Product Research

ThinkUp!™ FOUNDATIONS

Supporting documentation for the development of **ThinkUp! Foundations Compact Guide for Principals**

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ThinkUp! Foundations Compact Guide for Principals

Critical thinking is an essential element for preparing all learners to succeed in school and throughout their lives. Students do not enter school and automatically transform into critical thinkers. A thinking environment must be a shared priority that is created throughout the school to help students learn to think critically. School leaders need resources that offer support in assisting teachers, students, and others school community stakeholders in embracing critical thinking, developing thinking traits, and purposefully cultivating a thinking environment throughout the school. Understanding how to cultivate such an environment is crucial to high levels of student and teacher performance.

The ThinkUp! Foundations Compact Guide for Principals™ is a resource for school principals as they build a thinking-centered environment, oversee that thinking traits are embedded within academics and social interactions, and monitor the integration of thinking across the curriculum. Two versions of the compact guide are available: one for elementary school leaders and another for secondary. With the focus on critical thinking resources, this 14-panel compact guide serves as a support for school leaders as they establish a school-wide culture for thinking with the intent to improve student and teacher performance.

Principals may also use this compact guide to:

- develop and sustain a school-wide environment that values thinking.
- clarify expectations for thinking.
- prepare students for success in school and in life.
- acquire a clear understanding of building a culture for thinking.
- identify nine thinking traits that develop students and teachers as strong thinkers.
- guide the infusion of thinking traits into the school and classroom environments.
- establish a common language for thinking.
- obtain strategies, tips, and ideas for implementing a school-wide focus on thinking.
- engage in thinking-focused conversations with teachers or professional learning communities (PLCs).
- nurture teacher development with feedback and emotional support.
- examine current thinking practices and determine future needs.
- plan and introduce engaging activities for students, teachers, parents, and community.
- solicit support from the parents and the community for a thinking initiative.
- facilitate and encourage critical thinking.
- orient students and families new to the school to a thinking culture.
- reflect, evaluate, and take action to enhance critical thinking.
- support professional development opportunities.
- monitor classroom practices that promote thinking.
- create shared responsibility for student and school success.

The compact resource guides principals as they establish and make expectations for thinking visible to all teachers, students, parents, and the community. This planning tool directs principals

to engage with the school community, working independently and collaboratively to maximize instructional time and ensure that thinking is integrated into daily instruction and encouraged in the home environment. The compact guide is created for flexible usage, allowing school leaders to determine when to address each element of a thinking culture.

Student achievement is ultimately determined and limited by the opportunities they have had to learn. "All students must learn to think no matter the subject area. With the passing of the Every Student Succeeds Act (ESSA), this federal law requires that academic assessments for "math and reading or language arts be administered annually in grades 3-8 and at least once in grades 9-12…" (Mandlawitz, 2016, p.1). The critical issue of accountability will continue with ESSA, with assessments being used to help improve schools and inform instruction. The law allows the state and local levels the opportunity to create systems for accountability, resources, interventions and teacher evaluation systems. The federal requirements of Every Student Succeeds Act mandate that all students participate in the state assessment program. Critical thinking is integrated into assessment items and performance tasks. If we don't explicitly build a thinking environment, how will our students learn to think, much less think at deeper levels?

The necessity of school leaders and teachers knowing how to build and sustain a thinking environment in schools is obvious. Critical thinking skills are essential for students to succeed, not only in their school work but also in their life after graduation. For students to meet state content standards, they must be able to critically examine information. After graduation, the ability to think and adapt will stand them in good stead in college and in their careers. Albert Einstein stated that education "is not the learning of the facts, but the training of the mind to think" (as cited in Frank, 1947, p. 185). Similarly, Margaret Mead (n.d.) commented, "Children must be taught how to think, not what to think." Educators have an opportunity and a responsibility to equip students with the critical thinking skills that can help them organize their thinking and transfer what they have learned to new situations.

