

**Contest Date:**

Interviews: March 30, 2021

(orientation 10AM- Contestant Schedule will be announced during orientation)

**Notebook Submissions:**

Notebooks must be received by March 23

to

DropBox: <https://www.dropbox.com/request/29Lewu3kGoRYRyHlFlyO>

Or to

Google Drive: [https://docs.google.com/forms/d/e/1FAIpQLSf3M1b5F-NpTSj6xTkKmNcSGGcloga90DwGO6ss6LOF0RI6qQ/viewform?usp=sf\\_link](https://docs.google.com/forms/d/e/1FAIpQLSf3M1b5F-NpTSj6xTkKmNcSGGcloga90DwGO6ss6LOF0RI6qQ/viewform?usp=sf_link)

**Contest Type: VIRTUAL**

(all contest type MUST knows are listed on the website. YOU NEED TO BE FAMILIAR WITH BOTH THIS DOCUMENT AND THAT DOCUMENT)

**Zoom Contest Link:**

<https://ohioskillsusa-org.zoom.us/j/95553612792?pwd=VUVpMlMxSThOOXI1M29wSG9Sbm1WQ>

T09

Meeting ID: 955 5361 2792

Passcode: 666992

## PURPOSE

To select the outstanding promotional exhibit that SkillsUSA student members design and construct. The display is built around and articulates a common theme established by SkillsUSA. Students are encouraged to construct displays that are portable and inexpensively shipped.

## TESTING

There is no written knowledge test in this contest.

## ELIGIBILITY (Team of 3)

Open to active SkillsUSA members.

All displays come straight to state based on the following guidelines:

Each CTPD may send one display for each building that operates independently (i.e. - Columbus City may send one display from each career center).

OR

Each CTPD may send one display for each 500 members or part of 500 members (i.e. - if Miami Valley CTC has 1450 members. They would be permitted to send three displays).

## THEME

“SkillsUSA: Champions at Work – Empowered to Succeed”

## ORIENTATION

Orientation will be at 1030 am in the designated ZOOM meeting listed above. Orientation is for contestants only and is closed to advisors. Contestants will be given their contest appointment time during orientation and all contestants should report 10 minutes prior to their contest time and wait in the “Waiting Room”. Advisors are not permitted in the contest area during judging.

## CLOTHING

Official SkillsUSA dress

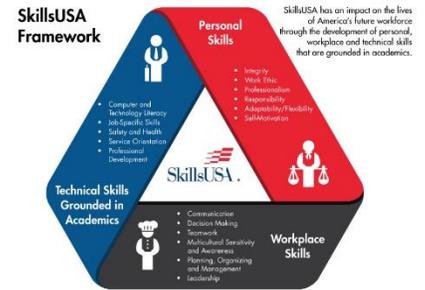
Men	Official red blazer, jacket or sweater; black dress slacks; white dress shirt; plain black tie with no pattern or SkillsUSA black tie; black socks and black shoes.
Women	Official red blazer, jacket or sweater; black dress skirt (knee length) or slacks with businesslike white, collarless blouse or white blouse with small, plain collar that may not extend onto the lapels of the blazer; black sheer or skin-tone seamless hose and black dress shoes.

## OBSERVER RULE

Observers, including advisors, are not permitted in the contest area during judging. This is a Closed Contest.

## TOOLS PROVIDED BY CONTESTANTS

- All tools necessary to assemble and set up their display
- 25' UL approved extension cord, if display requires electricity
- **Standard 25' Tape Measure**
- A letter signed by the local school administrator verifying that display was designed and built by students must accompany each display and must be the first page of the notebook
- An official SkillsUSA one-inch 3-ring binder
- Notebook limited to 12 pages (24 surfaces) – verification letter by school administrator does count as part of the 12 pages (24 surfaces)
- Displays requiring tables will need to bring their own table
- No smartwatches/phones will be permitted in the contest room



- At orientation, each team contestant must present a resume to the judges

## SPECIAL INFORMATION

- Contestants will compete with their display in the background
- All 3 students must be present and should observe social distancing and wear masks
- Judges may ask students at any time to rotate the camera
- Competitors should have a standard tape measure to measure the display on screen for the judges

## SCOPE OF THE CONTEST

### Knowledge Performance

There is no written knowledge test required in this contest.

### Skill Performance

This contest is a team event that begins with goal setting in relation to a theme and involves the major competencies: developing a design, teamwork, organizing work, communications, marketing a product, and demonstrating workplace skills of workmanship. These competencies are comprised of several sub-competencies, which are listed below.

