Unit 6: Genetics

HONORS BIOLOGY

**Unit Length**: ~13 days of instruction
**Unit Dates**:

*Genetics*: Friday 10/14 – Wednesday 10/19 (4 days)

***Midterm Review****:* Thursday 10/20 – Friday 10/21

*Genetics*: Monday 10/24 – Friday 10/28 (**One day will be used for Midterm Exams**) (4 days)

***Teacher Work Day***: Monday 10/31

Genet*i*cs: Tuesday 11/1 – Monday 11/7 (5 days)

**IMPORTANT NOTE ABOUT THIS UNIT**: Work with the Biology PLC to determine the exact days for Midterm Review and Midterm Exams. Genetics will be taught before and after the exam. Genetics should be taught during the week of midterm exams every day except on the actual Biology Midterm Exam Day (TBD).

**DAY 1 (Friday 10/14)**

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| **Assignment/Task** | **Details** | **Time** |
| 1. Assign **Genetics Brochure Project** to Honors classes.
 | **Due Date is Tuesday 11/8** Formal Grade. Please discuss the expectations and go over the rubric with students. Project information is also on the weebly website. | 10-15 min |
| 1. Notes: “Unit 6: Introduction to Genetics and Heredity”
 | Print the notes 2 sided as shown on the “key.”Follow the PPT “Intro to Genetics\_2016” and use the key.* Begin by allowing students time to complete the Inventory of Traits survey on p. 4 of the notes and then discussing/sharing results as a class. Don’t worry with recording actual class numbers (10 min)
* Complete front page of notes (2 min)
* Partner Discussion about genes and environment (8-10 min)
* Students read “Linking Genetics with Reproduction” on p.2 of notes. Post or review the correct answers (10 min)
 | 35 min |
| 1. Guided Practice: “Meet Gregor Mendel”
 | * Students should use the PH textbooks and class handouts about Mendels Experiments to complete p. 3 of the notes.
* Show You Tube video on slide 9 after students have finished. (3 min)
 | 30 min |
| 1. Notes: “Who Was Gregor Mendel?”
 | Use the PPT beginning on slide 10 to complete p. 5-6 of the notes  | 15-20 min |
| 1. Worksheet: “Genetics Vocabulary Practice” side 1
 | Students should be able to complete side 1 and then check answers at the SSS before leaving. | Remaining class time |
| 1. Homework: HB pp. 97-101
 | Students should use the PPT “17. Intro Genetics\_2016” and “Nature\_Nurture\_2016” under the Unit 6 tab on the class website to read, highlight important information, answer the side box questions, and complete the Check Yourself Questions. |  |

**DAY 2 (Monday 10/17)**

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| **Assignment/Task** | **Details** | **Time** |
| 1. Worksheet: “Genetics Vocabulary Practice” side 2
 | * Students should complete the “Genetics Practice Problems #2 and check their answers at the SSS (or go over together as a class)
* Use slide 22 from PPT “Intro to Genetics\_2016” to model the expectations
* Tell students to write down the terms/definitions at the bottom of the page shown on the key
 | 20 min |
| 1. Amoeba Sisters video + Worksheet
 | Show Amoeba Sisters online video called “Monohybrids and the Punnett Square Guinea Pigs” and complete worksheet questions 1-8 with students.  | 10 min |
| 1. “Heredity Simulation: Hornimonsters”
 | Materials (labeled popsicle sticks) for this activity should be prepared and in envelopes or plastic baggies in the file cabinet marked “Genetics”. This is a very quick activity. | 15 - 20 min |
| 1. PPT Notes: “The Punnett Square”
 | * Provide copies of the slides for students to fill in notes with you. Use the key and PPT “Intro to Genetics\_2016” starting on slide 29. Have students highlight important points.
* Slide 33 has a short video about PTC. This video is optional
 | 15-20 min |
| 1. Worksheet: “Independent Practice”
 | * Print this on the back of the Amoeba Sisters worksheet.
* Model how to do #4 and #5 using the PPT.
* Have students work independently on the rest and either check their work at the SSS or use the PPT slides to have students model how they solved each problem. Do not grade for accuracy!
 | 20 min. |
| 1. Homework: Midterm Review Study Guide (if one is being given) **AND/OR** Finish incomplete class work
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**DAY 3 (Tuesday 10/18)**

