

# Genetics Honors (#2000440)

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	Course Path: Section: Grades PreK to 12 Education
Course Number: 2000440	Courses > Grade Group: Grades 9 to 12 and Adult
Course Number: 2000440	Education Courses > Subject: Science >
	SubSubject: Biological Sciences >
	Abbreviated Title: GENETICS HON
Number of Credits: One (1) credit	Course Length: Year (Y)
	Course Attributes:
	Honors
Course Type: Core Academic Course	Course Level: 3
Course Status: Course Approved	
Graduation Requirement: Equally Rigorous Science	

### **GENERAL NOTES**

#### English Language Development ELD Standards Special Notes Section:

Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate information, ideas and concepts for academic success in the content area of Science. For the given level of English language proficiency and with visual, graphic, or interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and teachers which maximizes an ELL's need for communication and social skills. To access an ELL supporting document which delineates performance definitions and descriptors, please click on the following link:

http://www.cpalms.org/uploads/docs/standards/eld/SC.pdf

For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition at sala@fldoe.org.

## **Course Standards**

#### Integrate Standards for Mathematical Practice (MP) as applicable.

- MAFS.K12.MP.1.1 Make sense of problems and persevere in solving them.
- MAFS.K12.MP.2.1 Reason abstractly and quantitatively.
- MAFS.K12.MP.3.1 Construct viable arguments and critique the reasoning of others.
- MAFS.K12.MP.4.1 Model with mathematics.
- MAFS.K12.MP.5.1 Use appropriate tools strategically.
- MAFS.K12.MP.6.1 Attend to precision.
- MAFS.K12.MP.7.1 Look for and make use of structure.
- MAFS.K12.MP.8.1 Look for and express regularity in repeated reasoning.

