric is included in Appendix C.

Teachers may elect to phase-in the components of this rubric one at a time to ensure students understand each of the expectations. The length of time over which the rubric is introduced may vary depending on the needs of the students in the class. When a new category is presented, sixth graders may particularly enjoy working in groups to act out the behaviors on the scale of one through five. Teachers should post the grading criteria for each category, and eventually the entire rubric, in the classroom and give copies to each student in order to help them remember the expectations.

Some students may struggle to adapt to the daily grade system or have too many behavioral issues to make the rubric accretive. These students may find daily grades overwhelming, discouraging, or exposing. Teachers can differentiate this practice by working with an individual student to establish a singular and attainable goal. This individualization will provide the student with a more manageable plan that should translate into gradual improvements in classroom behavior.

At the end of class, teachers need to make time for students to reflect on and grade their behavior. Most teachers record daily grades as students say them aloud, but others may prefer to have students write their names and daily grades on a piece of scrap paper. At the beginning of the year, teachers may even elect to hand out copies of the rubric, ask students to circle the behaviors they exhibited in each category, and then indicate an overall daily grade. This practice would ensure that students actually consider the behavioral expectations and not just arbitrarily choose a grade. Throughout the year, teachers should also discuss inflated or deflated daily grades with students in order to support the development of self-awareness.

Study plans promote planning and metacognition. Sixth graders tend to struggle with the frequency of tests and quizzes as well as the breadth of information on assessments. Teachers can support students' ability to study efficiently by helping them to develop a study plan and checklist. A proposed planning device is presented in Appendix D. This Study Plan and Checklist asks students to record the subject, date, content, and format of the test as well as select individual study strategies. These prompts facilitate planning and metacognition because students are forced to evaluate exactly what they need to know, how long they have to prepare, and what they are going to do to learn the information. Additionally, students are able to track their progress. This tool should be used in conjunction with the students' planners.

The study strategies presented on the Study Plan and Checklist are all active study strategies. It is beyond the scope of this paper to explore active study strategies in detail; however, active study strategies are activities that require students to do something with the information, such as writing and answering questions, solving problems, and

summarizing. Active engagement with the information enhances understanding and memory. Conversely, passive study strategies, such as re-reading notes and text, do not require students to actively think about the material and therefore are not as effective. It is important that teachers make time during class to teach active study strategies and provide students with opportunities to experiment with each activity because sixth graders have very little experience with taking assessments. This training will also prepare students for seventh grade when students will take more tests and quizzes as well as final exams.

The buddy system supports planning, memory, and attention. Several sixth grade teachers indicated that they intend to create a buddy system within their classes so that students can contact one another if they have a question about an assignment, need notes from a missed class, or have any other academic concerns. Through the buddy system, students will learn to take more academic initiative and solve problems more independently, without relying solely on the teacher. This arrangement could be even more effective if the buddy system is instituted across the entire grade by dividing sixth graders into groups of three or four students (or "buddies") who are in the same homebase, math, and foreign language classes (if possible). Students are more likely to remember and utilize their buddies if they only have one group.

The functionality of the buddy system depends on two primary factors. First, students must know how to contact their buddies. Buddy groups need to exchange email addresses and telephone numbers, and students must record the contact information in the personal directory on the last page of the student planner. Students who are prone to losing materials would also benefit from storing the buddy contact list on Google Drive.

Students should then practice emailing their buddies. Second, teachers need to encourage students to use their buddy group. A pattern of communication can be established in the classroom and outside. The important thing is that students begin to see their buddies as sources of information and support.

Additional Strategies that Support and Promote Executive Function Skills

It is beyond the scope of this paper to provide in-depth discussions of additional executive function supports and strategies; however, a list of general ideas is provided below.

Metacognition.

- Help students to understand their unique learning styles, strengths, and challenges. Ask questions such as:
    - "Who am I? Am I different from others? How am I seen by others?" (Cox, 2007, p. 196)
    - "What type of learner am I? What am I good at? What do I struggle with?" (Terkeltaub, 2012, p. 34)
    - "How good am I at this specific task…? Can I control how well I do? If I work hard on this task, will I do well? Why did I succeed or fail? Did I succeed because I worked hard and used appropriate strategies on this task? Did I do well because I used specific organizational and self-checking strategies?" (Melter, 2010, p. 11)
- Use surveys and questionnaires to assess students' metacognition (Meltzer, 2010). Available options: Metacognitive Awareness System (MetaCOG; Meltzer, 2010).

- Create a culture of strategy use in the classroom (Meltzer, 2010; Meltzer & Basho, 2010). Teachers can achieve a strategic classroom by implementing the following system for strategy instruction and implementation (synthesized from Meltzer, 2010; Meltzer & Basho, 2010):
    - Introduce the strategy
        - Identify a problem
        - Explain the need for a strategy
    - Explicitly teach and model the strategy
        - Explain what the strategy is
        - Ensure that students understand when, how, and why to use the strategy
        - Use think-alouds to demonstrate how to apply a strategy
    - Schedule opportunities for students to practice and apply the strategy
        - Allow students to use class time to explore and experiment with the strategy (but do not expect students to use the strategy with new or challenging content)
        - Provide opportunities for students to use the strategy individually or in small groups
        - Facilitate strategy discussions
        - Encourage students to explain how to use the strategy
    - Reinforce student usage of the strategy
        - Have students add the strategy to a display board in the classroom

        - Have students record the strategy in personal strategy notebooks
        - Give credit for strategy usage
        - Cue students to use the strategy on a variety of tasks
        - Embed the strategy into lesson plans across the curriculum
        - Require explanations of how students use the strategy on assignments, assessments, and activities
        - Provide students with opportunities to teach others how to use the strategy to approach and solve a variety of problems
    - Require students to reflect on the efficacy of the strategy
        - Facilitate strategy discussions
        - Ask students to explain how a strategy helps them to solve problems
        - Require students to record the following in their personal strategy notebooks:
            - The types of problems that can be solved or managed through the use of the strategy
            - The strengths of the strategy
            - The shortcomings or weaknesses of the strategy
            - Any revisions that would make the strategy more effective in the future
    - Challenge and encourage students to develop their own strategies
        - Help students identify problems and the need for new strategies

