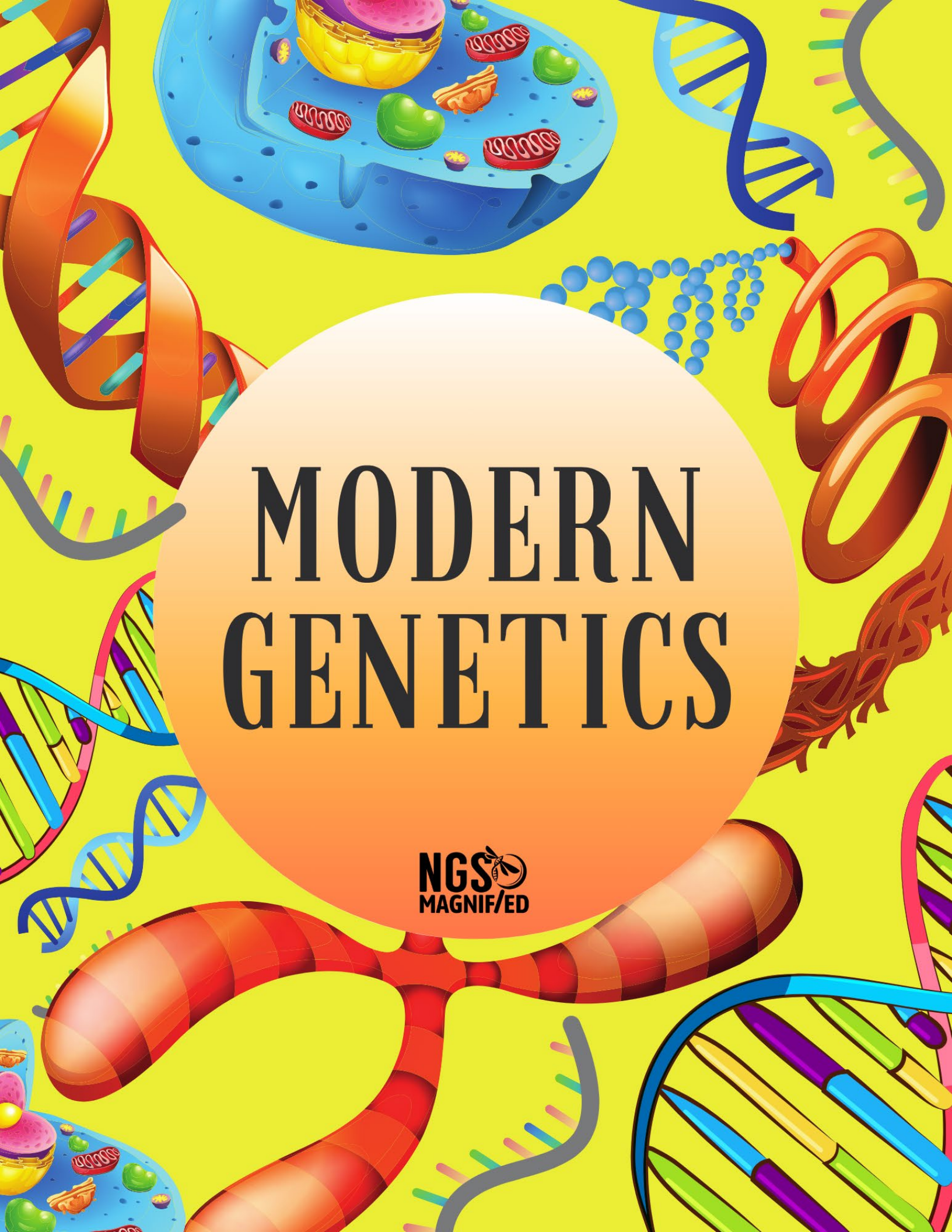




MODERN GENETICS

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Table of Contents: Modern Genetics

Description	Page #
Introduction	3
Section 1: Complex Patterns of Inheritance	4
Codominance/Blood Typing Background Printable	5
Mystery of the Baby Blunder Printable (Colon and Gray)	6–7
Mystery of the Baby Blunder Answer Key	8
Quiz: Complex Patterns of Inheritance	9
Section 2: The Genetic Code	10
“Cookie” 6 Door Shutter Foldable Printable	11
Protein Synthesis Cut-out Page 1	12
Protein Synthesis Cut-out Page 2	13
Protein Synthesis Cookie Analogy Answer Key	14
Quiz: The Genetic Code	15
Section 3: Human Genetic Disorders	16
History of Boomp Family Printable	17
Pedigree Chart Printable	18
Boomp Family Pedigree Answer Key	19
Quiz: Human Genetic Disorders	20
Section 4: Advances in Genetics	21
Tastization Advertisement Criteria	22
Quiz: Advances In Genetics	23
Answer Keys (Quizzes)	24
Contact and Copyright	25
Student Cover – Blackline	26
Appendix: Teacher Notes – LARGE Print	27–30

Introduction

If you are new to the idea of using a Science Interactive Notebook in your classroom, stop by my Nitty Gritty Science shop and download my Intro to Science Interactive Notebooks tutorial for FREE! In there you will find tips on how to begin with your students, what materials to have on hand and, most importantly, how it will enhance your students learning through reflection and creativity.

