

**Warren County School District**

**PLANNED INSTRUCTION**

**COURSE DESCRIPTION**

**Course Title:** App Creators (PLTW STEM COURSE)

**Course Number:** 00756

**Course Prerequisites:** None

**Course Description:**

App Creators introduces students to the field of computer science and the concepts of computational thinking, through the creation of mobile apps. Students are challenged to be creative and innovative, as they collaboratively design and develop mobile solutions to engaging, authentic problems. Students experience the positive impact of the application of computer science to society as well as other disciplines, particularly biomedical science.

The course provides students opportunities for self-expression. Teams identify a personal or community problem of interest to them that can be solved with mobile app solution. The problem can address issues such as health and wellness, the environment, school culture, emergency preparedness, education, community service – the options are endless!

**Suggested Grade Level:** 6 - 8

**Length of Course:**    ☐ One Semester                      ☐ Two Semesters                      ☒ Other (9-week course)

**Units of Credit:** .25 Middle Level Credit (Insert *None* if appropriate)

***PDE Certification and Staffing Policies and Guidelines (CSPG) Required Teacher Certifications:***  
CSPG 65

**Certification verified by WCSD Human Resources Department:** ☒ Yes    ☐ No

**TEXTBOOK AND SUPPLEMENTAL MATERIALS**

**Continue using Board approved textbook?** ☐ Yes    ☐ No (If yes, then complete the information below.)

**Board Approved Textbooks, Software, Supplemental Materials:**

**Title:** Project Lead the Way Durable and Consumable Resources

**Publisher:**

**ISBN #:**

**Copyright Date:**

**Date of WCSD Board Approval:**

## **BOARD APPROVAL:**

**Date Written:** 8/28/2018

**Date Approved:** October 8, 2018; March 11, 2019 Revised

**Implementation Date:** 2018-2019

### **SPECIAL EDUCATION AND GIFTED REQUIREMENTS**

The teacher shall make appropriate modification to instruction and assessment based on a student's Individual Education Plan (IEP) or Gifted Individual Education Plan (GIEP).

#### **COURSE OVERVIEW**

*(List the content to be taught)*

**For standards, essential questions, content, and skills see Curriculum Map** – See attached course outline and academic standards taught within this course.

#### **ASSESSMENT**

**Portfolio Assessment:** ☐ Yes ☒ No

**District-Wide Common Final Examination Required:** ☐ Yes ☒ No

**Course Challenge Assessment (Describe):** None

**WRITING TEAM:** Warren County School District

### **WCSD STUDENT DATA SYSTEM INFORMATION**

1. Is there a required final examination? ☐ Yes ☒ No  
*\*Warren County School District Policy 9741 and 9744 state, "All classes in grades 9-12 shall have a final exam."*
2. Does this course issue a mark/grade for the report card? ☒ Yes ☐ No
3. Does this course issue a Pass/Fail mark? ☐ Yes ☒ No
4. Is the course mark/grade part of the GPA calculation? ☒ Yes ☐ No
5. Is the course eligible for Honor Roll calculation? ☒ Yes ☐ No
6. What is the academic weight of the course?

☐ No weight/Non credit

☒ Standard weight

☐ Enhanced weight

*Have you ever wondered how mobile apps are created?*

*Students learn and apply computational thinking and technical knowledge and skills to create mobile apps. Students also acquire and apply skills pertaining to the design process, problem solving, persistence, collaboration, and communication.*

*Go beyond being an app consumer and become an app creator!*

App Creators introduces students to the field of computer science and the concepts of computational thinking, through the creation of mobile apps. Students are challenged to be creative and innovative, as they collaboratively design and develop mobile solutions to engaging, authentic problems. Students experience the positive impact of the application of computer science to society as well as other disciplines, particularly biomedical science.

The unit provides students opportunities for self-expression. Teams identify a personal or community problem of interest to them that can be solved with a mobile app solution. The problem can address issues such as health and wellness, the environment, school culture, emergency preparedness, education, community service—the options are endless!

### **App Creators Lesson Summary**

Lesson 1	Let's Create an App!
Lesson 2	Taking It to the Next Level
Lesson 3	The App Challenge

#### **Lesson 1: Let's Create an App!**

Students are introduced to the concept of pair programming, app development, and the MIT App Inventor development tool. They learn about the Model-View-Controller (MVC) design pattern, app graphical design, event-driven programming, debugging, and algorithm creation using variables and conditional logic. They create engaging biomedical science apps and fun interactive games that apply these concepts and use basic user interface features, media, and animation.

