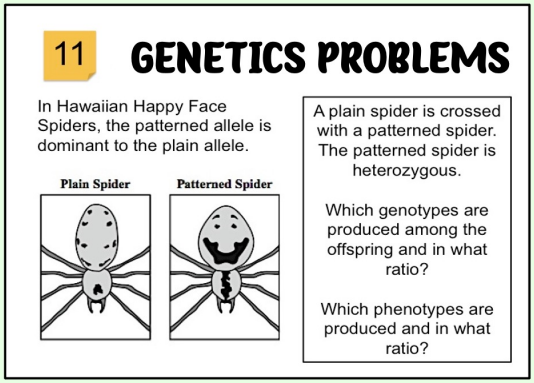


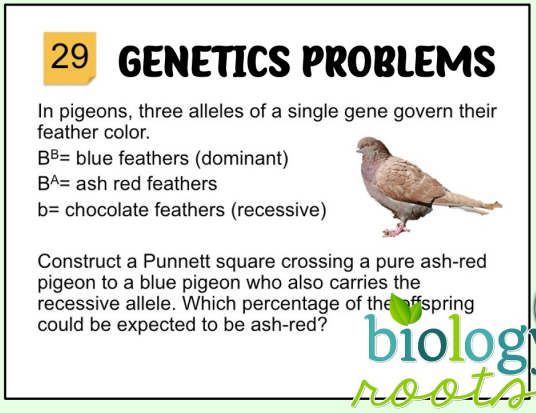
GENETICS

Complete Unit

Topics include:

- ✅ Monohybrid Crosses
- ✅ Mendel's Laws
- ✅ Punnett Squares
- ✅ Dihybrid Crosses
- ✅ Codominance
- ✅ Incomplete Dominance
- ✅ X-linked Inheritance
- ✅ Multiple Alleles
- ✅ Polygenic Traits
- ✅ Pedigrees

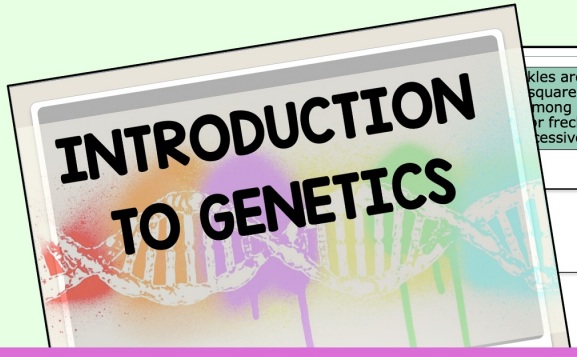




biology roots

Best for high school or middle school

Editable, digital options, answer keys included!





Step 1) Determine the parental cross:

____ x ____

Step 2) Set up Punnett square with parental crosses (outside the box).

Step 3) Fill in the Punnett Square to determine genotypes among offspring (inside the box).

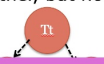
Step 4) Determine genotypic and phenotypic ratios among offspring



Mendel's Laws

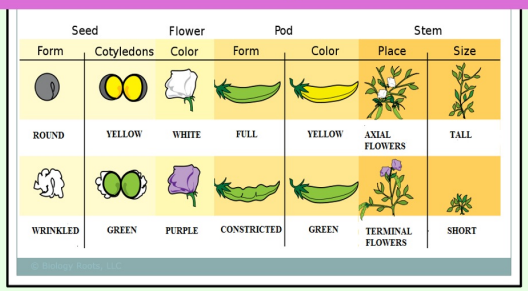
Mendel and other scientists repeated his experiments many times. Mendel's experiments proved two laws of heredity.

1. **Mendel's Law of Segregation:** states that each pair of alleles separate when gametes are formed. A gamete will receive one allele or the other, but not both.



Editable INTRODUCTION TO GENETICS

28 slides cover Mendel's experiments; Mendel's laws; alleles; monohybrid crosses; and Punnett squares



Seed		Flower	Pod		Stem	
Form	Cotyledons	Color	Form	Color	Place	Size
ROUND	YELLOW	WHITE	FULL	YELLOW	AXIAL FLOWERS	TALL
WRINKLED	GREEN	PURPLE	CONSTRICTED	GREEN	TERMINAL FLOWERS	SHORT

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When a parent makes sperm or eggs, their genes separate

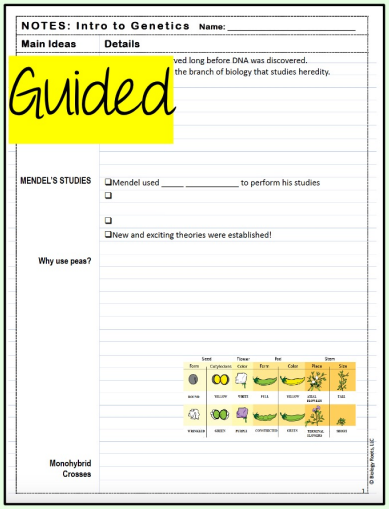
(PRINCIPLE OF SEGREGATION)

The GAMETES (egg or sperm) contain either a dominant allele or a recessive allele.