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| **Assignment/Task** | **Details** | **Time** |
| 1. Warm-up: ½ sheet on using genetics vocabulary (1-5)
 | Students should complete the warm-up side (front) only. Post answers at SSS | 5 min |
| 1. Worksheet: “Practice Genetics Problems”
 | PPT “Intro to Genetics\_2016” starting on slide 41. Tell students to do front side only (1-5) | 15 min |
| 1. Review Lecture
 | Use slides 42-47 to review Mendel’s experiments to discover the Principle of Dominance. Students should actively listen. | 5 min |
| 1. Worksheet “More Mendelian Genetics”
 | Tell students to complete the back side of the worksheet (1-4). Use slides 48-50 to model the first 3 problems. | 10-15 min |
| 1. Guided Practice: “Huntington’s Disease: A Dominant Trait”
 | This is the back side of the warm-up sheet. Use slides 52-55 to work problems out with the class.  | 10 min |
| 1. Article: “True Blue” – A Close Read
 | * Provide copies of the articles for students to read and annotate. They have 3 tasks while they read:
1. Highlight new/unfamiliar/key vocabulary (especially anything related to genetics)
2. In the margins, ask questions
3. In the margins, make comments and connections to prior experiences or things learned in class
* After you have checked they have done the close read, tell students to answer the analysis questions (1-9)
* Collect for a grade.
 | 45 min |
| 1. Homework: Midterm Review Study Guide (if one is being given) **OR** HB p. 109
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**DAY 4 (Wednesday 10/19)**

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| **Assignment/Task** | **Details** | **Time** |
| 1. Warm-up: “Bikini Bottom Genetics 2”
 | Post answers at the SSS.Check that students completed HW p. 109. Post those answers at the SSS as well | 10 min |
| 1. Notes: “Non-Mendelian Genetics”
 | Use PPT “Incomplete and Codominance 2016”Students will need colored pencils (red, pink, black, gray) | 25-30 min |
| 1. Worksheet: “Independent Practice”
 | You may go over answers with the class or post answer key at SSS. Do not grade. | 20-30 min |
| 1. Exit Ticket: “Punnett Square Program”
 | Give this as an exit grade. Students should show all work. Give a grade for this and use to gauge understanding. If there is not enough class time, this may also be used as a warm-up the next day. | 5-10 min |
| 1. Homework: Midterm Review Study Guide (if one is being given) **OR** HB pp. 102-107
 | Students may use any remaining class time to begin. Students should use the PPT “Punnett Squares\_2016” under the Unit 6 tab on the class website to read, highlight important information, answer the side box questions, and complete the Check Yourself Questions. |  |

**MIDTERM REVIEW! 2 DAYS (Thurs. 10/20 – Friday 10/21)**

* There are a few documents in the “Midterm Review Folder” that you may use for re-teaching or re-looping.
* There are practice questions you can have students answer either independently, in pairs, or for homework.
* Usually, I work closely with Mrs. Buchy or Miss Schwippert to set up some review stations or play a Kahoot game. Please collaborate with them!
* Please obtain the Midterm Test(s) from the Biology PLC. I do not know if it will be paper and scantron or in School Net.
* Last year, we did NOT include Genetics on the Midterm.

**MIDTERM EXAM**

* The midterm exam will be given on one of the designated Science Test Days. Please consult the Biology PLC to determine this date.
* Please allow a full 90 minutes for students to take the midterm exam.
* If everyone finishes early, then continue on with the genetics lesson OR play a science related movie/video.

**Day 5 – 8 (One day this week will be for Midterm Exams)**

**DAY 5 (Monday 10/24) – Check/collect materials for the opening activity the day before the lesson.**

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| **Assignment/Task** | **Details** | **Time** |
| 1. Introductory Activity to Polygenic Traits
 | PPT “Polygenic traits\_2016”**Option 1:** “ An Exploration of a Polygenic Trait: Human Height” 🡪 Students work in pairs and flip 6 pennies to determine the likely genetic outcomes. Collect class data, graph, and analyze. (Higher Level) slides 1-2**Option2:** “Handspan: Determining Polygenic Inheritance” 🡪 Students work individually and use a ruler to measure the width of their handspan in millimeters. Collect class data, graph, and analyze. (Lower Level) slides 3-4 | Option 1: about 30-40 minutesOption 2: about 15-20 minutes |
| 1. Notes: “Non-Mendelian Genetics 🡪 Polygenic Traits”
 | Use PPT “Polygenic traits\_2016” starting on slide 5 | 10-15 min |
| 1. Amoeba Sisters video: “Incomplete Dominance, Codominance, Polygenic Traits, and Epistasis”
 | This video is important because it shows students various ways of writing the alleles for solving these problems.  | 7:10 |
| 1. Notes: “Non-Mendelian Genetics: Multiple Alleles”
 | Use PPT “Multiple Alleles\_Blood Type Notes\_2016”Model how to solve the problems. Use the key in the binder. | 30+ min |
| HW: Midterm Review Study Guide (if one is being given) **OR** HB pp. 108 |  |  |

