

HOVERCRAFTS  
AIR CUSHION VEHICLES (ACV)  
by the



*Team members:*

Hugo  
Alex  
Konstantine

*Team advisor: Ms. Kathryn Gunkel, P.E.  
April 21, 2000*

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## Executive Summary

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We built a hovercraft. There was 3 members called the Flying Thunder. They are Alex , Hugo , and Konstantine . We got together for a competition called the Engineering Challenge.

At first we had trouble with wiring. We also had problems with weight and steering. We made modifications to the design and the way weight was added. We built a working hovercraft for entry in a competition.



## **INTRODUCTION.**

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The Engineering Team members are Alex , Konstantine , and Hugo . We are 6th graders from Deep Creek Middle School. Mitchell asked us to join this team. We met on Tuesdays, Thursdays, and Saturdays. We also split into 2 teams of 3 to test out option A Hovercraft and option B Hovercraft. The Options available was a Powered Maglev, Recycling, Straw Bridge, Board Game Manufacturing, and Hovercraft. We wanted to make something electric so it left the Powered Maglev and the Hovercraft. We couldn't do the Powered Maglev because it needed a track and that was something Ms. Kathy didn't have. So we were left with the Hovercraft. Also, Mitchell saw test models in a teachers workshop and thought it was cool.

The person that invented a Hovercraft was Sir Christopher Cockerell. He was born June 4, 1910, and died June 1, 1999. It was tested in 1955 using an empty KiteKat cat food tin inside a coffee can, an industrial air blower and a pair of kitchen scales. 

### **PURPOSE.**

One of the purposes was to learn teamwork skills. First we used lots of cooperation to make this achievement possible. First we decided teams that we thought would work hard and that they will work better on each others side. In the begining we tried hard, but failed to accomplish some parts of our practice hovercraft. Then we started cooperating more once we got started on our final copy. For example, one time we wasted the whole day playing. That has never occured again.

The positives of working together are that we get to do more work in a shorter period of time. Also people with lesser skills will be helped by the ones with better skills. The negatives is that we can become of track and not concentrate because some problems we came

At the beginning of the "Hovercraft Project" we learned a lot of information on Hovercrafts. For example, we learned how Hovercrafts are made, how Hovercrafts are upgraded, who invented the Hovercraft, how the Hovercraft is used today, etc. That is how we got started with this project.

Also, in the first book we read and we learned how hard and

tiring it was to make a model Hovercraft, but we also learned how much more hard and tiring it was to make a human-sized Hovercraft.

In the second book we read and we learned about aerodynamics, and how it involves how our Hovercraft will work.

The last book we read was on how Hovercrafts are generally used today. For instance, Hovercrafts are used for emergencies such as floods, drownings, and fires. It is also used basically for fun like races, models, collections, and best looking Hovercraft tournaments. Ms. Kathy supplied these books for us, to help us know what we will be making.

Furthermore, we didn't get all of our information from books, we had human resources such as Ms. Kathy our advisor, Mr. Bernie her husband, members of the projects parents, and our basic knowledge of the subject. That is basically what we did for the development of our subject.

## PROCEDURES.

In building the hovercraft we had to split into two groups and the best final hovercraft would be entered in the contest on May 6. We had to choose which hovercraft was better because it has battery placement in a different place. Ms. Kathy picked a hovercraft for each team. The instruction had making a hull, motor brace, fan, rudders, and cabin.

Later we found that the back was dragging. We decided to add to the front. Next, we had huge gaps so we made a skirt. Finally, the corners of the skirt wasn't even with the bottom so we ended up shaving the corners of the hovercraft.

Another hard part of the hovercraft was the wiring and measuring. These were hard because if we got one part messed up the whole wiring would be messed up. The measuring was confusing at first because when we had to move the hole in the hull forward we asked ourselves why. Later we knew when we had to put the switch on the front of the cabin.

Our team was discussing for most of one day. We then came up with a team name of Flying Thunders. The way we got this idea was by

a boy wearing a shirt with a raven. So Konstantine drew the picture and Alex wrote the lettering. Later we found we had too many people in the group. So we split up into two equal teams of 3 people each. They then had a whole day to figure out they're name. They came to a conclusion of Dragon Thunder.

We then traced our raven design with a black marker. We then scanned the design in the computer and tried different colors. We came to a decision of red for lightning and inside wings. Then the beak and feat yellow. The rest was all black. We did the same for the lettering. We wanted a dark, but not to dark red. We tried and tried all the reds until we came with a decision. The decison was first black then red and so on. After that we scanned both out and put them in our file folder.

## **RESULTS.**

The thing that was learned from our Test model was basically to learn from our mistakes. For example, the first problem that was encountered was that we had trouble measuring things and cutting them out, because everytime we would cut something the measurement would end up being wrong. So eventually Ms. Kathy told us to always start from the one-inch mark, so our measurements would end up being a little more, or exactly accurate.

