

# CAMP INVENTION CHAMPIONS™ ALIGNED TO COMMON CORE AND NEXT GENERATION SCIENCE STANDARDS

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## KEY CONCEPTS

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- Inventions have contributed to the world of sports and benefit both the players and fans.
- Brainstorming is a divergent thinking tool that is used to generate ideas in creative problem solving.
- Sketching and designing an idea can help provide clarity in problem solving.
- Prototyping is an essential part of ideation and inventing.
- Modifications can be made to devices to help them meet new and different challenges.
- Problems can be solved by applying scientific ideas about magnets.
- Newton's Laws of Motion can be applied when playing sports and games.
- Simple machines can be found in sports and tabletop games.
- Intellectual property is an idea, creation, or design that can be protected (e.g., patents and trademarks).
- Trademarks are present on many print and digital media and products.
- Defining a problem includes reflecting upon constraints on materials, time, or cost.
- Some materials have properties that are best suited for an intended purpose.
- Clearly defining and describing a prototype can show its utility.
- Working collaboratively brings in different perspectives when completing a challenge.
- Text features such as captions, subheadings, and illustrations are can be used to more efficiently find key details.
- Engineers utilize both two-dimensional and three-dimensional shapes.
- Operations and algebraic thinking are used in sports and games to keep score.

# OBJECTIVES

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Children will:

- Work as a group to brainstorm ideas.
- Design and build their own Sports Complex (i.e., functional tabletop game).
- Participate in a hybrid game that incorporates elements of running a relay and bowling using a hover ball.
- Learn how Newton's Laws of Motion can be applied when playing sports.
- Hear about the inventors and inventions behind sports complex construction.
- Examine National Inventors Hall of Fame Inductee trading cards to draft their Innovation Dream Team each day.
- Incorporate an invention used in sports complex construction into their Sports Complex.
- Work in teams to build a device to push a hover ball.
- Play a hybrid game of soccer and shuffleboard using a hover ball.
- Hear about the inventors and inventions behind sports equipment.
- Incorporate an invention used in sports equipment into their Sports Complex.
- Investigate how simple machines are used in sports equipment and tabletop games.
- Consider how far the ball and players will move in their Sports Complex.
- Create a mascot that will help bring attention to their Sports Complex.
- Explore the importance of trademarks.
- Create an innovative name for their Sports Complex and mascot and then add a trademark symbol.
- Hear about the inventors and inventions that help light up the sports world.
- Incorporate an invention used in sports complex lighting into their Sports Complex.
- Design sports complex lights and other eye-catching features for their Sports Complex.
- Play a hybrid game of pinball and croquet using a hover ball.
- Hear about the inventors and inventions that provide fans with the ultimate game day experience.
- Incorporate an invention into their Sports Complex that will benefit the fans.

- Build a concession stand for their Sports Complex.
- Work in teams to create their own hover ball game inspired by sports and games.
- Hear about the inventors and inventions that help make broadcasting sporting events possible.
- Take turn visiting each other's Sports Complexes.

# CAMP INVENTION CHAMPIONS™ ALIGNED TO NEXT GENERATION SCIENCE STANDARDS K-6

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## KINDERGARTEN–GRADE TWO

### K-2-ETS1 ENGINEERING DESIGN

- K-2-ETS1-2. Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

## GRADE THREE–FIVE

### 3-5-ETS1 ENGINEERING DESIGN

- 3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

## GRADE SIX–EIGHT

### MS-ETS1 ENGINEERING DESIGN

- MS-ETS1-1. 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 the possible solutions.

## KINDERGARTEN

### K-PS2 MOTION AND STABILITY: FORCE AND INTERACTIONS

- K-PS2-1. Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.
- K-PS2-2. Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or pull.

## GRADE TWO

### 2-PS1 MATTER AND ITS INTERACTIONS

- 2-PS1-1. Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.
- 2-PS1-1. Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.

## GRADE THREE

### 3-PS2 MOTION AND STABILITY: FORCES AND INTERACTIONS

- 3-PS2-1. Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.
- 3-PS2-3. Ask questions to determine cause and effect relationships of electric and magnetic

interactions between two objects not in contact with each other.