NOTES

The PowerPoint comes with 2 types of student notes to choose from: guided or fill in the blank



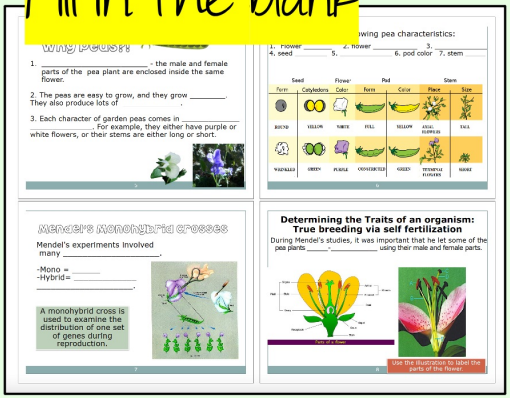
NOTES: Intro to Genetics Name: _____

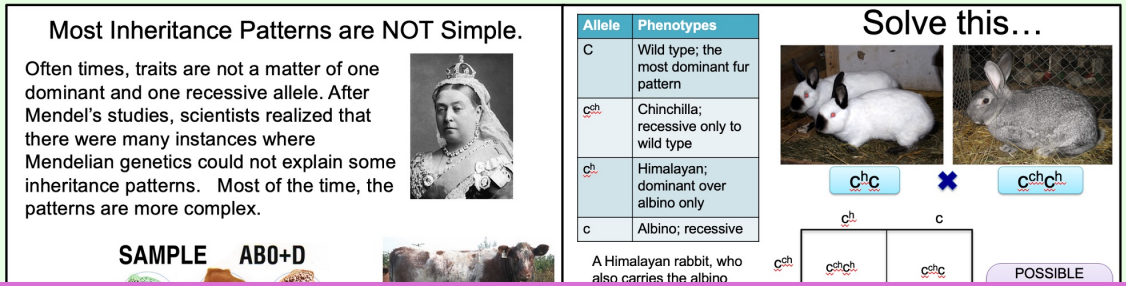
Main Ideas	Details
	ved long before DNA was discovered. the branch of biology that studies heredity.
MENDEL'S STUDIES	❑Mendel used ____ _____ to perform his studies ❑ ❑ ❑New and exciting theories were established!
Why use peas?	
Monohybrid Crosses	

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Guided

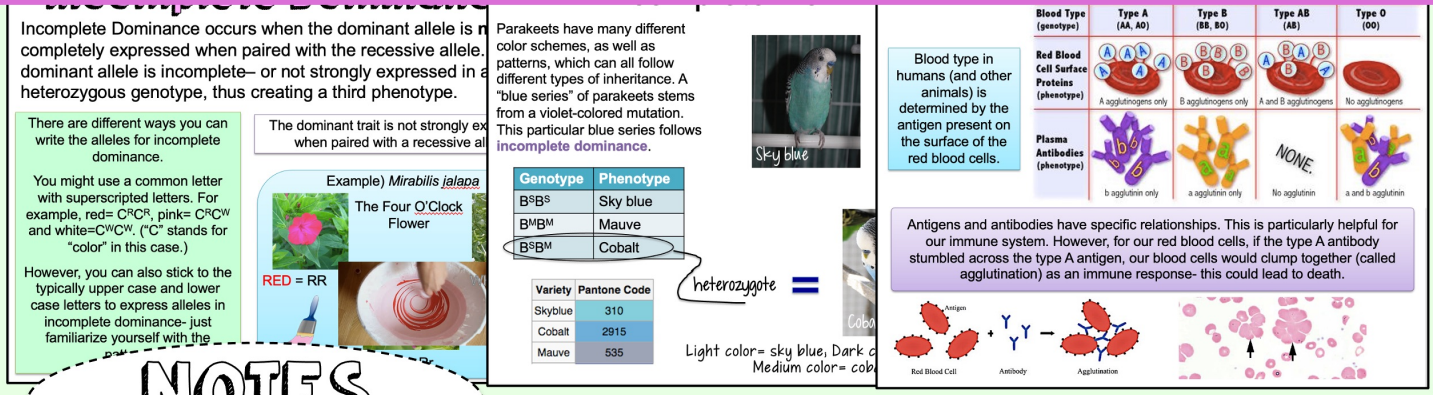
Fill in the blank





Editable COMPLEX PATTERNS OF GENETICS

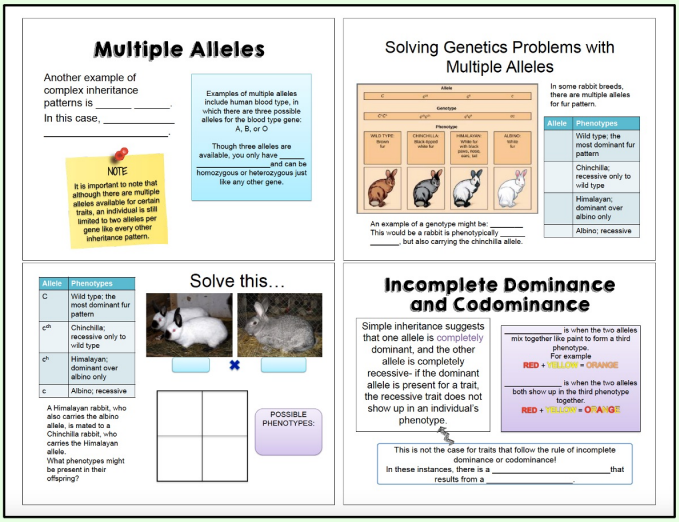
29 slides cover Multiple Alleles, Incomplete Dominance, Codominance, Polygenic Inheritance and X-linked traits



NOTES

Fill in the blank

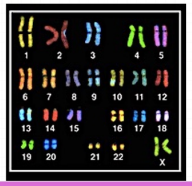
The PowerPoint comes with accompanying student notes



Types of Traits

We have a total of **23 pairs of homologous chromosomes.**

- 22 of these pairs are autosomal
- 1 of these pairs are sex chromosomes
  - Female pair= XX Male pair= XY



If a trait is **autosomal**, that means the trait is on one of the non-sex chromosomes.

