



DEEPER DIVE: BRAIN SCIENCE

Overview

Spectra Star (SS) is a digital platform designed to accelerate the cognitive, emotional, social, civic, and physical growth of every K-12 student, readying them for post high school success in further education, work, and life in general. The platform can be easily and successfully employed in any K-12 organization (or subset of same), to include public, private, religious, and charter schools, as well as homeschooling environments.

Competency Proficiencies

This platform is anchored by a **Growth Mindset** and an **Asset v. Deficit** student development orientation. The development of multi-level Competency (C) proficiencies combined with the reduction of Learning Inhibitors (LI) when present, support the growth mindset and asset framework.

The Competencies

- SS employs 25 competencies made up of miscellaneous attribute elements, e.g., knowledge, skills, talents, values, beliefs, interests, traits, drives, mindsets, dispositions, and aptitudes that capture unique capabilities. Cs are both sociogenic and biogenic in origin and require different levels of effort for enhancement or acquisition based on lessons learned from decades of education coaching and consulting experience and from brain science. In the table below, the competencies are grouped by four key aspects of human functioning. The capital letter in parentheses following each C indicates the effort required to demonstrate an advanced level of proficiency, i.e., L = Low, M = Moderate, and H = High. This is based on brain science and described in more detail in the following pages.

A. THINKING (+)	B. INTERPERSONAL (+)	C. CHARACTER (+)	D. PHYSICAL (+)
1. Critical Thinking (M-H)	8. Emotional Maturity (M)	15. Accurate Self-Assessment (M-H)	22. Physical Care (L-M)
2. Active Learner (H)	9. Accurate Empathy (M-H)	16. Integrity (H)	23. Energy (H)
3. Cognitive Agility (H)	10. Relationship Building (M)	17. Altruism (M)	24. Adventurous (H)
4. Creativity (H)	11. Communication (M-H)	18. Nurturing (M-H)	25. Speech (M-H)
5. Innovation (M-H)	12. Collaboration (M)	19. Humility (H)	
6. Flexibility & Adaptability (H)	13. Social Agility (M-H)	20. Sense of Responsibility (H)	
7. Results Focused (H)	14. Leadership (M-H)	21. Agency (M-H)	

Competency Derivation Sources

- **The Bryan Group's (TBG)** research-based competency library of top-performer capabilities across sectors (education, business, non-profit, etc.), types of positions, and age groups. These are the Cs of top performers based on 45 years of applied motivation and competency research.
- Research on what employers are seeking in first level hires out of high school and college.
- A comprehensive and detailed list of adjectives generated by experienced SI coaches and consultants, and those adjectives typically employed by teachers to describe student behavior in the classroom/school setting.
- The Cs that, when mastered, lead to post-graduate success in further education, the trades, military, work, and life in general. They capture core life skills that complement traditional academic skills and lead to post high school success, regardless of the endeavor.

The Number of Competencies (25)

- To keep the number of Cs manageable and facilitate their utility, some attributes were combined that aren't exactly the same, e.g., *Flexibility & Adaptability*, and in that case, there are behavioral indicators/measures reflecting both within the C description.
- After review, you may feel an attribute is missing, e.g., *Resilience*, *Problem Solving*, or *Team Player*. What you will find is that behavioral indicators related to these competencies are distributed across several competencies in the model — so they are there, just not given a separate label.

Competency Levels of Proficiency

- The following chart provides the research basis for both the *levels of proficiency* and the *level of effort required to enhance or acquire a specific competency*. The chart contains 11 types of attributes based on Dr. Bryan's 45+ years of applied motivation and competency research. The chart text headers in **maroon** are primarily sociogenic and the text headers in **purple** are primarily biogenic. The type of C/attribute and its level-of-effort to acquire or enhance were critical in selecting the three levels of behavioral indicators for each competency. (Note: The words in CAPS in the chart reflect the individual mindsets captured by the SI Core Mindset inventory and the Planning Style Mindset Inventory.)

