HMH SCIENCE DIMENSIONS 2018 Alignment TEMPLATE

GRADE 7

EPSD Unit 3: Inheritance and Variation of Traits First Marking Period

Overview: Students develop and use models to describe how gene mutations and sexual reproduction contribute to genetic variation. They also demonstrate understanding of the genetic implications of sexual and asexual reproduction. Students use data and conceptual models to understand how the environment and genetic factors determine the growth of an individual organism. They connect this idea to the role of animal behaviors in animal reproduction and to the dependence of some plants on animal behaviors for their reproduction. Students provide evidence to support their understanding of the structures and behaviors that increase the likelihood of successful reproduction by organisms. The crosscutting concepts of cause and effect and structure and function provide a framework for understanding how gene structure determines differences in the functioning of organisms. Students are expected to demonstrate proficiency in analyzing and interpreting data, using models, conducting investigations, and communicating information. Students are also expected to use these practices to demonstrate understanding of the core ideas.

Standards: (MS-LS3-1) Develop and use a model to describe why structural changes to

Instructional Days: 20-25

HMH Science Dimensions Program Resources Module B

Unit 3: Reproduction, Heredity, and Growth

Unit Video (a male bird of paradise attracts a female bird); Why it Matters p. 122; Unit Starter p. 123; Vocabulary p. 123I; Unit Project p. 123K; Unit Connections p. 196; Unit Review pp. 197-200; Unit Performance Task pp. 201-202

Standard for all Units: (D) Interactive Multilingual Glossary; (D/P) Unit Pretest; (D) Lesson Quizzes; (D/P) Unit Test

Note: Refer to the Curriculum Alignment Common Language (CACL) Guide to decipher acronyms.

Lesson 1: Inheritance pp. 124-139	Lesson 2: Asexual and Sexual Reproduction pp. 140-155	Lesson 3: Plant Reproduction and Growth pp. 156- 175	Lesson 4: Animal Reproduction and Growth pp. 176- 195
D/P – WIM			
Questions p. 122	D/P- WIM	D/P- WIM	D/P- WIM
	Questions p. 122	Questions p. 122	Questions p. 122
D/P- CYEI (digital			
picture) How did	D/P- CYEI (digital	D/P- CYEI (digital	D/P- CYEI (digital
these kittens get	picture) Why is the	picture) How does	picture) Why are
their fur colors? p.	Cavendish banana	the structure of the	these male zebras
125	in danger of	sacred lotus flower	fighting? p. 177
	extinction? p. 141	relate to	
P- ENB (prompt)		reproduction? p.	P- ENB (prompt)
Gather evidence to		157	Gather evidence

HMH SCIENCE DIMENSIONS 2018 Alignment TEMPLATE

genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism. (MS-LS3-2) Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation. All from above plus: (MS-LS1-4) Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively. (MS-LS1-5) Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.

Objective 1: Students will: Develop and use a model to describe why asexual reproduction results in offspring with identical genetic

help explain how kittens got their fur color. p. 125 D/P- LS Construct an Explanation of Trait Inheritance (Students explain how Mendel's data supported his hypothesis and support their answer by citing evidence from the lesson. Students also explain which trait is recessive when Mendel crossed a truebreeding plant with yellow peas with a true-breeding plant with green peas and all first generation offspring had yellow peas.) p. 127 D/P- HOL Activity Model Genes and **Traits (Students** model how genetic variation can be influenced by

P- ENB (prompt) Gather evidence to help explain why the Cavendish banana is facing extinction. p. 141 P- ENB (prompt) Banana plants grown for food crops are the result of asexual reproduction. Does the genetic information of each plant come from one or two parents? Students record evidence. p. 143 D/P- ENGIT Develop a Hybrid (A rose farmer needs to grow plants that produce orange flowers in the colder, fall months; students describe how the farmer might try to produce this hybrid.) p. 144

P- ENB (prompt) Gather evidence to help explain the function of the sacred lotus flower. p. 157 P- ENB (prompt) The sacred lotus flower has a large seedpod that eventually dries out and causes the flower to bend over; students identify how they think the sacred lotus flower's seeds are dispersed and record their evidence in their ENB. p. 161 D/P- LS Construct an Argument (Students use evidence to construct an argument for why producing seeds might be more advantageous than not producing

to help explain why male zebras fight with each other. p. 177 P- ENB (prompt) What type of animal is the zebra? Students also identify if they think the zebra reproduces asexually or sexually. p. 180 D/P- LS Evaluate Reproductive **Strategies** (Students cite evidence from the text to explain how using both types of reproduction influences the distribution of aggregating anemone populations.) p. 181 D/P- Courtship **Behaviors** (Students watch video to see a

HMH SCIENCE DIMENSIONS 2018 Alignment TEMPLATE

information. Develop and use a model to describe why sexual reproduction results in offspring with genetic variation.