- 3-PS2-4. Define a simple design problem that can be solved by applying scientific ideas about magnets.

## GRADE FOUR

### 4-PS3 ENERGY

- 4-PS3-1. Use evidence to construct an explanation relating the speed of an object to the energy of that object.

## GRADE SIX-EIGHT

### MS-PS2 MOTION AND STABILITY: FORCES AND INTERACTIONS

- MS-PS2-1. Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.
- MS-PS2-2. Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.
- MS-PS2-3. Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.

### MS-PS3 ENERGY

- MS-PS3-2. Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.

### MS-PS4 WAVES AND THEIR APPLICATIONS IN TECHNOLOGIES FOR INFORMATION TRANSFER

- MS-PS4-3. Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.

# CAMP INVENTION CHAMPIONS™ ALIGNED TO COMMON CORE STATE STANDARDS FOR MATHEMATICS K-6

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## KINDERGARTEN

### COUNTING AND CARDINALITY K.CC

*Know number names and the count sequence.*

- K.CC3. Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).

*Count to tell the number of objects.*

- K.CC4. Understand the relationship between numbers and quantities; connect counting to cardinality.
  - a. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object.
  - b. Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they are counted.
  - c. Understand that each successive number name refers to a quantity that is one larger.

*Compare numbers.*

- K.CC6. Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies.
- K.CC7. Compare two numbers between 1 and 10 presented as written numbers.

### GEOMETRY K.G

*Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres).*

- K.G1. Describe objects in the environment using names of shapes and describe the relative positions of these objects using terms such as above, below, beside, in front of, behind, and next to.

*Analyze, compare, create, and compose shapes.*

- K.G5. Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.

## GRADE ONE

### OPERATIONS AND ALGEBRAIC THINKING 1.OA

*Add and subtract within 20.*

- 1.OA5. Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).

### NUMBER AND OPERATIONS IN BASE TEN 1.NBT

*Extend the counting sequence.*

- 1.NBT1. Count to 120 starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.

### MEASUREMENT AND DATA 1.MD

*Measure lengths indirectly and by iterating length units.*

- 1.MD1. Order three objects by length; compare the lengths of two objects indirectly by using a third object.

### GEOMETRY 1.G

*Reason with shapes and their attributes.*

- 1.G1. Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.
- 1.G2. Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape.

## GRADE TWO

### NUMBER AND OPERATIONS IN BASE TEN 2.NBT

*Understand place value.*

- 2.NBT3. Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.

*Use place value understanding and properties of operations to add and subtract.*

- 2.NBT5. Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or relationship between addition and subtraction.

### GEOMETRY 2.G

*Reason with shapes and their attributes.*

- 2.G1. Recognize and draw shapes having specified attributes such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and

cubes.

## GRADE THREE

### NUMBER AND OPERATIONS IN BASE TEN 3.NBT

*Use place value understanding and properties of operations to perform multi-digit arithmetic.*

- 3.NBT2. Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.

### GEOMETRY 3.G

*Reason with shapes and their attributes.*

- 3.G1. Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.

## GRADE FOUR

### NUMBER AND OPERATION IN BASE TEN 4.NBT

*Use place value understanding and properties of operations to perform multi-digit arithmetic.*

- 4.NBT4. Fluently add and subtract multi-digit whole numbers using the standard algorithm.

### MEASUREMENT AND DATA 4.MD

*Geometric measurement: understand concepts of angle and measure angles.*

- 4.MD5. Recognize angles as geometric shapes that are formed whenever two rays share a common end point, and understand concepts of angle measurement.

## GRADE FIVE

### GEOMETRY 5.G

*Classify two-dimensional figures into categories based on their properties.*

- 5.G4. Classify two-dimensional figures in a hierarchy based on properties.

# CAMP INVENTION CHAMPIONS™ ALIGNED TO COMMON CORE STATE STANDARDS FOR ENGLISH LANGUAGE ARTS K-6

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## READING STANDARDS FOR INFORMATIONAL TEXT RI

### KINDERGARTEN

- RI1. With prompting and support, ask and answer questions about key details in a text.
- RI4. With prompting and support, ask and answer questions about unknown words in a text.
- RI7. With prompting and support, describe the relationship between illustrations and the text in which they appear (e.g., what person, place, thing, or idea in the text an illustration depicts).
- RI10. Actively engage in group reading activities with purpose and understanding.