Legend: **Maroon = sociogenic** • **Purple = biogenic**

Low Effort to Acquire or Enhance	Moderate to High Level of Effort to Acquire or Enhance	High Level of Effort to Acquire or Enhance
Knowledge What someone knows to include specific technical and interpersonal facts, cause-effect relationships, and operations. Technical Skills Specific technical job skills: the ability to apply technical/task-related knowledge. Basic Interpersonal, Management, or Sales Skills Interpersonal skills such as reading people, building relationships, team	Learning/Planning Style The approach a person employs when learning and making decisions, e.g., quick to decide, slow to decide, or goes with gut feelings rather than logic. How a person selects and processes stimuli/data — SEARCHER, MODEL BUILDER, DECISION MAKER, DOER. Values/Beliefs Qualities that define what people hold as being personally important, e.g., to treat people fairly and ALTRUISM.	Motives/Mindsets Three needs which direct behavior, i.e., the need to build and maintain personal RELATIONSHIPS for their own sake, the need for TASK ACCOMPLISHMENT, and the need for INFLUENCE (an Influence Mindset). Traits Enduring qualities of a person, e.g., friendly, aggressive, kind, optimistic, extroverted, introverted, reflective, or INTELLECTUAL CURIOSITY.

Low Effort to Acquire or Enhance	Moderate to High Level of Effort to Acquire or Enhance	High Level of Effort to Acquire or Enhance
building, or sales and supervisory skills.	Self-Image View of own roles and level of proficiency, e.g., good sales person, good or poor parent. Interests Specific likes or dislikes, i.e., preferences for certain types of activities.	Aptitudes Specific intellectual capabilities or other unique abilities, e.g., musical or artistic talents. Physical Characteristics Body attributes you are born with, e.g., hair or eye color. Stages of physical and neurological development.

- The chart below describes how each competency is structured.
- The three levels of proficiency are based on brain science and support the growth mindset and asset v. deficit framework.
- In applying the Cs to enhance student capabilities, age and grade level play no part. Of concern is only the level of C proficiency regardless of age and grade. This reduces complexity and facilitates the identification and implementation of C growth strategies. It also enhances each student's ability to identify specific areas of strength to build on and to select education and work pathways that leverage those strengths.
- It is likely that through SI platform application in multiple settings, additional behavioral indicators will be identified for each of the levels, and that indicators may be assigned to different levels than originally placed.

Level 1	Basic level of proficiency — indicators that are not as sophisticated or complex as those at Level 2 and require significantly less time and effort to acquire or enhance than those at Level 3 , which are dependent on core brain capabilities.
Level 2	Intermediate level of proficiency — indicators that are not as sophisticated as those at Level 3 and require somewhat less time and effort to acquire or enhance than those at Level 3.
Level 3	Advanced level of proficiency — indicators that reflect thoughts, feelings, and behaviors typically related to personality factors such as motives/drives, traits, and aptitudes that take a lot of time and effort to enhance, acquire, and/or sustain. They are dependent on core brain structural-based capabilities.

Sample Competency Description (Critical Thinking)

- Each C is described in terms of:
 - Its label/name.
 - Related descriptors/adjectives. This helps teachers to identify the competencies of greatest development value for each student.
 - The behavioral indicators for each of the three levels of proficiency.
- AI was not used to generate the competencies or indicators but was used to refine their language and to minimize redundancy within and across competencies.

1. CRITICAL THINKING (M-H): *Analyzes information to draw conclusions, make judgments, and solve problems.*

Related Descriptors: bright, clever, intelligent, smart, good judgment, logical, conceptualizer, sharp witted, shrewd, practical, analytical thinker, problem-solver, logical reasoning, evaluative thinking, strategic thinking, rational thinking, objective analysis.

Basic Proficiency

- a. Remembers important facts when solving problems and answering questions.
- b. Can explain new ideas using their own words.
- c. Sorts things into groups of similar items when asked to do so.
- d. Can tell how two things are the same or different.
- e. Clearly shares what they learned from or with others.
- f. Says “I don’t know” when they truly don’t understand something.