    - Highlight situations when students use a novel approach to a problem
    - Encourage students to implement revisions to pre-established strategies
    - Facilitate strategy-sharing discussions
    - Cue students to use their own strategies
    - Challenge students to apply their strategies to approach and solve a variety of problems
    - Require students to assess the effectiveness and efficiency of their strategies
    - Require students to revise and refine their strategies
    - Have students record their strategies in personal strategy notebooks
    - Foster student ownership of strategies by having them present new strategies to the class, posting the strategy on the display board, and naming the strategy after the student
- Encourage students to continually question and test their own understanding and mastery of topics, ideas, and skills (Meltzer, 2010). Students should ask themselves, "Do I really understand this concept? Does this concept really make sense? Can I teach this concept to someone else?"
- Help students to be more aware of their actions, words, thoughts, and strategies (Cox, 2007). Ask students: "Why did you do it?" or "What were you thinking?" (Cox, 2007, p. 64).

Planning.

- Follow the systematic approach to strategy instruction (as outlined in the "metacognition" section above) to ensure that students become metacognitive of memory strategies.
- Teach students how to delay gratification so that they have the time and opportunity to plan a task (Cox, 2007).
- Give students credit for planning their work process and time (Cox, 2007; Krishnan, Feller, & Orkin, 2010).
- Emphasize that students need to actively plan their approach to assignments, not just complete the task (Cox, 2007; Krishnan, Feller, & Orkin, 2010).
- Question students about unconsidered, potential outcomes or behaviors (Cox, 2007).
- Challenge students to "slow down and consider important decisions" (Cox, 2007, p. 66).
- Note deadlines and interim due dates on class calendars and timelines (Krishnan, Feller, & Orkin, 2010).
- Teach students how to visualize themselves doing a task (Cox, 2007).
- Explicitly teach students how to set "good" goals that are proximate, specific, and appropriately challenging (Krishnan, Feller, & Orkin, 2010).
- Allocate time for students to set specific activity goals for long-term projects (Krishnan, Feller, & Orkin, 2010).

- Schedule time for students to record and explain their goals. Krishnan, Feller, and Orkin (2010) present goal-planning worksheets (pp. 217-8) that is appropriate for sixth grade students.
- Provide clear objectives and instructions for assignments and activities (Cox, 2007).
- Provide rubrics and work samples for particular projects and assignments so that students know what is expected of them (Krishnan, Feller, & Orkin, 2010).
- Help students to break tasks down into smaller parts (a.k.a. "chunking"; Cox, 2007).
- Teach students how to work backwards to plan the components of a task (Cox, 2007).
- Require students to record their intended work process as a checklist (Cox, 2007).
- Teach students to prioritize tasks. Krishnan, Feller, and Orkin (2010) explain that students should categorize tasks as obligations (mandatory and time-sensitive tasks), aspirations (enjoyable tasks that happen at a specific time), and negotiations (enjoyable tasks that can be done at any time). The nature of each task will dictate its importance on a student's schedule.
- Provide students with an hourly calendar of a day or week, and have them schedule their obligatory, aspirational, and negotiable activities (Krishnan, Feller, & Orkin, 2010).

- Support students' ability to estimate tasks (Krishnan, Feller, & Orkin, 2010). Task estimation includes:
    - Breaking larger projects into smaller, more manageable parts, a process also known as "chunking;"
    - Predicting how long it will take to complete each part of the task; and
    - Reflecting on how long each part actually took so that future predictions are more accurate.
- Play time estimation games with students. Games include:
    - Guess When a Minute Is Up! (Krishnan, Feller, & Orkin, 2010, p. 76)
    - Recipe for Success (Krishnan, Feller, & Orkin, 2010, p. 78)
- Provide egg timers, stopwatches, and alarms so that students can keep track of time during class, activities, and assignments (Cox, 2007; Krishnan, Feller, & Orkin, 2010).
- Help students to monitor their progress on a task and realize when schedules need to be rearranged, strategies or behaviors are inefficient, and responsibilities need to be amended (Krishnan, Feller, & Orkin, 2010).
- Teach students how to make personal checklists (Krishnan, Feller, & Orkin, 2010).

Organization.

- Follow the systematic approach to strategy instruction (as outlined in the "metacognition" section above) to ensure that students become metacognitive of organizational strategies.
- Help students to organize information and ideas.

- Provide graphic organizers (Krishnan, Feller, & Orkin, 2010). Examples include:
  - K-W-L charts organize "what I Know," "what I Want to learn," and "what I did Learn" (Krishnan, Feller, & Orkin, 2010, p. 67)
  - Cause and effect flow charts (Krishnan, Feller, & Orkin, 2010, p. 68)
  - Timelines
  - T-charts
  - Venn diagrams
  - Multi-column notes
  - Concept webs
- Provide students with various opportunities to categorize and compare information (Krishnan & Feller, 2010).
- Require students to annotate text in order to identify main ideas and supporting details (Krishnan & Feller, 2010).
- Require students to summarize information in a few words as possible (Levine, 2001).
- Teach writing strategies, such as:
  - PLEASE: Pick a topic, List ideas, Evaluate ideas, Activate the paragraph by writing a topic sentence, Supply supporting sentences, and Evaluate the paragraph (Krishnan & Feller, 2010)

