

# Higher-Order Thinking



## Examples of Observable Student H.E.A.T.® Seen in Classroom Walkthroughs

### Students taking notes only; no questions asked

- In a U.S. History class, students were taking notes based on a *YouTube* video about the causes of the Civil War.
- A 7th grade science teacher remarked to her students, “Okay, you need to write this down because it is going to be on Friday’s quiz.”
- As a pre-reading activity, 4th grade students were prompted by their teacher to write down the definition for specific vocabulary words that appear in the passage.

### Students explain learning at the Recall level

- A 10th grade student used Voice Thread to record her own reading of the poem, *The Road Not Taken*, by Robert Frost.
- Seventh grade students made a timeline leading up to the U.S. Civil War.
- A 5th grade teacher commented to his students, “Today, we are going to make a chart showing each of the stages of the water cycle.”

### Students apply learning at the Skill/Concept level

- A ninth grade English teacher stated to her students, “During the next 20 minutes, I want you to work in your groups to find three examples of a metaphor in Chapter 3 of the book, *To Kill a Mockingbird*.”
- As a review, an eighth grade math teacher assigned her students the even practice problems on page 134 of their math textbook.
- Kindergarten students made a coloring book describing what it meant to be a good friend.

### Students justify learning at the Strategic Thinking level

- An 11th grade student designed a marketing plan for a product in his Economics class using a known strategy as a model.
- Sixth grade math students used central tendency (i.e., mean, median, mode) to report the outcome of a soap bubble blowing experiment.
- Third grade students used their map reading skills to draw a map on grid paper from their home to the school that included a map legend, compass rose, and a scale.

### Students arrange learning at the Extended Thinking level

- Tenth grade students constructed a box and whisker graph to compare survey data from 9th and 10th grade students regarding their perceptions about mandatory school uniforms.
- Seventh grade art students compared two pieces of art work from the early Renaissance Period in terms of their form, color, and texture.
- Fifth grade students made a flow chart to compare the plot structure of two short stories.

### Students create new learning at the Extended Thinking level

- A ninth grade Language Arts teacher commented, “Today, you will be preparing a scoring guide to prioritize your five persuasive essays during the past two weeks.” (evaluating)
- Seventh grade science students used their robotics kits to invent a machine that could do a specific task. (creating)
- Kindergarten students devised a “marketing” plan to make people want to have their own pet worm for their home. (creating)

# Engaged Learning



## Examples of Observable Student H.E.A.T.® Seen in Classroom Walkthroughs

### Students report what they have learned only

- When prompted by his Government teacher to name at least three traditional swing states during a national Presidential election, a student responded, “Ohio, Pennsylvania, and Florida.”
- Middle school math students used their digital responders to identify the number of sides, edges, and vertices of a rectangular prism.
- Elementary students created individual PowerPoints that summarized what they had learned about physical vs. chemical changes.

### Students collaborate to report what they have learned with possible options

- High school science students worked in teams of three to collect water samples at a local stream that bordered their campus and later reported their findings to the class.
- Sixth grade students worked in a group to label the different parts of a plant in their science class.
- A fourth grade teacher stated, “As a review, I want you to get into your learning groups and arrange the following fractions and decimals in order from highest to lowest: .75,  $\frac{1}{4}$ ,  $\frac{9}{10}$ , .3.”

### Students solve a teacher-directed problem

- As a math review, a high school teacher prompted her students to determine how much surface wood they would need to purchase from a lumber yard to build a rectangular deck that would encase a circular hot tub with a radius of 4 feet, but allow a minimum of a 3 foot path around the hot tub with adequate room for sunbathing.
- Seventh grade students mirrored the scientific method by using different strategies (e.g., shaking the box, using magnets, weighing the box) to arrive at a hypothesize as to the contents inside a plastic “black box” in their science class. Students later opened the black box to compare the actual contents versus its hypothesized contents.
- Fifth grade students designed individual book covers for the same fictional selection based on their individual interpretation of the book’s major theme.

### Students collaborate to solve a teacher-directed problem with possible options

- In a Government class, students worked in groups to prepare a debate as to the constitutionality of the First Amendment to protect individuals who openly desecrate the American flag.
- A 7th grade literacy teacher commented, “I want you to work in groups to compose your own original ending for the Chapter based on the main character’s final encounter with his parents.”
- Based on the number of student disruptions during group activity, Ms. Williams had her second grade students collaborate in their learning groups to develop five rules for personal behavior that need to be followed when working as a group. Afterwards, each group proposed a student behavior rubric that they would use to assess each other’s behavior during group activity.

### Students collaborate to define the task, the process, and/or the solution

- In a high school geometry class, students designed a blueprint for a new school, prepared a budget, and constructed a mock-up.
- Students in a 7th grade social studies class developed a multimedia presentation to persuade viewers about the abusive conditions of child workers in the international chocolate industry. The presentation also offered possible solutions to the problem.
- Third grade students designed new fire escape routes for the entire school based on their understanding and application of perimeter.

### Students collaborate to define the task, the process, and/or the solution; collaboration extends beyond the classroom

- High school biology students collaborated with African law enforcement via video-conferencing to develop forensic techniques using DNA samples that could be used to identify the meat and fur of illegally-hunted wildlife. The students integrated these techniques into a workshop that would eventually be facilitated by law enforcement personnel in each of the impacted African countries.
- Based on the growing interest in Brazil from of a group of Pre-K students, the students wanted to fly there. They worked with their teacher and local airport personnel to build a mock airplane in class that would carry their entire class to Brazil.

# Authentic Connections



## Examples of Observable Student H.E.A.T.® Seen in Classroom Walkthroughs

### The content of the learning experience is missing or too vague to determine relevance

- There is no documented lesson plan and/or written/verbal objectives to determine any degree of relevancy of the current learning episode. Students are unsure of what they are learning or why they are learning the content.

