FLORIDA DEPARTMENT OF EDUCATION
fldoe.org

Secondary Science Webinar

PJ Duncan, Secondary Science Specialist

Ashley Palelis, Computer Science Specialist

Bureau of Standards & Instructional Support

Webinar

- Everyone is muted
- Webinar is being recorded
- Questions: type in the question box
- If you are having trouble hearing the audio, please call (646) 307-1716 and enter
  - access code: 627-284-826

Desired Outcomes

By the end of this webinar, participants will be able to:

- Effectively utilize the CPALMS website.
- Understand the supportive relationship of science standards throughout elementary, middle and high school.
- Discover resources for the effective teaching of genetics in secondary science.

Poll

- Let’s answer a poll question!

CPALMS

- Training by Ashley

Test Item Specifications

- Grade 08 Statewide Science Assessment
- Biology End-of-Course Assessment

Middle Grades Science Standard SC.7.L.16.1

Understand and explain that every organism requires a set of instructions that specifies its traits, that this hereditary information (DNA) contains genes located in the chromosomes of each cell, and that heredity is the passage of these instructions from one generation to another.

Also Assesses

SC.7.L.16.2 Determine the probabilities for genotype and phenotype combinations using Punnett Squares and pedigrees.

SC.7.L.16.3 Compare and contrast the general processes of sexual reproduction requiring meiosis and asexual reproduction requiring mitosis.

Prior Knowledge:

SC.4.L.16.1

Identify processes of sexual reproduction in flowering plants, including pollination, fertilization (seed production), seed dispersal, and germination.

SC.4.L.16.2

Explain that although characteristics of plants and animals are inherited, some characteristics can be affected by the environment.

SC.4.L.16.3

Recognize that animal behaviors may be shaped by heredity and learning.

Clarification :

Students will describe and/or explain that every organism requires a set of instructions that specifies its traits.

Students will identify and/or explain that hereditary information (DNA) contains genes located in the chromosomes of each cell and/or that heredity is the passage of these instructions from one generation to another.

Students will use Punnett squares and pedigrees to determine genotypic and phenotypic probabilities.

Students will compare and/or contrast general processes of sexual and asexual reproduction that result in the passage of hereditary information from one generation to another.

Content Limits :

Items may assess the general concepts of mitosis and meiosis but will not assess the phases of mitosis or meiosis. Items will not use the terms haploid or diploid.

Items referring to sexual reproduction will not address human reproduction.

Items addressing Punnett squares or pedigrees will only assess dominant and recessive traits.

Items addressing pedigrees are limited to assessing the probability of a genotype or phenotype of a single individual. Items may require the identification of parental genotypes that result in certain genotypic or phenotypic probabilities in offspring.

Items will not assess incomplete dominance, sex-linked traits, polygenic traits, multiple alleles, or codominance.

Items addressing Punnett squares are limited to the P and F1 generations.

Items will not assess mutation.

Items will not address or assess the stages of meiosis, fertilization, or zygote formation.

Items will not address or assess human genetic disorders or diseases.

3 Access Points

Independent

SC.7.L.16.In.1: Explain that some characteristics are passed from parent to child (inherited).

Supported

SC.7.L.16.Su.1: Recognize that offspring have similar characteristics to parents.

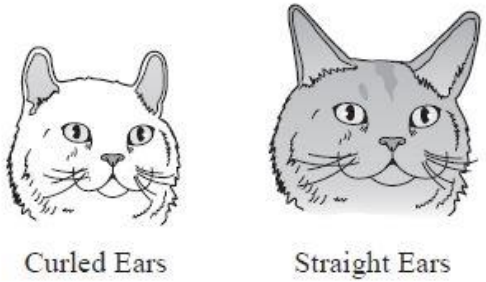
Participatory

SC.7.L.16.Pa.1: Recognize a characteristic passed from parents to self, such as eye color.

SAMPLE TEST ITEMS (1)

Test Item #: Sample Item 1

Question: The gene for curled ears (C) is dominant over the gene for straight ears (c). The picture below shows a cat with curled ears (Cc) and a cat with straight ears (cc).