    - BOTEC (for a systematic approach to writing): Brainstorm, Organize, Topic sentence, Evidence, Conclusion (by Essay Express as cited in Kincaid & Trautman, 2010, p. 125)
    - STOP (for persuasive essays): Suspend judgment, Take a side, Organize ideas, and Plan more while writing (Krishnan & Feller, 2010)
    - DARE (for persuasive essays, may be used in conjunction with STOP): Develop a topic sentence, Add supporting details, Rejects arguments from other side, and End with a conclusion (Krishnan & Feller, 2010)
    - PROVE (for writing thesis statements): Present knowledge, Reveal information, Offer examples or explanations, Verify knowledge, and Express knowledge in a summary statement (Krishnan & Feller, 2010)
    - TREE: Topic sentence, Reasons, Ending, and Examine (Graham, Harris, & Olinghouse, 2007; Krishnan & Feller, 2010)
    - POW: Pick idea, Organize notes, Write and say more (Graham, Harris, & Olinghouse, 2007)
    - Pieces of a Thesis: a graphic organizer used to structure analytical essays (Krishnan & Feller, 2010)
- Help students to organize materials and establish organizational routines in the classroom.

    - Show students examples of organized materials and work spaces (Cox, 2007)
    - Require students to date all notes, assignments, assessments, and handouts (Krishnan & Feller, 2010).
    - Hole-punch all handouts so that they can be stored in three-ring binders.
    - Check binders regularly to make sure they are organized and complete (Krishnan & Feller, 2010; Levine, 2001).
    - Hold students accountable for staying organized (Krishnan & Feller, 2010).
    - Take time to organize student lockers, binders, and backpacks (Levine, 2001).
- Help students organize their time by creating calendars and plans (Levine, 2001).
- Explicitly teach students how to recognize and take advantage of externally-developed organizational systems (Krishnan & Feller, 2010). External structures that students should understand include:
    - Classroom routines (Krishnan & Feller, 2010)
    - Text structures (Krishnan & Feller, 2010)
    - Curricular goals and lesson plans (Krishnan & Feller, 2010; Krishnan, Feller, & Orkin, 2010)
- Implement consistent routines within the classroom (Krishnan & Feller, 2010).

Attention.

- Follow the systematic approach to strategy instruction (as outlined in the "metacognition" section above) to ensure that students become metacognitive of attention strategies.
- Develop a cueing system for students who are particularly distractible or inattentive (Levine, 2001). The student should help to choose the cue so that it is discrete but effective.
- Maintain close proximity to students who are particularly prone to inattention or distractibility (Cox, 2007; Levine, 2001).
- Support students' ability to focus in class and while reading by providing note-taking templates or graphic organizers. These tools can also help students to identify the topic, main idea, and supporting details (Meltzer & Bagnato, 2010).
- Provide students with writing structures or outlines so that their writing stays on topic and focused (Meltzer & Bagnato, 2010).
- Make sure that students can explain the process or steps required in an activity. Many students struggle to initiate tasks because they do not know where to begin.
- Having a game plan will help students to avoid procrastinating and get to work quickly.
- Institute consistent classroom routines (Meltzer & Bagnato, 2010).

- Encourage students to start their homework as soon as they get home from school so that they avoid getting wrapped up in another activity and procrastinating. Parents also need to reinforce this strategy.
- Have students verbally explain or write about their thinking patterns and problem-solving approaches to common tasks or questions (Meltzer & Bagnato, 2010). This strategy helps students to generalize and apply their understandings in new situations. Examples include:
    - Math: Have students define problem types, write out the steps for solving that problem, record an example, and develop a strategy for remembering the problem-solving process.
    - Test-taking: Have students define question types, write out steps for responding to those questions, record examples of that question format, and develop a strategy for remembering the response process.
- Help students break tasks down into smaller, more manageable activities (Cox, 2007).
- Only give students one part of an assignment, assessment, or task at a time (Levine, 2001). Do not give the student subsequent tasks until he/she completes and hands in the current one.
- Give students breaks at set intervals. Some students can only work for ten minutes at a time while others and maintain focus for hours.
- Allow students to take a certain number of breaks during class (Levine, 2001). Breaks can include stretching, standing, getting a drink of water, or going to the restroom.

- Provide students with fidgets in order to keep their hands busy and their minds alert (Levine, 2001).
- Give students alarms, timers, or stopwatches can help students to keep track of how long they have been working (Cox, 2007).
- Require students to solve math problems in more than one way (Meltzer & Bagnato, 2010).
- Require students to illustrate math problems and concepts.
- Challenge students to think flexibly and shift mindsets (Meltzer & Bagnato, 2010). Possible activities include:
    - Tell jokes, riddles, and word games that challenge students to interpret ambiguous language (Meltzer & Bagnato, 2010). This strategy supports reading comprehension and helps students to recognize the importance of word choice and clarity in writing.
    - Ask students to use one word in as many ways as they can, for example *steal* a pen, *steal* home, *steal* a glance, what a *steal*, etc. (Meltzer & Bagnato, 2010).
    - Encourage students to illustrate two or more meanings for the same ambiguous sentence or headline (Meltzer & Bagnato, 2010).
    - Ask students to list all the uses for a common object, such as a paper cup, stapler, or banana (Meltzer & Bagnato, 2010). This strategy supports problem-solving by making students to think flexibly and creatively so they do not become "stuck."