### Contest Guidelines

1. The display must be designed and constructed by students who were enrolled during the school year immediately preceding the National Leadership and Skills Conference.
2. Maximum size of the display will be 48" wide by 48" deep by 84" high (measured from the floor and a parallel line running from the drapery posts in front of displays). All stationary and moving parts must remain inside these dimensions. The minimum size of a floor or table top display will be 32" wide by 42" deep by 42" high (measured from the floor or from a table top parallel to the front of the display layout line). PENALTY: Five points will be deducted for each 1/8" over the prescribed size for any dimension or for each 1/8" under the prescribed size for any dimension. If foldout portions are used in the display, they must be arranged to comply with the maximum size of the display.
3. A team of three (3) contestants in official SkillsUSA attire shall participate in a presentation/interview component in which contestants will describe the display and how it conforms to the theme. The presenters/interviewees should include information on:
  - how the layout and design was determined
  - how the central theme was carried out
  - the educational value of the display
  - the creativity and originality incorporated into the display
  - the quality of workmanship
  - how the display was constructed according to a plan
  - what different occupational/academic program team members participated in the construction
  - what were the time lines and number of hours consumed in construction of the display
  - what parts of the display (if any) were commercially made
  - what were the construction costs
  - how the display was designed to allow easy transportation and setup/teardown.

The presentation/interview will be five (5) to seven (7) minutes in length. A time keeper will announce thirty (30) seconds remain in the interview time allotment so contestants and judges can complete final comments. The presentation/interview will end at the seven (7) minute set time. No penalties will be involved for the presentation/interview.

The presentation/interview team must bring a 1" official SkillsUSA three-ring binder containing pictures, design sketches and drawings, a brief description of the purpose of the display in relation to the theme and its educational value, information about the development and construction of the display, what programs/students participated in construction the display, and what are the plans for using the display after competition.

**Note:** The notebook should be used as a visual aid in helping team members inform judges about the display.

A letter/signed by the local school administrator, certifying that the display was designed and constructed by students must be included as the first page of the notebook. The notebook must be limited to twelve (12) pages (24 surfaces). Unused plastic document holders will count as pages and surfaces. A five (5) point penalty will be assessed for each surface over 24.

The notebook should be brought by the display team, used to support the presentation of the display to judges, and left at the display at the conclusion of the presentation/interview for further review by judges and technical committee members.

The technical committee chairman will inform the presentation team as to whether or not the display can be deactivated. If so, team members may want to remove electronic hardware for security concerns.

4. The display may use references to state, city or school without penalty.
5. If displays use electronic equipment, surge protectors should be installed. The SkillsUSA headquarters cannot be responsible for current surges. Consider using a power strip with a circuit breaker for 110-volt power. Displays that have electrical/electronic components should be designed so that they can be activated and deactivated with one switch. The activation time will be reduced by the interview participant, and the switch will be left at the display following the interview for further review by the judges.
6. When the public visits the displays, display teams should take turns presenting their displays to interested visitors while ensuring the security of their displays.
7. The displays must be set up by students. Advisors are not to enter the setup area with the exception of moving in the display. Since the setup area has limited space, only three contestants will be allowed to participate in setting up the display.

**The following WILL NOT be tolerated and are grounds for disqualification from the competition:**

- No cellphones in the contest area.
- No contact with anyone outside of the contest area once the contest begins.
- No inappropriate communication between contestants such as verbally degrading another contestant.
- No cheating on any portion of the contest such as informing another contestant of the skills/test prior to competing.

**STANDARDS AND COMPETENCIES**

**Ohio Technical Competencies**

1.1.4	Describe the role and function of professional organizations, industry associations and organized labor and use networking techniques to develop and maintain professional relationships.
1.1.5	Develop strategies for self-promotion in the hiring process (e.g., filling out job applications, résumé writing, interviewing skills, portfolio development).
1.1.8	Identify the correlation between emotions, behavior and appearance and manage those to establish and maintain professionalism.
1.2.2	Deliver formal and informal presentations.
1.2.3	Identify and use verbal, nonverbal and active listening skills to communicate effectively.
1.2.5	Communicate information (e.g., directions, ideas, vision, workplace expectations) for an intended audience and purpose.
1.2.6	Use proper grammar and expression in all aspects of communication.
1.2.7	Use problem-solving and consensus-building techniques to draw conclusions and determine next steps.
1.2.10	Use interpersonal skills to provide group leadership, promote collaboration and work in a team.
1.2.11	Write professional correspondence, documents, job applications and résumés.
1.2.12	Use technical writing skills to complete forms and create reports.
1.4.2	Select and use software applications to locate, report, analyze and present information (e.g., word processing, e-mail, spreadsheet, databases, presentation, Internet search engines).