#### **Lesson 2: Taking It to the Next Level**

Students further explore the concepts investigated in Lesson 1 and build upon their skills to use data in mobile applications. They create algorithms using loops to streamline repetition and iterate through lists, and create procedures to abstract the details of a task and reduce redundancy. They learn to organize and store persistent data collected from user input and device sensors.

#### **Lesson 3: The App Challenge**

Students apply all of the knowledge and skills they have acquired to design and create a mobile app solution for a personal or community problem. They apply the design process and computational thinking skills to decompose the problem into smaller modules. Following user-centered design principles, they design and create an appropriate user interface and program the app to produce the desired behavior.

# PLTW App Creators (AC)

## Common Core State Standards for English Language Arts: 7th Grade

### Lesson 1

#### 7.RL.4 - Reading Literature

Determine the meaning of words and phrases as they are used in a text, including figurative and connotative meanings; analyze the impact of rhymes and other repetitions of sounds (e.g., alliteration) on a specific verse or stanza of a poem or section of a story or drama.

#### 7.RI.4 - Reading Informational

Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of a specific word choice on meaning and tone.

#### 7.W.2 - Writing

Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.

#### 7.W.2.d - Writing

Use precise language and domain-specific vocabulary to inform about or explain the topic.

#### 7.W.3.d - Writing

Use precise words and phrases, relevant descriptive details, and sensory language to capture the action and convey experiences and events.

#### 7.SL.1 - Speaking and Listening

Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 7 topics, texts, and issues, building on others' ideas and expressing their own clearly.

#### 7.SL.1.b - Speaking and Listening

Follow rules for collegial discussions, track progress toward specific goals and deadlines, and define individual roles as needed.

#### 7.SL.1.c - Speaking and Listening

Pose questions that elicit elaboration and respond to others' questions and comments with relevant observations and ideas that bring the discussion back on topic as needed.

**7.SL.1.d - Speaking and Listening**

Acknowledge new information expressed by others and, when warranted, modify their own views.

**7.SL.6 - Speaking and Listening**

Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate.

**7.L.2.b - Language**

Spell correctly.

**7.L.3 - Language**

Use knowledge of language and its conventions when writing, speaking, reading, or listening.

**7.L.4.a - Language**

Use context (e.g., the overall meaning of a sentence or paragraph; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.

**7.L.4.c - Language**

Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning or its part of speech.

**7.L.5.b - Language**

Use the relationship between particular words (e.g., synonym/antonym, analogy) to better understand each of the words.

**7.L.6 - Language**

Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.

## **PLTW App Creators (AC)**

### **Common Core State Standards for English Language Arts: 7th Grade**

#### **Lesson 2**

##### **7.RL.4 - Reading Literature**

Determine the meaning of words and phrases as they are used in a text, including figurative and connotative meanings; analyze the impact of rhymes and other repetitions of sounds (e.g., alliteration) on a specific verse or stanza of a poem or section of a story or drama.

##### **7.RI.4 - Reading Informational**

Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of a specific word choice on meaning and tone.

##### **7.W.2 - Writing**

Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.

##### **7.W.2.d - Writing**

Use precise language and domain-specific vocabulary to inform about or explain the topic.

##### **7.W.3.d - Writing**

Use precise words and phrases, relevant descriptive details, and sensory language to capture the action and convey experiences and events.

##### **7.SL.1 - Speaking and Listening**

Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 7 topics, texts, and issues, building on others' ideas and expressing their own clearly.

##### **7.SL.1.b - Speaking and Listening**

Follow rules for collegial discussions, track progress toward specific goals and deadlines, and define individual roles as needed.

##### **7.SL.1.c - Speaking and Listening**

Pose questions that elicit elaboration and respond to others' questions and comments with relevant observations and ideas that bring the discussion back on topic as needed.



**7.SL.1.d - Speaking and Listening**

Acknowledge new information expressed by others and, when warranted, modify their own views.

**7.SL.6 - Speaking and Listening**

Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate.

**7.L.2.b - Language**

Spell correctly.

**7.L.3 - Language**

Use knowledge of language and its conventions when writing, speaking, reading, or listening.

**7.L.4.a - Language**

Use context (e.g., the overall meaning of a sentence or paragraph; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.

**7.L.4.c - Language**

Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning or its part of speech.

**7.L.5.b - Language**

Use the relationship between particular words (e.g., synonym/antonym, analogy) to better understand each of the words.

**7.L.6 - Language**

Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.

## **PLTW App Creators (AC)**

### **Common Core State Standards for English Language Arts: 7th Grade**

#### **Lesson 3**

##### **7.RL.4 - Reading Literature**

Determine the meaning of words and phrases as they are used in a text, including figurative and connotative meanings; analyze the impact of rhymes and other repetitions of sounds (e.g., alliteration) on a specific verse or stanza of a poem or section of a story or drama.