Name	Description
	Describe the scientific explanations of the origin of life on Earth.
<u>SC.912.L.15.8:</u>	Remarks/Examples: Annually assessed on Biology EOC. Also assesses <u>SC.912.N.1.3</u> , <u>SC.912.N.1.4</u> , and <u>SC.912.N.2.1</u> .
SC.912.L.15.9:	Explain the role of reproductive isolation in the process of speciation.
<u>SC.912.L.15.12:</u>	List the conditions for Hardy-Weinberg equilibrium in a population and why these conditions are not likely to appear in nature. Use the Hardy-Weinberg equation to predict genotypes in a population from observed phenotypes.
	Describe the conditions required for natural selection, including: overproduction of offspring, inherited variation, and the struggle to survive, which result in differential reproductive success.
<u>SC.912.L.15.13:</u>	Remarks/Examples:
	Annually assessed on Biology EOC. Also assesses SC.912.L.15.14, SC.912.L.15.15, and SC.912.N.1.3.
SC.912.L.15.14:	Discuss mechanisms of evolutionary change other than natural selection such as genetic drift and gene flow.
SC.912.L.15.15:	Describe how mutation and genetic recombination increase genetic variation.
	Use Mendel's laws of segregation and independent assortment to analyze patterns of inheritance.
<u>SC.912.L.16.1:</u>	Remarks/Examples:
	Annually assessed on Biology EOC. Also assesses SC.912.L.16.2.
<u>SC.912.L.16.2:</u>	Discuss observed inheritance patterns caused by various modes of inheritance, including dominant, recessive, codominant, sex-linked, polygenic, and multiple alleles.
	Describe the basic process of DNA replication and how it relates to the transmission and conservation of the genetic information.
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Science         Science <t< th=""><th>SC.912.L.16.3:</th><th>Remarks/Examples: Integrate <u>HE.912.C.1.7</u>. Analyze how <u>heredity</u> and family history can impact personal health. Annually assessed on Biology EOC. Also assesses</th></t<>	SC.912.L.16.3:	Remarks/Examples: Integrate <u>HE.912.C.1.7</u> . Analyze how <u>heredity</u> and family history can impact personal health. Annually assessed on Biology EOC. Also assesses
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Sci 102.1.1.6.4.         Become the mechanisms on application and grane sequences in a pathwarder, and transplane and transplane model.           Sci 102.1.1.6.1.         Become the view constraint in transplane parker where balances constraints on on the process. The constraints on the sequence the sequence transplane model sequences and the one of the process. The constraints on the sequence transplane model sequences in the sequence transplane model.           Sci 102.1.1.6.2.         Become the view of the sequences of the sequence transplane model.           Sci 102.1.1.6.2.         Become the view of the sequence of the sequence transplane.           Sci 102.1.1.6.2.         Become the view of the sequence	<u>SC.912.L.16.4:</u>	Explain how mutations in the DNA sequence may or may not result in phenotypic change. Explain how mutations in gametes may result in phenotypic changes in offspring.
S2:921.19.7       Describe how views and tacking transfer grants method balance multiple grants the instead balance of the proved part of the proved south.         S2:921.19.8       Remark/Examples:         S2:921.19.8       Remark/Examples:         S2:921.19.9       Remark/Examples:         S2:921.19.9       Remark/Examples:         S2:921.19.9       Remark/Examples:         S2:921.19.1	SC.912.L.16.5:	Explain the basic processes of transcription and translation, and how they result in the expression of genes.
Explain the restanding between marking, cell gdb, wet accounted all growth patientially insulting in carear           2, 212.116.0.         Explain five and why the appendix does all gdb and the restance of the advance	SC.912.L.16.6:	Discuss the mechanisms for regulation of gene expression in prokaryotes and eukaryotes at transcription and translation level.
Sci 12:11:51         Remarks/Examples:           Sci 12:11:51         Explain the on advecting the structure on inpert previous hould.           Sci 12:11:52         Explain the on advecting the structure on inpert previous hould.           Sci 12:11:52         Explain the on advecting the structure on inpert previous hould.           Sci 12:11:51:11         Explain the inpert of the inclusional on advecting advecting the inclusional on advecting the inclusional on advecting the inclusional on advecting the inclusional on advecting advecting the inclusional on advecting the inclusional on advecting the inclusional on advecting the inclose advecting the inclusionadvecting the inclusion	<u>SC.912.L.16.7:</u>	Describe how viruses and bacteria transfer genetic material between cells and the role of this process in biotechnology.
International         Integrate (E-932.2.1.2)         Analyze have by propEx and family history can impact partonal handlin.           C:132.1.16.9.         Explain how and why the genetic code is unlessed and is common to almost all organisms.           SV:22.1.16.10.         Remarks/Complete: Intensity associated on Bullety 700.           C:132.1.16.12.         Florence the intendergine executed with ferroric modulate and 50.4 should feature. Including motion of and the protocome of an integration of a single state of the intendergine executed with feature state. In the intender of the intendergine executed with feature state intender of the intendergine executed with feature state.           SV:22.1.16.12.         Describe the character intender of motions and relates to a file intender of the intendergine executed with feature state intender of the intendergine executed with the intender of motions and relates to a file inprotocome intender of motions and relates to a file inprotocome intender of motions and relates in the intender of motions and relates in the inmature of motions and relates in the inmature in intender of motions and relates in the inmature intender of motions and relates in the inmature of motions and relates in the inmature intender of motions and relates intender of i		Explain the relationship between mutation, cell cycle, and uncontrolled cell growth potentially resulting in cancer.
Sci 912 116 5: Explain how and why the genetic code is universal and is common to almost all organisms. Federates the ingest of federatorology on the individual, reading yield he individual individual metalements. Sci 92 116 10: Explain how and why the genetic code is universal and is common to almost all organisms. Sci 92 116 10: Explain how and why the genetic code is universal and allocal accurates. Sci 92 116 10: Explain how and why the genetic code is universal and of the federatorology and the federatorology and the federatorology and the federatorology. Sci 92 116 10: Explain how and why the genetic code is universal and the federatorology and the federatorology. Sci 92 116 11: Explain he proceed of the federatorology and the federatorology	SC.912.L.16.8:	
