UNIT OVERVIEW

REPRODUCTION

Unit Issue: The use of genetic information to make medical and health-related decisions.

Anchoring Phenomenon: Most people have features more like their biological relatives than most other people, but even within a family, each person is unique.

Listed below is a summary of the activities in this unit. Note that the total teaching time is listed as 19–28 periods of approximately 45–50 minutes (approximately 4–6 weeks). There are no suggested activities to skip in this unit as skipping an activity in this case would mean losing key NGSS elements of the unit, e.g. the opportunity to practice elements of the PE prior to the activity that assesses it.

Activity Description	Topics	Advance Preparation	Assessment	Teaching Periods
1. **View and Reflect: Joe's Situation** Students are introduced to a scenario of a student who has just learned he may have inherited a genetic condition (Marfan syndrome).	genes, genetic disorders LITERACY SENSEMAKING	Preview the video, preview Activity 7, plan when to set up seedlings for demo.	E&T QUICK CHECK A7	1–2
2. **Modeling: Creature Features** Students develop models to investigate the inheritance of a trait in imaginary creatures.	gene, trait, sexual reproduction, breeding, offspring, inherited, modeling, hypothesis LITERACY SENSEMAKING	Obtain chart paper; obtain black, blue, and orange markers; copy Student Sheets; make templates; preview Activity 7; plan when to set up seedlings for demo.	MOD QUICK CHECK A2	1–2
3. **Reading: Reproduction** Students read about the differences between sexual and asexual reproduction at the cellular level.	cell, heredity, offspring, asexual reproduction, sexual reproduction, clone, fertilization LITERACY	Copy Student Sheet, preview Activity 7, plan when to set up seedlings for demo.	EXP QUICK CHECK A1 MOD A3	2
4. **Investigation: Gene Combo** Students model the inheritance of single-gene traits by collecting and analyzing data from coin tosses.	gene, inherited, fertilization, allele, dominant, recessive, random, probability, modeling, hypothesis MATHEMATICS SENSEMAKING	Obtain pennies and small cups (optional), copy Student Sheet.	ODA Proc ARG QUICK CHECK A6 EXP A8	1–2
5. **Problem Solving: Gene Squares** Students use Punnett squares to model sexual reproduction and predict the approximate frequencies of traits among offspring.	allele, dominant, recessive, carrier, heterozygous, homozygous, Punnett square MATHEMATICS	Copy Student Sheet.	MOD A5	2–3
6. **Reading: Mendel, First Geneticist** Students read about Gregor Mendel's experiments with pea plants.	gene, trait, allele, sexual reproduction, offspring, dominant, recessive, probability, random LITERACY		EXP A5	1–2

REPRODUCTION (continued)

Activity Description	Topics	Advance Preparation	Assessment	Teaching Periods
7. **Laboratory: Do Genes Determine Everything?** Students design an experiment to investigate the effect of the environment on such plant traits as seedling color.	gene, allele, trait, heredity, heterozygous, homozygous, nature vs. nurture LITERACY MATHEMATICS	Obtain masking tape, permanent markers.	PCI Proc. ODA Proc. AID A1 EXP A2 (Assessment of PE MS-LS1-5)	2
8. **Reading: Show Me the Genes!** Students read about the behavior of chromosomes and the function of DNA during sexual reproduction.	cell, gene, allele, chromosome, DNA, fertilization, mutation, nucleus, sexual reproduction LITERACY SENSEMAKING		MOD A1, A3 QUICK CHECK A2	2
9. **Investigation: Breeding Critters — More Traits** Students create imaginary critter offspring to model patterns of inheritance and develop explanations of what happens in terms of genes, chromosomes, and environmental effects.	allele, chromosome, diversity, dominant, gene, recessive, trait	Obtain pennies, colored pencils; prepare materials (e.g., cut straws), copy Student Sheet.	MOD A7 (Assessment of PE MS-LS3-2) EXP A8	1–2
10. **Investigation: Animal Behavior** Students read one of four real case studies on a behavioral or physical trait in an animal. They examine and interpret graphs to argue for how those traits increase the animal's reproductive success.	reproductive success, animal behavior LITERACY MATHEMATICS SENSEMAKING		ARG A1 (Assessment of PE MS-LS1-4)	2
11. **Investigation: Plant–Animal Interactions** Students read about four different flowers and four different pollinators. They construct an argument for how the structure of the plant increases its reproductive success by attracting a specific type of pollinator.	pollination, pollinator		ARG A1 (Assessment of PE MS-LS1-4)	1
12. **Modeling: How Do Genes Produce Traits?** Students use a simplified codon table to determine part of the fibrillin protein sequence from a given DNA sequence and explore the protein's three-dimensional structure.	DNA, gene, protein, subunit	Copy Student Sheet.	QUICK CHECK A2, A3	1–2
13. **Modeling: Fault in the Genes** Students model mutations and their effects on protein sequence and structure.	mutation SENSEMAKING	Preview video.	MOD A4 (Assessment of PE MS-LS3-1)	1–2
14. **Talking It Over: Advising Joe** Students revisit the Marfan scenario and use a model to construct an explanation of what is going on and an argument about what Joe should do.	DNA, dominant, heterozygous/ homozygous, mutation, probability, trait	Copy Student Sheet.	COM Proc. E&T A2	1–2