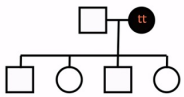
If the trait is **X-linked,** that means the trait is on the sex chromosome X.

Looking at Pedigrees

- Circles represent females
- Squares represent males
- Darkened shapes represent affected individuals.

If the condition is autosomal, shapes can be ignored.
If the condition is sex-linked, shapes must be taken into consideration.

Example- Autosomal Recessive Disorder



Since the affected individual in the example is recessive, the genotype must be tt.

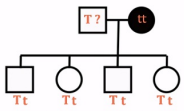
Looking at Pedigrees

We can figure out what the genotypes of the parents are by looking at their offspring.

We know that the mother must give a copy of her alleles to her kids. Since she only has the "t" allele to give, each child gets a "t".

We also know that the other individuals are not affected, therefore, they must have at least one T allele.

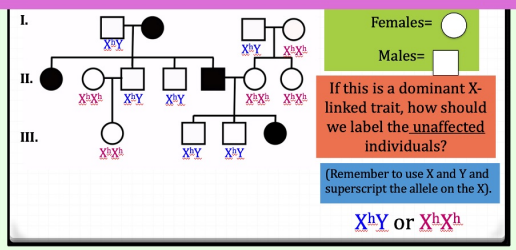
Example- Autosomal Recessive Disorder

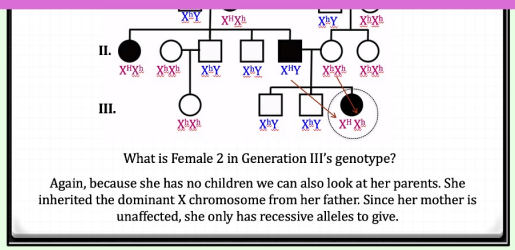


We still cannot figure out the exact genotype of the father (TT or Tt). It remains unknown given the information.

Editable PEDIGREES

25 slides cover autosomal dominant; autosomal recessive; X-linked patterns

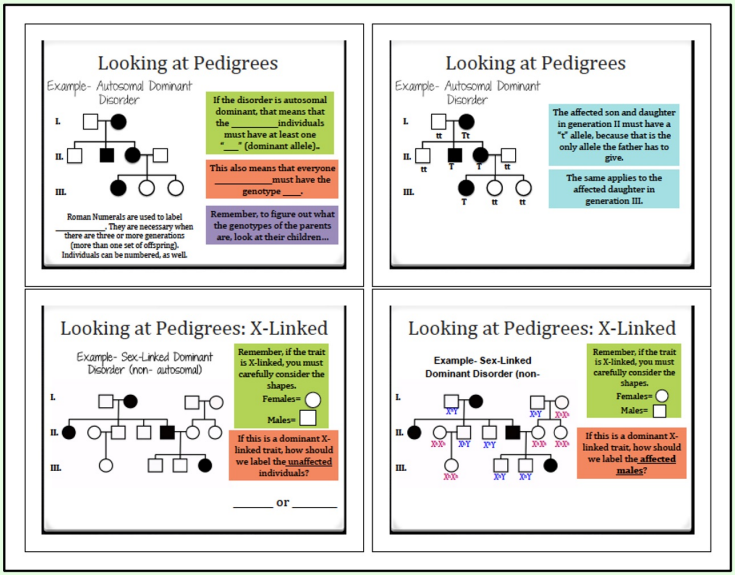




NOTES

Fill in the blank

The PowerPoint comes with accompanying student notes



CLASSWORK (most is editable). Answer keys always included.

MONOHYBRID CROSS PRACTICE: FANTASY CREATURES

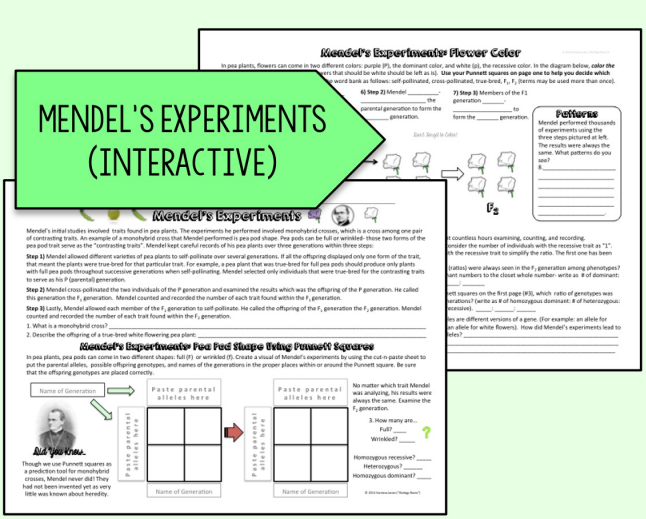
MONOHYBRID CROSS PRACTICE "GIVE PEAS A CHANCE"