Evaluation for impact of biotechnology on the individual, socially and the antiromovel, including models and schlad issues.           SC 932.16.10         Remerk/Champles: Annually assessed on Biology EDD.           SC 932.16.11         Decause the technologies associated with formatic modeline and DNA description, polymershe than motion, liquides, and transformation is used to construct recombining independent by antifactions, polymershe than motion, liquides, and transformation is used to construct recombining independent sections in the formation of new cells and is reportance in maintaining dominance number during availability of polymers of motion, liquides, and that consequences for against and motion in the formation of new cells and relation to the processes of associal and associal reproduction and thair consequences for genetic variatility of constructions and meetils and relation to the processes of associal and associal reproduction and thair consequences for genetic variatility of constructions in the constructions, including independent sections of social and associal reproduction and thair consequences for genetic variatility of constructions in the constructions and relation to the processes of associal and associal reproduction and thair consequences for genetic variatility of constructions and relations and relations and relations of the four major categories of biological macromolecules.           SC 932.10.11         Remark/Examples: Annually associate associate and principal associates and relations of the social and second relations of the consequence of biological macromolecules.           SC 932.10.11         Remark/Examples: Annually associate and biology EOC. Also associates 50.922.12.13           SC 932.10.11         Remark/Examples: Annually associate associate and procession of social ane		Integrate <u>HE.912.C.1.7</u> . Analyze how heredity and family history can impact personal health.
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Sci 212.116.122 Becarbs the back DMA technology (relation algobiology demountaineds, get electroprocests, polymerses their reaction, lightion, and transformative transformative transmomentation technology. Becarbs the call cycle, including the process of mitoxis. Explain the role of mitoxis in the formation of new cells and its importance in maintaining dramatoms mumber during assess are production.  Sci 212.116.112 Compare and contrast mitoxis and metaks and relate to the processes of vanael and assessat reproduction dividen results in the formation of heap's gamesis or spores.  Sci 212.116.112 Compare and contrast mitoxis and metaks and relate to the processes of vanael and assessat reproduction and their consequences for genetic variate compare and contrast mitoxis and metaks and relate to the processes of vanael and assessat reproduction.  Remark/Sciangles:  Remark/Sciangles:	<u>SC.912.L.16.10:</u>	
SciPIZ-10.12/2         transformation) is used to construct recombinant: DNA majecular QNA cosm(s).           SciPIZ-10.14.         Describe the dispose, including the process of microlise. Explain the role of moles in the formation of moviels and its importance in maintaining.           SciPIZ-10.14.         Describe the process of microlise. Explain the role of moles in the formation of moviels and the importance in maintaining.           SciPIZ-10.16.         generative the process of microlise. Explain the role of moles in the formation of moviels and the consequences for genuite variation.           SciPIZ-10.17.         Remarks/Examples: Immunity assessor in microlise. SciPIZ-11.6.11 & SciPIZ-11.6.11 & SciPIZ-11.6.16           SciPIZ-11.11.         Recognite the consequences of the loss of biodyceid due to catastrophic events.           SciPIZ-11.12.         Recognite the consequences of the loss of biodyceid due to catastrophic events.           SciPIZ-11.13.         Recognite the consequences of tables of biodyceid due to catastrophic events.           SciPIZ-11.13.         Recognite the consequences of tables of biodyceid due to catastrophic events.           SciPIZ-11.11.         Recognite the consequences of tables of biodyceid due to catastrophic events.           SciPIZ-11.11.         Recognite the loss of biodyceid functions of the four major catastrophic events.           SciPIZ-11.11.         Recognite the loss of biodyceid functions of the four major catastrophic events.           SciPIZ-11.11.11.         Recognite the loss of biodyceid functions of t	<u>SC.912.L.16.11:</u>	Discuss the technologies associated with forensic medicine and DNA identification, including restriction fragment length polymorphism (RFLP) analysis.
SCIULIDATE         characterization production.           SCIULIDATE         Describe the process of medias. Including independent assortment and crossing over. Explain how reduction dividion results in the formation of hapid genetics or spores.           SCIULIDATE         Remarks/Examples:           Remarks/Examples:         Remarks/Examples:           Remarks/Examples:         Remarks/Examples:           Remarks/Examples:         Remarks/Examples:           Remarks/Examples:         Remarks/Examples:           Records the consequence of the losses of biodyneity due to catastrophic events, elimite charges, human activity, and the introduction of messive, non-active species.           SCIULIDATE         Remarks/Examples:           Records the consequence of the losses of biodyneity due to catastrophic events, elimite charges, human activity, and the introduction of messive, non-active species.           SCIULIDATE         Remarks/Examples:           Annually assessed on filledgy EOC. Also assesses <u>SCIULIDATE</u> Remarks/Examples:         Annually assessed on filledgy EOC. Also assesses <u>SCIULIDATE</u> Annually assessed on filledgy EOC. Also assesses <u>SCIULIDATE</u> Conduct systematic to sharps that lower the debutotion mergy of biodyneits in biological macromuleuse.           Conduct systematic to sharps that lower the debutotion mergy of biodyneits in biological macromuleuse.           Conduct systematic tobservations, Michaele and outcome (depondebut) type spectra. <td>SC.912.L.16.12:</td> <td></td>	SC.912.L.16.12:	