Curled Ears

Straight Ears

What percent of the offspring are expected to have curled ears as a result of a cross between the cats shown?

Answer Options:

A. 100

B. 75

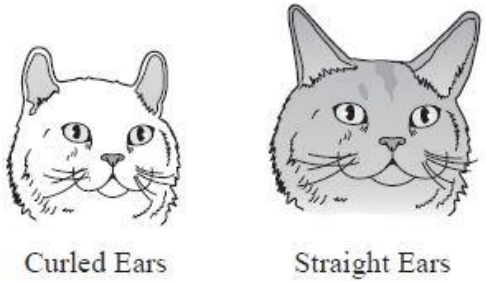
C. 50

D. 25

SAMPLE TEST ITEMS (1)

Test Item #: Sample Item 1

Question: The gene for curled ears (C) is dominant over the gene for straight ears (c). The picture below shows a cat with curled ears (Cc) and a cat with straight ears (cc).



Curled Ears

Straight Ears

What percent of the offspring are expected to have curled ears as a result of a cross between the cats shown?

Answer Options:

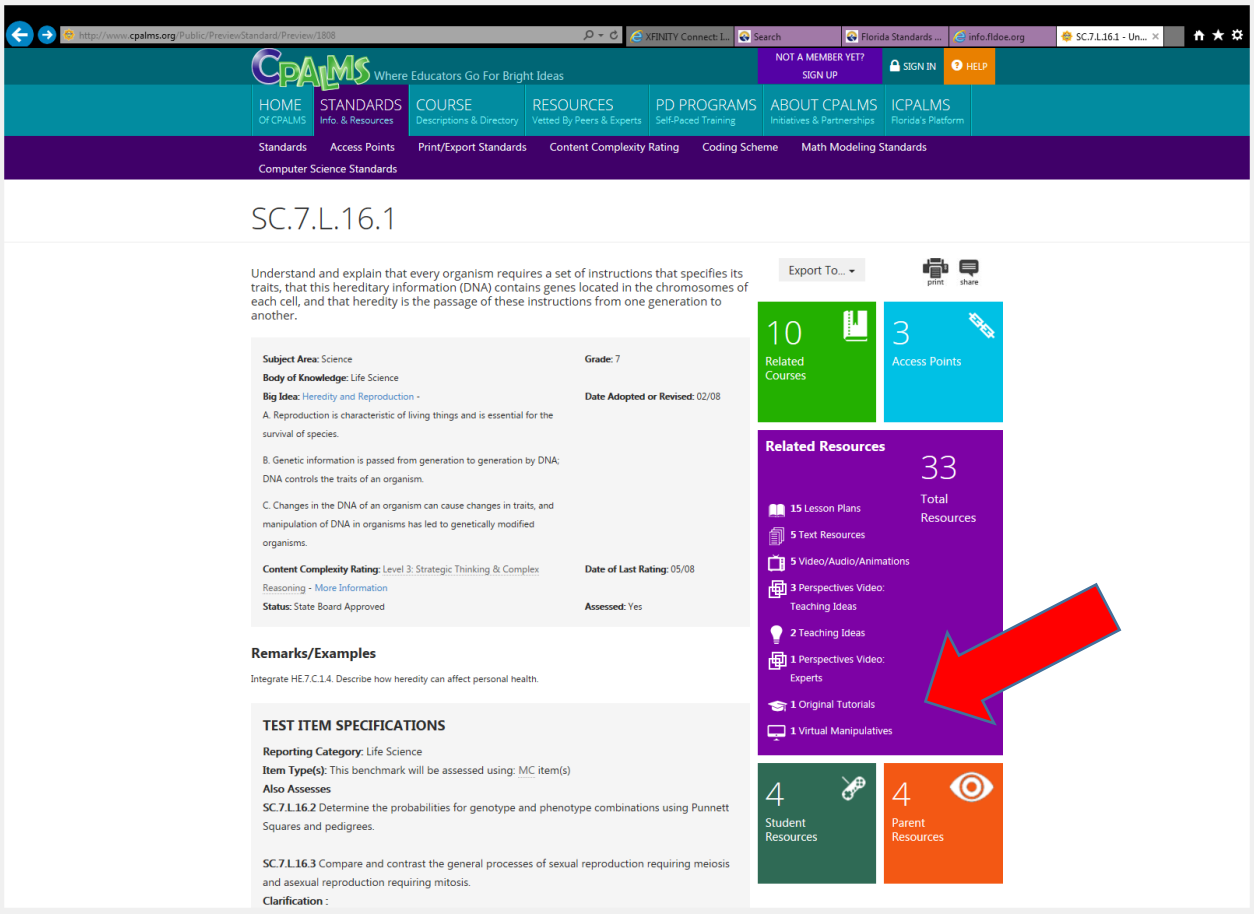
A. 100

B. 75

C. 50 Correct

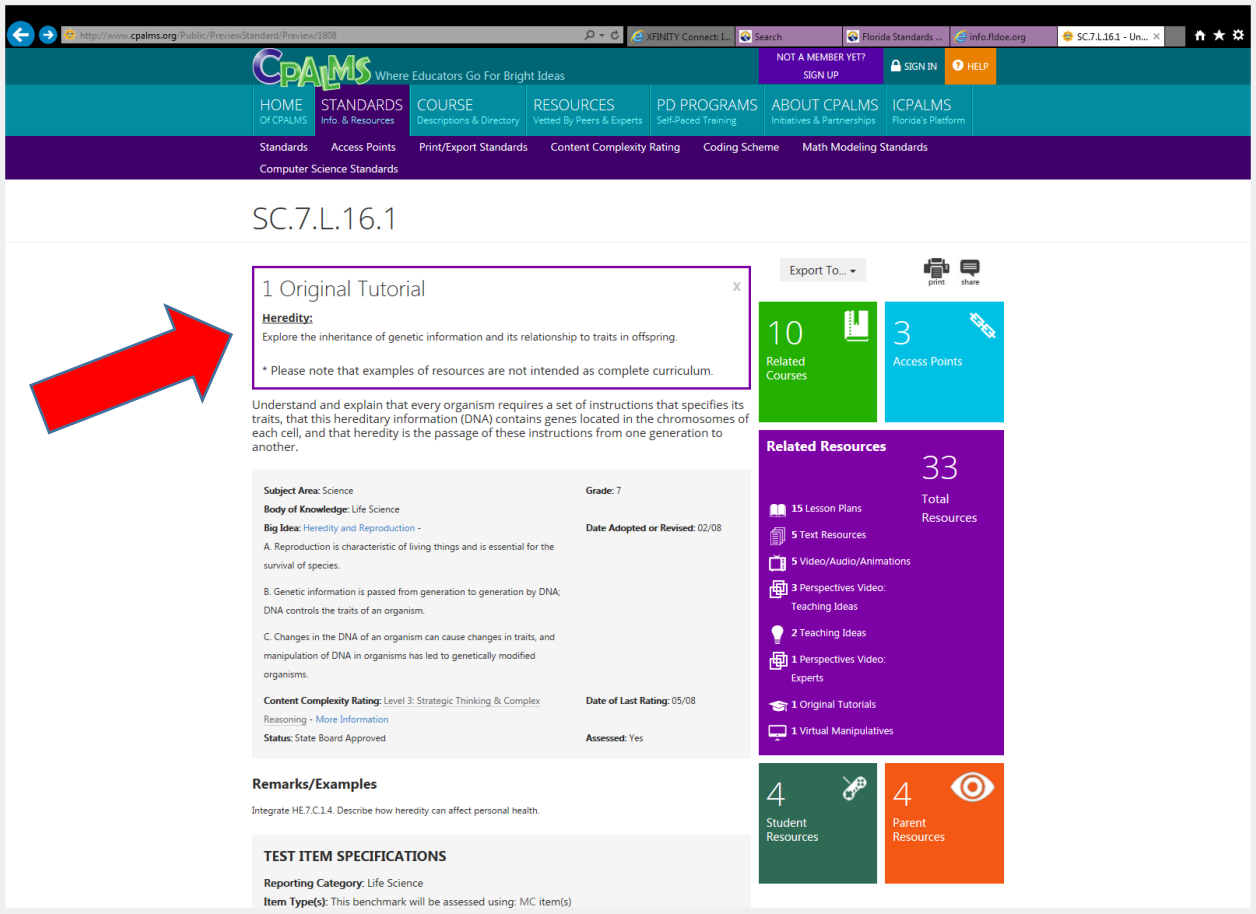
