NAME _____

DATE _____

Wisconsin Fast Plants® 72-hour Genetics Kit

Working in groups of four, you will germinate seeds of Wisconsin *Fast Plants* to study the inheritance of a trait (phenotype) through three generations. Here is some background information on the generations of plants that you will study.

P_1 is considered the female parent plant and is homozygous for color. (The female plant produces the seed.)

P_2 is considered the male parent plant and is homozygous for a different color. (The male plant provides pollen, which fertilizes ovules in the flowers of the female plant. The fertilized ovules develop into seeds.)

The P_1 and P_2 plants are crossed to produce offspring. The offspring of this cross are called the F_1.

The F_1 plants are crossed to produce the third generation of plants, which are called the F_2.

Activity 1: Germinating Seeds

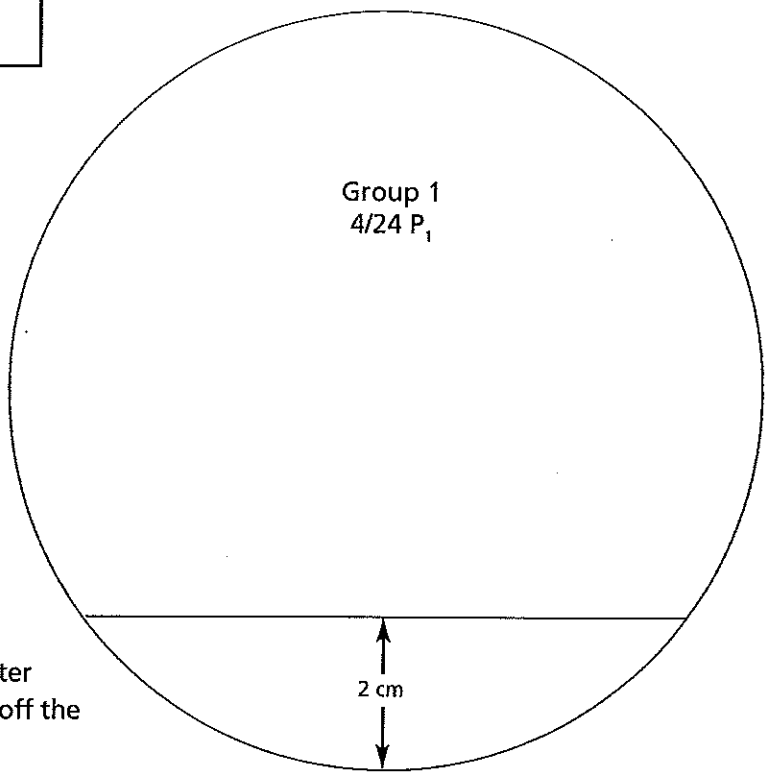
Your group will germinate four plates of seeds:

Plate of Seeds	Seed Type	Number of Seeds
1	P_1	10
2	P_2	10
3	F_1	10
4	F_2	25

Decide which of you will be responsible for preparing each plate. Your instructor has prepared a separate workstation for each type of seeds. You will need a pencil and a ruler or straightedge. Go to the workstation for your assigned plate.

Sowing Plates with Seeds

1. Use a ruler to draw a line 2 cm from the edge of a sheet of filter paper as shown here. Write the date, your group's name or number, and the seed type (e.g., P_1 or F_2) on the paper. Place the filter paper circle inside the lid of a petri dish.
2. Use a dropping pipet to add water to the filter paper until it is completely saturated. Drain off the excess water.



3. Place your seeds on the filter paper, somewhere above the 2-cm line. When you have finished, place the bottom of the dish on the lid to serve as a cover.

Assemble your group's plates and set them into a cup as shown —at a steep angle and with the 2-cm marked section at the bottom. Pour water into the cup to a depth of about 2 cm. The water level should not reach any of the seeds on the filter paper. If it does, either rotate the plate(s) or remove the plate(s) and reposition the seeds on the filter paper. Leave the cups with their plates where indicated by your instructor.

Over the next few days, the seeds will germinate, and the seedlings will begin to grow. Remember that the parent plants are homozygous for contrasting color phenotypes.

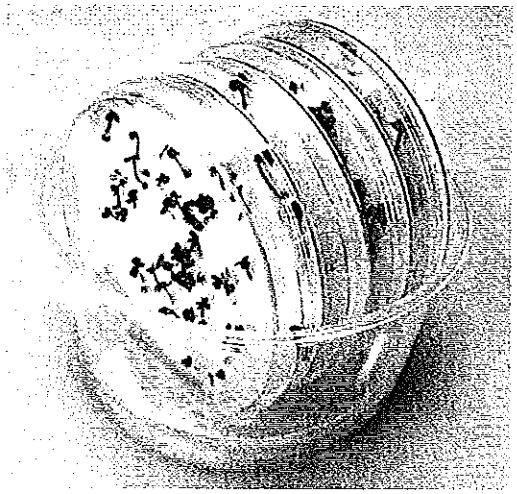


Fig. 2 Plates in Germination Cup

1. Will the F_1 be homozygous or heterozygous for color? How do you know?

2. How will you know which color phenotype is produced by a dominant allele?

Activity 2: Observing Seedlings

Compare the seedlings in your P_1 and P_2 plates. Record the color differences you observe between the P_1 and P_2 seedlings. Remember that these are the phenotypes.

P_1 seedling color _____

P_2 seedling color _____

F_1 seedling color _____

Compare the parental seedlings to the F_1 seedlings.

Which color is produced by the action of a dominant allele? _____

Remember that each color is caused by the action of an allele of a color gene. As a class, decide on the allele symbols you will use and record them here.

_____ is the symbol for the dominant allele for _____.

_____ is the symbol for the recessive allele for _____.

Using your allele symbols, fill in the following for the parental cross and the F_1.

P_1 _____ × P_2 _____

↓

F_1 _____

In the space below, fill in the blanks of the Punnett square to show the different allele combinations that may result from crossing the F_1 to produce the F_2.

F_1 cross to produce F_2 _____ × _____

From your completed Punnett square, what is the expected phenotype ratio for the F_2?

Now examine your F_2 plate. Separate the seedlings by their phenotype and count them. Combine your count with the counts of the other groups in your class to fill in the F_2 Data Table below.

F_2 Data Table

Group	A. Phenotype Count for _____	B. Phenotype Count for _____
Class Totals		

How does your class data compare with the expected phenotype ratio predicted by the Punnett square?

Actual Count:

class total for Phenotype A _____ + class total for Phenotype B _____ =

total of all phenotypes counted by the class _____

Counts expected from the Punnett square:

Are your actual counts close to the expected counts?

If not, what are some of the factors that may have caused your results to be different?