##### **7.RI.4 - Reading Informational**

Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of a specific word choice on meaning and tone.

##### **7.W.1 - Writing**

Write arguments to support claims with clear reasons and relevant evidence.

##### **7.W.2 - Writing**

Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.

##### **7.W.2.d - Writing**

Use precise language and domain-specific vocabulary to inform about or explain the topic.

##### **7.W.3.d - Writing**

Use precise words and phrases, relevant descriptive details, and sensory language to capture the action and convey experiences and events.

##### **7.SL.1 - Speaking and Listening**

Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 7 topics, texts, and issues, building on others' ideas and expressing their own clearly.

##### **7.SL.1.b - Speaking and Listening**

Follow rules for collegial discussions, track progress toward specific goals and deadlines, and define individual roles as needed.



**7.SL.1.c - Speaking and Listening**

Pose questions that elicit elaboration and respond to others' questions and comments with relevant observations and ideas that bring the discussion back on topic as needed.

**7.SL.1.d - Speaking and Listening**

Acknowledge new information expressed by others and, when warranted, modify their own views.

**7.SL.4 - Speaking and Listening**

Present claims and findings, emphasizing salient points in a focused, coherent manner with pertinent descriptions, facts, details, and examples; use appropriate eye contact, adequate volume, and clear pronunciation.

**7.SL.5 - Speaking and Listening**

Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points.

**7.SL.6 - Speaking and Listening**

Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate.

**7.L.2.b - Language**

Spell correctly.

**7.L.3 - Language**

Use knowledge of language and its conventions when writing, speaking, reading, or listening.

**7.L.4.a - Language**

Use context (e.g., the overall meaning of a sentence or paragraph; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.

**7.L.4.c - Language**

Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning or its part of speech.

**7.L.5.b - Language**

Use the relationship between particular words (e.g., synonym/antonym, analogy) to better understand each of the words.

**7.L.6 - Language**

Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.

## **PLTW App Creators (AC)**

### **Common Core State Standards for English Language Arts: 8th Grade**

#### **Lesson 1**

##### **8.RL.4 - Reading Literature**

Determine the meaning of words and phrases as they are used in a text, including figurative and connotative meanings; analyze the impact of specific word choices on meaning and tone, including analogies or allusions to other texts.

##### **8.RI.4 - Reading Informational**

Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of specific word choices on meaning and tone, including analogies or allusions to other texts.

##### **8.W.2 - Writing**

Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.

##### **8.W.2.d - Writing**

Use precise language and domain-specific vocabulary to inform about or explain the topic.

##### **8.W.3.d - Writing**

Use precise words and phrases, relevant descriptive details, and sensory language to capture the action and convey experiences and events.

##### **8.SL.1 - Speaking and Listening**

Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly.

##### **8.SL.1.b - Speaking and Listening**

Follow rules for collegial discussions and decision-making, track progress toward specific goals and deadlines, and define individual roles as needed.

##### **8.SL.1.c - Speaking and Listening**

Pose questions that connect the ideas of several speakers and respond to others' questions and comments with relevant evidence, observations, and ideas.

**8.SL.1.d - Speaking and Listening**

Acknowledge new information expressed by others, and, when warranted, qualify or justify their own views in light of the evidence presented.

**8.SL.6 - Speaking and Listening**

Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate.

**8.L.2.c - Language**

Spell correctly.

**8.L.3 - Language**

Use knowledge of language and its conventions when writing, speaking, reading, or listening.

**8.L.4.a - Language**

Use context (e.g., the overall meaning of a sentence or paragraph; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.

**8.L.4.c - Language**

Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning or its part of speech.

**8.L.5.b - Language**

Use the relationship between particular words to better understand each of the words.

**8.L.6 - Language**

Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.

## **PLTW App Creators (AC)**

### **Common Core State Standards for English Language Arts: 8th Grade**

#### **Lesson 2**

##### **8.RL.4 - Reading Literature**

Determine the meaning of words and phrases as they are used in a text, including figurative and connotative meanings; analyze the impact of specific word choices on meaning and tone, including analogies or allusions to other texts.

##### **8.RI.4 - Reading Informational**

Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of specific word choices on meaning and tone, including analogies or allusions to other texts.

##### **8.W.2 - Writing**

Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.

##### **8.W.2.d - Writing**

Use precise language and domain-specific vocabulary to inform about or explain the topic.

##### **8.W.3.d - Writing**

Use precise words and phrases, relevant descriptive details, and sensory language to capture the action and convey experiences and events.

##### **8.SL.1 - Speaking and Listening**

Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly.

##### **8.SL.1.b - Speaking and Listening**

Follow rules for collegial discussions and decision-making, track progress toward specific goals and deadlines, and define individual roles as needed.