**Ohio Academic Standards**

## Writing

Ohio Technical Competencies	ELA Standard	ELA Standard Description
1.1.4	W.9-10.1	<p>Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.</p> <ol style="list-style-type: none"> <li>Establish a clear and thorough thesis to present an argument.</li> <li>Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among claim(s), counterclaims, reasons, and evidence.</li> <li>Develop claim(s) and counterclaims fairly, supplying evidence for each while pointing out the strengths and limitations of both in a manner that anticipates the audience’s knowledge level and concerns.</li> <li>Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.</li> <li>Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.</li> <li>Provide a concluding statement or section that follows from and supports the argument presented.</li> </ol>
1.1.4	W.9-10.2	<p>Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.</p> <ol style="list-style-type: none"> <li>Establish a clear and thorough thesis to present information.</li> <li>Introduce a topic; organize complex ideas, concepts, and information to make important connections and distinctions; include formatting b. (e.g., headings), graphics (e.g., figures, tables), and multimedia to aid in comprehension, if needed.</li> <li>Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience’s knowledge of the topic.</li> <li>Use appropriate and varied transitions to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.</li> <li>Use precise language and domain-specific vocabulary to manage the complexity of the topic.</li> <li>Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.</li> <li>Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).</li> </ol>
1.1.5 1.2.5 1.2.11	W.9-10.4	<p>Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)</p>
1.4.2	W.9-10-6	<p>Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology’s capacity to link to other information and to display information flexibly and dynamically.</p>
1.1.4	W.11-12.1	<p>Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.</p> <ol style="list-style-type: none"> <li>Establish a clear and thorough thesis to present a complex argument.</li> <li>Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences claim(s), counterclaims, reasons, and evidence.</li> <li>Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant evidence for each while pointing out the strengths and limitations of both</li> </ol>

		<p>in a manner that anticipates the audience’s knowledge level, concerns, values, and possible biases.</p> <ul style="list-style-type: none"> <li>d. Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.</li> <li>e. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.</li> <li>f. Provide a concluding statement or section that follows from and supports the argument presented.</li> </ul>
1.1.4	W.11-12.2	<p>Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.</p> <ul style="list-style-type: none"> <li>a. Establish a clear and thorough thesis to present and explain information.</li> <li>b. Introduce a topic; organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia to aid comprehension, if needed.</li> <li>c. Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience’s knowledge of the topic.</li> <li>d. Use appropriate and varied transitions and syntax to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.</li> <li>e. Use precise language, domain-specific vocabulary, and techniques such as metaphor, simile, and analogy to manage the complexity of the topic.</li> <li>f. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.</li> <li>g. Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).</li> </ul>
1.1.5 1.2.5 1.2.11	W.11-12.4	<p>Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)</p>
1.4.2	W.11-12.6	<p>Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.</p>

## Speaking and Listening

Ohio Technical Competencies	ELA Standard	ELA Standard Description
1.2.3 1.2.5 1.2.7 1.2.10	SL.9-10.1	<p>Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on <i>grades 9–10 topics, texts, and issues</i>, building on others’ ideas and expressing their own clearly and persuasively.</p> <ul style="list-style-type: none"> <li>a. Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.</li> <li>b. Work with peers to set rules for collegial discussions and decision-making (e.g., informal consensus, taking votes on key issues, presentation of alternate views), clear goals and deadlines, and individual roles as needed.</li> <li>c. Propel conversations by posing and responding to questions that relate the current discussion to broader themes or larger ideas; actively incorporate</li> </ul>

