

Biology Enrichment 24-25 Lesson Plans

UNIT 4: REPRODUCTION

Unit 4: Reproduction Lessons Overview		
Unit 4 Student Portfolio	Lesson 4: Genetic Variation	Lesson 8: Review / Catch Up
Lesson 1: Human Life Cycle	Lesson 5: Punnett Squares I	Lesson 9: Reproductive System Presentation & Unit 4 Assessment
Lesson 2: Meiosis Part I	Lesson 6: Punnett Squares II	
Lesson 3: Meiosis Part II	Lesson 7: Genetics & The Env.	Enrichment Opportunities
Biology Enrichment Scope & Sequence		

CUMULATIVE PROJECT IDEAS: Unit 4 Reproduction + **Nervous? (If you don't use it for Unit 5)**

- Organs in standards (nervous): **brain, neurons, spinal cord**
- Unfortunately not too many hands on activities or direct connection to standards but could use these as “phenomena” to teach standards through
 - [Pregnancy Poster Project](#) + [Research Template](#)
 - [Menstrual Cycle Exploration](#) (graphing, observation, and data analysis)
- Brain Dissection (should have a few extra)
 - [Lab Write Up](#)
- [Nervous System Practice and Games](#)
- [Sense Activity](#)
- Spina bifida could be an interesting phenomena to focus this around because it has genetic and environmental causes
 - Intersection of nervous and reproductive systems
 - Talk about human life cycle and meiosis
 - Punnett squares
 - Looking at the gene(s) associated with it
 - What are environmental factors that potentially impact it?

	UNIT 1	UNIT 2	UNIT 3	UNIT 4	Unit 5
HS-LS1-1	✓				✓
HS-LS1-2	✓	✓	✓		✓
HS-LS1-3	✓	✓	✓		✓
HS-LS1-4			✓		✓
HS-LS1-5		✓			✓
HS-LS1-6	✓				✓
HS-LS1-7		✓			✓
HS-LS2-1					✓
HS-LS2-2	✓				✓
HS-LS2-4	✓				✓
HS-LS2-5					✓
HS-LS2-6					✓
HS-LS2-7					✓
HS-LS3-1				✓	✓
HS-LS3-2				✓	✓

LESSON 1: HUMAN LIFE CYCLE

HS-LS3-1

Develop and use a model to show how DNA in the form of chromosomes is passed from parents to offspring through the processes of meiosis and fertilization in sexual reproduction.

- Clarification Statement:
 - The model should demonstrate that an individual's characteristics (phenotype) result, in part, from interactions among the various proteins expressed by one's genes (genotype).

Integrated Learning Objective

X

Notes

- Teaching the organs of the reproductive system is not important. Go over the role of sperm and egg and fertilization, influence of DNA/genetics, students can infer meiosis must make gametes with half the number of chromosomes to make a "whole" zygote

Vocabulary

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Materials

- Unit 4 Student Portfolio
- Google Classroom, post video links
- 1.1 x
- 1.2 x
- 1.3 XX System Review

Additional Resources

Assessment

- 1.3 XX System Summary asks students to answer the integrated learning objective
- Daily 5 point engagement grade

Exemplary Response

LESSON 2: MEIOSIS PART I

HS-LS3-1

Develop and use a model to show how DNA in the form of chromosomes is passed from parents to offspring through the processes of meiosis and fertilization in sexual reproduction.

- Clarification Statement:
 - The model should demonstrate that an individual's characteristics (phenotype) result, in part, from interactions among the various proteins expressed by one's genes (genotype).

Integrated Learning Objective

X

Notes

- Connect to making gametes (sperm and egg) and their role in fertilization and genetic diversity

Vocabulary

-

Materials

- Unit 4 Student Portfolio
- Google Classroom, post video links
- 2.1 x
- 2.2 x
- 2.3 x

Additional Resources

Assessment

- 2.3 XX Summary asks students to answer the integrated learning objective
- Daily 5 point engagement grade

Exemplary Response

LESSON 3: MEIOSIS PART II

HS-LS3-1

Develop and use a model to show how DNA in the form of chromosomes is passed from parents to offspring through the processes of meiosis and fertilization in sexual reproduction.

- Clarification Statement:
 - The model should demonstrate that an individual's characteristics (phenotype) result, in part, from interactions among the various proteins expressed by one's genes (genotype).

Integrated Learning Objective

X

Notes

- Connect to making gametes (sperm and egg) and their role in fertilization and genetic diversity

Vocabulary

-

Materials

- Unit 2 Student Portfolio
- Google Classroom, post video links
- 3.1 x
- 3.2 x
- 3.3 x

Additional Resources

Assessment

- 3.3 XX Summary asks students to answer the integrated learning objective
- Daily 5 point engagement grade

Exemplary Response

LESSON 4: GENETIC VARIATION

HS-LS3-2

Make and defend a claim based on evidence that genetic variations (alleles) may result from (a) new genetic combinations via the processes of crossing over and random segregation of chromosomes during meiosis, (b) mutations that occur during replication, and/or (c) mutations caused by environmental factors. Recognize that mutations that occur in gametes can be passed to offspring.