##### **8.SL.1.c - Speaking and Listening**

Pose questions that connect the ideas of several speakers and respond to others' questions and comments with relevant evidence, observations, and ideas.

**8.SL.1.d - Speaking and Listening**

Acknowledge new information expressed by others, and, when warranted, qualify or justify their own views in light of the evidence presented.

**8.SL.6 - Speaking and Listening**

Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate.

**8.L.2.c - Language**

Spell correctly.

**8.L.3 - Language**

Use knowledge of language and its conventions when writing, speaking, reading, or listening.

**8.L.4.a - Language**

Use context (e.g., the overall meaning of a sentence or paragraph; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.

**8.L.4.c - Language**

Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning or its part of speech.

**8.L.5.b - Language**

Use the relationship between particular words to better understand each of the words.

**8.L.6 - Language**

Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.



## **PLTW App Creators (AC)**

### **Common Core State Standards for English Language Arts: 8th Grade**

#### **Lesson 3**

##### **8.RL.4 - Reading Literature**

Determine the meaning of words and phrases as they are used in a text, including figurative and connotative meanings; analyze the impact of specific word choices on meaning and tone, including analogies or allusions to other texts.

##### **8.RI.4 - Reading Informational**

Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of specific word choices on meaning and tone, including analogies or allusions to other texts.

##### **8.RI.7 - Reading Informational**

Evaluate the advantages and disadvantages of using different mediums (e.g., print or digital text, video, multimedia) to present a particular topic or idea.

##### **8.W.1 - Writing**

Write arguments to support claims with clear reasons and relevant evidence.

##### **8.W.2 - Writing**

Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.

##### **8.W.2.d - Writing**

Use precise language and domain-specific vocabulary to inform about or explain the topic.

##### **8.W.3.d - Writing**

Use precise words and phrases, relevant descriptive details, and sensory language to capture the action and convey experiences and events.

##### **8.SL.1 - Speaking and Listening**

Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly.



**8.SL.1.b - Speaking and Listening**

Follow rules for collegial discussions and decision-making, track progress toward specific goals and deadlines, and define individual roles as needed.

**8.SL.1.c - Speaking and Listening**

Pose questions that connect the ideas of several speakers and respond to others' questions and comments with relevant evidence, observations, and ideas.

**8.SL.1.d - Speaking and Listening**

Acknowledge new information expressed by others, and, when warranted, qualify or justify their own views in light of the evidence presented.

**8.SL.4 - Speaking and Listening**

Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation.

**8.SL.5 - Speaking and Listening**

Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.

**8.SL.6 - Speaking and Listening**

Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate.

**8.L.2.c - Language**

Spell correctly.

**8.L.3 - Language**

Use knowledge of language and its conventions when writing, speaking, reading, or listening.

**8.L.4.a - Language**

Use context (e.g., the overall meaning of a sentence or paragraph; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.

**8.L.4.c - Language**

Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning or its part of speech.

**8.L.5.b - Language**

Use the relationship between particular words to better understand each of the words.

**8.L.6 - Language**

Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.

# **PLTW App Creators (AC)**

## **Common Core State Standards for English Language Arts: Anchor Standards**

### **Lesson 1**

#### **AS.R.1 - Reading**

Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

#### **AS.R.4 - Reading**

Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.

#### **AS.R.10 - Reading**

Read and comprehend complex literary and informational texts independently and proficiently.

#### **AS.W.4 - Writing**

Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

#### **AS.SL.1 - Speaking and Listening**

Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

#### **AS.SL.6 - Speaking and Listening**

Adapt speech to a variety of contexts and communicative tasks, demonstrating command of formal English when indicated or appropriate.

#### **AS.L.3 - Language**

Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.

#### **AS.L.4 - Language**

Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.

**AS.L.6 - Language**

Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

## **PLTW App Creators (AC)**

### **Common Core State Standards for English Language Arts: Anchor Standards**

#### **Lesson 2**

##### **AS.R.1 - Reading**

Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

##### **AS.R.4 - Reading**

Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.

##### **AS.R.10 - Reading**

Read and comprehend complex literary and informational texts independently and proficiently.

##### **AS.W.4 - Writing**

Produce clear and coherent writing in which the development, organization, and style are appropriate to the task, purpose, and audience.

##### **AS.SL.1 - Speaking and Listening**

Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

##### **AS.SL.6 - Speaking and Listening**

Adapt speech to a variety of contexts and communicative tasks, demonstrating command of formal English when indicated or appropriate.

##### **AS.L.3 - Language**

Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.

##### **AS.L.4 - Language**

Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.

**AS.L.6 - Language**

Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college- and career-readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.



