PORTABLE AND EFFICIENT PCR MACHINE

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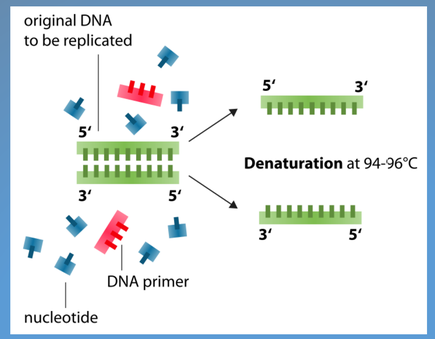
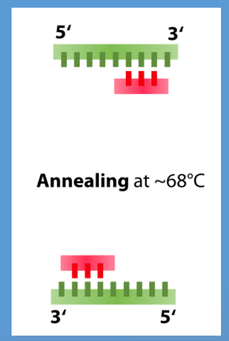
THE POLYMERASE CHAIN REACTION

The polymerase chain reaction(PCR) is used to amplify specific regions of genomic DNA. PCR consists of three stages and these three stages combined, constitute one cycle of PCR. For successful amplification 30 cycles are done.

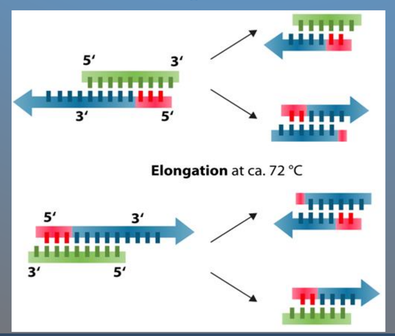
Denaturation: Samples are heated to 94-96 C for 20-30 seconds resulting in single stranded DNA molecules

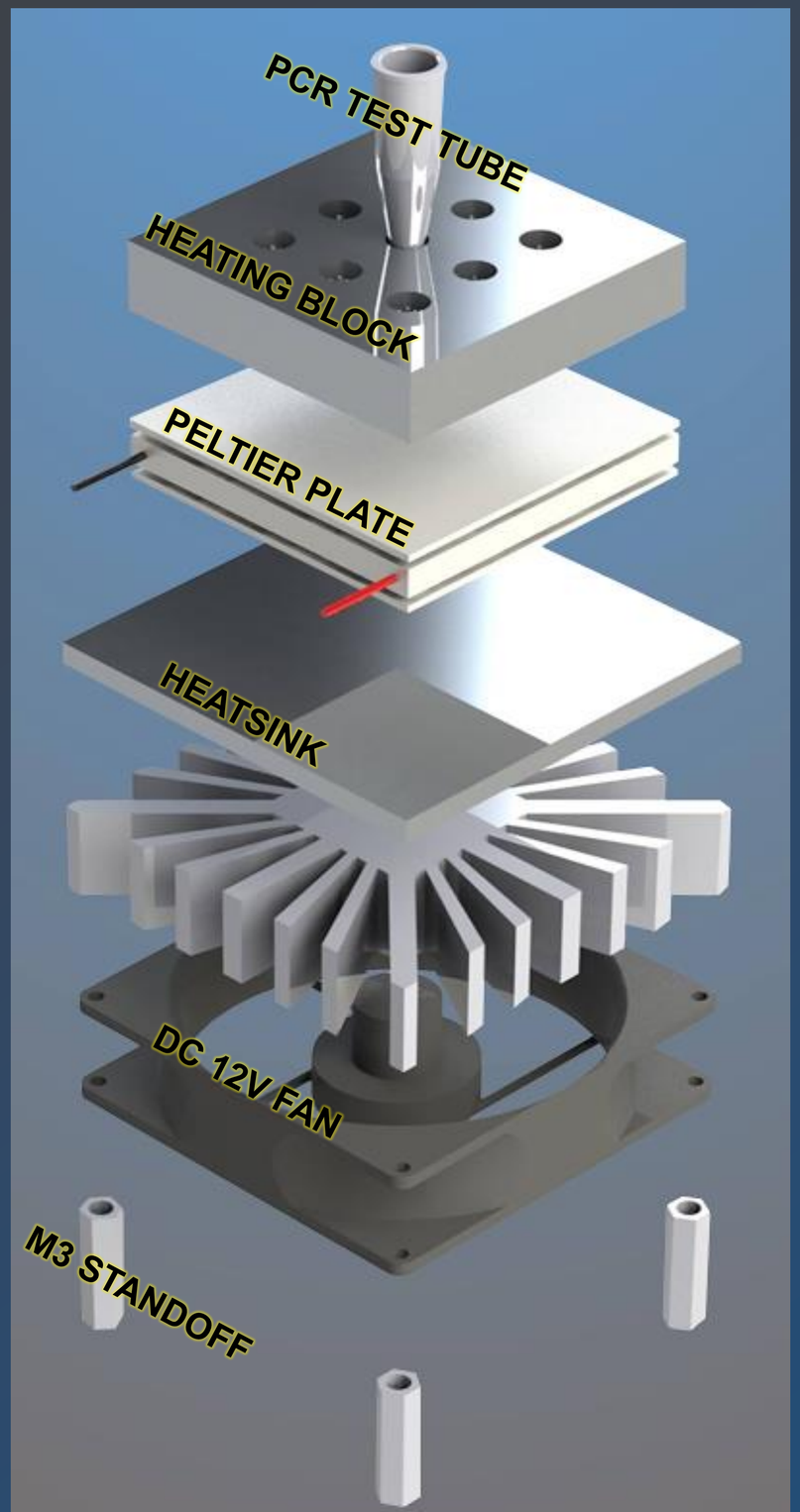


Annealing: The samples are cooled to 56-60 C for 40 seconds. DNA primers bind to their complementary regions on the single stranded DNA



Elongation: The temperature of the samples is raised to 80 C. *Taq* polymerase synthesizes a new complementary strand of DNA which doubles the target sequence





CODE

```
void loop() {

  //get temps for each sample
  int sampleOneTemp = digitalRead(2);
  Serial.println(sampleOneTemp, DEC);
  delay(1);
  int sampleTwoTemp = digitalRead(3);
  Serial.println(sampleTwoTemp, DEC);
  delay(1);

  while (cycles >= 0) {

    if (cycles == 0) {

     hold();
    }

    if (cycles == 1) {

      denaturation();
      annealing();
      elongation();
      extention();
    }

    else {

      denaturation();
      annealing();
      elongation();
    }

    cycles--;
}
```

CIRCUIT