Critical thinking and problem-solving skills are identified as two key areas in preparing students for college and career readiness (MetLife, 2011; Achieve, 2015). Based on an examination of top-performing global educational systems, a key identifier of successful systems is rigor (Ripley, 2013). Schools have been criticized for not adequately preparing students for the level of rigor they will encounter in college (Achieve, 2006). In 2011, only 25% of high school graduates taking the ACT successfully passed all four of the ACT's College Readiness Benchmarks, and 28% of high school students did not pass any of them. ACT predictions have been confirmed: nearly one third of students entering post-secondary education take remedial courses in one or more subjects because they lack the skills to take standard credit-bearing courses (National Center for Education Statistics, 2011). Moreover, research into the success rates of college students and high school seniors has shown that students' level of critical thinking is predictive of their grades or cumulative college grade point average (Facione, 1990a, 1990b; Sternberg, 2008).

In terms of employment, an overwhelming percentage of employers (93%) have indicated that job candidates' capacity to think critically, communicate clearly, and solve complex problems is more important than their college major (Association of American Colleges and Universities, 2013). When asked in 2015 how American public high schools could do a better job of preparing

students for the expectations of college and the working world, college instructors and employers emphasized the need for critical thinking and problem-solving skills. This is especially true today, where new knowledge is rapidly accelerating and information is instantly available. Students with critical thinking and problem-solving skills can interpret and evaluate what they read, see, and hear to effectively make the transition to college and career.

Educators, parents, and community members also agree that critical thinking and problem-solving skills are important skills for students. The findings of the Project Tomorrow (2014), a survey of district administrators, teachers, parents, and community members, show critical thinking and problem-solving skills as essential skills needed by students for future success.

Student success hinges on teacher practice. One important function of formative assessment is to inform instruction. Rice (2003) states that teacher quality weighs heavily on student achievement. Formative assessment will help teachers make more targeted adjustments and increase responsive adjustments and interventions based on student needs. A panel is dedicated to Assessment for Thinking in ThinkUp! Foundations. Suggestions are shared to guide school leaders in what to look for when observing in a classroom as well as what the expectations are for students and teachers. Observing teachers utilizing formative assessment regarding thinking and offering formative feedback to students improves quality of thought. According to (Black et al., 2013) formative assessment contributes to achievement of standards and intervention support. The incorporation of formative assessment is essential because it improves teaching and learning. Several researchers indicate the difference that can be made when formative assessment is embedded into instruction (Darling-Hammond, 2004; Marzano, 2003, 2006; Shepard, 2000; Heritage, 2007).

As previously indicated, there is a connection between critical thinking skills and success in life—not just in college and in the workplace. Research has found that adults who scored higher on critical thinking assessments reported fewer negative life events. Possessing critical thinking skills helped the participants make positive life choices (de Bruin, Parker & Fischoff, 2007). This is echoed by Nisbett (2016), who states, “Schools cannot claim to prepare students for life unless they help students learn to reason effectively and to make choices that will improve their lives and the lives of others” (p. 28).

In short, thinking skills can help equip students with the ability to navigate challenging life circumstances, economic changes, and complex political challenges. There are direct implications for educators in elementary and high schools. As educators design instruction, it is imperative that school leaders evaluate to determine if curricula and assessment that emphasize authentic real-world problems, inquiry-based learning, and opportunities for students to apply what they know in meaningful ways are worked into the instructional design (Stobaugh, 2013a; 2013b). This strengthens the need for a resource to help the school leader set the tone for establishing a thinking culture that supports the development of critical thinking and provide the resources teachers need to create thinking classrooms. Thus, the intent of Think Up! Foundations, is to offer a compact guide for administrators to support them on this journey.

Encouraging and fostering thinking is central to student learning. In education, a shift from a focus on content to an emphasis on thinking skills is apparent. Thinking must be integrated with content to make meaning and deepen learning. Costa

and Kallick (2009, p. 5) state that the standards "suggest that successful instruction in skillful thinking should be done while teaching subject matter instead of in addition to teaching subject matter. Thinking and subject matter content are neither separate from nor in opposition to each other. The implication is that a student cannot demonstrate mastery of any of these required standards without performing one or more important thinking skills." Thus, a resource that emphasizes how to build a school-wide thinking culture is imperative. Think Up! Foundations supports school leaders in establishing a thinking climate throughout the school. If this type environment is created across the curriculum, then teachers can succeed in promoting deeper learning, encouraging students to share evidence or reasoning for solutions, rather than simply providing facts or a single answer.