## **PLTW App Creators (AC)**

### **Common Core State Standards for English Language Arts: Anchor Standards**

#### **Lesson 3**

##### **AS.R.1 - Reading**

Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

##### **AS.R.4 - Reading**

Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.

##### **AS.R.10 - Reading**

Read and comprehend complex literary and informational texts independently and proficiently.

##### **AS.W.4 - Writing**

Produce clear and coherent writing in which the development, organization, and style are appropriate to the task, purpose, and audience.

##### **AS.SL.1 - Speaking and Listening**

Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

##### **AS.SL.4 - Speaking and Listening**

Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to the task, purpose, and audience.

##### **AS.SL.5 - Speaking and Listening**

Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.

##### **AS.SL.6 - Speaking and Listening**

Adapt speech to a variety of contexts and communicative tasks, demonstrating command of formal English when indicated or appropriate.

**AS.L.3 - Language**

Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.

**AS.L.4 - Language**

Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.

**AS.L.6 - Language**

Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college- and career-readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

## **PLTW App Creators (AC)**

### **Common Core State Standards for English Language Arts: 6-8 Literacy Standards for History/Social Studies, Science, and Technical Subjects**

#### **Lesson 1**

##### **6-8.RH.4 - Reading History/Social Studies**

Determine the meaning of words and phrases as they are used in a text, including vocabulary specific to domains related to history/social studies.

##### **6-8.RH.7 - Reading History/Social Studies**

Integrate visual information (e.g., in charts, graphs, photographs, videos, or maps) with other information in print and digital texts.

##### **6-8.RST.3 - Reading Science/Technical**

Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

##### **6-8.RST.4 - Reading Science/Technical**

Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.

##### **6-8.RST.7 - Reading Science/Technical**

Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

##### **6-8.WHST.2 - Writing HS/S/T**

Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

##### **6-8.WHST.2.d - Writing HS/S/T**

Use precise language and domain-specific vocabulary to inform about or explain the topic.

##### **6-8.WHST.4 - Writing HS/S/T**

Produce clear and coherent writing in which the development, organization, and style are appropriate to the task, purpose, and audience.

## PLTW App Creators (AC)

### Common Core State Standards for English Language Arts: 6-8 Literacy Standards for History/Social Studies, Science, and Technical Subjects

#### Lesson 2

##### 6-8.RH.4 - Reading History/Social Studies

Determine the meaning of words and phrases as they are used in a text, including vocabulary specific to domains related to history/social studies.

##### 6-8.RH.7 - Reading History/Social Studies

Integrate visual information (e.g., in charts, graphs, photographs, videos, or maps) with other information in print and digital texts.

##### 6-8.RST.3 - Reading Science/Technical

Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

##### 6-8.RST.4 - Reading Science/Technical

Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.

##### 6-8.RST.7 - Reading Science/Technical

Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

##### 6-8.WHST.2 - Writing HS/S/T

Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

##### 6-8.WHST.2.d - Writing HS/S/T

Use precise language and domain-specific vocabulary to inform about or explain the topic.

##### 6-8.WHST.4 - Writing HS/S/T

Produce clear and coherent writing in which the development, organization, and style are appropriate to the task, purpose, and audience.

## **PLTW App Creators (AC)**

### **Common Core State Standards for English Language Arts: 6-8 Literacy Standards for History/Social Studies, Science, and Technical Subjects**

#### **Lesson 3**

##### **6-8.RH.4 - Reading History/Social Studies**

Determine the meaning of words and phrases as they are used in a text, including vocabulary specific to domains related to history/social studies.

##### **6-8.RH.7 - Reading History/Social Studies**

Integrate visual information (e.g., in charts, graphs, photographs, videos, or maps) with other information in print and digital texts.

##### **6-8.RST.3 - Reading Science/Technical**

Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

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##### **6-8.WHST.2.d - Writing HS/S/T**

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##### **6-8.WHST.4 - Writing HS/S/T**

Produce clear and coherent writing in which the development, organization, and style are appropriate to the task, purpose, and audience.

# **PLTW App Creators (AC)**

## **Common Core State Standards for Mathematics**

### **Lesson 1**

#### **7.NS.1.d - The Number System**

Apply properties of operations as strategies to add and subtract rational numbers.



# **PLTW App Creators (AC)**

## **Common Core State Standards for Mathematics**

### **Lesson 2**

#### **7.NS.1.d - The Number System**

Apply properties of operations as strategies to add and subtract rational numbers.

# **PLTW App Creators (AC)**

## **Common Core State Standards for Mathematics**

### **Lesson 3**

#### **7.NS.1.d - The Number System**

Apply properties of operations as strategies to add and subtract rational numbers.

