

6th Grade Science STEAM Integration

Unit 3: Traits & Reproduction

Topic: Engineering Design

Time: 2 Days

Standards:

[MS-LS1-2](#) Develop and use a model to describe the function of a cell as a whole and the ways parts of cells contribute to the function.

[MS-LS1-4](#) Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively

[MS-LS1-5](#) Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.

[MS-LS3-2](#) Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.

[ISTE 1.6](#)— Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.

Scenario

Every monster has its own look—sharp teeth, furry arms, glowing eyes—but where do those traits come from? Just like you, monsters inherit their traits from their parents through genes! In this activity, you'll use Punnett squares to determine the traits of your very own monster—and then bring it to life using paper circuits.

Your monster must:

- Show at least 3 inherited traits (determined by Punnett squares)
- Include LED eyes powered by a simple paper circuit
- Be labeled with its genotype and phenotype

Success Criteria

Students can use Punnett squares to determine inherited traits, correctly label genotypes and phenotypes, and build a working paper circuit to represent one or more traits in a creative monster design.

Lesson Outline

Day 1 – Genes & Designs

- Warm-Up (10 min)
 - Quick review: What is a genotype? What is a phenotype?
 - Example Punnett square for glowing eyes (G = glow, g = no glow)
- Activity (30 min)
 - Students are given parent genotypes for several traits, e.g.:
 - Eye Glow (G/g)
 - Fur Color (B/b)
 - Teeth Shape (T/t)
 - Complete Punnett squares to find offspring combinations
 - Randomly select one offspring outcome to build
 - Sketch and color monster design showing phenotype for each trait
 - Decide where LED lights will go (e.g., eyes)
- Wrap-Up (5 min)
 - Share monster sketches with a partner and compare traits



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Day 2 – Build & Light It Up

- Warm-Up (5 min)
 - Demo: How to build a paper circuit (copper tape + LED + battery)
 - Safety tip: Always check polarity (long LED leg = +)
- Activity (35 min)
 - Build your Paper Circuit Monster:
 - Glue monster design to backing
 - Add copper tape circuit behind the LED eyes
 - Attach battery so eyes light up when circuit is closed
 - Label traits with genotype + phenotype
 - Example: Eye Glow – Genotype: Gg, Phenotype: Glowing
- Wrap-Up (5 min)
 - Gallery walk to showcase glowing monsters and traits
 - Optional: Students explain one trait's inheritance using their Punnett square

Extension/Optional Challenge:

Let students design a “parent monster” pair and swap with classmates to create different monster offspring!

Resources

[Paper Circuits Monster Worksheet](#)