Marzano (2009) stressed the importance of a common language as it provides a framework or a way to talk about instruction at school. Just as educators use a shared language to discuss effective instruction to improve student learning, it stands to reason that to converse about critical thinking and its development, a language common to all should also exist. According to Walsh and Sattes, "A language of thinking promotes exactness and precision in expressing cognitive processing" (2011, p. 144). When a shared understanding is developed based on the common language of critical thinking, teachers can engage in deliberate conversations to make real-time adjustments in planning and engaging students in meaningful thinking experiences. By developing this knowledge base, teachers are given opportunities to improve their expertise in thinking and to better understand the kinds of practice opportunities needed to help students grow as independent thinkers. Thus, a panel that highlights developing a common language was addressed in the compact guide. When the principal values a common language among the school community, then all stakeholders can speak and understand the same thinking language.

School leaders must be specific in stating expectations for a thinking classroom if they want teachers and parents to support such an environment. All principals may not understand what thinking expectations entail, therefore a panel in the compact guide is featured to guide principals. Classrooms can be work cultures or thinking cultures. In work cultures, an emphasis is placed on students completing assignments, often at a low cognitive level. Thinking cultures nurture students' thinking skills (Ritchhart, 2002). Stobaugh (2013a) notes that teachers can train brains in a "thought-full" classroom just as people visit a gym to train their bodies to be stronger and more agile. Classrooms should encourage student questions and inquiries that focus on higher-order thinking and deepen learning experiences.

Students should be taught the importance of thinking critically and how critical thinking skills impact their future success. It is recommended that students be taught that improvement in thinking skills is like improvement in any sport or hobby. Emphasize that the development of thinking takes commitment as well as practice, practice, practice. Students must also understand that learning how to think critically develops and improves over time. Teachers must ensure that students know the purpose or the reason behind every learning experience, so the focus remains on the learning itself and not the work. Stobaugh (2013b, p. 137) states, "By establishing a focus on thinking, teachers can transform classrooms from mass-production classrooms with students able to answer fact-based questions to classrooms that embody real learning through thinking as students analyze, critique, and create."

Expectations should be clear and communicated to teachers and to students so they know that learning is more than the acquisition of information and skill, and that discussions are not merely superficial. Only then will individuals understand what a thinking classroom looks like. Classroom tasks, routines, and assessments will make it transparent that in-depth thinking is required for success. Higher-order questions (e.g., Why is ___? What are you assuming when you say ___? What evidence can you offer to support ___? How might ___?) and thoughtful responses are desired. Students will readily observe that tasks, routines, and assessments are designed to elicit thinking and to transfer and make meaning. Translating thinking from content-area instruction into a wide variety of situations allows students to see relevance. Thinking expectations will enable individuals to effectively evaluate the quality of thinking of others and self-assess their own thinking, determining individual progress and the improvement needed. When expectations for thinking are made explicit, evidence can be gathered and judgments can be formed (Paul & Elder, 2000). With the emphasis on learning and thinking at the core of instruction within a school, the focus of the classroom shifts from acquisition of content to making meaning. School leaders can set this tone by establishing expectations up front and thus guide teachers to do the same within the classrooms. The panel on expectations gives school leaders a wide range from which they can select those that coincide with the school's goals and slowly add other expectations as deemed appropriate.

The most powerful way to raise student achievement is through professional learning. More than ever before, students need effective instruction to develop the deeper thinking skills needed for school and later in life. Research shows that teachers need on-the-job support to infuse ideas into daily instructional practices (Joyce and Showers, 2002). The need for professional development to focus on instruction is based on the assumption that the quality of instruction is the key determinant of variation in student achievement (Wenglinsky, 2000; Hattie, 2009). School leaders must understand the role thinking plays and their responsibilities in making thinking a core element across the curriculum. Therefore, a panel about professional development is included in the ThinkUp! Foundations Compact Guide to assist school leaders in providing necessary support to establish a culture for thinking. Questions that can be used to promote instructional conversations among teachers and within Professional Learning Communities are featured in the guide to stimulate thinking conversations.

