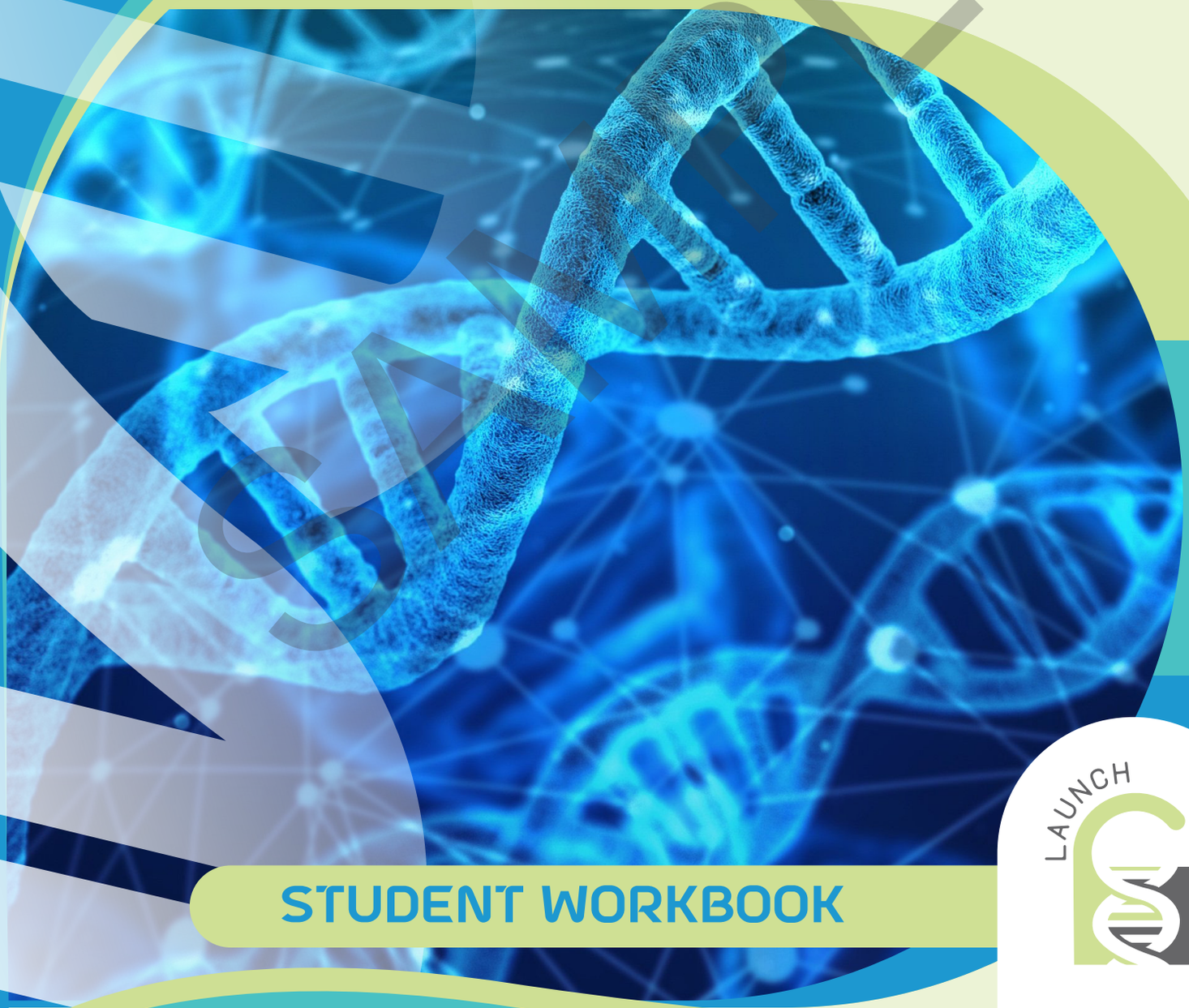
CRACK THE CODE



SAMPLE

STUDENT WORKBOOK

LAUNCH

ACTIVITY 1

THE UNKNOWN

There is a lot medical professionals know, but what about the parts of us we don't know yet? In this activity, you will discover a medical mystery to unlock parts of the unknown.