Focused Lessons with Differentiated Instruction

The lessons shared on the following pages cover National Science Standards and meet students' needs. I have given you the notes that I would give my students (Right Side – Input Side of Notebook) so you can understand what I'm having the students focus on when working on their creative assignments (Left Side – Output Side of Notebook). Each lesson focuses on a Question of the Day (QOD) represented in red in the top margin of each "Input" page with the student giving an answer in red on "Output" page.

Left Side – Output

Instructions for each Output Side are included. This includes cut-outs, foldables or master copies where applicable. You may find that students work slowly at first, but once groups are organized and students know what is expected from them, not only will you see more energy focused on the final product, but also you will be shocked at the level of creativity certain students have in certain areas.

Mini-Assessments

Mini quizzes will be given for each section so you may monitor student's level of understanding. For reproduction purposes, there are two quizzes to a page so you can cut in half and save on paper.

Section 1: Complex Patterns of Inheritance

Answer: Because the traits are controlled by many genes.

Mystery of the Baby Blunder

Directions: Using the background information on ABO blood types and your knowledge of human genetics, help solve the mystery of the baby blunder in which newborn babies were accidentally given the wrong wristbands in the delivery room. Fortunately, each baby's blood type is known, so you can use Punnett squares to help determine which baby belongs to which set of parents.

Parents: the Lincolns with blood types O and AB, the Franklins with blood types AB and B, the Darwins with blood types O and O, and the Mendels with blood types O and A.

Lincolns (O/AB)

	A	B
i	Ai	Bi
i	Ai	Bi

Possible: A or B

Franklins (AB/B)

	A	B
A	AA	AB
B	AB	BB

Possible: AB, B

Darwins (O/O)

	i	i
i	ii	ii
i	ii	ii

Possible: O

Mendels (O/A)

	A	i
i	Ai	ii
i	Ai	ii

Possible: A, O

Baby 1 AB
I belong to the: **Franklins**

Baby 2 B
I belong to the: **Lincolns**

Baby 3 A
I belong to the: **Mendels**

Baby 4 O
I belong to the: **Darwins**

Question: Why do some traits exhibit a large number of phenotypes?

COMPLEX PATTERNS OF INHERITANCE

Incomplete dominance - when neither allele of the parents is completely dominant, the phenotype of the heterozygous offspring is a mix of parents
Ex. red snapdragons x white snapdragons $\Rightarrow$ pink snapdragons

Codominant alleles - both alleles show equally
Ex. black chicken x white chicken $\Rightarrow$ speckled chicken

Multiple alleles - there are more than two alleles for a genetic trait
Ex. a rabbit's coat color - four possible colors

Humans have 23 pairs of chromosomes. 22 pairs of homologous chromosomes are called **autosomes**. The 23rd pair is called the **sex chromosomes**, which are indicated by X for females and Y for males.

Sex-linked traits - traits controlled by genes located on sex chromosomes. Ex. color blindness

Polygenic inheritance - inheritance pattern of a trait that is controlled by two or more genes. Ex. skin color and height

* Nutrition, light, chemicals, infectious agents such as bacteria, fungi, parasites, and viruses can all influence how genes are expressed.

Instructions:

Students will understand blood typing and codominant alleles when they have to help identify which baby belongs to which set of parents in this Baby Blunder activity. This activity will also serve as a great review using Punnett squares!

Included is a background information sheet on codominance blood types, a Baby Blunder student printable, a teacher answer key and a mini-quiz.

MULTIPLE LEARNING STYLES ADDRESSED WITH ORIGINAL ACTIVITIES – NO REPEATS!

Complex Patterns of Inheritance: Codominance

Background:

Human blood type is determined by codominant alleles, or alleles where both show equally. There are three different alleles for human blood type:

Genotype	Blood type
I^A	A
I^B	B
i	O

Each human has two blood type alleles, because we inherit one blood type allele from our mother and one from our father.