To promote a thinking culture, school leaders should demonstrate support for their teachers in utilizing multiple classroom examples and tools to nurture thinking. As educators conceptualize critical thinking, there are several frameworks that define the various levels of critical thinking that administrators should become familiar if they are not. In 1956, Benjamin Bloom in his book Taxonomy of Educational Objectives proposed a thinking taxonomy that is still used by teachers as an established hierarchy of critical thinking skills. Recognizing the existence of different levels of thinking behaviors important to learning, Benjamin Bloom and his colleagues developed Bloom's Taxonomy, a common structure for categorizing test questions and designing instruction. The taxonomy is divided into six levels, from basic factual recall, or Knowledge, to the highest order, Evaluation, which assesses value or asks the teacher or learner to make judgments among ideas. This framework was revised and clarified (Anderson et al., 2001). The revised taxonomy changed the names of each level to verbs to show that thinking is active and changed the order of the

sixth or highest level of thought, making Evaluate the fifth level and Create the sixth level. The six levels of thinking are known as the Cognitive Domain and a second domain was added, termed the Knowledge Domain.

Another framework is Norman Webb's Depth of Knowledge (DOK), which was developed in 1997. Norman Webb's Depth of Knowledge framework (2002) was expanded to the content areas and is used to categorize a task or an assessment item according to the complexity of thinking required of students to successfully engage with and complete the task or item. The four levels of DOK require students to interact with content in different and deeper ways as the cognitive demand progresses with each level: Level 1: Recall and Reproduction; Level 2: Skills and Concepts; Level 3: Strategic Thinking/Reasoning; Level 4: Extended Thinking. Webb's DOK levels can be applied across all content areas. This useful tool guides teachers to better design instruction and assessment that increases rigor and develops deeper understanding. Unlike RBT, the verb does not categorize the level of thinking; the key factor is the context in which the verb is used and the depth of thinking required. Attention seems to increase so much more than in previous years in the amount of attention given to students' abilities to think critically (Hobgood, Thibault, and Walberg, 2005). Still another framework described is the Cognitive Rigor Matrices (CRMs) devised in 2009 by Karin Hess by combining Revised Bloom's Taxonomy with Webb's DOK. Instructional curricular examples are featured on each matrix. School leaders must be aware that teachers can use these frameworks to guide instructional planning and assessment to ensure that higher-level thinking is incorporated into everyday learning.

In the 1950s, Bloom found that 95% of the test questions developed to assess student learning only required thinking at the lowest level of learning, recall of information. Similar findings indicated an overemphasis on lower-level questions and activities with little emphasis on the development of students' thinking skills (Risner, Skeel, and Nicholson, 1992). Studies over the last 40 years have confirmed Bloom's Taxonomy of the Cognitive Domain as a framework to establish intellectual and educational outcomes. The conclusions reached by researchers substantiate that students achieve more when they manipulate topics at the higher levels of thinking.

Studies show that the art of asking questions with an emphasis on higher-level thinking can advance student achievement. Thus, the panel Facilitating Thinking and Questioning is included in the compact guide for ThinkUp! Foundations. For teachers to infuse thinking into the curriculum, they must see that administrators value thinking. Ideas are given to assist leaders in their responsibilities. Marzano, Pickering, and Pollock (2001) reported how teachers can increase their effectiveness in teaching and learning by using research findings on questioning strategies. An important conclusion showed learning to increase in classrooms where teachers asked questions related to essential content rather than questions teachers gleaned would interest students (Alexander, Kulikowich, & Schulze, 1994; Risner, Nicholson, & Webb, 1994). Fillippone (1998) found that teachers ask lower-level questions more times than not. School leaders can emphasize the importance of questioning by involving teachers in high level conversations and posing questions that encourage teachers to ponder and collaborate with colleagues.

Evolving teaching standards have embraced a new view of questioning. Danielson's Framework for Teaching (2013), adopted in many states as a basis for their teaching standards, has included

an indicator based on effective questioning and discussion techniques. New teaching standards promote more student engagement in the questioning process and call for higher levels of thinking with more open-ended questions allowing multiple correct answers. The evaluation rubric or the system a district has in place for teacher evaluation often includes a questioning component. These expectations can be used to guide principals in techniques and behaviors that should occur among teachers and students. However, a panel titled Expectations is included in the compact guides to direct principals in the kinds of behaviors expected when a school is promoting a thinking culture.