D. 25

Related Resources

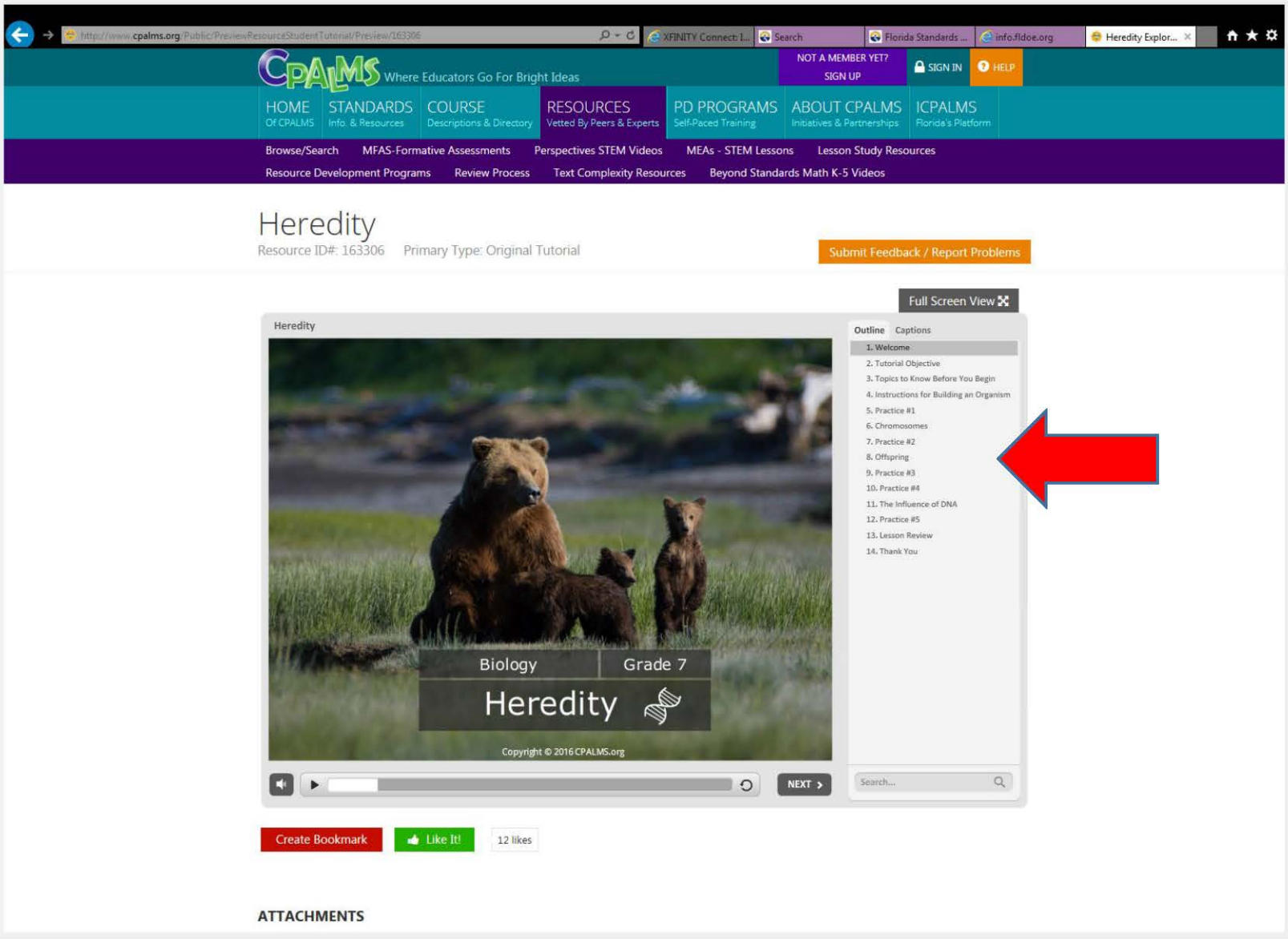


www.FLDOE.org

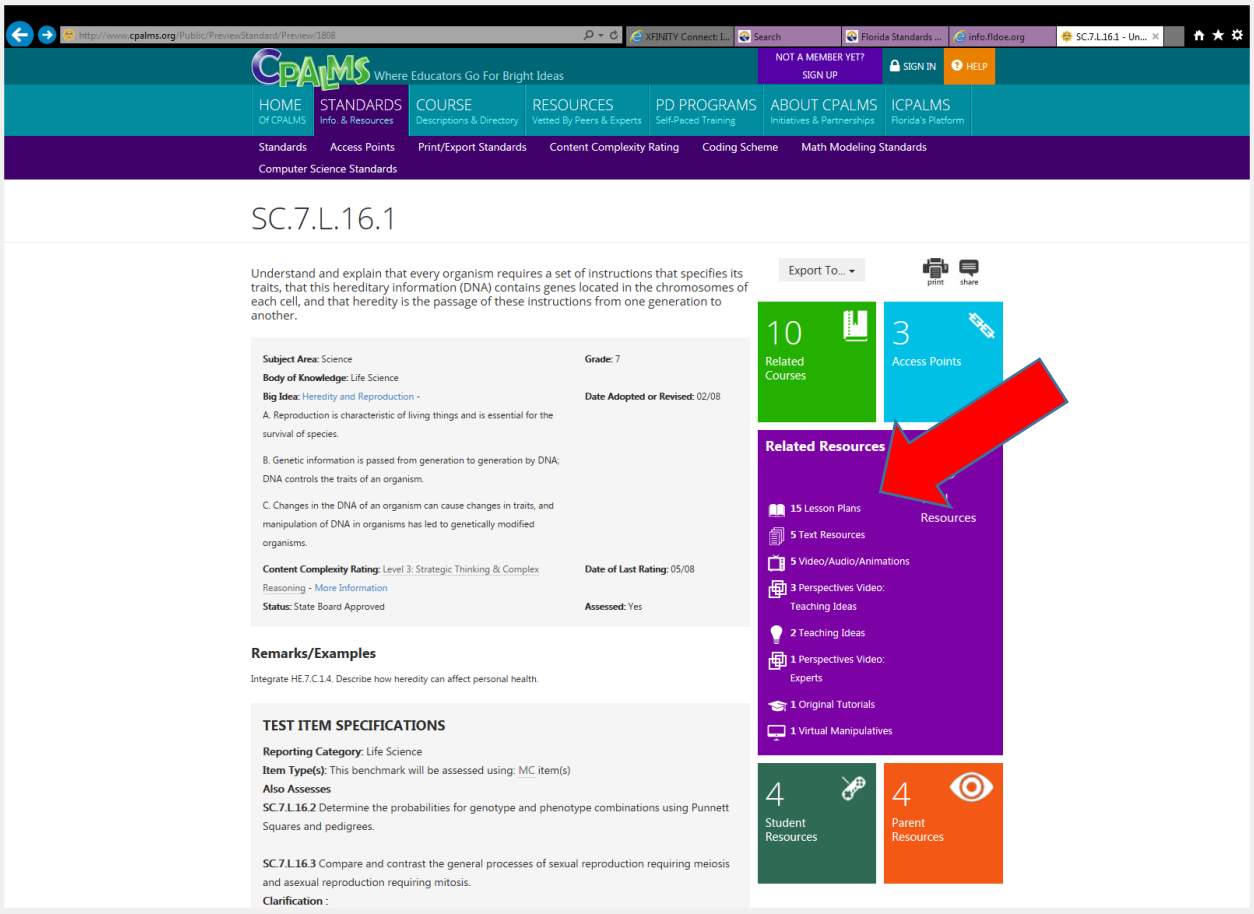
Original Tutorials



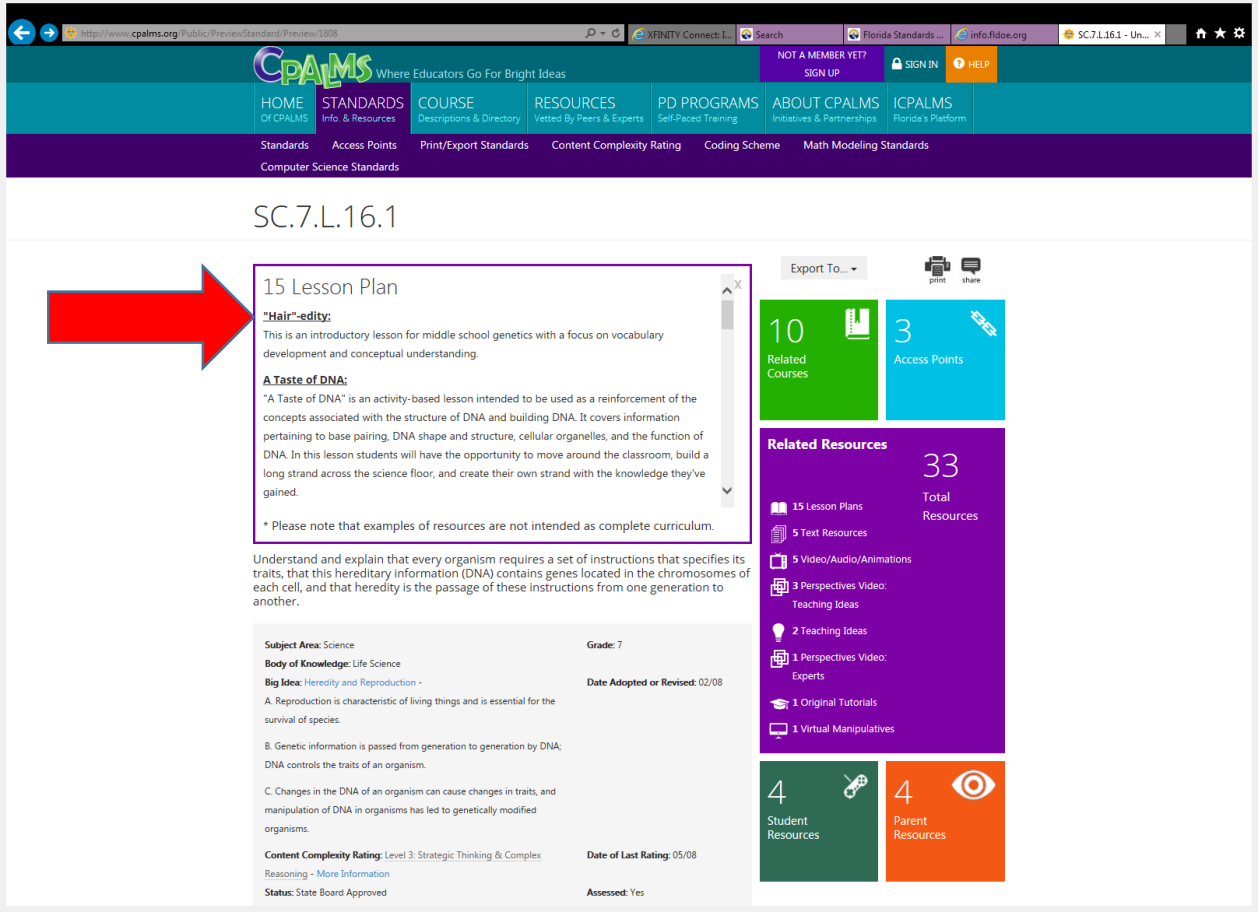
www.FLDOE.org



Related Resources



Lesson Plans



www.FLDOE.org

Resources
SC.7.L.16.1

"Hair"-edity

http://www.cpalms.org/Public/PreviewResourceLesson/Preview/128896

This is an introductory lesson for middle school genetics with a focus on vocabulary development and conceptual understanding.

Resources
SC.7.L.16.1

A Taste of DNA

http://www.cpalms.org/Public/PreviewResourceLesson/Preview/75955

"A Taste of DNA" is an activity-based lesson intended to be used as a reinforcement of the concepts associated with the structure of DNA and building DNA. It covers information pertaining to base pairing, DNA shape and structure, cellular organelles, and the function of DNA. In this lesson students will have the opportunity to move around the classroom, build a long strand across the science floor, and create their own strand with the knowledge they've gained.