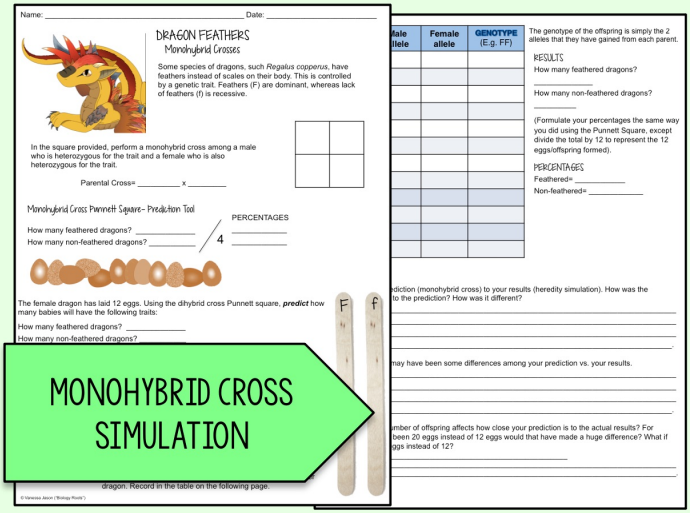
Mendel and Monohybrid Crosses classwork

MENDEL'S EXPERIMENTS READING EXERCISE

CLASSWORK AND HOMEWORK

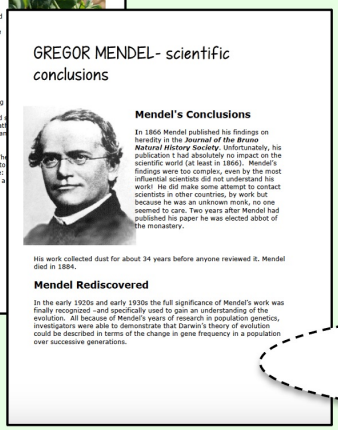
CLASSWORK (most is editable). Answer keys always included.

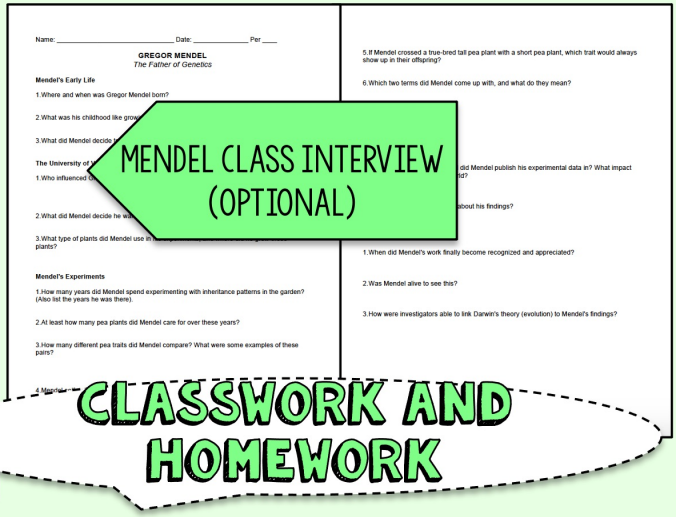




Mendel and Monohybrid Crosses classwork

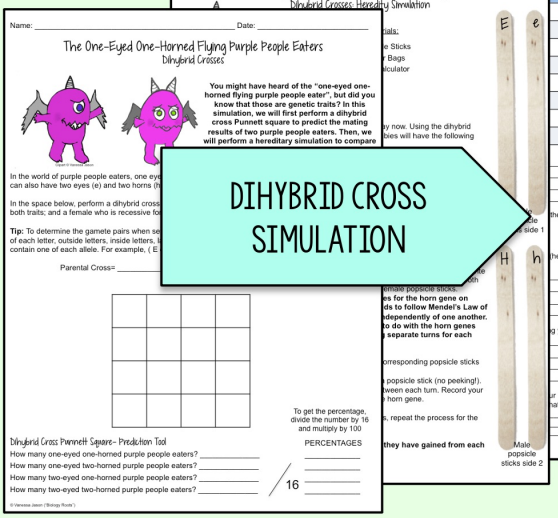




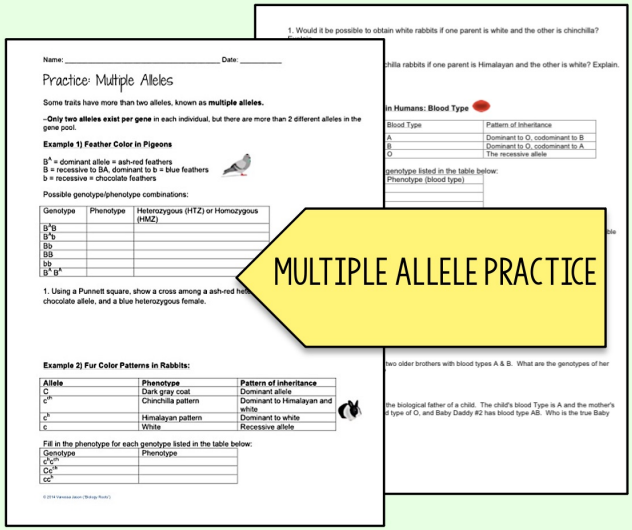


CLASSWORK AND HOMEWORK

CLASSWORK (most is editable). Answer keys always included.