  - Have students categorize vocabulary words, events, people, concepts, and other information in several different ways (Meltzer & Bagnato, 2010).
  - "Encourage students to write a short story from the perspective of an object" (Meltzer & Bagnato, 2010, p. 146), person, or character.
  - Have students come up with alternative ending to novels and short stories (Meltzer & Bagnato, 2010). Students can also imagine what would have happened if a historical event had not happened or ended differently.
  - Challenge students to manipulate words and numbers by playing logic games, such as crossword puzzles, Boggle, Magic Squares, and Sudoko (Meltzer & Bagnato, 2010).
- Teach students how to identify the topic, main idea, and supporting details (Meltzer & Bagnato, 2010). Strategies include:
  - Have students use indentation, two-column, or concept web notes.
  - Require students to annotate text (Bagnato & Meltzer, 2010).
  - Ask students to use writing structures.
- Ask students to compare and contrast information, concepts, and events (Meltzer & Bagnato, 2010). Graphic organizers, such as a Venn diagram or T-chart, can help students identify similarities and differences as well as common themes.
- Teach students to monitor their comprehension while reading (Bagnato & Meltzer, 2010). Strategies include:

  - Annotating text (Bagnato & Meltzer, 2010)
  - Writing chapter summaries (Bagnato & Meltzer, 2010)
  - "Changing section headings into questions" (Bagnato & Meltzer, 2010, p. 167)

- Teach students to edit and revise written assignments (Bagnato & Meltzer, 2010). Strategies include:
  - Taking a break before beginning the editing process
  - Using a colored pen to edit work (Bagnato & Meltzer, 2010)
  - Reading the written work aloud (Bagnato & Meltzer, 2010)
  - Analyzing writing errors and creating personalized editing checklists (Meltzer & Bagnato, 2010)
  - Using a grading rubric (Bagnato & Meltzer, 2010)
  - SPORTS (for editing written work): Sentence structure, Punctuation, Organization, Repetition, Tense, Spelling (Kincaid & Trautman, 2010)
  - STOPS (for editing written work): Sentence structure, Tenses, Organization, Punctuation, Spelling (Bagnato & Meltzer, 2010)
- Teach students to check their work in math (Bagnato & Meltzer, 2010). Strategies include:
  - Analyzing errors and making personalized checklists of common mistakes (Bagnato & Meltzer, 2010)
  - Plugging in the answer to the original equation
  - Estimating the answer and comparing the estimation to the calculation (Meltzer & Bagnato, 2010)

    - POUNCE (for checking work in math): change Pen color for corrections, check the Operation, Underline the question asked, check the Numbers (and signs), check the Calculations, make sure the answer is close to the Estimate (Kincaid & Trautman, 2010)

- Teach students to check their work on tests (Bagnato & Meltzer, 2010). Strategies include:
    - Turning the test over for 30 seconds before checking
    - Using personal checklists that list common past mistakes (Bagnato & Meltzer, 2010)
    - QUEST to do your best! (for reviewing written responses to essay or short answer questions on tests): read the QUestion carefully, look at the Evidence, check for Signal words, review Topic sentence (Kincaid & Trautman, 2010)

Memory.

- Follow the systematic approach to strategy instruction (as outlined in the "metacognition" section above) to ensure that students become metacognitive of memory strategies.
- Teach students memory strategies that address: "attending to details; repetition, rehearsal, and review; attaching meaning; and chunking information" (Kincaid & Trautman, 2010, p. 116).
- Teach students how to use mnemonics (or memory aids) to remember facts and processes (Kincaid & Trautman, 2010). Mnemonic devices include:

- Keywords: associating new or challenging vocabulary words with familiar, key words. Visual images and/or short stories help students to remember the connection between the vocabulary word and the keyword. This strategy is commonly used in foreign language study. Examples include:
  - La playa is Spanish for beach because I like to play on the beach.
  - Le pain is French for bread because bread is baked in a pan.
- Acronyms: real or imaginary words that support memory of a set of facts, items in a series, or steps in a process. Examples include:
  - HOMES (for remembering the Great Lakes): Huron, Ontario, Michigan, Erie, Superior
  - PEMDAS (for order of operations in math): Parentheses, Exponents, Multiplication/Division, Addition/Subtraction
  - CUPS (for solving word problems in math): Circle numbers and operations, Underline the question that needs to be answered, draw a Picture, and Solve (Kincaid & Trautman, 2010)
  - KNOW (for focusing attention on numbers and operations in math): Key words or phrases, Numbers that are needed, Operations, Work it out! (Kincaid & Trautman, 2010)
  - POUNCE (for checking work in math): change Pen color for corrections, check the Operation, Underline the question asked,

check the Numbers (and signs), check the Calculations, make sure the answer is close to the Estimate (Kincaid & Trautman, 2010)

- BOTEC (for a systematic approach to writing): Brainstorm, Organize, Topic sentence, Evidence, Conclusion (by Essay Express as cited in Kincaid & Trautman, 2010)
- ISA (for embedding quotes in essays): Introduce, State, Analyze (Kincaid & Trautman, 2010)
- SPORTS (for editing written work): Sentence structure, Punctuation, Organization, Repetition, Tense, Spelling (Kincaid & Trautman, 2010)
- QUEST to do your best! (for reviewing written responses to essay or short answer questions on tests): read the QUestion carefully, look at the Evidence, check for Signal words, review Topic sentence (Kincaid & Trautman, 2010)

- Acrostatics (or crazy phrases): phrases or sentences in which the first letter in each word supports the memory of facts, items in a series, or steps in a process. Examples include:
  - Lizards Wrestle Crunchy Pretzels (for remembering the process for creating a crazy phrase): "List the information in order, Write the first letter from each word, Create a silly sentence whose words begin with those letters…, Practice the

sentence until you remember it easily" (Kincaid & Trautman, 2010, p. 119)

- Every Good Boy Deserves Fun (for remembering the lines and spaces of the treble clef in music): EGBDF (Cox, 2007)

- Chants, rhymes, and songs: chants, rhymes, and songs enhance memory because information is encoded acoustically. Examples include:
  - "In fourteen hundred and ninety-two, Columbus sailed the ocean blue."
  - "I before E except after C."
  - 50 Nifty United States song
- Visuals: ideas or information can be linked through visual images. Also, visual associations aid memory of items, information, or text. Visualization can be particularly helpful for reading comprehension and retention. Examples include:
  - Italy looks like a boot.
  - Latitude lines run horizontally (east-west) just like the rungs on a ladder.
  - Direct or star in a "mental movie" while reading a novel.
  - Draw elaborate and silly vocabulary cartoons
  - Present historical events on a timeline
  - Organize ideas in a concept web, chart, or diagram