### GRADE ONE

- RI1. Ask and answer questions about key details in a text.
- RI4. Ask and answer questions to help determine or clarify the meaning of words and phrases in a text.
- RI5. Know and use various text features (e.g., headings, tables of contents, glossaries, electronic menus, icons) to locate key facts or information in a text.
- RI6. Distinguish information provided by pictures or other illustrations and information provided by the words in a text.
- RI7. Use illustrations and details in a text to describe its key ideas

### GRADE TWO

- RI1. Ask and answer such questions as *who*, *what*, *where*, *when*, *why*, and *how* to demonstrate understanding of key details in a text.
- RI4. Determine the meaning of words and phrases in text relevant to a *grade 2 topic or subject area*.
- RI5. Know and use various text features (e.g., captions, bold print, subheadings, glossaries, indexes, electronic menus, icons) to locate key facts or information in a text efficiently.
- RI7. Explain how specific images (e.g., a diagram showing how a machine works) contribute to and clarify a text.

### GRADE THREE

- RI1. Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.
- RI3. Describe the relationship between a series of historical events, scientific ideas or concepts,

or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.

- RI4. Determine the meaning of general academic and domain-specific words and phrases in a text relevant to *grade 3 topic or subject area*.
- RI5. Use text features and search tools (e.g., key words, sidebars, hyperlinks) to locate information relevant to a given topic efficiently.
- RI7. Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).

## GRADE FOUR

- RI1. Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.
- RI3. Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.
- RI4. Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a *grade 4 topic or subject area*.
- RI7. Interpret information presented visually, orally, or quantitatively (e.g., charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.

## GRADE FIVE

- RI3. Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.
- RI4. Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a *grade 5 topic or subject area*.

## GRADE SIX

- RI7. Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.

## WRITING STANDARDS W

### GRADE ONE

- W8. With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.

### GRADE TWO

- W8. Recall information from experiences or gather information from provided sources to answer a question.

## GRADE THREE

- W8. Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories.

## GRADE FOUR

- W8. Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.

## GRADE FIVE

- W8. Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.

## SPEAKING AND LISTENING STANDARDS SL

### KINDERGARTEN

- SL1. Participate in collaborative conversations with diverse partners about *kindergarten topics and texts* with peers and adults in small and larger groups.
  - a. Follow agreed-upon rules for discussions (e.g., listening to others and taking turns speaking about topics and texts under discussion).
  - b. Continue a conversation through multiple exchanges.
- SL2. Confirm understanding of a text read aloud or information presented orally or through other media by asking and answering questions about key details and requesting clarification if something is not understood.
- SL3. Ask and answer questions in order to seek help, get information, or clarify something that is not understood.
- SL4. Describe familiar people, places, things, and events, and, with prompting and support, provide additional detail.
- SL5. Add drawings and other visual displays to descriptions as desired to provide additional detail.
- SL6. Speak audibly and express thoughts, feeling, and ideas clearly.

### GRADE ONE

- SL1. Participate in collaborative conversations with diverse partners about *grade 1 topics and texts* with peers and adults in small and larger groups.
  - a. Follow agreed-upon rules for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion).
  - b. Build on others' talk in conversations by responding to the comments of others through multiple exchanges.

- c. Ask questions to clear up any confusion about the topics and texts under discussion.
- SL2. Ask and answer questions about key details in a text read aloud or information presented orally or through other media.
- SL3. Ask and answer questions about what a speaker says in order to gather additional information or clarify something that is not understood.
- SL4. Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly.
- SL5. Add drawings or other visual displays to descriptions when appropriate to clarify ideas, thoughts, and feelings.
- SL6. Produce complete sentences when appropriate to task and situation. (See grade 1 Language standards 1 and 3 on page 26 for specific expectations.)