C 972.116.16. Describe the process of melosis. Including independent assortment and crossing over. Explain how reduction division results in the formation of hapic amore on scrooms. Compare and contrast mitrais and melosis and relate to the processes of social and assould reproduction and their consequences for genetic vertex  For 972.116.17. Remarks/Examples: Describe the characteristics of populations, such as number of individuals, ape structure. density, and pattern of distribution. Remarks/Examples: Parants/Streamples: Parants/Streamp	SC.912.L.16.14:	
Cr 0121_16.12.       Remarks/Examples: Immunity accessed on fillatory FDC. Also accesses <u>SC 0121_17.16.18 C 0121_17.14 SC 0121_16.16.5</u> SC 0121_17.1:       Remarks/Examples: Findia Standards Connections: MAFS.K12.MP.7.1 Look for and make use of structure. density, and pattern of distribution.         SC 0121_17.1:       Remarks/Examples: Findia Standards Connections: MAFS.K12.MP.7.1 Look for and make use of structure.         SC 0121_17.8:       Recorptice the consequences of the losses of biodiversity due to catastrophic events. climate changes, human activity, and the introduction of measlew, non-native species.         SC 0121_18.1:       Remarks/Examples: Annually accessed on Biology FDC. Also assesses <u>SC 0121_18.11</u> SC 0121_18.1:       Remarks/Examples: Annually assessed on Biology FDC. Also assesses <u>SC 0121_18.11</u> SC 0121_18.1:       Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the fallowing: 1. Pose questions about the natural work(A) (Alculuate the purpose of the investigation and identify the relevant scientific concepts).         2. Conduct systematic observations, (Wite procedures that are dere and replicable indentify the relevant scientific concepts).         3. Examine books and observations, conduct and record measurements at appropriate levide on generative and consistent observations; conduct and record measurements at appropriate levide or generative maxime relationships between test (independent) variable a medicable of precision. Follow safety guidelines).         3. Examine books and observations of informetation or see what is already follow safety guideline	SC.912.L.16.16:	Describe the process of meiosis, including independent assortment and crossing over. Explain how reduction division results in the formation of haploid
Annually assessed on Biology FOC. Also assesses <u>SC 912.1.16.15 SC 912.1.16.15</u> Biocuss the characteristics of populations, such as number of individuals, age structure, density, and pattern of distribution.  SC 912.1.17.1: Prevents/Examples: Provide Standards Connections: MAFS X12.MP.7. Look for and make use of structure.  SC 912.1.17.8: Prevents/Examples: Annually assessed on Biology FOC. Also assesses <u>SC 912.1.18.11</u> Bescribe the basic molecular structures and primary functions of the four major categories of biological macromolecules.  SC 912.1.18.1: Prevents/Examples: Annually assessed on Biology FOC. Also assesses <u>SC 912.1.18.11</u> Sc 912.1.18.11 Describe the basic molecular structures and primary functions of the four major categories of biological macromolecules.  Annually assessed on Biology FOC. Also assesses <u>SC 912.1.18.11</u> Sc 912.1.18.11 Describe the basic molecular structures and primary functions of the four major categories of biological macromolecules.  Annually assessed on Biology FOC. Also assesses <u>SC 912.1.18.11</u> Sc 912.1.18.11 Describe the basic molecular structures of the over the activation energy of biochemical reactions. Identify the relevant scientific concepts).  Conduct systematic observations, (White procedures that are clear and repictable. Identify the relevant scientific concepts).  Conduct systematic observations, (White procedures that are clear and repictable. Identify observations and the of maximum observations, (White procedures that need of prevision. Follow salety guidelines).  Examine books and other sources of information to see what is already known.  A Review what is known in light of empirical evidence, (Examine Whether available empirical evidence can be interpreted in terms of existing involvedge and models, and in nucledures, (Learnine Whether available and graphs), (Collect data or evidence in a organized way. Property use instruments, equipment, and materials (e.g., sales, probeware, meter statis, microacepies, computers) including se up, california to the exp		Compare and contrast mitosis and meiosis and relate to the processes of sexual and asexual reproduction and their consequences for genetic variation.
Sc. 912.L 17.1       Remarks/Examples: Liona Standards Connections: MAFS K12 MP.7: Look for and make use of structure.         Sc. 912.L 17.8.       Recognites the consequences of the losses of biodiversity due to catastrophic events, climate changes, human activity, and the infroduction of mastive, non-native spocies.         Sc. 912.L 18.1:       Remarks/Examples: Annually assessed on Biology EOC. Also assesses <u>SC 912.L 18.11</u> Sc. 912.L 18.11:       Remarks/Examples: Annually assessed on Biology EOC. Also assesses <u>SC 912.L 18.11</u> Sc. 912.L 18.11:       Explain the rate of enzymes as catalysts that lower the activation energy of biochemical reactions. Identify factors, such as pH and temperature, and their effect on enzyme activity.         Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. Pose questions about the natural world. (Articulate the purpose of their investigation andity the relevant scientific conception observations; conduct and record measumements at apportate levels of provide motiods for accurate and consistent observations; conduct and record measumements at apportate levels of provide motiods for accurate and consistent observations; conduct and record measumements at apportate levels of provide and bio mprical evidence can be interpreted in terms of existing knowledge and models, and if not, modify or develop new models).         5. Plan investigations, (Design and evaluet a scientific investigation). <ul> <li>Use tools tog atter, analyze, and interpret data (Initio inducts). Employ appropriate evides of and evidence in a organized way. Property los instruments, equipment, and materistals (e.g., scales, probeware, meter st</li></ul>	<u>SC.912.L.16.17:</u>	