- Encourage students to use memory strategies that align with their learning styles and strengths (Cox, 2007; Kincaid & Trautman, 2010). Examples include:
    - Auditory learners:
        - Record verbal explanations of concepts and later listen to the recording (Kincaid & Trautman, 2010)
        - Teach the concept to someone else
        - Listen to instructional videos
        - Set lessons and information to music (Cox, 2007)
    - Visual learners:
        - Visualize learning experiences (Cox, 2007)
        - Recopy notes and diagrams (Kincaid & Trautman, 2010)
        - Create or associate images with information
        - Watch instructional videos
    - Kinesthetic learners:
        - Rewrite notes
        - Create models
        - Act out processes and events
- Help students to draw connections between new ideas with existing ones (Cox, 2007; Kincaid & Trautman, 2010). Background information is a powerful tool for understanding, evaluating, comparing, analyzing, and thinking about new information.

- Help students to chunk information into smaller bits (Cox, 2007; Kincaid & Trautman, 2010).
- Encourage students to externalize all the information they are holding in working memory (Cox, 2007). Particular tools include student planners and checklists.
- Require students to use active reading strategies that support working memory and improve reading comprehension and retention (Kincaid & Trautman, 2010). Examples include:
    - The STAR strategy (Kincaid & Trautman, 2010)
    - Chapter Summary Organizers (Kincaid & Trautman, 2010)
    - Title and Why (Kincaid & Trautman, 2010)
    - Book Notes (Kincaid & Trautman, 2010)
    - Text Annotations
    - SQ3R: Survey, Question, Read, Rewrite (take notes), Review
- Require students to summarize and paraphrase information (Levine, 2001).
- Provide partial outlines or note-taking templates to minimize working memory demands when students are taking notes so that they can focus on understanding the text (Kincaid & Trautman, 2010).
- Encourage students to do a "brain dump" at the beginning of a test (Kincaid & Trautman, 2010). A brain dump is when students write down any information or strategies that will likely need but forget while taking a test.
- Require students to outline their ideas before writing (Levine, 2001).

- Challenge students to solve increasingly long computation problems in their heads (Levine, 2001).

Part V: Next Steps

The research, ideas, and recommendations presented in this paper are just a starting-off point. There is still much to explore and do to ensure that students develop effective executive functioning skills. Most obviously, the initial plan of recommendations needs to be implemented, reviewed, revised, and expanded. The list of additional supports presents other strategies that can be incorporated into the sixth grade curriculum, but even this list is incomplete. In addition to the executive functioning skills of metacognition, planning, organization, memory, and attention, emotional regulation is an important component of self-regulation. Emotional control is not addressed in this paper but definitely warrants further research and inclusion in a more comprehensive plan. The entire sixth grade program also needs to be revised to better reflect the developmental abilities, needs, and interests of sixth grade students. Furthermore, executive functioning impacts a person's ability to do nearly everything in life, so non-academic tasks and situations should be examined. Finally, executive functioning supports should be implemented systematically throughout the entire school, not just the sixth grade or the Middle School.

Part VI: Conclusion

Teachers need to support the executive functioning skills of sixth grade students. Developmentally, students lack the ability to self-regulate because eleven and twelve year olds have underdeveloped prefrontal cortexes, rely on the amygdala for decision-making, and have an abundance of dopamine in the brain. These conditions cause students to act

impulsively, emotionally, and seemingly illogically. To complicate matters even more, sixth grade is a transition year when students enter the Middle School and face higher academic demands and expectations. Teachers need to explicitly teach the executive functioning skills and strategies that will allow sixth graders to meet these increased requirements. Teachers also need to provide ongoing support, practice, and reinforcement in order to ensure that students develop the desired thinking processes and behavior patterns. Such experiences can influence the neural circuitry in the students' brains so that the prefrontal cortex begins to coordinate thoughts and actions and more executive control is achieved.

This paper presents an initial plan for supporting select executive function skills within the sixth grade at the particular school where I am a learning specialist. The recommendations address specific regulatory challenges experienced by sixth graders, including beginning each class, tracking assignments and assessments, navigating moodle, organizing binders, writing argumentative paragraphs, monitoring behavior in class, studying for assessments, and utilizing peers to solve problems. With consistent, explicit, and ongoing support from teachers, students will be able to develop these skills and adjust to the academic and behavioral demands of the Middle School.

References

American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders (5th ed.).* Washington, DC: American Psychiatric Association.

Bagnato, J. S. & Meltzer, L. (2010). Self-monitoring and self-checking: The cornerstones of independent learning. In L. Meltzer (Ed.), *Promoting executive function in the classroom* (pp. 160-174). New York, NY: The Guilford Press.

Barkley, R. A. (1996). Linkages between attention and executive function. In G. R. Lyon & N. A. Krasnegor (Eds.), *Attention, memory, and executive function* (pp. 307-326). Baltimore, MD: Paul H. Brooks.

Barkley, R. A. (1997a). *ADHD and the nature of self-control.* New York, NY: The Guilford Press.

Barkley, R. A. (1997b). Behavioral inhibition, sustained attention, and executive functions: Constructing a Unifying Theory of ADHD. *Psychological Bulletin, 121*(1), 65-94. Retrieved from Academic Search Premier.

Blakemore, S.-J. & Choudhury, S. (2006). Development of the adolescent brain: Implications for executive function and social cognition. *Journal of Child Psychology and Psychiatry, 47*(3/4), 296-312. Retrieved from Omnifile Full Text Select.

Brown, T. E. (2002 November). DSM-IV: ADHD and executive function impairments. *Advanced Studies in Medicine, 2*(25), 910-914. Retrieved from http://www.drthomasebrown.com/pdfs/ef_article.pdf.