Moderate Proficiency

- a. Breaks complex problems into smaller, manageable parts to solve them better.
- b. Uses information from different sources to solve problems effectively.
- c. Explains their reasoning and how they reach their conclusions.
- d. Asks thoughtful questions to better understand problems and situations.
- e. Recognizes the difference between facts and opinions in information.
- f. Uses a systematic approach when working through problems.
- g. Processes new information quickly and draws reasonable conclusions.
- h. Stays objective and uses evidence when analyzing situations.

Advanced Proficiency

- a. Identifies cause-and-effect relationships in complex, multi-layered situations.
- b. Recognizes trends and patterns in information that initially appear unconnected or random.
- c. Develops accurate conclusions based on evidence and reasoning, even with incomplete information.
- d. Questions their own assumptions and challenges others’ views when thorough understanding is needed, or information gaps are identified.
- e. Recognizes their own biases and blind spots, seeking help when needed to solve problems accurately.
- f. Is energized by challenging mental tasks and complex problem-solving opportunities.

Learning Inhibitors (Performance & Growth Disruptors)

- SS employs 14 Learning Inhibitors (LI) which have been shown to impede competency growth in all circumstances. The same four C categories of human functioning were used to group the LIs. The impact of various types of trauma are reflected in the inhibitors.
- The inhibitors were derived from:
 - The adjectives used by teachers, counselors, and administrators to describe student behavioral and emotional challenges.
 - The clinical expertise and experience of Dr. Bryan and Dr. Theis.
 - The American Psychiatric Association *Diagnostic and Statistical Manual of Mental Disorders (DSM-5-TR)* was helpful in defining the inhibitors and the three levels of severity associated with each.
- AI was employed to refine the LI language and minimize redundancy.

A. THINKING (–)	B. INTERPERSONAL (–)	C. CHARACTER (–)	D. PHYSICAL (–)
1. Unfocused 2. Thinking Challenged	3. Off-putting 4. Disruptive 5. Anxious 6. Depressed 7. Moody	8. Untrustworthy 9. Self-centered 10. Negative Outlook 11. Immature	12. Physical 13. Speech 14. Aggressive

Sample LI Description (Anxious)

Level 1	Mild symptoms and learning interference.
Level 2	Moderate symptoms and learning interference.
Level 3	Severe symptoms and learning interference.

5. ANXIOUS: *Demonstrates symptoms of nervousness and emotional discomfort.*

Related Descriptors: fearful, tense, high strung, strung out, edgy, fretful, uneasy, apprehensive, worried, troubled, nervous, afraid, jumpy, overwrought, uptight, hyper.

Mild Symptoms

- Has difficulty focusing or concentrating.
- Is easily distracted.
- Mind goes blank in challenging situations.
- Is tense, irritable, and/or restless.
- Is clingy — seeks reassurance frequently.
- Fidgets.
- Avoids social interactions that cause emotional discomfort.
- Appears withdrawn.
- Engages in excessive use of gaming, videos, or social media to reduce and manage anxiety.

Moderate Symptoms

- a.** Needs continual adult support to function.
- b.** Is afraid to leave familiar surroundings, e.g., home.
- c.** Is fearful of new situations.
- d.** Over worries everything.
- e.** Expresses a sense of impending danger or doom.
- f.** Is quick to anger.
- g.** Demonstrates persistent worry and fear not consistent with actual conditions — they are out of proportion.
- h.** Has difficulty making decisions.
- i.** Is often overtired, depressed, or low energy.
- j.** Exercises excessively to manage anxiety.

Severe Symptoms

- a.** Suffers panic attacks.
- b.** Cries frequently.
- c.** Is absent from school, or late to school, on a regular basis.
- d.** Is immobilized by anxiety — freezes when in stressful situations.
- e.** Displays frequent psychosomatic symptoms, which may change, e.g., upset stomach, nausea, headaches, dizziness, heart palpitations, sleep problems, sweating, trembling, shaking, muscle tenseness, hyperventilation, increased heart rate, frequent use of the toilet, and not eating well — too much, too little, etc.
- f.** Demonstrates a heightened startle response.
- g.** Demonstrates unfounded phobias.
- h.** Abuses substances to reduce anxiety, e.g., drugs or alcohol.