Fordia Standards Connections: MARS.K12.MP.7: Losk for and make use of structure.         Sc.912.L17.8:       Recognize the consequences of the losses of biodiversity due to catastrophic events, climate changes, human activity, and the introduction of investive, non-halve species.         Sc.912.L18.11:       Remarks/Examples:         Annually assessed on Biology EOC. Also assesses <u>SC.912.L18.11.</u> Sc.912.L18.11:       Explain the role of enzymes as catalysts that lower the activation energy of biochemical reactions. Identify factors, such as pH and temperature, and their effect on enzyme activity.         Define a problem based on a specific. body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following:         1. Pose questions about the natural world, (Ariculate the purpose of the investigation and identify the relevant scientific concepts).         2. Conduct systematic observations, (Write procedures that are clear and replicable. Identify observables and examine relationships between test (independent) variable and outcome (dependent) variable active science in and other sources of information to see what is already known,         4. Review what is known in light of empirical evidence, (Examine whother available empirical evidence can be interpreted in terms of existing knowledge and models, and if not, modify or develop new models).         5. Plan investigations, (Design and evaluate a scientific investigation).         6. Use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical represension (including the data cables and grap		Discuss the characteristics of populations, such as number of individuals, age structure, density, and pattern of distribution.
Sci. 012.1.18         Investment         Investment           SC. 912.1.18.1:         Describe the basic molecular structures and primary functions of the four major categories of biological macromolecules.           SC. 912.1.18.1:         Remarks/Examples: Annually assessed on Biology EOC. Also assesses <u>SC. 912.1.18.11</u> .           SC. 912.1.18.11:         Explain the role of enzymes as catalysis that lower the activation energy of biochemical reactions. Identify factors, such as pif and temperature, and their effect on enzyme activity.           Define a problem basid on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. Pose questions about the natural world, (Articulate the purpose of the investigation and identify the relevant scientific concepts).           2. Conduct systematic observations, (Write procedures that are clear and replicable. Identify boservables and assume relationships between test (independent) variable and outcome (dependent) variable. Employ appropriate methods for accurate and consistent observations; conduct and record measurements at appropriate levels of precision. Follow safety guidelines).           3. Examine books and other sources of information to see what is already known,           4. Review what is known in light of empirical evidence, (Examine whether available empirical evidence can be interpreted in terms of existing knowledge and models, and if not, modify or develop new models).           5. Plan investigations, (Design and evaluate a scientific investigation).         6. Benerate explanations, or descriptions of events,           8. Generate explanations that explicate or descriptions of eve	<u>SC.912.L.17.1:</u>	
Describe the basic molecular structures and primary functions of the four major categories of biological macromolecules.         Sci. 912.1.18.1:       Remarks/Examples: Annually assesses and biology EOC. Also assesses <u>50</u> , 912.1.18.1.1.         Sci. 912.1.18.11:       Explain the role of enzymes as catalysts that lower the activation energy of biochemical reactions. Identify factors, such as pH and temperature, and there defect on enzyme activity.         Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earthyspace science, and do the following: 1. Pose questions about the natural world. (Africulate the purpose of the investigation and identify the relevant scientific concepts), 2. Conduct systematic observations, (Write procedures that are clear and replicable. Identify boservables and examine relationships between test (independent) variable and outcome (dependent) variable. Employ appropriate methods for accurate and consistent observations; conduct and record measurements at appropriate loved of precision. Follow safety guidelines).         3. Examine books and other sources of information to see what is already known, 4. Review what is known in light of empirical evidence, (Examine whether available empirical evidence can be interpreted in terms of existing knowledge and models, and if not, modify or develop new models).         5. Plan investigations, (Design and evaluate a scientific investigation).          bus closs tog ather, analyze, and interpret atil. (this includes the use of masurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), (Collect data or evidence in a cryanized way. Property	SC.912.1.17.8:	
SC.912.1.18.1:  Remarks/Examples: Annually assessed on Biology EOC. Also assesses <u>SC.912.1.18.11</u> .  Sc.912.1.18.11:  Sc.912.1.12: Sc.912.1.12: Sc.912.1.18.11: Sc.912.1.12: Sc.912.1.13. Translate quantitative rot technical information expressed in words: a sequence on the sc.  Sc.912.1.11: Sc.912.1.12: Sc.912.		
Amually assessed on Biology EOC. Also assesses <u>SC 912.1.18.11.</u> SC 912.1.18.11:       Explain the role of enzymes as catalysts that lower the activation energy of biochemical reactions. Identify factors, such as pH and temperature, and their effect on enzyme activity.         Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following:         1. Pose questions about the natural world, (Articulate the purpose of the investigation and identify the relevant scientific concepts).         2. Conduct systematic observations; (Write procedures that are clear and repicable. Identify observables and examine relationships between test (independent) variable and outcome (dependent) variable. Employ appropriate methods for accurate and consistent observations; conduct and record measurements at appropriate levels of precision. Follow safety guidelines).         3. Examine books and other sources of information to see what is already known,         4. Review what is known in light of empirical evidence, (Examine whether available empirical evidence can be interpreted in terms of existing knowledge and models, and if not, modify or develop new models).         5. Plan investigations, (Design and evaluate a scientific investigation).         6. Use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation, echnique, maintenance, and storage).         7. Pose answers, explanations, or descriptions of events,         8. Generate explanations that exploritions of events,         8. Generate explanations that explicate or descriptions of eve		
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	<u>sc.912.N.1.1:</u>	