Choudhury, S., Charman, T., & Blakemore, S.-J. (2008). Development of the teenage brain. *Mind, Brain, and Education, 2*(3), 142-147. Retrieved from Omnifile Full Text Select.

Cox, A. J. (2007). *No Mind Left Behind: Understanding and fostering executive control – The eight essential brain skills every child needs to thrive.* New York, NY: Penguin.

Curwin, R. L., Mendler, A. & Mendler, B. (2008). *Discipline with dignity* (3rd ed.). Alexandria, VA: Association for Supervision and Curriculum Development.

Dawson, P. (2010, October). Lazy – or not?. *Educational Leadership, 68*(2), 35-8. Retrieved from http://www.ascd.org/publications/educational-leadership/oct10/vol68/num02/Lazy%E2%80%94Or-Not%C2%A2.aspx

Dawson, P. & Guare, R. (2009). *Smart but scattered: The revolutionary "executive skills" approach to helping kids reach their potential.* New York, NY: The Guilford Press.

Denckla, M. B. (1994). Measurement of executive function. In G. R. Lyon (Ed.), *Frames of reference for the assessment of learning disabilities: New views on measurement issues* (pp. 117-142). Baltimore, MD: Paul H. Brooks.

Denckla, M. B. (1996). A theory and model of executive function: A neuropsychological perspective. In G. R. Lyon & N. A. Krasnegor (Eds.), *Attention, memory, and executive function* (pp. 263-278). Baltimore, MD: Paul H. Brooks.

Elliot, R. (2003). Executive functions and their disorders. *British Medical Bulletin, 65,* 45-59. Retrieved from

http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.115.1745&rep=rep1&type=pdf.

Graham, S., Harris, K. R. & Olinghouse, N. (2007). Addressing executive function problems in writing. In L. Meltzer (Ed.), *Executive Function in Education* (pp. 216-236). New York, NY: The Guilford Press.

Havasy, S. K. (n.d.). Brain development and executive functioning. *Tarnow Center for Self-Management*. Retrieved from http://www.tarnowcenter.com/clinicians/285-brain-development-and-executive-functioning.html.

Jones, K. (2013, February 27). The amygdala: A full brain integrator in the face of fear. *Knowing Neurons*. Retrieved from http://knowingneurons.com/2013/02/27/the-amygdala-a-full-brain-integrator-in-the-face-of-fear/.

Jurado, M. B., & Rosselli, M. (2007). The elusive nature of executive functions. *Neuropsychology Review, 17*(3), 213-233. Retrieved from http://acdl.crpp.nie.edu.sg/documents/jurado%20rosselli%202007.pdf.

Kincaid, D. M. & Trautman, N. (2010). Remembering: Teaching students how to retain and mentally manipulate information. In L. Meltzer (Ed.), *Promoting executive function in the classroom* (pp. 110-139). New York, NY: The Guilford Press.

Krishnan, K. & Feller, M. J. (2010). Organizing: The heart of efficient and successful learning. In L. Meltzer (Ed.), *Promoting executive function in the classroom* (pp. 86-109). New York, NY: The Guilford Press.

Krishnan, K., Feller, M. J., & Orkin, M. (2010). Goal setting, planning and prioritizing: The foundations of effective learning. In L. Meltzer (Ed.), *Promoting executive function in the classroom* (pp. 57-85). New York, NY: The Guilford Press.

Lambek, R., Tannock, R., Dalsgaard, S., Trillingsgaard, A., Damm, D., & Thomsen, P. H. (2010). Validating neuropsychological subtypes of ADHD: How do children with and without executive function deficit differ? *Journal of Child Psychology, 5*(8), 895-904. Retrieved from Academic Search Premier.

Lerner, R. M., Lerner, J. V., Bowers, E. P., Lewin-Bizan, S., Gestsdottir, S., & Urban, J. B. (2011). Self-regulation processes and thriving in childhood and adolescence: A view of the issues. In R. M. Lerner, J. V. Lerner, E. P. Bowers, S. Lewin-Bizan, S. Gestsdottir, & J. B. Urban (Eds.), Thriving in childhood and adolescence: The role of self-regulation processes. *New Directions for Child and Adolescent Development, 133,* 1-9.

Levine, M. (2001). *Educational care: A system for understanding and helping children with learning differences at home and in school.* Cambridge, MA: Educators Publishing Service.

Meltzer, L. (2010). *Promoting executive function in the classroom.* New York, NY: The Guilford Press.

Meltzer, L. & Bagnato, J. S. (2010). Shifting and flexible problem solving: The anchors for academic success. In L. Meltzer (Ed.), *Promoting executive function in the classroom* (pp. 140-159). New York, NY: The Guilford Press.

Moilanen, K. L. (2007). The adolescent self-regulatory inventory: The development and validation of a questionnaire of short-term and long-term self-regulation. *Journal of Youth and Adolescence, 36,* 835-848.

OnTRAC planner: The 101, middle level, 2013-2014 (2012). Bellingham, WA: School Specialty.

Steinberg, L. (2011). Demystifying the adolescent brain. *Educational Leadership, 68*(7), 42-46. Retrieved from http://www.cng.edu/Tti/Classroom_Management/Demystifying%20the%20adolescent%20brain.pdf.

Sylwester, R. (1995). *A celebration of neurons: An educator's guide to the human brain.* Aeandria, VA: Association for Supervision and Curriculum Development.

Terkeltaub, S. (2012). *Designing a website for students with executive function deficits.* (Unpublished masters thesis). Bank Street College of Education, New York, NY.

Wood, C. (1997). *Yardsticks: Children in the classroom ages 4-14; A resource for parents and teachers.* Turner Falls, MA: Northeast Foundation for Children.

Appendix A
Sixth Grade Teacher Questionnaire

A Google form was circulated to all sixth grade teachers in order to assess the executive functioning demands of sixth grade. Below are the questions that were included in the questionnaire.