I MEDICAL MYSTERY

You are a medical professional and have a patient, Elizabeth, who is a 30-year-old female. She comes to you because she is experiencing:

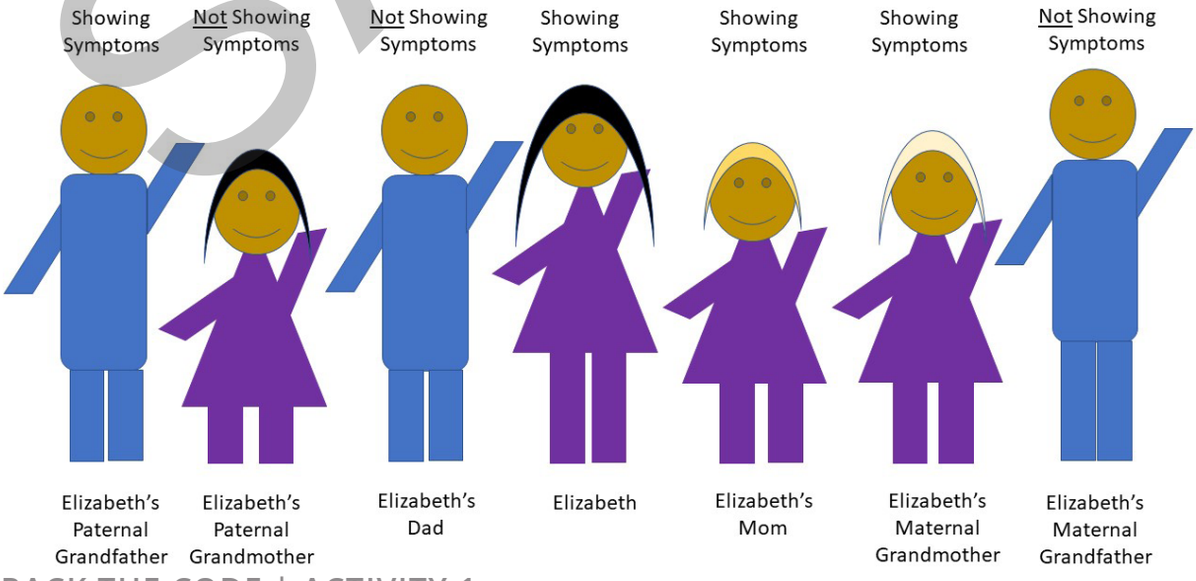
Difficulty concentrating

Stumbling when walking

Intense mood swings

When asked how long she's been experiencing these symptoms, Elizabeth tells you that it's been happening for at least a year but has been getting progressively worse.

Elizabeth tells you that her mother, maternal grandmother, and paternal grandfather also experienced the same symptoms. Their conditions eventually worsened to include hallucinations, jerky movements, and periods where they no longer acted like themselves.



SAMPLE

Now you try, with parent A being homozygous recessive for both pea color and stem height, and parent B being homozygous dominant for pea color and heterozygous dominant for stem height. Parent A has been provided for you.

	ps	ps	ps	ps

Law #2: Law of Segregation

The **law of segregation** states that an organism has two copies of every gene and that they get one gene from each parent. In the case of pea plants where parent A is homozygous recessive and parent B is homozygous dominant, offspring will get a p gene from parent A and a P gene from parent B. Although parent A has two p genes (genotype: pp), only one gene will go to each of its offspring. The same is true for parent B. This is because offspring get one gene from each parent for any given trait.

THINK ABOUT IT!

Let's assume that Elizabeth's mom is heterozygous dominant because her mother has the disease trait, while her father does not, and we can assume her dad is homozygous recessive because he doesn't express the disease trait even though his father does.

1. What are the genotypes and phenotypes for each parent?

2. Create a Punnett square for gene combinations offspring from Elizabeth's parents could have.

3. What is Elizabeth's genotype? Is she heterozygous or homozygous? Explain.

SAMPLE

3. With no more than a quarter of the red and green doughs, make 6 replicated chromosomes with the red dough and 6 with the green dough.

4. Two of each color of replicated chromosome will go in interphase, prophase, and metaphase.

5. With no more than a quarter of the red and green dough, make 12 unpaired chromosomes with the red dough and 12 with the green dough.

6. Four of each color of unpaired chromosome will go in anaphase, telophase, and cytokinesis.

7. With no more than half of the yellow dough, make 12 asters. Put two in each stage of mitosis, at the ends of the cell.

8. With no more than half of the white dough, make 24 mitotic spindles. Eight will go in prophase, metaphase, and anaphase to attach the chromosomes to the aster.

9. Label your stages on the paper.

Save the remaining modeling dough for the next section.

PAIRING UP

In human cells, there are 46 chromosomes (23 pairs). During mitosis, this number doubles as the mother cell prepares to split into two daughter cells that will both have 46 chromosomes. However, the 23 homologous pairs (46 chromosomes) in the final daughter cells make each a **diploid cell**. The diploid number is referred to as **2n**.

There are also **haploid cells**, which you'll learn about in the next section, that have half the number of chromosomes, or only one chromosome for each pair. The haploid number is referred to as **n**. Think about why a cell would have only one chromosome for each pair.

SAMPLE

SAMPLE

LAUNCH

SCIENCE UNLOCKED

© Home Science Tools. All rights reserved.
Reproduction for personal or classroom use only.

Contact us at: www.homesciencetools.com/customer-service/

A Product of Homesciencetools.com

Kit	SU-CTCDNA
Instructions	IN-CTCDNAS
Revision Date	5/2021