	LAFS.910.WHST.3.9 Draw evidence from informational texts to support analysis, reflection, and research.
	LAFS.1112.RST.1.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
	LAFS.1112.RST.1.3 Follow precisely a complex multistep procedure when carrying out <u>experiments</u> , taking measurements, or performing technical tasks analyze the specific results based on explanations in the text.
	LAFS.1112.RST.3.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
	LAFS.1112.WHST.1.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
	LAFS.1112.WHST.3.9 Draw evidence from informational texts to support analysis, reflection, and research.
	Florida Standards Connections for Mathematical Practices
	<ul> <li>MAFS.K12.MP.1: Make sense of problems and persevere in solving them.</li> <li>MAFS.K12.MP.2: Reason abstractly and quantitatively.</li> <li>MAFS.K12.MP.3: Construct viable arguments and critique the reasoning of others. [Viable arguments include evidence.]</li> <li>MAFS.K12.MP.4: Model with mathematics.</li> <li>MAFS.K12.MP.5: Use appropriate tools strategically.</li> <li>MAFS.K12.MP.6: Attend to precision.</li> <li>MAFS.K12.MP.7: Look for and make use of structure.</li> <li>MAFS.K12.MP.8: Look for and express regularity in repeated reasoning.</li> </ul>
	Describe and explain what characterizes science and its methods.
<u>SC.912.N.1.2:</u>	Remarks/Examples: Science is characterized by empirical <u>observations</u> , testable questions, formation of <u>hypotheses</u> , and experimentation that results in stable and replicable results, logical reasoning, and coherent theoretical constructs.
	Florida Standards Connections: MAFS.K12.MP.3: Construct viable arguments and critique the reasoning of others.
	Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).
<u>SC.912.N.2.1:</u>	Remarks/Examples: Science is the systematic and organized inquiry that is derived from <u>observations</u> and experimentation that can be verified or tested by further <u>investigation</u> to explain natural phenomena (e.g. Science is testable, pseudo-science is not science seeks falsifications, pseudo-science seeks confirmations.)
	Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as questions addressed by other ways of knowing, such as art, philosophy, and religion.
<u>SC.912.N.2.2:</u>	Remarks/Examples: Identify scientific questions that can be disproved by experimentation/testing. Recognize that pseudoscience is a claim, belief, or practice which is presented as scientific, but does not adhere to strict standards of science (e.g. controlled <u>variables</u> , sample size, replicability, empirical and measurable evidence, and the concept of falsification).
	Florida Standards Connections: MAFS.K12.MP.3: Construct viable arguments and critique the reasoning of others.
	Describe the function of models in science, and identify the wide range of models used in science.
<u>SC.912.N.3.5:</u>	Remarks/Examples: Describe how models are used by scientists to explain <u>observations</u> of nature.
	Florida Standards Connections: MAFS.K12.MP.4: Model with mathematics.
	Explain how various factors, such as concentration, temperature, and presence of a catalyst affect the rate of a chemical reaction.
<u>SC.912.P.12.12:</u>	Remarks/Examples: Various factors could include: temperature, pressure, solvent and/or solute <u>concentration</u> , sterics, surface area, and <u>catalysts</u> . The rate of reaction is determined by the <u>activation energy</u> , and the pathway of the reaction can be shorter in the presence of <u>enzymes</u> or <u>catalysts</u> . Examples may include: decomposition of hydrogen peroxide using manganese (IV) oxide nitration of benzene using concentrated sulfuric <u>acid</u> hydrogenation of a C=C double bond using nickel.
LAFS.1112.RST.1.1:	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LAFS.1112.RST.1.2:	Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.
LAFS.1112.RST.1.3:	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LAFS.1112.RST.2.4:	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 11–12 texts and topics.
LAFS.1112.RST.2.5:	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.
LAFS.1112.RST.2.6:	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.
LAFS.1112.RST.3.7:	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LAFS.1112.RST.3.8:	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.
LAFS.1112.RST.3.9:	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