### The learning experience represents a group of connected activities, but does not connect the content to the real world

- In a high school trigonometry class, the teacher introduces trigonometric ratios to students. Afterwards, students practice using trigonometric ratios by finding the unknown height of different objects using a digital clinometer.
- In an 8th grade Spanish class, students reviewed vocabulary words followed by participating in an activity called, *Conjugation Races*, which reinforced the conjugation of verbs in Spanish.
- A fourth grade teacher commented, “Today, we are going to learn about state capitals. Afterwards, you will be working with your learning group to complete an online quiz where you will need to match the state capital to its state.”

### The learning experience emphasizes real-world content connections made by the teacher

- In a high school Social Studies class, the teacher referenced how teenagers in another state were starting their own *Vote Now* campaign to inspire people to vote in the upcoming Presidential Election.
- In a 6th grade classroom, the teacher showed a *YouTube* video on a recent tornado in Dallas, Texas, as a focus activity to get her students thinking about natural disasters.
- In a 4th grade classroom, the teacher talked to her students about the negative impact of plastic bottles on sea life.

### The learning experience focuses on students exploring/discussing real-world content connections

- In a high school Social Studies class, the teacher and her students talked about the importance of getting people in their community to vote in the upcoming Presidential Election.
- In a 6th grade classroom, the teacher and his students discussed different natural disasters in their community including how some individuals were able to overcome enormous odds to reach safety during a local disaster.
- In a 4th grade classroom, a guest speaker from the recycling plant discussed with students how plastic can be reused to reduce the amount of plastic entering the waterways.

### The learning experience provides opportunity for students to apply their content understanding to a real world situation

- In a high school Social Studies class, students created their own campus campaign to reduce student apathy and increase voter turnout in the upcoming school class elections.
- In a 6th grade classroom, students conducted a disaster preparedness audit of their residences to determine their level of preparedness in the event of a natural disaster.
- In a 4th grade classroom, students created a recycling campaign on campus to reduce the amount of garbage destined for the local landfill.

### The learning experience involves students creating a product that has a real-world purpose beyond the classroom that directly impacts the students

- In a high school Social Studies class, students collaborated with local community members to create a public service announcement targeting the 18 - 25 year old voters who historically produce the lowest voter turnout among all age groups.
- In a 6th grade classroom, students worked in conjunction with the local American Red Cross to design a community campaign aimed at helping others become more disaster-prepared in their homes.
- In a 4th grade classroom, students worked with their local state and federal representatives to create new legislation that eliminated the use of bottled water in plastic containers.

# Technology Use



## Examples of Observable Student H.E.A.T.<sup>®</sup> Seen in Classroom Walkthroughs

### Digital and/or environmental resources are (1) not available, (2) not used, or (3) not directly connected to the learning

- In a high school trigonometry class, the teacher introduced trigonometric ratios to students. Afterwards, students practiced using trigonometric ratios by finding the unknown height of different objects using a protractor and a plumb line.
- In an 8th grade Spanish class, students reviewed vocabulary words followed by participating in an activity called, *Conjugation Races*, which reinforced the conjugation of verbs in Spanish.
- A fourth grade teacher commented, “Today, we are going to learn about state capitals. Afterwards, you will be working with your learning group to complete a quiz where you will need to match the state capital to its state.”

### Students’ use of digital and/or environmental resources appears to be an add-on or is not needed for task completion

- In a high school trigonometry class, the teacher introduced trigonometric ratios to students using the classroom interactive board.
- In an 8th grade Spanish class, the teacher introduced the conjugation of verbs in Spanish using his computer and an LCD projector.
- In a fourth grade classroom, the teacher used GoogleEarth to show the distance between the state capitals in California and Missouri.

### Teacher leads whole group learning with digital and/or environmental resources

- In a high school trigonometry class, the teacher required students to find the height of a building using GoogleEarth rather than going outside and finding the height of the bank building located next to the school using trigonometric ratios.
- In an 8th grade Spanish class, students spent a week creating individual PowerPoint presentations on the conjugation of verbs in Spanish.
- In a fourth grade classroom, the teacher required students to create a five-slide PowerPoint presentation on the state capital of Oregon, Salem.

### Students use teacher-directed digital and/or environment resources to accomplish learning outcomes

- In a high school trigonometry class, the teacher introduced trigonometric ratios to students. Afterwards, students practiced using trigonometric ratios by finding the unknown height of different objects using an online clinometer.
- In an 8th grade Spanish class, the teacher set up a video-conference between his students and students from another Spanish class in a neighboring district to practice their conversational Spanish.
- In a fourth grade classroom, students used GoogleEarth to plan a trip from the state capital of Delaware, Dover, to the state capital of Washington, Olympia.

### Students use self-selected digital and/or environmental resources to accomplish learning outcomes

- In a high school trigonometry class, students self-selected different apps and websites to estimate the amount of paint required and the cost to paint the interior of the school’s gymnasium.
- In an 8th grade Spanish class, students self-selected different apps and/or websites to conduct a videoconference with another Spanish class.
- In a fourth grade classroom, students were given options of different apps and websites they could use to plan a five-day vacation on a limited budget that was a minimum of 500 miles from their own state capital.

### Students use self-selected digital resources to accomplish learning outcomes beyond conventional strategies

- In a high school trigonometry class, students self-selected different apps and/or websites to develop a more efficient process for preparing a bid to paint the interior of the school’s gymnasium.
- In an 8th grade Spanish class, students self-selected different apps and/or websites to design a better way of improving their conversational Spanish.
- In a fourth grade classroom, students were given options of different apps and/or websites they could use to reduce the cost of a five-day vacation by 25% that was a minimum of 500 miles from their own state capital.