6th Grade Routines & Practices

Daily Classroom Routines

1. What routine do you use at the BEGINNING of class? Please describe the step-by-step process that students should follow when they enter your classroom.
2. What routine do you use at the END of class? Please describe the step-by-step process that students should follow when they leave your classroom.
3. How do students learn and know about the routines in your class? Please describe how you communicate routines to students.
4. What materials do students need in your class?
5. Are students expected to take notes in your class? How are students expected to take notes in your class?

Homework

1. Do you know the homework prior to the start of class? Do you plan and copy the homework before class so that students leave class with their homework?
    - Always – 4 times per week
    - Usually – 2-3 times per week
    - Sometimes – 1-2 times per week
    - Never
2. Could you post the homework at the beginning of class? In your discipline, is it feasible to plan and copy your homework prior to the start of class?
    - Always – 4 times per week
    - Usually – 2-3 times per week
    - Sometimes – 1-2 times per week
    - Never
3. Could you post the homework at the end of class? In your discipline/class, is it feasible to tell students about the homework at the end of class?
    - Always – 4 times per week
    - Usually – 2-3 times per week
    - Sometimes – 1-2 times per week
    - Never
4. How do you notify students about homework? Choose all that apply.
    - Posted in classroom
    - Moodle
    - Announced verbally
    - Distributed in Study Hall
    - Other: _____
5. When do you correct/collect homework in class?

- Immediately at the beginning of class
- After a warm-up
- At the end of class
- I don't collect homework
- Other: _____

6. Is there anything else you would like to share about homework in your class?

Moodle

1. How do you want students to use moodle in your class?
2. How do you think students actually use moodle in your class?
3. How do you structure your moodle? Are there specific reasons why you structure your moodle in this way? Things to consider: chronological or reverse chronological order; organized by unit, week, month, or not broken down; includes topic outline, handouts, videos, and/or resources; display or hide prior topics; etc.
4. Do you use the calendar function on moodle? Why?

Binders

1. What binder sections do students need for your class?
2. How do students know where to put certain papers in their binder? Do you tell students where to put papers?
3. Do you hole-punch all handouts?
   - Always
   - Sometimes
   - Never

Academic Skills

1. Do students annotate in your class? How do you like students to annotate in your class?
2. Do students take indentation notes in your class? Why are indentation notes important for your class? What are the most important features of indentation notes?
3. Do students take 2-column notes in your class? Why are 2-column notes important for your class? What are the most important features of 2-column notes?
4. Do students make study guides in your class? What do study guides look like in your class?
5. Do you use writing structures/graphic organizers in your class? What are the main features of the writing structure that you use?
6. How do you encourage students to solve problems independently? Are there set routines that students should follow in order to get answers to questions about homework, classwork, etc?
7. Are there any other skills that students need to be successful in your class?

Appendix B
Paragraph Writing Structures

Paragraph Writing Structure #1

QUestion: _____

Ideas: List FIVE (5) arguments you *could* use in your paragraph.

- _____
- _____
- _____
- _____
- _____

Choose: Circle THREE (3) points that you would like to use in your paragraph.

Outline: Outline your paragraph in the space below.

Topic Sentence: Write a clear sentence that answers the question.
Reasons: Put your reasons in a logical order.
Reason #1:
Reason #2:
Reason #3:
Closing Sentence: Summarize your argument without repeating what you already said.

Write: Using your outline, write a FIVE (5) SENTENCE paragraph.

Edit & Revise: If you typed your paragraph, print it. Check your paragraph for spelling mistakes, grammatical errors, transition words, and clarity. Note changes in COLORED PEN.

Publish: Create a final version of your paragraph that has no mistakes.

Paragraph Writing Structure #2

QUestion: _____

Ideas: List FIVE (5) arguments you *could* use in your paragraph.

- _____
- _____
- _____
- _____
- _____

Choose: Circle THREE (3) points that you would like to use in your paragraph.

Outline: Outline your paragraph in the space below.

Topic Sentence: Write a clear sentence that answers the question.
Reasons: Put your reasons in a logical order. Then, think of examples to illustrate each reason.
Reason #1: Example:
Reason #2: Example:
Reason #3: Example:
Closing Sentence: Summarize your argument without repeating what you already said.

Write: Using your outline, write an EIGHT (8) SENTENCE paragraph.

Edit & Revise: If you typed your paragraph, print it. Check your paragraph for spelling mistakes, grammatical errors, transition words, and clarity. Note changes in COLORED PEN.

Publish: Create a final version of your paragraph that has no mistakes.

Paragraph Writing Structure #3

QUestion: _____

Ideas: List FIVE (5) arguments you *could* use in your paragraph.

- _____
- _____
- _____
- _____
- _____

Choose: Circle THREE (3) points that you would like to use in your paragraph.

Outline: Outline your paragraph in the space below.

Topic Sentence: Write a clear sentence that answers the question.
Reasons: Put your reasons in a logical order. Think of examples to illustrate each reason. Then, locate evidence (quotes, statistical data, images, etc.) that confirm your reasons and examples.
Reason #1: Example: Evidence:
Reason #2: Example: Evidence:
Reason #3: Example: Evidence:
Closing Sentence: Summarize your argument without repeating what you already said.

Write: Using your outline, write an ELEVEN (11) SENTENCE paragraph.

Edit & Revise: If you typed your paragraph, print it. Check your paragraph for spelling mistakes, grammatical errors, transition words, and clarity. Note changes in COLORED PEN.

Publish: Create a final version of your paragraph that has no mistakes.

Paragraph Writing Structure #4

QUestion: _____

Ideas: List FIVE (5) arguments you *could* use in your paragraph.

- _____
- _____
- _____
- _____
- _____

Choose: Circle THREE (3) points that you would like to use in your paragraph.