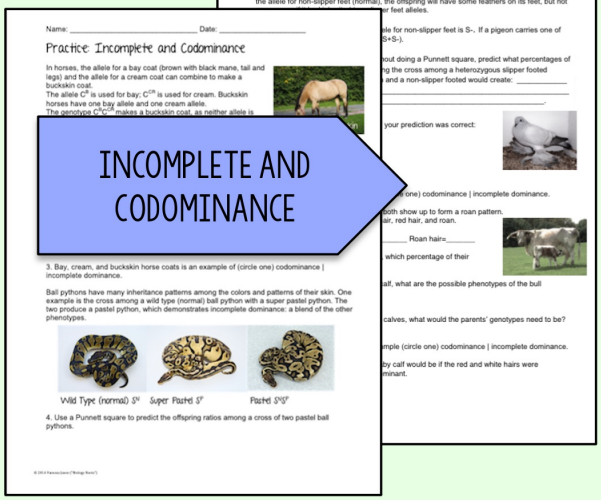


DIHYBRID CROSS SIMULATION

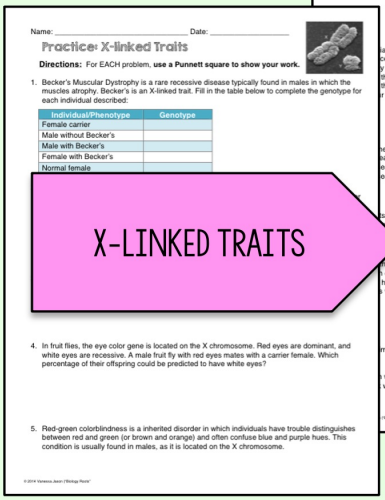


MULTIPLE ALLELE PRACTICE

CLASSWORK AND HOMEWORK

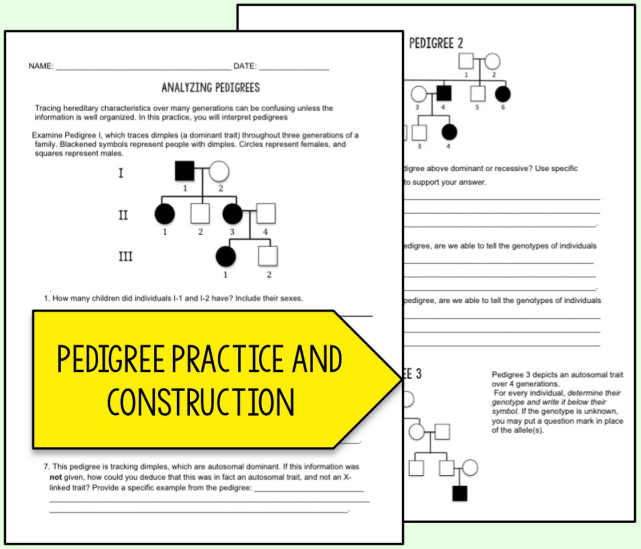


INCOMPLETE AND CODOMINANCE

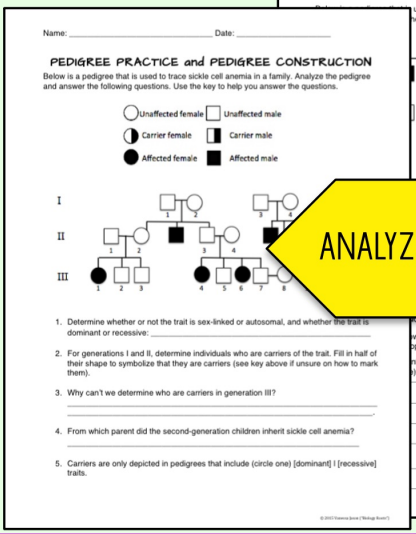


X-LINKED TRAITS

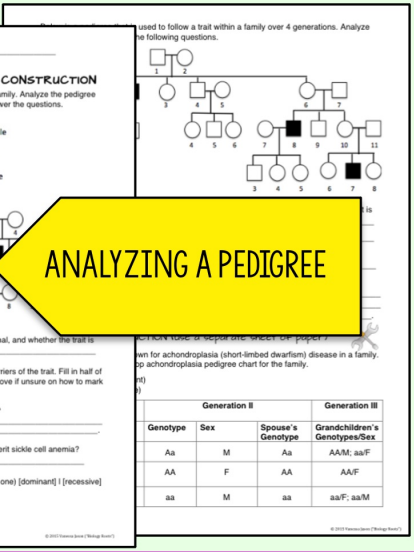
CLASSWORK (most is editable). Answer keys always included.