LAFS.1112.RST.4.10:	By the end of grade 12, read and comprehend science/technical texts in the grades 11–12 text complexity band independently and proficiently.
	Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 11– 12 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.
	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.
	b. Work with peers to promote civil, democratic discussions and decision-making, set clear goals and deadlines, and establish individual roles as
LAFS.1112.SL.1.1:	needed.
	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.
	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.
LAFS.1112.SL.1.2:	Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed
	decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data.
LAFS.1112.SL.1.3:	Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, assessing the stance, premises, links among ideas, word choice, points of emphasis, and tone used.
LAFS.1112.SL.2.4:	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,
LIN 0.1112.0L.2.1.	and a range of formal and informal tasks.
LAFS.1112.SL.2.5:	Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of
LAI 3.1112.32.2.3.	findings, reasoning, and evidence and to add interest.
	Write arguments focused on discipline-specific content. a. Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and
	a. Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) non-alternate of opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence.
	b. Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and evidence for each while pointing out the strengths
	and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience's knowledge level, concerns,
LAFS.1112.WHST.1.1:	values, and possible biases.
	c. 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.
	d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.
	e. Provide a concluding statement or section that follows from or supports the argument presented.
	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
	a. Introduce a topic and 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 when useful to aiding comprehension.
	b. 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.
LAFS.1112.WHST.1.2:	c. Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among complex
	ideas and concepts. d. Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic;
	convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.
	e. Provide a concluding statement or section that follows from and supports the information or explanation provided (e.g., articulating implications or
	the significance of the topic).
LAFS.1112.WHST.2.4:	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
LAFS.1112.WHST.2.5:	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most
<u>En 0.1112.wn01.2.0.</u>	significant for a specific purpose and audience.
LAFS.1112.WHST.2.6:	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.
LAFS.1112.WHST.3.7:	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and
LAFS.1112.WHST.3.8:	limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of
	ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.
LAFS.1112.WHST.3.9:	Draw evidence from informational texts to support analysis, reflection, and research.
LAFS.1112.WHST.4.10:	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.
	For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch
MAFS.912.F-IF.2.4:	graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing,
	decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity. ★
	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
	*
	a. Graph linear and quadratic functions and show intercepts, maxima, and minima.
MAFS.912.F-IF.3.7:	b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.
	c. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.
	<ul> <li>Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.</li> <li>Graph exponential and logarithmic functions, showing intercents and end behavior, and trigonometric functions, showing period, midline, and</li> </ul>
	e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude, and using phase shift.
MAFS.912.G-MG.1.2:	Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot). *
MAFS.912.N-Q.1.1:	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. $\star$

