CALIFORNIA SCIENCE & ENGINEERING FAIR
2018 PROJECT SUMMARY

Name(s)
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Project Number
38727

Project Title
Disease Identification, with a Spin

Abstract

Objectives/Goals
The objective of this build is to create a cheap, non-electric, hand-powered centrifuge for people in third-world countries to use to identify and prevent the spread of various diseases.

Methods/Materials
We used CDs and string to build our centrifuges, and this method worked. After three prototypes, we came up with the current design, which uses foam to hold the capillary tubes where the blood is held. To test, we used a tachometer to measure the rpm (rotations per minute) in order to compare our centrifuge to a lab-grade centrifuge.

Results
Our centrifuge was able to spin at speeds around 30,000 rpm, while most lab-grade centrifuges spin at 2,500, the speed needed to separate blood in 5 minutes (Note: Many lab-grade centrifuges spin faster, but 2,500 rpm is the minimum speed needed to separate blood). We were also able to separate cow blood (Bovine blood), which proved that our centrifuge would be able to separate human blood in the future.

Conclusions/Discussion
In conclusion, our centrifuge has the capability to separate blood purely through hand power. However, the centrifuge#s foam protection for the capillary tubes causes drag, lowering the centrifuge#s rpm. In the future, the model would be refined even more so that there is less drag. In addition to that, the centrifuges could be mass-produced easily (around 30 minutes for one) and the materials put into kits and shipped to various third-world countries plagued by illness.

Summary Statement
Our project was to build a cheap, hand-powered, portable centrifuge that could spin at speeds fast enough to separate blood.

Help Received
No professional help.