# **PLTW App Creators (AC)**

## **The Computer Science Teachers Association Standards**

### **Lesson 1**

#### **2-A-2-1 - Algorithms and Programming**

Solicit and integrate peer feedback as appropriate to develop or refine a program.

#### **2-A-7-2 - Algorithms and Programming**

Compare different algorithms that may be used to solve the same problem in terms of their speed, clarity, and size (e.g., different algorithms solve the same problem, but one might be faster than the other). [Clarification: Students are not expected to quantify these differences.]

#### **2-A-7-4 - Algorithms and Programming**

Interpret the flow of execution of algorithms and predict their outcomes. [Clarification: Algorithms can be expressed using natural language, flow and control diagrams, comments within code, and pseudocode.]

#### **2-A-5-5 - Algorithms and Programming**

Design, develop, and present computational artifacts such as mobile applications that address social problems both independently and collaboratively.

#### **2-A-5-6 - Algorithms and Programming**

Develop programs, both independently and collaboratively, that include sequences with nested loops and multiple branches. [Clarification: At this level, students may use block-based and/or text-based programming languages.]

#### **2-A-5-7 - Algorithms and Programming**

Create variables that represent different types of data and manipulate their values.

#### **2-A-3-9 - Algorithms and Programming**

Decompose a problem into parts and create solutions for each part.

#### **2-A-6-10 - Algorithms and Programming**

Use an iterative design process (e.g., define the problem, generate ideas, build, test, and improve solutions) to solve problems, both independently and collaboratively.

**2-C-6-13 - Computing Systems**

Use a systematic process to identify the source of a problem within individual and connected devices (e.g., follow a troubleshooting flow diagram, make changes to software to see if hardware will work, restart device, check connections, swap in working components).

**2-I-7-19 - Impacts of Computing**

Explain how computer science fosters innovation and enhances nearly all careers and disciplines.

# **PLTW App Creators (AC)**

## **The Computer Science Teachers Association Standards**

### **Lesson 2**

#### **2-A-2-1 - Algorithms and Programming**

Solicit and integrate peer feedback as appropriate to develop or refine a program.

#### **2-A-7-2 - Algorithms and Programming**

Compare different algorithms that may be used to solve the same problem in terms of their speed, clarity, and size (e.g., different algorithms solve the same problem, but one might be faster than the other). [Clarification: Students are not expected to quantify these differences.]

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#### **2-A-5-7 - Algorithms and Programming**

Create variables that represent different types of data and manipulate their values.

#### **2-A-4-8 - Algorithms and Programming**

Define and use procedures that hide the complexity of a task and can be reused to solve similar tasks. [Clarification: Students use and modify, but do not necessarily create, procedures with parameters.]

#### **2-A-3-9 - Algorithms and Programming**

Decompose a problem into parts and create solutions for each part.

#### **2-A-6-10 - Algorithms and Programming**

Use an iterative design process (e.g., define the problem, generate ideas, build, test, and improve solutions) to solve problems, both independently and collaboratively.

**2-C-6-13 - Computing Systems**

Use a systematic process to identify the source of a problem within individual and connected devices (e.g., follow a troubleshooting flow diagram, make changes to software to see if hardware will work, restart device, check connections, swap in working components).

**2-D-7-15 - Data and Analysis**

Explain the processes used to collect, transform, and analyze data to solve a problem using computational tools (e.g., use an app or spreadsheet form to collect data, decide which data to use or ignore, and choose a visualization method.).

**2-I-7-19 - Impacts of Computing**

Explain how computer science fosters innovation and enhances nearly all careers and disciplines.

**2-I-1-20 - Impacts of Computing**

Provide examples of how computational artifacts and devices impact health and well-being, both positively and negatively.

**2-I-6-23 - Impacts of Computing**

Redesign a computational artifact to remove barriers to universal access (e.g., using captions on images, high-contrast colors, and/or larger font sizes).



# **PLTW App Creators (AC)**

## **The Computer Science Teachers Association Standards**

### **Lesson 3**

#### **2-A-2-1 - Algorithms and Programming**

Solicit and integrate peer feedback as appropriate to develop or refine a program.

#### **2-A-7-4 - Algorithms and Programming**

Interpret the flow of execution of algorithms and predict their outcomes.

[Clarification: Algorithms can be expressed using natural language, flow and control diagrams, comments within code, and pseudocode.]

#### **2-A-5-5 - Algorithms and Programming**

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#### **2-A-5-6 - Algorithms and Programming**

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Create variables that represent different types of data and manipulate their values.

#### **2-A-4-8 - Algorithms and Programming**

Define and use procedures that hide the complexity of a task and can be reused to solve similar tasks. [Clarification: Students use and modify, but do not necessarily create, procedures with parameters.]