**DAY 6 (Tuesday 10/25)**

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| **Assignment/Task** | **Details** | **Time** |
| 1. Warm-up: ½ sheet to review genetics vocab and concepts
 | Post answer key at SSS | 10-15 min |
| 1. Amoeba Sisters Video: “[Multiple Alleles (ABO Blood Types) and Punnett Squares](https://www.youtube.com/watch?v=9O5JQqlngFY) “ with worksheet
 | Show the video and have students complete the worksheet during or after. “Multiple Alleles\_Blood Type Notes\_2016” slide21 | 10 min |
| 1. Finish Notes on Mulitple Alleles if needed
 | “Multiple Alleles\_Blood Type Notes\_2016” | 10-15 min |
| 1. Independent Practice: “Who’s Your Daddy”
 | Post answer key at SSS but circulate and monitor/assist students as needed. | 20-30min |
| 1. Independent Practice: “Multiple Alleles and Blood Type”
 | Could use this as an informal grade/assessment OR post answer key. Can print as ½ sheet on back of warm-up. | 10-20 min |
| HW: Midterm Review Study Guide (if one is being given) **OR** HB pp. 108-110 and review notes for a quiz |  |  |

**DAY 7 (Wednesday 10/26)**

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| **Assignment/Task** | **Details** | **Time** |
| 1. Extended Warm-up: “Practice Before the Quiz”
 | Have students work independently, in pairs using their notes as needed. May want to work with a small group of any students who are struggling. Post answer key at SSS for students to check their work. Go over any problems with the class as needed. | 20-30 min |
| 1. Quiz: “U6 Genetics Quiz #1 (A and B versions)
 | Students should show all work. Do not allow them to use notes. | 30 min. |
| 1. Notes: “Sex-Linked Traits”
 | Use PPT “Sex Linked Traits\_2016” | 25-30 min |
| 1. Independent Practice: “Sex-Linked Traits Worksheet”
 | Circulate and help students as needed. Post answer at SSS. | 30 min |
| 1. HW: Midterm Review Study Guide (if one is being given) **OR** HB pp. 111-112
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**DAY 8 (Thursday 10/27)**

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| **Assignment/Task** | **Details** | **Time** |
| 1. Warm-up: 4 “boxes” of practice problems
 | Post warm-up answer key at SSSPost answer key to HB “Problem Solving” pages 109-112 | 10-15 min |
| 1. Finish Independent Practice if needed: “Sex-Linked Traits Worksheet”
 | Circulate and help students as needed. Post answer at SSS. | 30 min |
| 1. Competition: “Who Gets the Money?”
 | Use PPT “Sex Linked Traits\_2016” slide 12. There are 3 parts to this activity. Print them on different colored sheets of paper. (Extra copies are included in the binder). Students should only receive one part at a time. They must correctly complete that part before receiving the next. If it is a large class, I take the first 5 people to complete all 3 parts correctly. They must have all work done correctly to be a winner. Use the key to see what “work” should look like. Prizes may include candy, Bosco Bucks, HW passes, bonus points, etc.  | 20 min |
| 1. Notes: “A Pedigree Story”
 | * This is in the second “Genetics” Binder.
* Read aloud the family story. As you read, draw out the Pedigree on the board “thinking aloud” as you go.
* Students should just watch.
* When you are finished, allow them time to copy the pedigree on their notes.
* Then as a class discuss/complete/review “How to Construct a Pedigree”
* Save the back side of the handout for the next day.
* Use PPT “PEDIGREES\_booklet\_2016”.
 | 10-15 min |
| HW: HB pp. 113 - 114 | Students should use the PPT “20. Pedigrees\_2016” under the Unit 6 tab on the class website to read, highlight important information, answer the side box questions, and complete the Check Yourself Questions. |  |