I^A and I^B are codominant alleles, both being dominant to the allele i. There are four possible phenotypes or ABO blood types when alleles combine: A, B, AB and O. The table below shows the genotype and phenotype for each blood type:

Genotype	$I^A I^A$	$I^A i$	$I^B I^B$	$I^B i$	$I^A I^B$	ii
Blood type	A	A	B	B	AB	O

Complex Patterns of Inheritance: Codominance

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Name _____ Date _____

Quiz: Complex Patterns of Inheritance

Matching

_____ 1. Codominant alleles

_____ 2. Incomplete dominance

_____ 3. Multiple alleles

_____ 4. Sex chromosomes

_____ 5. Sex-linked traits

_____ 6. Polygenic inheritance

_____ 7. Autosomes

a. traits controlled by genes located on the sex chromosomes

b. blood type is an example of this

c. first 22 pairs of homologous chromosomes

d. when neither allele of the parents is completely dominant; offspring shows mixed phenotype

e. having more than two alleles for a genetic trait

f. 23rd pair of chromosomes in humans

g. inheritance pattern of a trait that is controlled by two or more genes

MINI QUIZZES INCLUDED FOR EACH SECTION

Name _____ Date _____

Quiz: Complex Patterns of Inheritance

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_____ 2. Incomplete dominance

_____ 3. Multiple alleles

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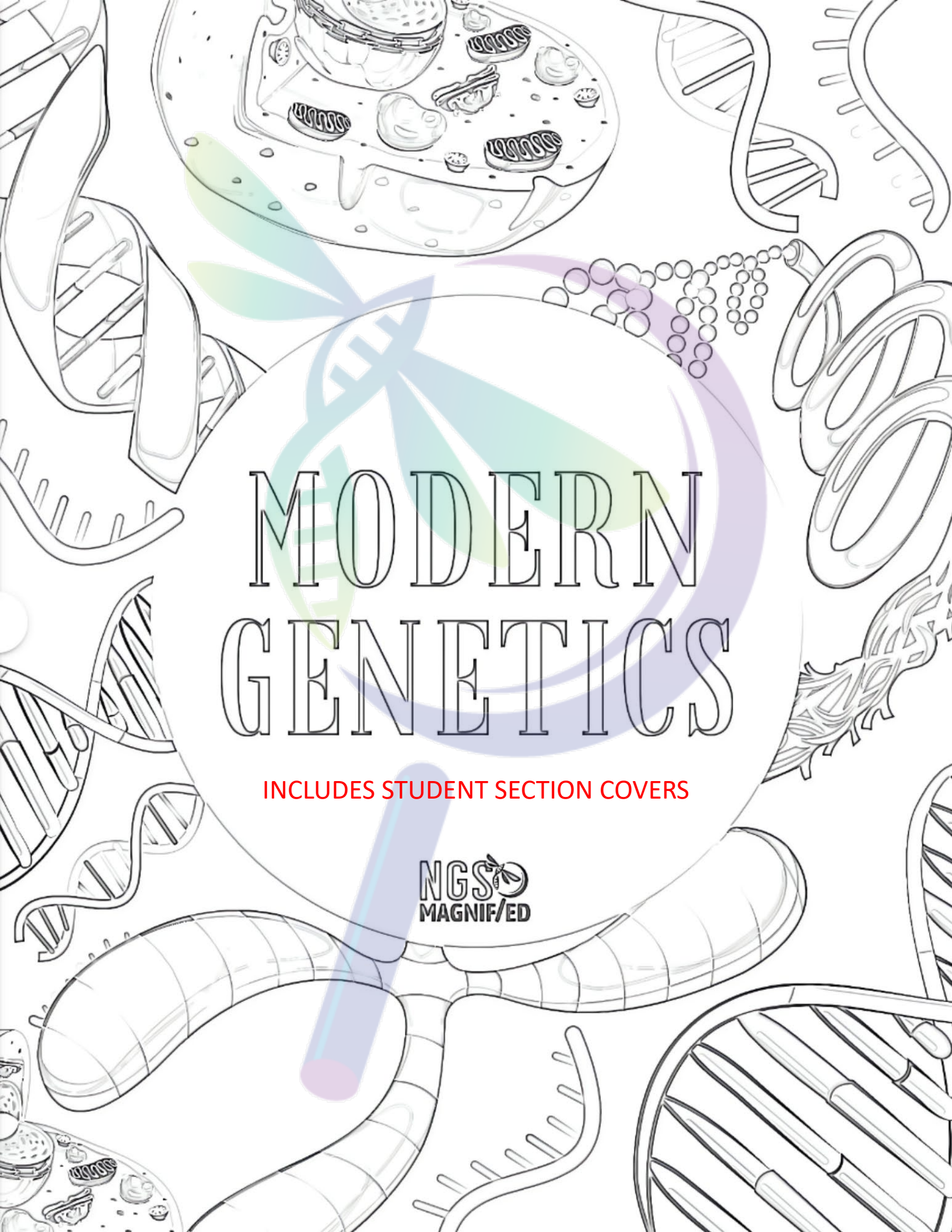
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g. inheritance pattern of a trait that is controlled by two or more genes



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INCLUDES STUDENT SECTION COVERS

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