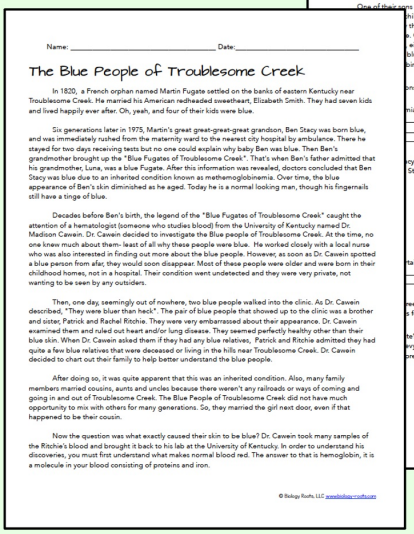
PEDIGREE PRACTICE AND CONSTRUCTION

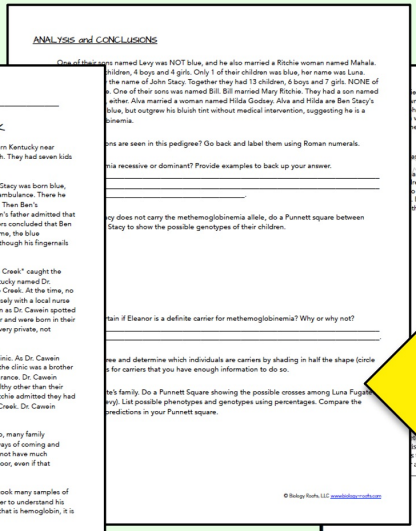


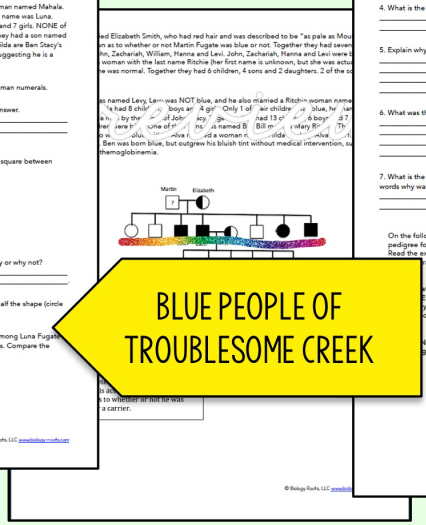
ANALYZING A PEDIGREE



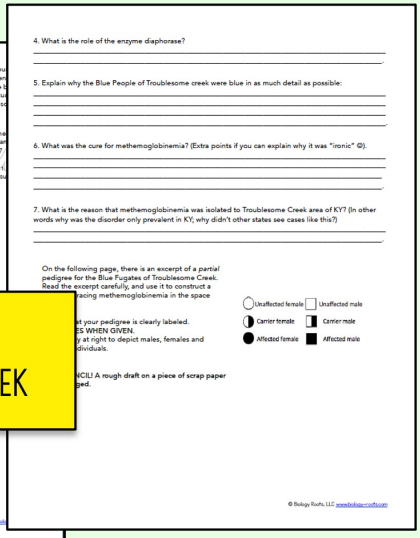
Pedigrees classwork







BLUE PEOPLE OF TROUBLESOME CREEK



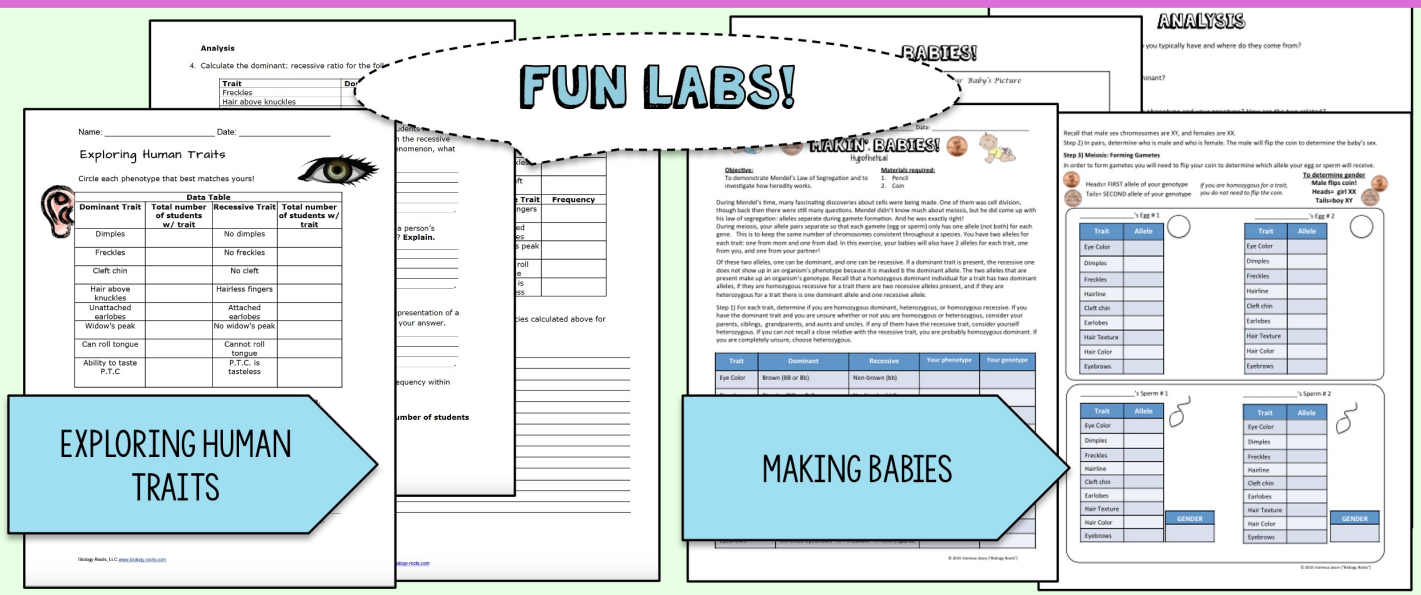
Genetics ATLAS Activities

(Analyzing and Thinking Like A Scientist)