#### **2-A-3-9 - Algorithms and Programming**

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#### **2-A-6-10 - Algorithms and Programming**

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#### **2-C-6-13 - Computing Systems**

Use a systematic process to identify the source of a problem within individual and connected devices (e.g., follow a troubleshooting flow diagram, make changes to software to see if hardware will work, restart device, check connections, swap in working components).

**2-D-7-15 - Data and Analysis**

Explain the processes used to collect, transform, and analyze data to solve a problem using computational tools (e.g., use an app or spreadsheet form to collect data, decide which data to use or ignore, and choose a visualization method.).

**2-I-7-18 - Impacts of Computing**

Summarize negative and positive impacts of using data and information to categorize people, predict behavior, and make recommendations based on those predictions (e.g., customizing search results or targeted advertising, based on previous browsing history, can save search time and limit options at the same time).

**2-I-7-19 - Impacts of Computing**

Explain how computer science fosters innovation and enhances nearly all careers and disciplines.

**2-I-1-20 - Impacts of Computing**

Provide examples of how computational artifacts and devices impact health and well-being, both positively and negatively.

**2-I-1-22 - Impacts of Computing**

Describe ethical issues that relate to computing devices and networks (e.g., equity of access, security, hacking, intellectual property, copyright, Creative Commons licensing, and plagiarism).

**2-I-6-23 - Impacts of Computing**

Redesign a computational artifact to remove barriers to universal access (e.g., using captions on images, high-contrast colors, and/or larger font sizes).

**2-N-7-24 - Networks and the Internet**

Summarize security risks associated with weak passwords, lack of encryption, insecure transactions, and persistence of data.

# **PLTW App Creators (AC)**

## **Next Generation Science Standards**

### **Lesson 1**

NGSS.P1 - Science and Engineering Practices

Asking questions (for science) and defining problems (for engineering)

NGSS.P2 - Science and Engineering Practices

Developing and using models

NGSS.P4 - Science and Engineering Practices

Analyzing and interpreting data

NGSS.P5 - Science and Engineering Practices

Using mathematics and computational thinking

NGSS.P6 - Science and Engineering Practices

Constructing explanations (for science) and designing solutions (for engineering)

NGSS.P8 - Science and Engineering Practices

Obtaining, evaluating, and communicating information

# **PLTW App Creators (AC)**

## **Next Generation Science Standards**

### **Lesson 2**

NGSS.P1 - Science and Engineering Practices

Asking questions (for science) and defining problems (for engineering)

NGSS.P2 - Science and Engineering Practices

Developing and using models

NGSS.P4 - Science and Engineering Practices

Analyzing and interpreting data

NGSS.P5 - Science and Engineering Practices

Using mathematics and computational thinking

NGSS.P6 - Science and Engineering Practices

Constructing explanations (for science) and designing solutions (for engineering)

NGSS.P8 - Science and Engineering Practices

Obtaining, evaluating, and communicating information

# **PLTW App Creators (AC)**

## **Next Generation Science Standards**

### **Lesson 3**

#### **NGSS.MS-ETS1-1 - Engineering Design**

Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

#### **NGSS.MS-ETS1-3 - Engineering Design**

Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

#### **NGSS.P1 - Science and Engineering Practices**

Asking questions (for science) and defining problems (for engineering)

#### **NGSS.P2 - Science and Engineering Practices**

Developing and using models

#### **NGSS.P4 - Science and Engineering Practices**

Analyzing and interpreting data

#### **NGSS.P5 - Science and Engineering Practices**

Using mathematics and computational thinking

#### **NGSS.P6 - Science and Engineering Practices**

Constructing explanations (for science) and designing solutions (for engineering)

#### **NGSS.P8 - Science and Engineering Practices**

Obtaining, evaluating, and communicating information

# PLTW App Creators (AC)

## Standards for Technological Literacy

### Lesson 1

1.6-8.F - Students will develop an understanding of the characteristics and scope of technology.

New products and systems can be developed to solve problems or to help do things that could not be done without the help of technology.

1.6-8.G - Students will develop an understanding of the characteristics and scope of technology.

The development of technology is a human activity and is the result of individual and collective needs and the ability to be creative.

1.6-8.H - Students will develop an understanding of the characteristics and scope of technology.

Technology is closely linked to creativity, which has resulted in innovation.

2.6-8.P - Students will develop an understanding of the core concepts of technology.

Technological systems can be connected to one another.

2.6-8.R - Students will develop an understanding of the core concepts of technology.

Requirements are the parameters placed on the development of a product or system.

3.6-8.F - Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study.

Knowledge gained from other fields of study has a direct effect on the development of technological products and systems.

4.6-8.D - Students will develop an understanding of the cultural, social, economic, and political effects of technology.

