

Purpose of Paperclip PCR

In this exercise you will model a polymerase chain reaction, while playing the role of DNA polymerase. Your desktop will represent the thermocycler running three polymerase chain reaction (PCR) cycles. Colored paper clips that represent primers and free nucleotides will be used to synthesize strands of DNA. Keep in mind the complementary base pair rules: adenine (A) is complementary to thymine (T) and Cytosine (C) is complementary to Guanine (G).

Objectives-PCR Paper Clip Model

- Model and explain the three steps of PCR including the correct directionality (5'- and 3'-ends).
- Explain the role of primers in PCR.
- Demonstrate where the primers will anneal to the original DNA template and subsequent PCR products.
- Use the model to determine how many cycles must occur to get only the desired PCR product.
- Describe the mathematical growth of the DNA during PCR.

Purpose for PCR/Electrophoresis

Now that you have a basic understanding of how PCR amplifies a specific gene you will use this technology to amplify the HER2 gene on your three patients.

Objectives-PCR & Gel Electrophoresis Confirmation (HER2)

- Describe the vital components needed to carry out a PCR reaction.
- Perform a PCR for the HER2 gene in 3 patients.
- Perform gel electrophoresis of the HER2 gene PCR product.
- Analyze the gel to determine the HER2 amplification for each patient.
- As a team, compare ~~and contrast~~ the HER2 data of all 12 patients.
- Describe how gel electrophoresis is used to determine the presence and size of the PCR product.
- Describe how the standard is used to determine size of each band in the gel.
- Analyze the gel to determine the band size and gene amplification number for each patient.

NGSS

DCI

LS3.A Inheritance of traits

LS3.B Variation in traits

CCC

System and system models

Models can be used to simulate systems and interactions in that system

SEP

Developing and Using Models

Develop and/or use a model (including mathematical and computational) to generate data to support explanations, predict phenomena, analyze systems, and/or solve problems.