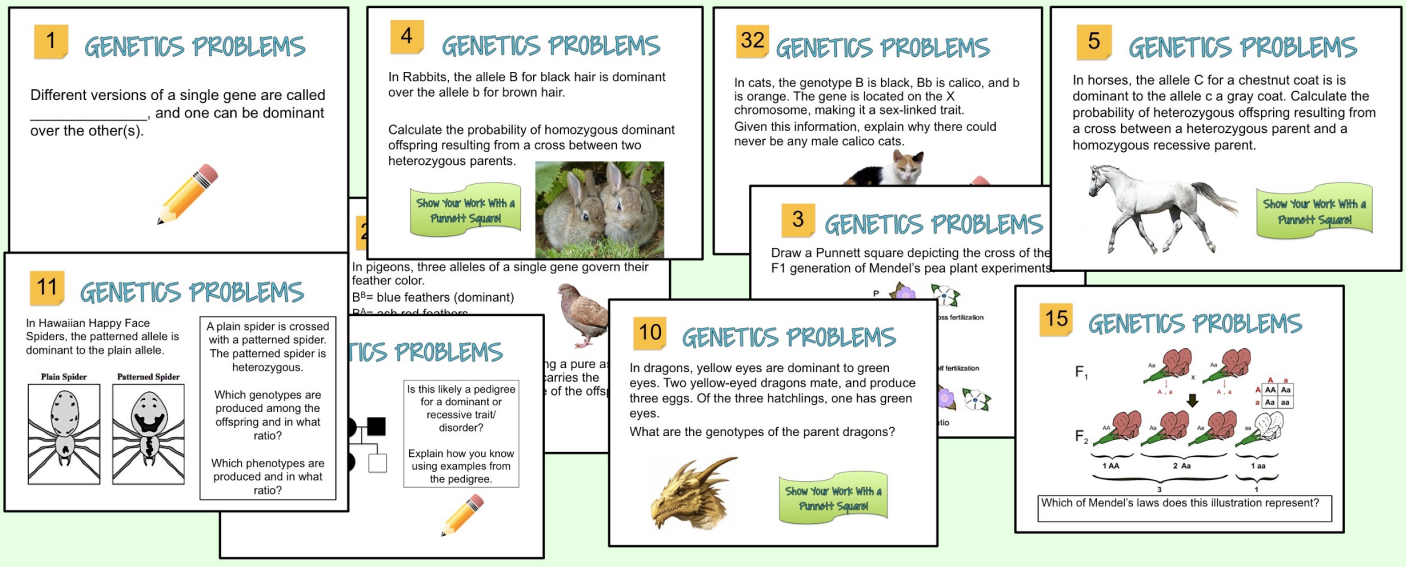
Optional and can be used in one of two ways:

1. As student-lead guided inquiry done in groups before teacher-lead instruction.
2. Or you can use what you'd like during traditional teacher-lead instruction.