Outline: Outline your paragraph in the space below.

Topic Sentence: Write a clear sentence that answers the question.
Reasons: Put your reasons in a logical order. Think of examples to illustrate each reason. Locate evidence (quotes, statistical data, images, etc.) that confirm your reasons and examples. Then, explain what the evidence means and how it proves your argument.
Reason #1: Example: Evidence: Meaning:
Reason #2: Example: Evidence: Meaning:
Reason #3: Example: Evidence: Meaning:
Closing Sentence: Summarize your argument without repeating what you already said.

Write: Using your outline, write a FOURTEEN (14) SENTENCE paragraph.

Edit & Revise: Check for spelling mistakes, grammatical errors, transition words, and clarity.

Publish: Create a final version of your paragraph that has no mistakes.

Paragraph Writing Structure #5

QUestion: _____

Ideas: List FIVE (5) arguments you *could* use in your paragraph.

- _____
- _____
- _____
- _____
- _____

Choose: Circle TWO (2) points that you would like to use in your paragraph.

Outline: Outline your paragraph in the space below.

Topic Sentence: Write a clear sentence that answers the question.
Reasons: Put your reasons in a logical order. Think of examples to illustrate each reason. Locate evidence (quotes, statistical data, images, etc.) that confirm your reasons and examples. Then, explain what the evidence means and how it proves your argument.
Reason #1: Example: Evidence: Meaning:
Reason #2: Example: Evidence: Meaning:
Different Perspective & Response: Present a different perspective on the question. Then, respond to that perspective by explaining why yours is better.
Different Perspective: Response:
Closing Sentence: Summarize your argument without repeating what you already said.

Write: Using your outline, write a TWELVE (12) SENTENCE paragraph.

Edit & Revise: Check for spelling mistakes, grammatical errors, transition words, and clarity.

Publish: Create a final version of your paragraph that has no mistakes.

Appendix C
Daily Grade Rubric

Classroom Expectation	Daily Grades				
	5	**4**	**3**	**2**	**1**
Beginning of Class Routine	• Arrived on time and quietly. • Immediatel y began do-now. • Took out all necessary class materials. • Quietly waited for the lesson to start.	• Arrived on time. • Began the do-now. • Took out all necessary class materials. • Waited for the lesson to start.	• Arrived on time. • Received one reminder to be quiet, begin the do-now, take out all necessary class materials, or wait patiently.	• Arrived on time. • Received two reminders to be quiet, begin the do-now, take out all necessary class materials, or wait patiently.	• Arrived late. • Did not do the do-now. • Did not take out all class materials. • Did not wait patiently for the lesson to start.
Preparation	• Had *all* necessary class materials. • Finished HW	• Borrowed paper or pen/pencil, but had all other class materials. • Finished HW	• Left the classroom to get necessary class materials. • Finished HW	• Forgot one class material at home. • Started HW but did not finish.	• Forgot several class materials at home. • Did not do HW.
Participation & Listening	• Engaged in *all* class activities and discussions. • Actively listened and responded to others' ideas.	• Participated in *most* class activities and discussions. • Listened throughout class.	• Participated in *some* class activities and discussions. • Mind wandered once or twice.	• Participated in *few* class activities and discussions. • Daydreame d for part of class.	• Did not participate in class activities or discussions. • Did not listen.
Social Intelligence	• Was respectful and helpful to others.	• Was respectful to others.	• Made *one* disrespectful gesture (ex: eye-roll, smirk).	• Made *one* disrespectful comment.	• Made *two or more* disrespectful gestures or comments.
Self-Control	• Remained on task during class. • Promptly and safely followed all instructions. • Did not disrupt class.	• Received *one* reminder to stay on task, follow instructions, or stop disrupting class.	• Received *two* reminders to stay on task, follow instructions, or stop disrupting class.	• Received *three* reminders to stay on task, follow instructions, or stop disrupting class.	• Was regularly off task and disruptive. • Did not follow instructions. • Was not safe.

Appendix D
Study Plan & Checklist

Study Plan & Checklist for: _____ *Write this test/quiz in your planner!*

Date of Test/Quiz:_____ # Days to Study: _____

What topics, concepts, or skills will be on the test/quiz? List what you need to know.

- _____
- _____
- _____
- _____
- _____
- _____

What types of questions will be on the test/quiz? Check off all that apply.

☐ Multiple-choice	☐ Matching	☐ Calculations
☐ Short answer	☐ True/False	☐ Word Problems
☐ Fill-in-the-blank	☐ Always/Sometimes/Never	☐ Other: _____
☐ Labeling	☐ Essay	☐ Other: _____

What *active* study strategies will you use? Choose *at least* THREE (3) active study strategies. Then plan when you will complete each activity and track your progress.	***Planned* Completion Date**	***Actual* Completion Date**
☐ Re-do old test, quiz, and homework questions.		
☐ Answer additional questions in the textbook or readings.		
☐ Define key words or vocabulary *in your own words* and use the word in a *new and original* sentence or paragraph.		
☐ Turn headings in readings, handouts, notes, and moodle into questions, and answer the questions *in your own words*.		
☐ Use class notes, readings, handouts, and moodle to create a reference sheet or study guide that explains all the important skills, concepts, and topics *in your own words*.		
☐ Create a timeline or flow chart that shows the relationship between events or concepts.		
☐ Summarize each of the major themes, then write and answer potential short answer or essay questions *in your own words*.		
☐ Develop memory tricks for key words, processes, etc.		
☐ Teach the concepts or skills to someone else.		
☐ Create and take a practice test or quiz using questions from the homework, old tests/quizzes, readings, handouts, and class notes.		
☐ Quiz yourself aloud OR have someone else quiz you.		
☐ Other:		

*****MAKE SURE TO RECORD YOUR TEST/QUIZ & STUDY PLAN IN YOUR PLANNER!*****