The ThinkUp! Foundations Compact Guide features strategies that alert a principal how wait-time should be acknowledged before and after asking a question. Usually teachers give less than one second for students to respond to a question and the results are short responses or no response at all. Student-to-student interaction and quality of responses increase when wait-time is addressed noted Fowler (1975). Rowe (1974a; 1974b) studied the effect of questions used by teachers on elementary students. Results showed three to five seconds of wait-time led to increases in student responses, student confidence, evidence supporting the response, and student conversation. This finding is consistent at the middle and high school levels when wait-time is allowed after asking a question. A recommendation is to allow five seconds of wait-time. Students must be informed that this time is their think-time and time should also be adjusted to the cognitive level of the questions. In the Think Up! Foundations Compact Guides, direction is offered in how wait-time and think-time should be employed within classrooms.

Research indicates there are specific behaviors that high-quality thinkers demonstrate. Effective thinkers and high-performing individuals do appear to portray certain characteristics (Goleman, 1995; Perkins, 1991). Costa and Kallick (2008, p.16) report there are certain characteristics that successful individuals “such as lawyers, mechanics, teachers, entrepreneurs, salespeople, physicians, athletes, entertainers, leaders, parents, scientists, artists, and mathematicians” tend to exhibit when faced with solving problems. They define these identifiable characteristics as “habits of mind.”

The need for critical thinking and problem-solving skills in our schools is not denied by educators. Today, where new knowledge is rapidly accelerating and information is instantly available, it is more important than ever that students know how to think critically and reach reasonable solutions. Students who display critical thinking and problem-solving skills can interpret and evaluate what they read, see, and hear to effectively make the transition to college or to the workforce and face whatever challenges life might bring.

While we see the need to include critical thinking skills, creating a culture for thinking should be given high priority. Students need to know that thinking is valued and nurtured in our schools—from the conversations heard, from the words uttered in response to their thoughts, to the physical arrangement of classrooms, to what is displayed, and to the roles that students and teachers play. A climate of trust can convey the importance of thinking in the school and even communicate that it is safe to express one’s thoughts, making thinking visible across the curriculum and in social interactions.

Beyond acquisition of skills and creation of a culture that promotes thinking, there is another consideration that can impact deeper thinking—

students should become aware of and learn to apply attributes or behaviors that strong thinkers exhibit. Love (2017) reported that in 2017 a team of educators from Mentoring Minds generated a list of traits they have observed throughout their education careers that were indicative of students who exhibited skillful thinking and deeper levels of thought. Based on their varied backgrounds of teaching and leadership experiences, elementary and secondary levels of curricula expertise, a range of 5–38 years working with children, observations of students, conversations with teachers, and 7 months of focused discussions, careful study, and deliberation, these educators collaboratively narrowed their lists to nine behaviors that students exhibited more times than not when thinking critically. Collectively, these nine behaviors were entitled 9 Traits of Critical Thinking™. These nine traits, when explicitly taught, modeled, and practiced, can guide students in becoming more successful when engaging in cognitively demanding tasks and in social interactions at school and in life beyond the classroom. The traits should be emphasized in context with activities that align to each featured trait during instruction. To understand the trait, the development outcomes, prompts that teachers might use to inquire if students are exhibiting the traits, and strategies for explicitly teaching the traits are highlighted in the compact guide in the last panel. This specific panel alerts principals to what to expect in relation to each trait as well as to guide teachers to plan instruction that integrates the traits into content and social interactions with students. The traits help students become increasingly aware of thinking and more alert to strategies that can be utilized in a variety of settings.

