Mayfield High School

Lesson Plans

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Biology

Learning Targets:

1. I can understand how the discovery of DNA structure demonstrates the nature of science.
2. I can understand the structure and function of DNA.
3. I can understand the process of DNA replication.

Level 2

A-C For vocabulary terms, I can write definitions and identify explanations or examples.

B. I can identify the parts of DNA in an unlabeled diagram.

C. I can label structures and processes.

Vocabulary

Anti-parallel DNA polymerase

Avery DNA Replication

Chargaff Double Helix

Complementary Base Pairs Franklin

Deoxyribonucleotide Hydrogen Bonds

Deoxyribose Nitrogenous Bases

DNA helicase Phosphate Groups

Level 3

A. I can use complementary base pairing to complete a double stranded DNA sequence.

B. I can follow a rubric to design and construct a physical model of DNA.

C. I can explain the process and importance of DNA replication, and given the sequence of an original DNA strand, I can predict the sequence of the replication products.

Level 4

C. I can explain roles and interactions of these scientists in the scientific process that revealed the structure of DNA.

Instructional materials and strategies:

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| UnitDay | Learning goals | Instructional strategies | Materials required | Assessments |
| Wed11/18 | B | Preview—students discuss existing knowledge about DNALesson—students work with text to complete reading guide that requires knowledge of the structure of DNAHmw—complete study guide  | Study guide copies for text 7.1-7.2: DNA structure | Quick check—completion & accuracy of study guide |
| Tues11/19 | A, then B review | Lesson—DNA structure discovery—20 minute movie—follow-up discussion & note takingPractice: Labeling diagrams of DNA structure, Chargaff’s rule practice, Watson & Crick Model practiceHmw—review vocabulary & study guide | HHMI movie clipUnlabeled diagrams of DNA, Chargaff rule practice worksheet |  |
| Fri11/20 | B | Lesson—How to critique a model of DNA using a rubricPractice—in groups of 3, analyze & critique 3 models (chosen for one to be well, one mediocrely, & one poorly designed)Hmw—initial planning DNA models | Sets of previous year’s models, sorted by qualityRubric copies | Observe students during critiques; compare their analysis to mine & teach w/in small groups if corrections are needed |
| Mon11/23 | CThen reinforceA-C | Lesson-DNA replicationPractice-DNA replicationGraphic organizers—completion of two different concept maps for unitHmw—review for formative assessment, continue planning for DNA model | Diagrams of DNA replicationCopies of concept mapsHHMI animation on DNA replication |  |
| Tues11/24 | A-C | Formative assessment—DNA structure & replication, historyIsolation of strawberry DNAHmw—Models of DNA due 11/30 | FA copiesMaterials to isolate strawberry DNA | FA |
| Mon11/30 | A-C | Teacher and student critiques of DNA modelsReview day in preparation for DNA unit test tomorrowHmw—test on DNA structure & replication L. Goals tomorrow | Keys to question sets, FA explanations, power point lessons, & review materials must be posted to webpage | DNA models analyzed |
| Tues12/1 | A-C | Unit test—DNA structureHmw—RAD quide 13.1—DNA expression | Test copiesCopies of RAD 13.1 | Unit Test |
| Wed 12/2 |  | Lesson-Central DogmaClips from “cracking the code of life”: “one wrong letter”, “finding cures is hard” to engage students—why DNA expression matters.Hmw—stanford notes—13.1 | Power point“cracking code of life video”13.1 stanford notes handout | Homework checked |
| Thurs12/3 |  | Lesson—transcription and RNA processingBegin colorcoding and labeling a central dogma diagramHomework: DNA🡪mRNA practice problems | Unlabeled diagrams of DNA expression & sets of colored pencils for each pair of studentsDNA🡪mRNA practice problemscopied | Homework checked |
| Fri12/4 |  | Lesson—RNA to protein lessonComplete colorcoding & labeling a central dogma lessonPractice: mRNA 🡪proteinHomework: try labeling a central dogma diagram w/o consulting notes | Colored pencil sets per pair studentsMore blank diagrams of central dogmaCodon charts & practice tables for mRNA🡪protein | Check homework |
| Mon12/7 |  | Review & practice—DNA🡪RNA🡪protein problemsDNA🡪RNA🡪protein modeling w/ foam manipulativesHMW—review for FA tomorrow | DNA🡪RNA🡪 protein practiceProblems & keys |  |
| Tues12/8 |  | FAInterventions & test prep | FA copies & keyIntervention materials | FA |
| Wed12/9 |  | Test—DNA expression | Unit Test copies | Unit test |
| Thurs12/10 |  | EXCEL Tech Discovery Day—no class |  |  |
| Fri12/11 |  | Lesson—Asexual vs Sexual cell DivisionAnd Mitotic cell cycleHmw—Rad guide 10.1 | Rad guide 10.1 copies |  |
| Mon12/14 |  | Practice & reinforce—Cell cycle DNA content diagrams practiceLesson—stages of mitosis with diagrams & animations & microscope slidesHmw—Rad guide 10.2 | Animations—mastering biology.com—cell cycle stagesCell cycle unlabled diagramsPhotos of onion root tips/stained to show mitotic stagesMitosis microscope slidesCopies of rad guide 10.2 | Check homeworkInteract with students in lab |
| Tues12/15 |  | Practice—bendaroo mitosis Practice—stages of mitosis worksheetLesson—cancer as a disorder of cell cycleHomework—prepare for FA | Bendaroos, white boards, markers for every studentMitosis stages worksheet | Check homework |
| Wed12/16 |  | FA asexual vs sexual cell division, cell cycle, and stages of mitosisInterventions Homework—final exam preparations | Copes FA & keyIntervention materials & plansAll materials for final exam review must be loaded onto webpage | FA |
| Thurs12/17 |  | Final examination self-paced review with texts and notebook contents OR online review materials | All materials for final exam review must be loaded onto webpage |  |
| Fri12/18 |  | 4th period final exam |  | Final exam |
| Mon12/21 |  | No class or exams |  |  |
| Tuesday 12/22 |  | 3rd and 5th period exams |  | Final exam |