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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| Unit  Day | Learning  goals | Instructional strategies | Materials required | Assessments |
| Wed  11/18 | B | Preview—students discuss existing knowledge about DNA  Lesson—students work with text to complete reading guide that requires knowledge of the structure of DNA  Hmw—complete study guide | Study guide copies for text 7.1-7.2: DNA structure | Quick check—completion & accuracy of study guide |
| Tues  11/19 | A, then B review | Lesson—DNA structure discovery—20 minute movie—follow-up discussion & note taking  Practice: Labeling diagrams of DNA structure, Chargaff’s rule practice, Watson & Crick Model practice  Hmw—review vocabulary & study guide | HHMI movie clip  Unlabeled diagrams of DNA, Chargaff rule practice worksheet |  |
| Fri  11/20 | B | Lesson—How to critique a model of DNA using a rubric  Practice—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 quality  Rubric copies | Observe students during critiques; compare their analysis to mine & teach w/in small groups if corrections are needed |
| Mon  11/23 | C  Then reinforce  A-C | Lesson-DNA replication  Practice-DNA replication  Graphic organizers—completion of two different concept maps for unit  Hmw—review for formative assessment, continue planning for DNA model | Diagrams of DNA replication  Copies of concept maps  HHMI animation on DNA replication |  |
| Tues  11/24 | A-C | Formative assessment—DNA structure & replication, history  Isolation of strawberry DNA  Hmw—Models of DNA due 11/30 | FA copies  Materials to isolate strawberry DNA | FA |
| Mon  11/30 | A-C | Teacher and student critiques of DNA models  Review day in preparation for DNA unit test tomorrow  Hmw—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 |
| Tues  12/1 | A-C | Unit test—DNA structure  Hmw—RAD quide 13.1—DNA expression | Test copies  Copies of RAD 13.1 | Unit Test |
| Wed  12/2 |  | Lesson-Central Dogma  Clips 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 |
| Thurs  12/3 |  | Lesson—transcription and RNA processing  Begin colorcoding and labeling a central dogma diagram  Homework: DNA🡪mRNA practice problems | Unlabeled diagrams of DNA expression & sets of colored pencils for each pair of students  DNA🡪mRNA practice problems  copied | Homework checked |
| Fri  12/4 |  | Lesson—RNA to protein lesson  Complete colorcoding & labeling a central dogma lesson  Practice: mRNA 🡪protein  Homework: try labeling a central dogma diagram w/o consulting notes | Colored pencil sets per pair students  More blank diagrams of central dogma  Codon charts & practice tables for mRNA🡪protein | Check homework |
| Mon  12/7 |  | Review & practice—DNA🡪RNA🡪protein problems  DNA🡪RNA🡪protein modeling w/ foam manipulatives  HMW—review for FA tomorrow | DNA🡪RNA🡪 protein practice  Problems & keys |  |
| Tues  12/8 |  | FA  Interventions & test prep | FA copies & key  Intervention materials | FA |
| Wed  12/9 |  | Test—DNA expression | Unit Test copies | Unit test |
| Thurs  12/10 |  | EXCEL Tech Discovery Day—no class |  |  |
| Fri  12/11 |  | Lesson—Asexual vs Sexual cell Division  And Mitotic cell cycle  Hmw—Rad guide 10.1 | Rad guide 10.1 copies |  |
| Mon  12/14 |  | Practice & reinforce—Cell cycle DNA content diagrams practice  Lesson—stages of mitosis with diagrams & animations & microscope slides  Hmw—Rad guide 10.2 | Animations—mastering biology.com—cell cycle stages  Cell cycle unlabled diagrams  Photos of onion root tips/stained to show mitotic stages  Mitosis microscope slides  Copies of rad guide 10.2 | Check homework  Interact with students in lab |
| Tues  12/15 |  | Practice—bendaroo mitosis  Practice—stages of mitosis worksheet  Lesson—cancer as a disorder of cell cycle  Homework—prepare for FA | Bendaroos, white boards, markers for every student  Mitosis stages worksheet | Check homework |
| Wed  12/16 |  | FA asexual vs sexual cell division, cell cycle, and stages of mitosis  Interventions  Homework—final exam preparations | Copes FA & key  Intervention materials & plans  All materials for final exam review must be loaded onto webpage | FA |
| Thurs  12/17 |  | 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 |  |
| Fri  12/18 |  | 4th period final exam |  | Final exam |
| Mon  12/21 |  | No class or exams |  |  |
| Tuesday 12/22 |  | 3rd and 5th period exams |  | Final exam |