Objective 2: Students will: Use models such as Punnett squares, diagrams, and simulations to describe the cause-and effect-relationship of gene transmission from parent(s) to offspring and resulting genetic variation. Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.

Objective 3: Students will: Identify and describe possible cause-and effect relationships affecting the reproductive success of plants and animals using probability. Support or refute an explanation of how characteristic animal behaviors and specialized plant structures affect the probability of successful plant reproduction using oral and written arguments. Use evidence from experiments and other scientific reasoning to support oral and written explanations of how environmental and genetic factors influence the growth of organisms.

Topic 1: Cell Division (mitosis/meiosis); DNA; Cancer; Mendel's Work; Probability and Heredity; Chromosomes; Mutation; Genetic Disorders; and

environmental factors, using a hypothetical fish species; students use evidence to predict, over several generations, the proportions of dominant and recessive alleles in the population.) pp. 130-131 P- ENB (prompt) Students think about the different phenotypes of fish scale color in the lab and the phenotypes of fur color in the kittens at the beginning of the lesson. Students use evidence from the lab to explain why all of the kittens do not have the same fur color, even though they have

D/P- DTM Calculate the Rate of Asexual Reproduction (Students assess the growth of bacteria based on their rate of reproduction; students use data in the table to make a graph of the change in the number of bacteria over time.) p. 146 D/P- HOL Activity Model Asexual and Sexual Reproduction (Students model asexual and sexual reproduction and use predictions of genotypes ad phenotypes to determine the relationship between each type of reproduction and genetic

seeds to the reproductive success of a plant species.) p. 162 D/P- Analyzing the Reproductive Success of Flowering Plants (Students watch video of the hawk moth visiting a flower and explore online to learn more about pollination in flowering plants.) pp. 163-164 D/P- HOL Activity **Investigate Flower Structures** (Students dissect a flower and record drawings of the structures they discover.) pp. 165-166 P- ENB (prompt) The sacred lotus flower is pollinated by bees and

male manakin "moonwalk" across a branch to impress a mate) p. 182 P- ENB (prompt) Is the fighting behavior of the zebras a courtship behavior or a parenting behavior? How might this behavior affect the reproductive success of the male zebra? Students record their evidence in the ENB. p. 183 D/P- DTM Analyze Female Mate Choice (Students analyze data in a graph to explain mate choices of female guppies.) p. 185 D/P- ENGIT **Explain Trait**

HMH SCIENCE DIMENSIONS 2018 Alignment TEMPLATE

Twenty-First Century Themes and Skills (TFCTS) to include: The Four C's, Life and Career Skills, and Information, Media, and ITC Literacy

Topic 2: Probability of Successful Reproduction; Environmental Effects and TFCTS

Essential Questions: Why do kids look similar to their parents? How do asexual reproduction and sexual reproduction affect the genetic variation of offspring? How do structural changes to genes (mutations) located on chromosomes affect proteins or affect the structure and function of an organism? What influences the growth and development of an organism? How do characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants, respectively? How do environmental and genetic factors influence the growth of organisms?

the same parents.) p. 131 D/P- ENGIT (From three choices, students select the process that would allow the horticulturist to grow only purpleflowered plants in the shortest amount of time.) p. 132 P- ENB (prompt) Many traits, such as fur color, are determined by more than one gene. How might the influence of multiple genes affect the number of possible phenotypes for fur color? Students record evidence in their ENB. p. 134 D/P- DTM Calculate Genotype **Probability** (Students complete a Punnett square to find the probability

diversity.) pp. 148-149 P- ENB (prompt) Students describe the genetic variation of the banana plants grown for food and identify how they think this level of variation relates to the threat of Panama disease in banana crops; students record evidence in their ENB. p. 150 D/P-LS Compare Asexual and Sexual Reproduction (Students compare asexual reproduction and sexual reproduction by completing the Venn diagram.) p. 150

D/P- TIF (enrich) Factors That Influence

beetles. How do the traits of the sacred lotus flower help attract these pollinators? p. 166 D/P- DTM Analyze Honeybee Colony Loss (Students analyze data from a graph to explain patterns of honeybee colony losses in the United States.) p. 167 D/P- ENGIT Explore Tomato Hybrids (Students analyze solutions in growing hybrid tomatoes for possible advantages and pitfalls; students evaluate each solution to determine modifications that can be made to optimize their solution.) p. 169

D/P-TIF (enrich)

Capsaicin Levels in

Selection in Dog Breeds (Students read text and compare and contrast the traits that would be desirable in a dog that helps police locate explosives and a dog that provides companionship for the elderly.) p. 187 D/P- HOL Activity Model the Growth of an Animal (Students work with a group of peers to design a board game that models how genetic and environmental factors affect animals.) pp. 189-190