- Clarification Statement:
 - Examples of evidence of genetic variation can include the work of McClintock in crossing over of maize chromosomes and the development of cancer due to DNA replication errors and UV ray exposure

Integrated Learning Objective

X

Notes

- Connect to gametes, zygote, DNA replication and mutations

Vocabulary

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Materials

- Unit 4 Student Portfolio
- Google Classroom, post video links
- 4.1 x
- 4.2 x
- 4.3 x

Additional Resources

Assessment

- 4.3 XX Summary asks students to answer the integrated learning objective
- Daily 5 point engagement grade

Exemplary Response

LESSON 5: PUNNETT SQUARES PART I

[HS-LS3-3](#)

Apply concepts of probability to represent possible genotype and phenotype combinations in offspring caused by different types of Mendelian inheritance patterns.

- Clarification Statements:
 - Representations can include Punnett squares, diagrams, pedigree charts, and simulations. Inheritance patterns include dominant-recessive, codominance, incomplete dominance, and sex-linked.

Integrated Learning Objective

X

Notes

- X

Vocabulary

-

Materials

- Unit 2 Student Portfolio
- Google Classroom, post video links
- 5.1 x
- 5.2 x
- 5.3 x

Additional Resources

Assessment

- 5.3 XX Summary asks students to answer the integrated learning objective
- Daily 5 point engagement grade

Exemplary Response

LESSON 6: PUNNETT SQUARES PART II

[HS-LS3-3](#)

Apply concepts of probability to represent possible genotype and phenotype combinations in offspring caused by different types of Mendelian inheritance patterns.

- Clarification Statements:
 - Representations can include Punnett squares, diagrams, pedigree charts, and simulations. Inheritance patterns include dominant-recessive, codominance, incomplete dominance, and sex-linked.

Integrated Learning Objective

X

Notes

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Vocabulary

-

Materials

- Unit 4 Student Portfolio
- Google Classroom, post video links
- 6.1 x
- 6.2 x
- 6.3 x

Additional Resources

Assessment

- 6.3 XX Summary asks students to answer the integrated learning objective
- Daily 5 point engagement grade

Exemplary Response

LESSON 7: GENETICS & THE ENVIRONMENT

HS-LS3-4

Use scientific information to illustrate that many traits of individuals, and the presence of specific alleles in a population, are due to interactions of genetic factors and environmental factors.

- Clarification Statements:
 - Examples of genetic factors include the presence of multiple alleles for one gene and multiple genes influencing a trait.
 - An example of the role of the environment in expressed traits in an individual can include the likelihood of developing inherited diseases (e.g., heart disease, cancer) in relation to exposure to environmental toxins and lifestyle; an example in populations can include the maintenance of the allele for sickle-cell anemia in high frequency in malaria-affected regions because it confers partial resistance to malaria.

Integrated Learning Objective

X

Notes

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Vocabulary

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Materials

- Unit 4 Student Portfolio
- Google Classroom, post video links
- 7.1 x
- 7.2 x
- 7.3 x

Additional Resources

Assessment

- 7.3 XX Summary asks students to answer the integrated learning objective
- Daily 5 point engagement grade

Exemplary Response

LESSON 8: REVIEW / CATCH UP

HS-LS3-1 HS-LS3-2 HS-LS3-3 HS-LS3-4		Integrated Learning Objective I will review my reproductive system project to revisit the content of Unit 4: Reproduction, and I will answer biology MCAS questions as preparation for the assessment.
Notes • Students can use this time to catch up on missed work, practice their presentation for next class and/or record a video presentation in lieu of speaking live in class • Make sure to review appropriate presentation skills and expectations (including a rubric) • Students should also review all of the Unit 4 material and answer practice MCAS questions		
Vocabulary • Lessons 1-7 vocabulary		Materials • Unit 4 Student Portfolio • Students' reproductive system project • 8.1 Presentation Rubric • 8.2 Unit 4 Practice MCAS Questions
Assessment • Daily 5 point engagement grade		

LESSON 9: REPRODUCTIVE SYSTEM PRESENTATION & UNIT 3 ASSESSMENT

HS-LS3-1 HS-LS3-2 HS-LS3-3 HS-LS3-4		Integrated Learning Objective I will demonstrate my knowledge by presenting my reproductive system project to class and answering Unit 4 MCAS questions.
Notes • Students should present their reproductive system project, to the class and teacher • Students should take a Unit 4 Assessment, that includes multiple choice and free response MCAS questions • Provide an opportunity for students to see their assessment performance and self-reflect on their answers and score		
Vocabulary • Unit's Vocabulary		Materials • Unit 4 Student Portfolio • 9.1 Reproductive System Rubric • 9.2 Unit 4 Assessment
Assessment • Daily 5 point engagement grade		

ENRICHMENT OPPORTUNITIES

Students who have completed lesson 9 before the final project due date, can work on the enrichment opportunities

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