**Focus on Inquiry**
This game uses a hands-on interactive approach to introducing students to genotype and phenotype combinations, Punnett Squares, and other genetic topics related to pedigree.

**Game Overview**
In this scenario-based game, players will assume the role of “monster intern” and assist Dr. Mayhem in answering patients’ genetic questions and problems. Upon successful completion of the game, students will be able to create and analyze Punnett squares to help explain how genotypes influence phenotypes, and determine the probability that a monster will inherit a particular trait from its parents based on data analysis. Students will also be able to determine which genotypes are required to produce desired monster traits (phenotypes) by examining and adjusting different Punnett squares.

**Implementation**
This game-based lesson can be used in conjunction with “Monster Mash-Up of Genetics” a 5E MSP lesson plan, created by Lindsey Evans, Brian Glasby, and Judy McDonald (2016), or as a standalone lesson or review activity.

<table>
<thead>
<tr>
<th>Duration</th>
<th>Setting</th>
<th>Grouping</th>
<th>Equipment</th>
<th>PTI Inquiry Subskills</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-40 minutes</td>
<td>Classroom or computer lab</td>
<td>Individual or partners</td>
<td>Computer or mobile device, Internet connection</td>
<td>3.3, 3.4, 4.3, 4.4, 5.2, 5.3, and 5.8</td>
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</tbody>
</table>

**Florida Science Standards – Nature of Science**
SC.7.N.3.2 - Identify the benefits and limitations of the use of scientific model.

**Florida Science Standards – Life Science**
SC.7.L.16.2 - Determine the probabilities for genotype and phenotype combinations using Punnett squares and pedigrees.

**Game Levels**

**Pre-Training** – In the pre-training section, students are able to select their level of difficulty, select an avatar, see the game and learning objectives, click through the navigation tutorial, visit the optional review section, and view the game storyline.

**Level 1 (Beginner)** – In this level, students learn about the basics of alleles, genotype, and phenotype. A series of three activities allows them to demonstrate their understanding of genotype and phenotype. This level has more scaffolding than other levels, as it introduces the core concepts of the game.

**Level 2 (Beginner)** – In this level, students experiment with Punnett Squares and use a trait table to make a visual connection between genotype and phenotype. They must complete each Punnett Square before answering a question about the possibility of a particular trait appearing.
Level 3 (Beginner) – In this level, students explore dominant and recessive traits, as well as homozygous and heterozygous traits. They use data to complete the Punnett Square and then draw conclusions based on this information.

Level 4 (Beginner/Advanced) – In this level, students continue to experiment with Punnett Squares and use a trait table to make a visual connection between genotype and phenotype. They must complete each Punnett Square before answering a question about the mathematical probability of a particular trait appearing.

Level 5 (Beginner/Advanced) – In this level, students explore dominant and recessive traits further, and use Punnett Squares to predict which traits may result from the monster couple’s union. They must fill in the alleles for the Punnett Squares in this activity.

Level 6 (Beginner/Advanced) – In this level, students must view the genetic profile for the mother and father monster, and then create a possible monster child using what they already know about Punnett Squares and dominant and recessive traits. There are several versions of the child possible, and students will answer questions about the child that they create.

Level 7 (Advanced) – In this level, students explore the concept of incomplete dominance by performing a slime test and hypothesizing why a pink monster resulted from red and white monster parents. Punnett Squares are used to illustrate the probability of each color result.

Level 8 (Advanced) – In this level, students explore the concept of co-dominance by performing a slime test and hypothesizing why a multi-colored monster resulted from two different colored parents. Punnett Squares are used to illustrate the difference between incomplete dominance and co-dominance.

Level 9 (Advanced) – In this level, students explore the concept of multiple alleles and order of dominance. Punnett Squares and an order of dominance table are used to illustrate this concept.

Bonus - Monster Maker – Students are offered the option to play the bonus level at the end of the Beginner and end of the Advanced game. In this level, students will choose several traits for their monster, and then answer a series of questions related to the likelihood of dominant and recessive traits occurring. Finally, students will be able to see the monster they created, choose a habitat for their monster, and print or save the end result.
Skip Level Instructions
The Monster Genetics game is played in a sequential order, but if you want to skip to a particular level in the game, it is possible to do so using a skip code during gameplay. Follow the instructions below.

Intern Badge: On the intern badge screen in the pre-training level, you can type any skip code over the number that is already present in the “passcode” field and then click on the continue arrow button.

Menu Button: From the game menu button you can type any skip code into the blank area at the bottom of the menu next to “Passcode” field and then click submit.
The following skip codes are currently valid in Monster Genetics:

Level 1 = 11111
Level 2 = 22222
Level 3 = 33333
Level 4 = 44444
Level 5 = 55555
Level 6 = 66666
Level 7 = 77777
Level 8 = 88888
Level 9 = 99999
Bonus = mmaker
Beginner Hallway = skip
Advanced Hallway = skipadv
Survey = survey