**Monday 10/31 is a Teacher Work Day**

**DAY 9 (Tuesday 11/1)**

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| **Assignment/Task** | **Details** | **Time** |
| Notes: Finish the notes from yesterday “Another Pedigree Story” and “A Final Pedigree Story” | * Use PPT “PEDIGREES\_booklet\_2016” beginning on slide 9
* Review answers with students using the PPT
 | 20 min |
| Notes: Pedigree Booklet | * Use PPT “PEDIGREES\_booklet\_2016” beginning on slide 13
* Print on colored paper.
* Use my key to fill in the missing notes in the PPT.
 | 20-30 min |
| “Pedigree Guided Practice” | Work out the pedigrees with students. Explain the clues to figuring out each type of inheritance pattern. Students should refer to their booklets! | 10 min |
| Station Activity: “Pedigree Analysis Sheet” | 1. Post the blue pedigree cards around the room.
2. Provide every student with the handout “Pedigree Analysis Sheet” and print the “Pedigree Reference Sheet” on the back.
3. Divide students evenly into groups. Students should rotate through the pedigrees, analyze, discuss, and provide 2 reasons for how they determined the inheritance pattern shown at each station.
4. Use the answer key provided to review answers as a class after the activity is complete.
 | 20 min |
| “Pedigree Independent Practice”  | This should be printed on the back of the Guided Practice.Students should work alone. Post answer key at SSS | 20 min |
| HW: HB pp. 115-117 | Students should use the PPT “21. Genetic Disorders\_2016” under the Unit 6 tab on the class website to read, highlight important information, answer the side box questions, and complete the Check Yourself Questions. |  |

**DAY 10 (Wednesday 11/2)**

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| **Assignment/Task** | **Details** | **Time** |
| 1. Warm-up: “Pedigree Worksheet”
 | Print on ½ sheet. Post answers at SSS | 10 min |
| 1. Finish up any loose ends from yesterday
 |  | 10-40 min |
| 1. “Genetic Counselor Training” worksheet
 | 1. Students should complete Part A using their notes from the Biology Handbook (pp. 115-117). For students who did not do their homework, they may use the Prentice Hall Biology textbook and refer to the page numbers indicated on the activity sheet.
2. After a student has completed Part A, they may come and get “patient strips” from you. Students need to complete 2-3 “Patient Analyses”. You determine.
3. Collect and use the key to grade for both completion and accuracy. This is a formal lab grade!
4. Some strips (blue and yellow) are printed, but the master is included if you need to run more copies. Please re-collect all strips.
 | 30 - 45 min |
| 1. “Karyotype Notes”
 | Use PPT “Karyotypes 2016” | 20 min |
| Homework: HB pp. 118-120 | Students should use the PPT “21. Genetic Disorders\_2016” under the Unit 6 tab on the class website to read, highlight important information, answer the side box questions, and complete the Check Yourself Questions. |  |

**DAY 11 (Thursday 11/3)**

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| **Assignment/Task** | **Details** | **Time** |
| 1. Warm-up: “Karyotype Practice”
 | Have students check their answers at the SSS | 5-10 min |
| 1. Karyotype Review notes and
2. Activity: “Doctor Diagnosis”
 | * Review Non-disjunction mutations and karyotypes using PPT “Karyotypes 2016” starting on slide17. Students should take notes on the “Karyotype Reference Sheet”
* Place copies of the 6 karyotypes at lab tables. Have students work in groups at the lab tables to identify all 6 karyotypes.
* Print the “reference sheet” on the back of the “Doctor Diagnosis” sheet.
* Check answers as a class.
 | 25 min |
| 1. “Karyotype Lab”
 | Use PPT “Karyotypes 2016” slides 26-29 to give directions.Either go over answers or collect and grade as a lab grade. | 40 min |
| Homework: HB “Problem Solving” pp. 123-126 | On Friday, you may post the answer key. (Found near back of binder) | Use any remaining class time |

**DAY 12 (Friday 11/4)**

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| **Assignment/Task** | **Details** | **Time** |
| 1. Warm-up: “Genetics Study Guide: Vocabulary”
 | * Post answer key or go over as a class.
 | 15-20 min |
| 1. “Partner Total Genetics Review”
 | * Pair students up (a high with a low).
* The “high” student is Partner A and always goes first.
* The “low” student is Partner B. He/she watches Partner A demonstrate how to solve the problem first. Then goes second.
* Both partners should “think aloud” as they solve each problem. This means read the problems aloud, talk out loud as they work, and model their thought processes.
* Students should continually alternate: Partner A, then Partner B for every question.
* Collect and give a grade for accuracy on this assignment.
 | 60-90 min |
| Homework: 1. Finish all HB pages 97-126 for Notebook Check (on test day)
2. “Unit 7: Genetics Qualifier” (due on test day)
 | Provide some class time on Monday for students to work. |  |

**DAY 13 (Monday 11/7)**

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| **Assignment/Task** | **Details** | **Time** |
| Complete the Partner Total Genetics Review |  | As needed |
| \*Optional: Unit 7: Genetics Practice Test | I don’t have a key, but Mrs. Buchy might | 20-30 min |
| \*Optional: “Pyramid Review Game” | Use PPT “Pyramid Review Game\_genetics” | 30-45 min |
| \*Optional: other review | Mrs. Buchy or Miss Schwippert may have other review sheets or activities students can do. | As needed |
| Homework: Study for test; complete practice guide/questions and/or Qualifier if needed; have HB notes ready to be checked (p. 97-126) |  |  |

**TEST DAY**

1. Plan about 60 minutes for all students to take the test.
2. The test will probably be in School Net. See Biology PLC for test code.
3. Grade Binders/Biology Handbooks during the test. This is a formal grade. (print copies of the rubric below)
4. Remind students of the “no cell phone policy”. Cell Phone = Zero.
5. Grades should automatically populate into Power School.