The use of technology affects humans in various ways, including their safety, comfort, choices, and attitudes about technology's development and use.

8.6-8.E - Students will develop an understanding of the attributes of design.

Design is a creative planning process that leads to useful products and systems.

8.6-8.F - Students will develop an understanding of the attributes of design.

There is no perfect design.



8.6-8.G - Students will develop an understanding of the attributes of design.

Requirements for design are made up of criteria and constraints.

9.6-8.F - Students will develop an understanding of engineering design.

Design involves a set of steps, which can be performed in different sequences and repeated as needed.

9.6-8.G - Students will develop an understanding of engineering design.

Brainstorming is a group problem-solving design process in which each person in the group presents his or her ideas in an open forum.

9.6-8.H - Students will develop an understanding of engineering design.

Modeling, testing, evaluating, and modifying are used to transform ideas into practical solutions.

10.6-8.F - Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.

Troubleshooting is a problem-solving method used to identify the cause of a malfunction in a technological system.

11.6-8.J - Students will develop the abilities to apply the design process.

Make two-dimensional and three-dimensional representations of the designed solution.

11.6-8.K - Students will develop the abilities to apply the design process.

Test and evaluate the design in relation to pre-established requirements, such as criteria and constraints, and refine as needed.

11.6-8.L - Students will develop the abilities to apply the design process.

Make a product or system and document the solution.

12.6-8.H - Students will develop the abilities to use and maintain technological products and systems.

Use information provided in manuals, protocols, or by experienced people to see and understand how things work.

12.6-8.J - Students will develop the abilities to use and maintain technological products and systems.

Use computers and calculators in various applications.

17.6-8.K - Students will develop an understanding of and be able to select and use information and communication technologies.

The use of symbols, measurements, and drawings promotes a clear communication by providing a common language to express ideas.

# **PLTW App Creators (AC)**

## **Standards for Technological Literacy**

### **Lesson 2**

1.6-8.F - Students will develop an understanding of the characteristics and scope of technology.

New products and systems can be developed to solve problems or to help do things that could not be done without the help of technology.

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11.6-8.L - Students will develop the abilities to apply the design process.

Make a product or system and document the solution.

12.6-8.H - Students will develop the abilities to use and maintain technological products and systems.

Use information provided in manuals, protocols, or by experienced people to see and understand how things work.

12.6-8.J - Students will develop the abilities to use and maintain technological products and systems.

Use computers and calculators in various applications.

17.6-8.K - Students will develop an understanding of and be able to select and use information and communication technologies.

The use of symbols, measurements, and drawings promotes a clear communication by providing a common language to express ideas.

# PLTW App Creators (AC)

## Standards for Technological Literacy

### Lesson 3

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New products and systems can be developed to solve problems or to help do things that could not be done without the help of technology.

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Knowledge gained from other fields of study has a direct effect on the development of technological products and systems.

4.6-8.D - Students will develop an understanding of the cultural, social, economic, and political effects of technology.

The use of technology affects humans in various ways, including their safety, comfort, choices, and attitudes about technology's development and use.

4.6-8.E - Students will develop an understanding of the cultural, social, economic, and political effects of technology.

Technology, by itself, is neither good nor bad, but decisions about the use of products and systems can result in desirable or undesirable consequences.

4.6-8.F - Students will develop an understanding of the cultural, social, economic, and political effects of technology.

The development and use of technology poses ethical issues.

Use information provided in manuals, protocols, or by experienced people to see and understand how things work.

12.6-8.J - Students will develop the abilities to use and maintain technological products and systems.

Use computers and calculators in various applications.

17.6-8.J - Students will develop an understanding of and be able to select and use information and communication technologies.

The design of a message is influenced by such factors as intended audience, medium, purpose, and the nature of the message.

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Modeling, testing, evaluating, and modifying are used to transform ideas into practical solutions.

10.6-8.F - Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.

Troubleshooting is a problem-solving method used to identify the cause of a malfunction in a technological system.

11.6-8.H - Students will develop the abilities to apply the design process.

Apply a design process to solve problems in and beyond the laboratory-classroom.

11.6-8.I - Students will develop the abilities to apply the design process.

Specify criteria and constraints for the design.

11.6-8.J - Students will develop the abilities to apply the design process.

Make two-dimensional and three-dimensional representations of the designed solution.

11.6-8.K - Students will develop the abilities to apply the design process.

Test and evaluate the design in relation to pre-established requirements, such as criteria and constraints, and refine as needed.

11.6-8.L - Students will develop the abilities to apply the design process.

Make a product or system and document the solution.

12.6-8.H - Students will develop the abilities to use and maintain technological products and systems.