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

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

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| 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.* |

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| 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 |

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| Lesson 1-3 | Time | Teacher’s activities Students’ activities | | Resources |
| Introduction  Main Activities  Closing | 10 min  180 min  20 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* |

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