**Test will be in School Net**. Test code will be provided by Kelly Schwippert (PLC lead) or Allison Buchy.

Tests should only be given on Science Test Days.

Please assign a Chrome Book # to each student. Students should ONLY use their assigned Chrome Books.

For class sizes greater than 30, students may bring in their own lap tops or you can borrow extra Chrome books from Mr. Hudspeth, Mrs. Buchy, Mrs. Pittenaro, or Miss Schwippert.

To access School Net:

* Students will need to go to **my.ncedcloud.org** using the Chrome Books.
* School Net is the icon **“HB IIS Lea 600”**
* They will need to have claimed their NC ID (most will have done this in 9th grade)
* They will need to remember their passwords.
	+ Username = student ID number
	+ Password may be reset by any of their teachers or by Meg Bombien in the media center

**RETESTS:**

1. If a student from HONORS BIOLOGY scores below 80% on the test, you may give them a copy of the Re-looping assignment (found in the back of the binder) to complete at home.
2. Once they have done it, they can bring it to Mrs. Buchy (CB 12) (or Ms. Schwippert in CB 11) after school to be checked. She will give them one opportunity to Re-test on paper.
3. Please either use the retest in the back of the binder or get one from Mrs. Buchy or Ms. Schwippert and record it on the paper version of the grades. I will go in and change the Gradebook grade to an 80% (highest possible re-test grade) if it is appropriate.

**BINDER CHECK #6**

**HB Module 8: Genetics | pp. 97-126**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

P.98 Notes Highlighted \_\_\_\_ / 2

\_\_\_\_ / 9

 Side Box \_\_\_\_ / 2

 CYQ Answered \_\_\_\_ / 5

P.101 Notes Highlighted \_\_\_\_ / 2

\_\_\_\_ / 6

 Side Box \_\_\_\_ / 2

 CYQ Answered \_\_\_\_ / 2

P.107 Notes Highlighted \_\_\_\_ / 1

\_\_\_\_ / 9

 Side Box \_\_\_\_ / 3

 CYQ Answered \_\_\_\_ / 5

\_\_\_ / 18

Problem Solving pp.109-112 \_\_\_\_ / 18

P.114 Notes Highlighted \_\_\_\_ / 2

\_\_\_\_ / 7

 Side Box \_\_\_\_ / 2

 CYQ Answered \_\_\_\_ / 3

P.117 Notes Highlighted \_\_\_\_ / 2

\_\_\_\_ / 8

 Side Box \_\_\_\_ / 2

 CYQ Answered \_\_\_\_ / 4

\_\_\_ / 14

Problem Solving pp.123-126 \_\_\_\_ / 14

**Total Points \_\_\_\_ / 71**

**BINDER CHECK #6**

**HB Module 8: Genetics | pp. 97-126**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

P.98 Notes Highlighted \_\_\_\_ / 2

\_\_\_\_ / 9

 Side Box \_\_\_\_ / 2

 CYQ Answered \_\_\_\_ / 5

P.101 Notes Highlighted \_\_\_\_ / 2

\_\_\_\_ / 6

 Side Box \_\_\_\_ / 2

 CYQ Answered \_\_\_\_ / 2

P.107 Notes Highlighted \_\_\_\_ / 1

\_\_\_\_ / 9

 Side Box \_\_\_\_ / 3

 CYQ Answered \_\_\_\_ / 5

\_\_\_ / 18

Problem Solving pp.109-112 \_\_\_\_ / 18

P.114 Notes Highlighted \_\_\_\_ / 2

\_\_\_\_ / 7

 Side Box \_\_\_\_ / 2

 CYQ Answered \_\_\_\_ / 3

P.117 Notes Highlighted \_\_\_\_ / 2

\_\_\_\_ / 8

 Side Box \_\_\_\_ / 2

 CYQ Answered \_\_\_\_ / 4

\_\_\_ / 14

Problem Solving pp.123-126 \_\_\_\_ / 14

**Total Points \_\_\_\_ / 71**