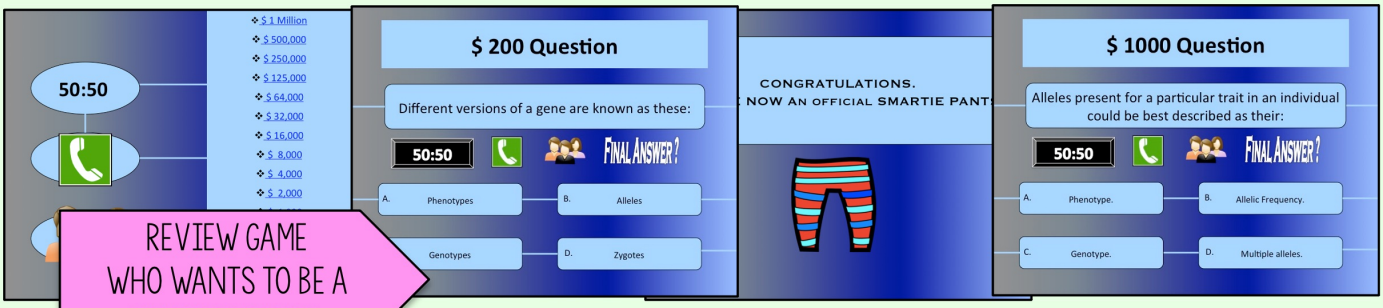
LABS



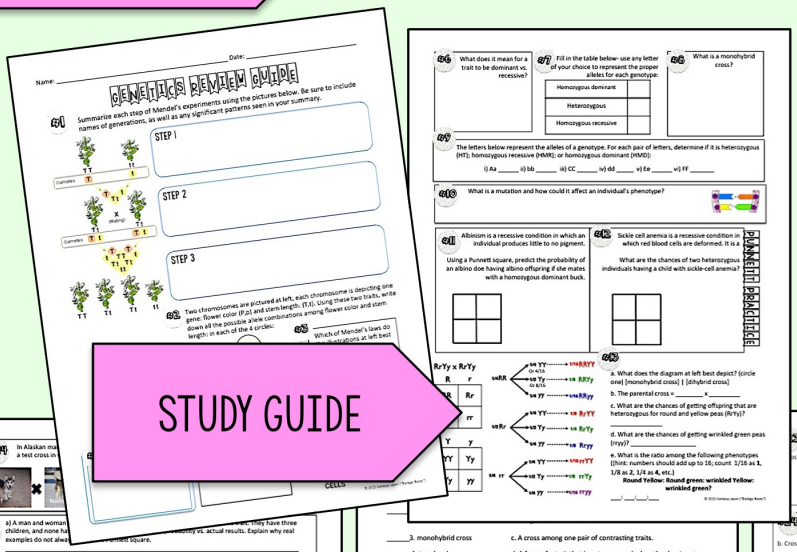
STATIONS



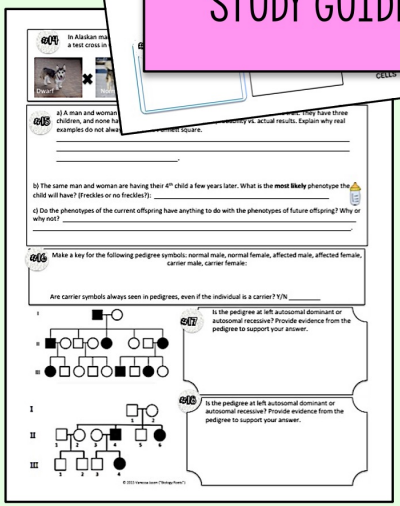
REVIEW AND QUIZZES

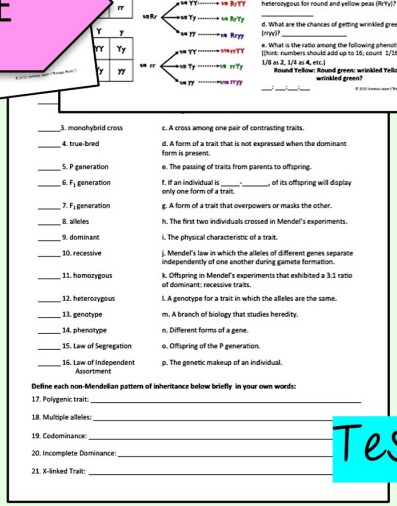


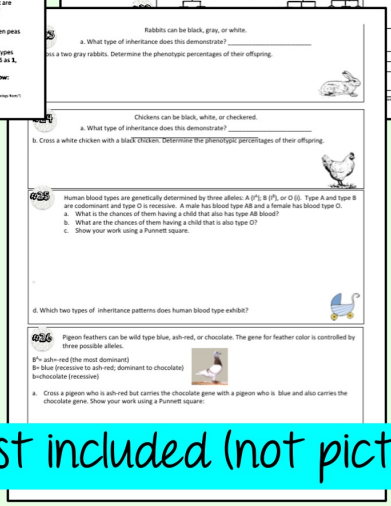
REVIEW GAME
WHO WANTS TO BE A SMARTIE PANTS



STUDY GUIDE







Test included (not pictured)

GENETICS UNIT BUNDLE ~50 MINUTE BLOCKS

DAY / DATE	STUDENT ACTIVITY AND TEACHER NOTES	LEARNING TARGET
(BEFORE)	ATLAS JOURNAL IS OPTIONAL. SEE TEACHER GUIDE IN FOLDER FOR MORE INFORMATION AND LEARNING TARGETS.	
1 _____	Notes: Introduction to Genetics OPTIONAL: If you'd like to do the Mendel Interview, assign Mendels Mendel's Experiments READING EXERCISE (not the cut and paste)– homework if not finished	To outline basic genetics, including terms such as phenotype and genotype, and to introduce Mendel and his laws.
2 _____	Review: Mendel's Experiments Reading Exercise Monohybrid Cross Practice: Give Peas a Change (you can do the first 1–2 as a class). Punnett Square Problem Set: Fantasy creatures (homework if not finished)	To determine possible genetic outcomes via Punnett squares. Goal: Students will have a basic understanding of P–square set up, genotypes, and phenotypes.
3 _____	Review Punnett Squares Problem Set (Fantasy Creatures) OPTIONAL: Mendel Interview Mendel's Experiments CUT and COLOR (if doing both the Interview and the Cut and Color; finish the cut and color activity for homework OR give time to finish it next class.) QUIZ coming up on introduction to genetics / monohybrid crosses! *Note: prep required for simulation: paper bags, popsicle sticks	To expand our understanding of Punnett Squares and have a solid understanding of P, F1, and F2 generations. Goal: Students will be able to explain patterns and ratios seen in Mendel's experiments.
4 _____	Lab: Simulating Monohybrid Crosses (Dragon Feathers) QUIZ next class	To predict genetic outcomes and compare this to actual outcomes using a simulation. Goal: Students will determine that Punnett squares are a prediction tool (not a crystal ball!)
5 _____	Optional: Quick review before class or take questions Quiz: Introduction to Genetics Optional LAB: Exploring Human Traits (optional; if you choose to skip, move onto dihybrid notes and dihybrid cross simulation this class period) *Note: prep required for simulation: paper bags, popsicle sticks	To evaluate recessive and dominant traits among the class. The goal is for students to determine that recessive traits do not always mean fewer individuals.
6 _____	Notes: Dihybrid Crosses Lab: Simulating Dihybrid Crosses (no big deal if you need time to finish next class– but best to make sure you get through the table #s 1–8)	To construct dihybrid cross Punnett squares.
7 _____	Notes: Complex Patterns of Inheritance up to blood types (through incomplete dominance; stop at x-linked genes.) Worksheets: Multiple alleles Homework: Incomplete and Codominance (depending on time, you can bump this to next class if needed.)	To apply what we have learned to more complicated inheritance patterns. Goal: Students will have a basic understanding of incomplete dominance, codominance, and multiple alleles.

A pacing guide with learning targets is provided to guide you with lesson planning throughout the entire unit.

Includes both 50 and 90 minute blocks.

Covers both learning targets and learning goals.

Adaptable - use it as is, or make your own!

More information:

Digital versions are hosted on Google Slides.

Supports NGSS (ATLAS activities particularly).

Test included (not pictured).

★★★★★ **Extremely satisfied**

This is a great resource to gain understanding of the concepts all while enjoying and having fun learning. We love Biology Roots.

Still not sure if you need this resource?

This unit is for any teacher who is looking for a truly no-prep genetics unit from start to finish, or simply a large bank of genetics activities to use in the classroom! If your school is using an online curriculum, and you are finding that it is not consistently conducive to student learning, my unit bundles are compatible as supplemental material and really help prevent student burn out - because I know what sparks students! I also update my material to keep it fresh.

Reach out with questions ☺

-Vanessa