		<p>others into the discussion; and clarify, verify, or challenge ideas and conclusions.</p> <p>d. Respond thoughtfully to diverse perspectives, summarize points of agreement and disagreement, and, when warranted, qualify or justify their own views and understanding and make new connections in light of the evidence and reasoning presented.</p>
1.2.2	SL.9-10.4	Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.
1.2.2 1.4.2	SL.9-10.5	Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.
1.2.2 1.2.5 1.2.6	SL.9-10.6	Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grades 9–10 Language standards 1 and 3 for specific expectations.)
1.2.3 1.2.5 1.2.7 1.2.10	SL.11-12.1	<p>Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on <i>grades 11–12 topics, texts, and issues</i>, building on others’ ideas and expressing their own clearly and persuasively.</p> <p>a. Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.</p> <p>b. Work with peers to promote civil, democratic discussions and decision making, set clear goals and deadlines, and establish individual roles as needed.</p> <p>c. Propel conversations by posing and responding to questions that probe reasoning and evidence; ensure a hearing for a full range of positions on a topic or issue; clarify, verify, or challenge ideas and conclusions; and promote divergent and creative perspectives.</p> <p>d. Respond thoughtfully to diverse perspectives; synthesize comments, claims, and evidence made on all sides of an issue; resolve contradictions when possible; and determine what additional information or research is required to deepen the investigation or complete the task.</p>
1.2.2	SL. 11-12.4	Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.
1.2.2 1.4.2	SL.11-12.5	Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.
1.2.2 1.2.5 1.2.6	SL. 11-12.6	Adapt speech to a variety of contexts and tasks, demonstrating a command of formal English when indicated or appropriate. (See grades 11–12 Language standards 1 and 3 for specific expectations.)

## Language

Ohio Technical Competencies	ELA Standard	ELA Standard Description
1.2.6	L.9-10.1	<p>Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.</p> <p>a. Use parallel structure.*</p>

		<ul style="list-style-type: none"> <li>b. Use various types of phrases (noun, verb, adjectival, adverbial, participial, prepositional, absolute) and clauses (independent, dependent; noun, relative, adverbial) to convey specific meanings and add variety and interest to writing or presentations.</li> </ul>
1.2.6	L.9-10.2	<p>Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.</p> <ul style="list-style-type: none"> <li>a. Use a semicolon (and perhaps a conjunctive adverb) to link two or more closely related independent clauses.</li> <li>b. Use a colon to introduce a list or quotation.</li> <li>c. Spell correctly.</li> </ul>
1.2.6	L.9-10.3	<p>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.</p> <ul style="list-style-type: none"> <li>a. Write work so that it conforms to the guidelines in a style manual (e.g., MLA Handbook, Turabian's <i>Manual for Writers</i>) appropriate for the discipline and writing type.</li> <li>b. Edit work so that it conforms to the guidelines in a style manual appropriate for the discipline and writing type.</li> </ul>
1.2.6	L.11-12.1	<p>Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.</p> <ul style="list-style-type: none"> <li>a. Apply the understanding that usage is a matter of convention, can change over time, and is sometimes contested.</li> <li>b. Resolve issues of complex or contested usage, consulting references (e.g., Merriam-Webster's Dictionary of English Usage, Garner's Modern American Usage) as needed.</li> </ul>
1.2.6	L.11-12.2	<p>Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.</p> <ul style="list-style-type: none"> <li>a. Observe hyphenation conventions.</li> <li>b. Spell correctly.</li> </ul>
1.2.6	L.11-12.3	<p>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.</p> <ul style="list-style-type: none"> <li>a. Vary syntax for effect, consulting references (e.g., Tufte's <i>Artful Sentences</i>) for guidance as needed.</li> <li>b. Apply an understanding of syntax to the study of complex texts when reading.</li> </ul>

## Writing Standards for Literacy in History/Social Studies, Science and Technical Subjects

Ohio Technical Competencies	ELA Standard	ELA Standard Description
1.2.12	WHST.9-10.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
1.2.12	WHST.9-10.5	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
1.2.12	WHST.11-12.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
1.2.12	WHST.11-12.5	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