A featured visual in the ThinkUp! Foundations Compact Guide depicts the 9 Traits of Critical Thinking™. These traits can be integrated into instruction using any order or combination of traits. By developing the 9 traits in students and integrating the traits into the curriculum, teachers can impact student success in thinking and learning. The identified critical thinking traits are basic to all learning at all levels and in all subject areas. Each trait contributes to the creation of a thoughtful environment that supports the development of skillful thinking. The compact resource supports principals as they model, support, and monitor the development of the traits. While the principal may interact and encourage the use of the traits, the responsibility lies with the teacher to plan opportunities to introduce and explicitly teach the nine traits. The goal is to promote these traits across the curriculum with every student—in every classroom, at home, and in the community to help students and adults internalize and display these nine traits. When students are guided to practice better thinking in school and in their daily lives, they will become more successful in cognitive-demanding tasks and learn to value thinking throughout their lives. Based on the 2002 synthesis research report, A New Wave of Evidence, several findings were concluded. The overall conclusion was, “When schools, families, and community groups work together to support learning, children tend to do better in school, stay in school longer, and like school more.” (Henderson and Mapp, 2002, p.7). The quality of the teacher and parent relationship appears to impact student performance. The interaction between teachers and parents can have a positive effect on the way in which students perform. It is important for teachers to focus on their roles in engaging parents. The role should be one that considers how to establish and maintain high-quality teacher and parent interaction (Hughes and Kwok, 2007). Better school opportunities exist for students when shared partnerships are formed. Working partnerships among parents,

families, teachers, students, and others in the community result in improved school programs and learning environment. This shared connection leads students to succeed in school and later in life (Epstein, 1995).

The panel Parental and Community Support offers ideas school leaders can use with parents and caregivers, and community to garner support for the school-wide thinking initiative. Working together can lead students to increase their practice and skillfully application of each trait, causing their actions to become more productive and automatic when they encounter unknown or challenging situations in the classroom and in the real world. Learning how to think equips students with the ability to navigate challenging life circumstances, so obtaining the input of all stakeholders is crucial. Throughout the compact guide, the principal is given access to ways to cultivate this powerful environment. With the resources or support provided in both the elementary and secondary Think Up! Foundations Compact Guides, school leaders can empower teachers and significant others to actively support a productive thinking climate.

Research indicates that thinking skills instruction makes a positive difference in the achievement levels of students. Past studies that reflect achievement over time show that learning gains can be accelerated. In verbal learning, research reports that the depth with which students process information has a definite impact on retention (Craik, 1979; Haller, Child, and Walberg, 1988). These results indicate that the teaching of thinking skills can enhance the academic achievement of participating students (Bass and Perkins, 1984; Freseman, 1990; Matthews, 1989; Nickerson, 1984). In the compact guides, emphasis is placed on an expectation of higher order thinking and learning. This is a significant shift towards what Ritchhart (2015) describes as cultures of thinking. Zohar and Dori (2003) found that when such a shift was placed on thinking and learning that all students, both high achievers and low achievers made considerable progress in higher order thinking when exposed to processes that were designed to nurture higher order thinking skills. It appears that when higher order skills are used in the application of knowledge then diverse students grasp a better understanding of content. School leaders are observing that teachers design activities that are cognitively challenging in a thinking environment. According to Tharp et al., 2000, p. 30), cognitively challenging activities should reflect “productive tension” which means they are neither too easy nor difficult. Producing correct answers is not always the goal of such challenging activities, but rather the goal is to lead students to consider alternatives as they think and problem solve. High expectations for learning are intended to be the result of cognitively challenging activities. Therefore, the use of thinking frameworks provide evidence that higher order thinking not only appears to improve achievement but can favorably impact development for non-native speakers of English. Therefore, the compact guides provide support in setting expectations in teaching critical thinking and meeting the requirements for incorporating research-based strategies and pedagogically sound principles for teaching and learning. A review of literature does suggest that a focus on higher order thinking can yield positive achievement gains.

Based on federal and state accountability requirements, all states and schools will have challenging, yet well-defined standards of achievement and accountability plans, requiring all students to reach mastery of the standards for each content area. To achieve mastery, students must think critically. As students engage in deeper thinking, the type of environment of the

school and classroom will impact the success levels of students. The ThinkUp! Foundations Compact Guide for Principals™ supports school leaders as they establish expectations for school environments that cultivate thinking. The ideas in this resource give direction to principals as they strive to support their staffs in preparing and delivering high-quality lessons in all content areas. With these skillfully designed teaching tools, there is quick-and-easy access to traits which define thoughtful thinkers as well as access to practical ideas, strategies, and tips that pave the way for a thinking-centered school that develops and strengthens thinkers. The ThinkUp! Foundations Compact Guides (elementary and secondary) are excellent critical thinking resources for establishing a thinking culture across an entire school—leading teachers and students to experience success in school and throughout their lives.

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