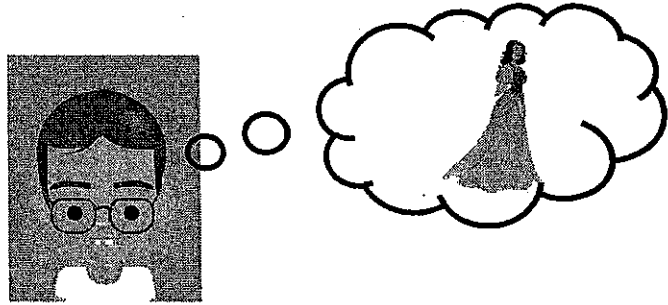


LEVEL 1: *Alsele Alley*

Peter Punnett Square is a nice boy who is only looking to rescue his love, Princess Punnett. But, he needs your help to solve the problems and riddles. He knows the levels will get harder and is worried you'll give up! He begs you to stay with him in this journey so he can be happy again!



Low and behold, as Peter makes the long journey to the Castle to rescue his Princess, he meets comes upon a small hut in the forest. The door knocker reads "Hatchi the Genetics Sensei.

Stage 1: Hatchi the Genetics Sensei

Peter exclaims: "A Sensei! Just what I need to help me on my journey"

Peter knocks on the door and questions timidly "Sensei?"

A deep, hallow voice from behind the door says softly and sternly, "It is I, Hatchi, the Genetics Sensei. Where does your journey take you?"

Peter clears his throat, "Ah, um, to the Castle to rescue Princess Punnett"

Hatchi's hallow voice replies, "You must answer the following questions before I deem you worthy of apprenticeship"

Peter replies "Ok... What questions should I answer Sensei?"

Hatchi slips a piece of paper underneath the door. Help Peter complete the first task so he can be worth of the Sensei's teachings.



Master Sensei's Quiz

What is a trait?

What is a gene?

What is an allele?

What do we mean when we say a gene is *dominant*?

What do we mean when we say a gene is *recessive*?

What is the difference between *genotype* and *phenotype*?

Upon receiving the Master of Arms signature, you may move onto the next Stage:

[Master of Arms Signature]

Stage 2: Hatchi's Lair

"Enter young Deshi (student)" says Hatchi

Upon entering Hatchi's hut, you find him working at his desk.

"What are you working on Sensei?" says Peter

"One should not ask so many questions of Sensei" says Hatchi

As Peter takes a closer look, Hatchi has a manuscript with different letters. "You must check my work Peter and let Sensei know if I have completed the problems accurately"

Peter reluctantly takes the manuscript from Sensei.

*Help Peter check for accuracy on the following genotypes, write next to it any corrections that must be made, if correct check the box next to the genotype.

Pea Plants	
Genotypes:	Corrections:
<input type="checkbox"/> GG <u>homozygous dominant</u>	_____
<input type="checkbox"/> Gg <u>heterozygous</u>	_____
<input type="checkbox"/> gg <u>homozygous recessive</u>	_____
<input type="checkbox"/> Tt <u>homozygous dominant</u>	_____
<input type="checkbox"/> TT <u>homozygous recessive</u>	_____
<input type="checkbox"/> Tt <u>heterozygous</u>	_____
<input type="checkbox"/> aa <u>homozygous recessive</u>	_____
<input type="checkbox"/> AA <u>heterozygous recessive</u>	_____
<input type="checkbox"/> Aa <u>heterozygous</u>	_____

"Sensei, I've made all the corrections, may I ask why do you want to know these genotypes?" questions Peter.

"Ah, Peter, it is the mystery of life, this question 'why?'" says Sensei, in a calm, feathery voice.

"Thanks for the clarity Sensei" says Peter sarcastically.

Name: _____ Period: ____ Date: _____

"Peter, your next task is to identify the **phenotype** of each pea plant from the following table:"

Trait of Pea	Dominant Allele	Recessive Allele
Seed Color	Green (G ____)	Yellow (gg)
Plant Height	Tall (T ____)	Short (tt)
Flower position	Axial (A ____)	Terminal (aa)

Pea Plants

Genotypes:

- GG _____
- Gg _____
- gg _____
- Tt _____
- TT _____
- Tt _____
- aa _____
- AA _____
- Aa _____

Phenotypes:

[Master of Arms Signature]

Stage 3: Melanie's Mendel:

"Congratulations young Deshi, you have helped Sensei identify alleles, genotypes and phenotypes" says Hatchi, smugly. "I must ask you now for a personal favor.

"Anything Sensei" says Peter

"Meet Melanie Mendel, her great uncle, Gregor Mendel proved the inheritance of certain traits with his experiments on pea plants." Sensei continues, "Melanie is helping me complete Punnett squares on certain traits with several pea plants. Can you help her complete the Punnett squares? If you complete this task, I know you will be ready for the Castle." Sensei reassures Peter.

"I would love to Sensei, you are an excellent teacher" Peter claims.

Melanie explains: "For each genetic cross, write the letters for each genotype in the parenthesis next to their descriptions. Then complete the Punnett Square crosses and identify the phenotypic ratios for each cross"

1. The tall gene (T) is dominant over the short gene (t). A homozygous dominant plant (_____) is crossed with a homozygous recessive plant (_____)

Phenotypic Ratio:

of Tall plants : # of Short Plants
 _____ : _____

2. Green seed color (G) is dominant over yellow seed color (g). A homozygous recessive plant (_____) is crossed with a heterozygous plant (_____).

Phenotypic Ratio:

of green seeds : # of yellow seeds
 _____ : _____

3. The axial flower position (A) is dominant over the terminal flower position (a). A heterozygous plant (_____) is crossed with a homozygous dominant plant (_____).

Phenotypic Ratio:

of plants with axial flowers : # plants with terminal flowers
 _____ : _____

Master of Arms Signature : _____

Name: _____ Period: ____ Date: _____

Stage 4: Help Hatchi!

"Thank you so much for helping my dear friend Melanie." Says Hatchi. "I have one last task for you before I will send you on your way"

"Your final task is to create a Punnett Square problem (cross) using the smooth and wrinkled pea gene. The only help I will give you is that smooth peas are dominant over wrinkled peas." [See Stage 3 for examples]

"After creating your problem, you must solve it using a Punnett square and give the phenotypic ratio"

Problem:
Punnett Square:
Phenotypic Ratio:

Master of Arms Signature : _____

"Congratulations! You no longer need Sensei Hatchi to guide you on your way!"

"You may move onto Level 2...but be careful of the moat around the Castle! There is said to be many foul sea creatures lurking in the depths of the ocean water" warns Sensei.

"I'll be careful Sensei, I have enjoyed being your student" says Peter humbly." **[Move onto Level 2]**