MAFS.912.N-Q.1.3:	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. ★
MAFS.912.S-IC.2.6:	Evaluate reports based on data. ★
	Represent data with plots on the real number line (dot plots, histograms, and box plots). ★
MAFS.912.S-ID.1.1:	Remarks/Examples: In grades 6 – 8, students describe center and spread in a data distribution. Here they choose a summary statistic appropriate to the characteristics of the data distribution, such as the shape of the distribution or the existence of extreme data points.
	Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets. ★
MAFS.912.S-ID.1.2:	Remarks/Examples: In grades 6 – 8, students describe center and spread in a data distribution. Here they choose a summary statistic appropriate to the characteristics of the data distribution, such as the shape of the distribution or the existence of extreme data points.
	Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers). 🖈
MAFS.912.S-ID.1.3:	Remarks/Examples: In grades 6 – 8, students describe center and spread in a data distribution. Here they choose a summary statistic appropriate to the characteristics of the data distribution, such as the shape of the distribution or the existence of extreme data points.
MAFS.912.S-ID.1.4:	Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve. $\star$
MAFS.912.S-ID.2.5:	Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data. ★
MAFS.912.S-ID.2.6:	<ul> <li>Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. ★</li> <li>a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, and exponential models.</li> <li>b. Informally assess the fit of a function by plotting and analyzing residuals.</li> <li>c. Fit a linear function for a scatter plot that suggests a linear association.</li> </ul>
	Remarks/Examples: Students take a more sophisticated look at using a linear function to model the relationship between two numerical variables. In addition to fitting a line to data, students assess how well the model fits by analyzing residuals.
ELD.K12.ELL.SC.1:	English language learners communicate information, ideas and concepts necessary for academic success in the content area of Science.
ELD.K12.ELL.SI.1:	English language learners communicate for social and instructional purposes within the school setting.
	Evaluate how environment and personal health are interrelated.
HE.912.C.1.3:	Remarks/Examples: Food options within a community; prenatal-care services; availability of recreational facilities; air quality; weather-safety awareness; and weather, air, and water conditions.
	Analyze how heredity and family history can impact personal health.
<u>HE.912.C.1.7:</u>	Remarks/Examples: Drug use, family obesity, heart disease, mental health, and non-communicable illness or disease.

## **Related Certifications**

Science (Secondary Grades 7-12)	
Biology (Grades 6-12)	

There are more than 1106 related instructional/educational resources available for this on CPALMS. Click on the following link to access them: <u>http://www.cpalms.org/Public/PreviewCourse/Preview/13099</u>