## Mathematics

Standard	Description
N.Q.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. ★
N.Q.2	Define appropriate quantities for the purpose of descriptive modeling. ★
N.Q.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. ★
A.SSE.1	Interpret expressions that represent a quantity in terms of its context. ★ a. Interpret parts of an expression, such as terms, factors, and coefficients. b. Interpret complicated expressions by viewing one or more of their parts as a single entity.
A.SSE.2	Use the structure of an expression to identify ways to rewrite it. <i>For example, to factor <math>3x(x - 5) + 2(x - 5)</math>, students should recognize that the "<math>x - 5</math>" is common to both expressions being added, so it simplifies to <math>(3x + 2)(x - 5)</math>; or see <math>x^4 - y^4</math> as <math>(x^2)^2 - (y^2)^2</math>, thus recognizing it as a difference of squares that can be factored as <math>(x^2 - y^2)(x^2 + y^2)</math>.</i>
A.SSE.3	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. ★ a. Factor a quadratic expression to reveal the zeros of the function it defines. b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines. c. Use the properties of exponents to transform expressions for exponential functions. <i>For example, <math>8^t</math> can be written as <math>2^{3t}</math>.</i>
A.APR.1	Understand that polynomials form a system analogous to the integers, namely, that they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials. a. Focus on polynomial expressions that simplify to forms that are linear or quadratic. (A1, M2) b. Extend to polynomial expressions beyond those expressions that simplify to forms that are linear or quadratic. (A2, M3)
A.APR.3	Identify zeros of polynomials, when factoring is reasonable, and use the zeros to construct a rough graph of the function defined by the polynomial.
A.REI.1	Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.
A.REI.3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
A.REI.10	Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).
F.IF.1	Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If $f$ is a function and $x$ is an element of its domain, then $f(x)$ denotes the output of $f$ corresponding to the input $x$ . The graph of $f$ is the graph of the equation $y = f(x)$ .
F.IF.4	For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. <i>Key features include the following: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.</i> ★ (A2, M3) a. Focus on linear and exponential functions. (M1) b. Focus on linear, quadratic, and exponential functions. (A1, M2)
F.IF.5	Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. <i>For example, if the function <math>h(n)</math> gives the number of person-hours it takes to assemble <math>n</math> engines in a factory, then the positive integers would be an appropriate domain for the function.</i> ★ a. Focus on linear and exponential functions. (M1) b. Focus on linear, quadratic, and exponential functions. (A1, M2) c. Emphasize the selection of a type of function for a model based on behavior of data and context. (A2, M3)

F.IF.6	Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph. ★ (A2, M3)
F.BF.1	Write a function that describes a relationship between two quantities. ★ <ol style="list-style-type: none"> <li>Determine an explicit expression, a recursive process, or steps for calculation from context.           <ol style="list-style-type: none"> <li>Focus on linear and exponential functions. (A1, M1)</li> <li>Focus on situations that exhibit quadratic or exponential relationships. (A1, M2)</li> </ol> </li> <li>Combine standard function types using arithmetic operations. <i>For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.</i> (A2, M3)</li> <li>(+) Compose functions. <i>For example, if <math>T(y)</math> is the temperature in the atmosphere as a function of height, and <math>h(t)</math> is the height of a weather balloon as a function of time, then <math>T(h(t))</math> is the temperature at the location of the weather balloon as a function of time.</i></li> </ol>
G.CO.2	Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not, e.g., translation versus horizontal stretch.
G.CO.3	Identify the symmetries of a figure, which are the rotations and reflections that carry it onto itself. <ol style="list-style-type: none"> <li>Identify figures that have line symmetry; draw and use lines of symmetry to analyze properties of shapes.</li> <li>Identify figures that have rotational symmetry; determine the angle of rotation, and use rotational symmetry to analyze properties of shapes.</li> </ol>
G.CO.5	Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using items such as graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.
G.CO.9	Prove and apply theorems about lines and angles. <i>Theorems include but are not restricted to the following: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.</i>
G.GMD.3	Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems. ★
G.GMD.4	Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.
S.MD.3	Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; find the expected value. <i>For example, find the theoretical probability distribution for the number of correct answers obtained by guessing on all five questions of a multiple-choice test where each question has four choices, and find the expected grade under various grading schemes.</i> ★
S.MD.4	Develop a probability distribution for a random variable defined for a sample space in which probabilities are assigned empirically; find the expected value. <i>For example, find a current data distribution on the number of TV sets per household in the United States, and calculate the expected number of sets per household. How many TV sets would you expect to find in 100 randomly selected households?</i> ★
S.MD.5	Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values. ★ <ol style="list-style-type: none"> <li>Find the expected payoff for a game of chance. For example, find the expected winnings from a state lottery ticket or a game at a fast-food restaurant.</li> <li>Evaluate and compare strategies on the basis of expected values. <i>For example, compare a high-deductible versus a low-deductible automobile insurance policy using various, but reasonable, chances of having a minor or a major accident.</i></li> </ol>
S.MD.6	Use probabilities to make fair decisions, e.g., drawing by lots, using a random number generator. ★
S.MD.7	Analyze decisions and strategies using probability concepts, e.g., product testing, medical testing, pulling a hockey goalie at the end of a game. ★

## Science

During grades 9 through 12, all students must use the following scientific processes with appropriate laboratory safety techniques to construct their knowledge and understanding in all science content areas:

Scientific Processes

# CHAPTER DISPLAY

- Identify questions and concepts that guide scientific investigations;
- Design and conduct scientific investigations;
- Use technology and mathematics to improve investigations and communications;
- Formulate and revise explanations and models using logic and evidence (critical thinking);
- Recognize and analyze explanations and models; and
- Communicate and support a scientific argument.