Middle Grades Life Science Standards Support Biology

SC.912.L.16.1

Use Mendel's laws of segregation and independent assortment to analyze patterns of inheritance.

Items may require the student to apply scientific knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge of **SC.7.L.16.1** and **SC.7.L.16.2**.

Annually assessed on Biology EOC

Also Assesses SC.912.L.16.2

Discuss observed inheritance patterns caused by various modes of inheritance, including dominant, recessive, codominant, sex-linked, polygenic, and multiple alleles.

SC.912.L.16.1 – Clarification

Students will use Mendel's laws of segregation and independent assortment to analyze patterns of inheritance.

Students will identify, analyze, and/or predict inheritance patterns caused by various modes of inheritance.

SC.912.L.15.6 – Content Limits

Items referring to general dominant and recessive traits may address but will not assess the P and F1 generations.

Items addressing dihybrid crosses or patterns that include codominance, incomplete dominance, multiple alleles, sex-linkage, or polygenic inheritance may assess the P and F1 generations.

3 Access Points

Independent

SC.912.L.16.In.1: Identify that genes are sets of instructions that determine which characteristics are passed from parent to offspring.

Supported

SC.912.L.16.Su.1: Recognize characteristics (traits) that offspring inherit from parents.

Participatory

SC.912.L.16.Pa.1: Recognize similar characteristics (traits) between a child and parents, such as hair, eye, and skin color, or height.

SAMPLE TEST ITEMS (1)

Question: Hemophilia is a sex-linked, recessive trait. Which of the following describes the probability of hemophilia in the offspring of a man who does not have hemophilia and a woman who is a heterozygous carrier?

Answer Options:

A. There is a 100% chance that their sons will have hemophilia.

B. There is a 0% chance that their daughters will have hemophilia.

C. There is a 25% chance that their sons will have hemophilia.

D. There is a 50% chance that their daughters will have hemophilia.

SAMPLE TEST ITEMS (1)

Question: Hemophilia is a sex-linked, recessive trait. Which of the following describes the probability of hemophilia in the offspring of a man who does not have hemophilia and a woman who is a heterozygous carrier?

Answer Options:

A. There is a 100% chance that their sons will have hemophilia.

B. There is a 0% chance that their daughters will have hemophilia. Correct

C. There is a 25% chance that their sons will have hemophilia.

D. There is a 50% chance that their daughters will have hemophilia.

Resources
SC.912.L.16.1

Dragon Genetics

http://www.cpalms.org/Public/PreviewResourceUrl/Preview/29008

In this lab, Dragon Genetics: Principles of Mendelian Genetics, students learn the principles of Mendelian genetics by using Popsicle sticks, each of which represents a pair of homologous chromosomes with multiple genetic traits. Pairs of students use their sets of Popsicle sticks to represent a mating and then identify the genetic makeup and phenotypic traits of the resulting baby dragon.

Resources
SC.912.L.16.1

Genetics, Genetics, and More Genetics

http://www.cpalms.org/Public/PreviewResourceUrl/Preview/155648

Students will use appropriate tools (Punnett squares) and techniques to gather, analyze, and interpret data. Students will explore various modes of inheritance through a hands-on activity creating offspring of a fictitious organism. Students will complete Punnett Squares for various genetic crosses, and analyze and interpret the results of those crosses. Students will be able to predict the genotype and phenotype of P1 and F1 generations using Punnett Squares. Students will be able to identify complex patterns of inheritance such as co-dominance and incomplete dominance.

Toolkits

- Biology Toolkit
- Middle Grades Toolkit coming soon

- www.fldoe.org and search for biology toolkit

Secondary Science Webinars

Topic for February: Environmental Education

Topic for March: Authentic Art Instruction in Science

For more information contact PJ Duncan
Patricia.Duncan@fldoe.org

Thank you

- If you have ideas for upcoming webinars, please contact PJ at Patricia.Duncan@fldoe.org or (850) 245-0808.
- Recorded webinars will available on our website.