Teacher: \_\_ N. Adamse \_\_\_\_\_\_\_\_\_\_

|  |  |  |  |
| --- | --- | --- | --- |
| Subject | Class | Date | Duration |
| Biology | Bio CPI (B3) | 3/22/21- 4/15/21 | 3 x 70 min |

|  |  |
| --- | --- |
| Topic | Constructing a 3D\* DNA model Part of the unit: **Cells and their organelles:** Nucleus |
| Grade level | 10th grade |
| Setting | Art Classroom with access to water and a variety of Art/Shop materials and tools |
| Standard(s) | [State/National Academic Standard(s):](https://sites.google.com/a/wgu.edu/state-specific-information/) **Life Science Standard, level 9-12: LS 1: From molecules to Organisms: Structures and Processes***Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins, which carry out the essential functions of life through systems of specialized cells* |
| Lsson Objective(s) | **Explain how DNA can act as a blueprint for living organisms****Condition**: *Students are provided with information (video, charts, review and lecture) about how DNA bases form the code for amino acids. Students have access to a variety of building materials such as: metal wires, cutting and bending pliers, hot glue, colored paper, tape, self- hardening clay, acrylic paint and brushes, wood pieces and woodworking tools.***Behavior:** *Students construct an accurate model of part of a DNA molecule that codes for the amino acids: Methionine, Glycine, Histidine and Lysine.* **Criterion:** *Students understand that DNA codes for different amino acids by three bases (codons), they need to show this knowledge in their model.**They show the correct components (sugar, phosphate group and the 4 bases) at the correct positions. They show the correct second strand with the correct complementary bases. They color code the components and explain the colors with a legend.* |

|  |  |
| --- | --- |
| Links to previous lesson and prerequisite skills | **Students have already finished a range of topics such as:**-The characteristics of Life, -Scientific methods-Introduction to Ecology, -Introduction to Evolution, -Cells and their organelles,-Photosynthesis and Chloroplasts, -Cell membrane and -Biomolecules |
| Links to future lesson | In the next lessons, students need to make a presentation about the history of DNA timeline |

|  |  |  |  |
| --- | --- | --- | --- |
| Lesson 1-3 | Time | Teacher’s activities Students’ activities  | Resources |
| IntroductionMain ActivitiesClosing | 10 min180 min20 min | Teacher:-Explains the assignment-Plays the short video clip-Hands out paper copies of assignment with chart of amino acid codons and grading rubric-Hands out a diagram with all the DNA components-Asks students which materials they choose-Provides students with materials needed-Explains some construction techniques-Guides and helps students when needed-Gives students feedback for revision-Constructs a (giant) 3D DNA molecule with students (max. 3 students) who cannot work independently-Puts all DNA models on display and discusses the results with the students-Grades the models with a rubric | Students:-Listen to explanation-Ask questions-Read the hand-outs and the grading rubric-Choose construction materials- Write down the order of the nitrogen bases and their complementary bases-Construct the 3D DNA model on their own, or with a partner, or with the teacher-revise their model when needed after teacher’s feedback-Watch the display and comment-Review their rubrics and revise their model when needed | *-Lap top**-Link to video clips**-Written Assignment with rubric**-Chart with codons for at the 20 amino acids**-Visual that shows the placement of the DNA components**-Outline of the assignments (activity schedule)**-Construction materials such as:* *metal wires, cutting and bending pliers, hot glue, colored paper, tape, self- hardening clay, acrylic paint and brushes, wood pieces and woodworking tools.**\*Full remote students use various materials they have at home or they make a 2d model and submit photos of it on Google Classroom* |

|  |  |
| --- | --- |
| Differentiation Strategies | -Students receive written, verbal and visual information-Students choose their construction materials-Students are allowed to choose a partner or work individually-Students can choose to work on a larger model with teacher |
| Formative assessments | The construction of the DNA model is the formative assessments. Students receive immediate feedback and can revise their model accordingly |
|  |  |

*\*Full remote students use various materials they have at home or they make a 2D model and submit photos of it on Google Classroom*