D/P- TIF (enrich)
Teaching Offspring
pp. 191-192
D- Hands-On Labs;
Effect of
Temperature on

of an offspring's	Reproduction pp.	Peppers pp. 171-	Gender; Propose
genotype and	151-152	172	Your Own Path
phenotype.) p. 134	D- Hands-On Labs;	D- Hands-On Labs;	
	Odd Reproduction;	Seed Vaults;	D/P- Lesson Self
D/P- TIF (enrich)	Propose Your Own	Propose Your Own	Check pp. 193-195
People in Science	Path	Path	D- Lesson Quiz
pp. 135-136			D-Make Your Own
D- Hands-On Labs;	D/P- Lesson Self	D/P- Lesson Self	Study Guide
Genetic	Check pp. 153-155	Check pp. 173-175	
Engineering;	D- Lesson Quiz	D- Lesson Quiz	P- DI (ELL/RTI) p.
Propose Your Own	D-Make Your Own	D-Make Your Own	1231
Path	Study Guide	Study Guide	P- Extension p.
			1231
D/P- Lesson Self	P- DI (ELL/RTI) p.	P- DI (ELL/RTI) p.	P- COLLAB p. 123J
Check pp. 137-139	1231	1231	P- Connections to
D- Lesson Quiz	P- Extension p. 1231	P- Extension p. 1231	Other Disciplines
D-Make Your Own	P- COLLAB p. 123J	P- COLLAB p. 123J	p. 123J
Study Guide	P- Connections to	P- Connections to	
	Other Disciplines p.	Other Disciplines p.	D-Science Safety
P- DI (ELL/RTI) p.	123J	123J	НВ
1231			D- CCC-HB
P- Extension p. 123I	D-Science Safety	D-Science Safety	D- ELA-HB
P- COLLAB p. 123J	НВ	НВ	D-M-HB
P- Connections to	D- CCC-HB	D- CCC-Hb	D- SEP-HB
Other Disciplines p.	D- ELA-HB	D- ELA-HB	D-ScienceSaurus
123J	D-M-HB	D-M-HB	Reference HB
	D- SEP-HB	D- SEP-HB	
D-Science Safety HB	D-ScienceSaurus	D-ScienceSaurus	D- YSI Simulation
D- CCC-HB	Reference HB	Reference HB	What Factors
D- ELA-HB			Affect
D-M-HB		D- YSI Simulation	Reproductive
D- SEP-HB		What Factors	Success?
		Affect	

	D-ScienceSaurus	Reproductive	
	Reference HB	Success?	

	Curriculum Alignment Common Language (CACL) Guide 6-8		
Acronym	Word/Phrase	Description	
CER	Claims Evidence Reasoning	Students make a claim and gather evidence along the way (during EXPLORATORY activities) to support claim.	
ССС-НВ	Crosscutting Handbook	Students who need extra support in grasping concepts or to refresh student knowledge of skills.	
CYEI	Can You Explain It	Lesson phenomenon used to ENGAGE students in learning at the beginning of the lesson.	
CYSI	Can You Solve It	Lesson phenomenon used to ENGAGE students in learning at the beginning of the lesson.	
D	Digital	Program resources and features in interactive digital form.	
DI (ELL/RTI)	Differentiated Instruction (English Language		
Extension	Learner/Response to Intervention)	A page that lists all learning activities used to	
COLLAB	Collaboration	differentiate learning, engage students in collaborative	
Connections	Connections to Other Disciplines	activities and connect learning to other subjects.	
to Other			
Disciplines			
DTM	Do the Math	Integrated subject learning.	
ENB	Evidence Notebook	Student notebook or journal used to gather evidence during EXPLORATORY learning activities to support their claims.	
ENGIT	Engineer It	Integrated subject learning.	
ELA-HB	English Language Arts Handbook	Students who need extra support in grasping concepts or to refresh student knowledge of skills.	
HOL	Hands-On Lab	Activities or experiments that enable students to demonstrate scientific procedures and analysis.	
LS	Language SmArts	Integrated subject learning.	

М-НВ	Math Handbook	Students who need extra support in grasping concepts or to refresh student knowledge of skills.
P	Print	Program resources and features in print form.
SEP-HB	Science and Engineer Practices Handbook	Students who need extra support in grasping concepts or to refresh student knowledge of skills.
TIF	Take It Further (enrich)	Enrichment activities for students in digital or print.
VBP	Video Based Project	Real life videos related to science and/or engineering that enable students to demonstrate mastery of performance expectations.
VL	Virtual Lab	Fully interactive simulations in which students perform experiments, collect data and answer questions.
WIM	Why It Matters	Questions related to lessons within each unit that asks students to consider how science affects the world around them.
YSI	You Solve It (Simulation)	Open-ended simulation-based learning with multiple answer options.