## GRADE TWO

- SL1. Participate in collaborative conversations with diverse partners about *grade 2 topics and texts* with peers and adults in small and larger groups.
  - a. Follow agreed-upon rules for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion).
  - b. Build on others' talk in conversations by linking their comments to the remarks of others.
  - c. Ask for clarification and further explanation as needed about the topics and texts under discussion.
- SL2. Recount and describe key ideas or details from a text read aloud or information presented orally or through other media.
- SL3. Ask and answer questions about what a speaker says in order to clarify comprehension, gather additional information, or deepen understanding of a topic or issue.
- SL4. Tell a story or recount an experience with appropriate facts and relevant, descriptive details, speaking audibly in coherent sentences.
- SL5. Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings.
- SL6. Produce complete sentences when appropriate to task and situation in order to provide requested detail or clarification. (See grade 2 Language standards 1 and 3 on page 26 for specific expectations.)

## GRADE THREE

- SL1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 3 topics and texts*, building on others' ideas and expressing their own clearly.

- b. Follow agreed-upon rules for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion).
  - c. Ask questions to check understanding of information presented, stay on topic, and link their comments to the remarks of others.
  - d. Explain their own ideas and understanding in light of the discussion.
- SL2. Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.
  - SL3. Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.
  - SL4. Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant descriptive details, speaking clearly at an understandable pace.
  - SL6. Speak in complete sentences when appropriate to task and situation in order to provide requested detail and clarification. (See grade 3 Language standards 1 and 3 on page 28 for specific expectations.)

#### GRADE FOUR

- SL1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 4 topics and texts*, building on others' ideas and expressing their own clearly.
  - b. Follow agreed-upon rules for discussions and carry out assigned roles.
  - c. Pose and respond to specific questions to clarify or follow up on information, and make comments that contribute to the discussion and link to the remarks of others.
  - d. Review key ideas expressed and explain their own ideas and understanding in light of the discussion.
- SL2. Paraphrase portions of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.
- SL4. Report on a topic or text, tell a story, or recount an experience in an organized manner, using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.

#### GRADE FIVE

- SL1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 5 topics and texts*, building on others' ideas and expressing their own clearly.
  - b. Follow agreed-upon rules for discussions and carry out assigned roles.
  - c. Pose and respond to specific questions by making comments that contribute to the discussion and elaborate on the remarks of others.

- d. Review the key ideas expressed and draw conclusions in light of information and knowledge gained from the discussions.
- SL2. Summarize a written text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.
- SL4. Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.

## GRADE SIX

- SL1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 6 topics, texts, and issues*, building on others' ideas and expressing their own clearly.
  - b. Follow rules for collegial discussions, set specific goals and deadlines, and define individual roles as needed.
  - c. Pose and respond to specific questions with elaboration and detail by making comments that contribute to the topic, text, or issue under discussion.
  - d. Review the key ideas expressed and demonstrate understanding of multiple perspectives through reflection and paraphrasing.
- SL2. Interpret information presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how it contributes to a topic, text, or issue under study.

## LANGUAGE STANDARDS L

### KINDERGARTEN

- L1. Demonstrate command of the conventions of standard English grammar and usage when writing and speaking.
- L4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on *kindergarten reading and content*.

### GRADE ONE

- L1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
- L4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on *grade 1 reading and content*, choosing flexibly from an array of strategies.

### GRADE TWO

- L1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
- L4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on *grade 2 reading and content*, choosing flexibly from an array of strategies.

### GRADE THREE

- L1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
- L4. Determine or clarify the meaning of unknown and multiple-meaning word and phrases based on *grade 3 reading and content*, choosing flexibly from a range of strategies.

### GRADE FOUR

- L1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
- L4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on *grade 4 reading and content*, choosing flexibly from a range of strategies.

### GRADE FIVE

- L1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
- L4. Determine or clarify the meaning of unknown multiple-meaning words and phrases based on *grade 5 reading and content*, choosing flexibly from a range of strategies.

### GRADE SIX

- L1. Demonstrate command of conventions of standard English grammar and usage when writing or speaking.
- L4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on *grade 6 reading and content*, choosing flexibly from a range of strategies.

### READING STANDARDS FOR LITERACY IN HISTORY/SOCIAL STUDIES RH

#### GRADE SIX

- RH4. Determine the meaning of words and phrases as they are used in a text, including vocabulary specific to domains related to history/social studies.

### READING STANDARDS FOR LITERACY IN SCIENCE AND TECHNICAL SUBJECTS RST

#### GRADE SIX

- RST4. 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*.