

How can DNA be used to determine if populations are isolated from one another?

Use popsicle sticks, M&Ms or other colored tokens to demonstrate how DNA can be used to determine whether populations are isolated from one another.

Complete the following demonstration to show students how DNA can be used to determine whether populations are isolated from one another or whether or not they are able to breed with one another. (Note: You can download a Popsicle DNA Diagram to use instead of popsicle sticks.)

Demonstration: How can DNA be used to determine if populations are isolated from one another? (i.e. Whether or not they breed with one another)

Prepare

Set up four different populations of Popsicle sticks or M&Ms. Each population will have a different composition of colored Popsicle sticks or M&Ms, which represent different versions of genes (alleles).

Population A contains:

- 1) 15 blue sticks
- 2) 12 green sticks
- 3) 12 plain sticks

Population B contains:

- 1) 10 blue sticks
- 2) 15 green sticks
- 3) 10 plain sticks

Population C contains:

- 1) 5 blue sticks
- 2) 15 green sticks
- 3) 19 plain sticks

Population D contains:

- 1) 1 blue stick
- 2) 2 green sticks
- 3) 26 plain sticks

Question: Which populations breed the most frequently with one another?

Answers: Population **A** breeds most frequently with **B** and **C**.

Question: Which population appears to be the most isolated? Why?

Answers: Population **D** appears to be the most isolated because it has very few blue and green sticks (or versions of that gene). If individuals from population D bred more frequently with the other populations than the number of blue and green sticks would increase.