The second problem we encountered was the wiring. We learned that the positive and negative wires have to go a certain place for the motors to run the correct way.

The last problem we had was that to much air was escaping from the bottom, so it could not hover. We figured out we needed a skirt so no air could escape.

### CONCLUSION.

After building and writing procedures we thought we could make modifications by adding a ring around the fan that makes the hovercraft move forward. We decided this because of pictures from the internet that showed better effects from the ring. Also, because our Hovercraft had steering problems. Another modification was adding sort of a wing on the rudders. Hopefully at the competition our Hovercraft will win the competition. I learned that you can do what you want with time and dedication. Some websites the we checked out Hoverclub of America and Universal Hovercraft. We also had safety goggles for the soldering and the hot glue gun.

*Good!*

## CERTIFICATION

We hereby certify that the work on the Hovercraft and report, except for the typing, was performed by the three students who are signed below. The typing was done by Ms. Kathy Gunkel. She typed exactly what we wrote and we had to edit and make corrections.

Hugo Diaz  
Hugo

4-18-00  
Date

Alex Ofwans  
Alex

4/18/00  
Date

Konstantine Myhr  
Konstantine

4/18/00  
Date

Kathryn Gunkel  
Kathryn O'C. Gunkel, P.E., Advisor

4-18-00  
Date

## Acknowledgment

We would like to thank Ms. Kathryn O'Connor Gunkel, P.E. Ms. Gunkel helped us by organizing our report providing supervision and guidance. She provided typing and materials.

We would also like to thank Hope Lutheran Church for providing us with their working facilities.

## Bibliography

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*Transportation*. English, J., copyright 1995, pp 82-83.

**The Hovercraft History & Hovercraft Museum Website.** Potter, C. URL: [www.user.globalnet.co.uk/~potter/index.html](http://www.user.globalnet.co.uk/~potter/index.html).

**HoverClub of America** website. URL: [www.hoverclubofAmerica.org/index.html](http://www.hoverclubofAmerica.org/index.html).

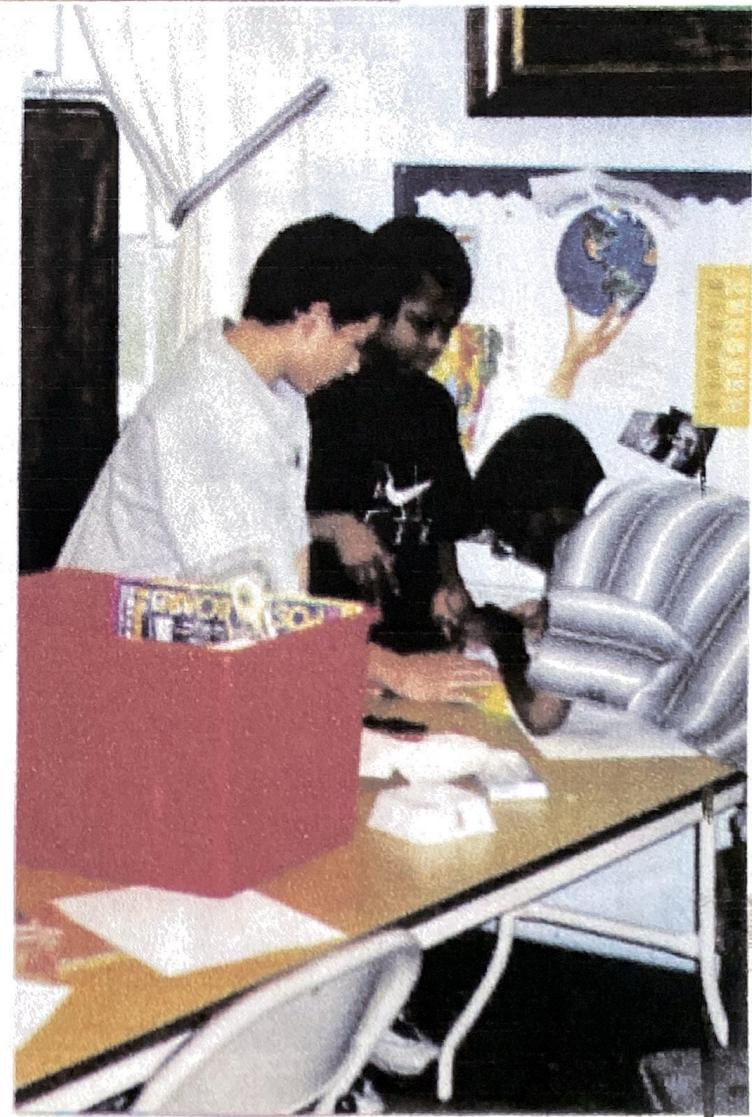
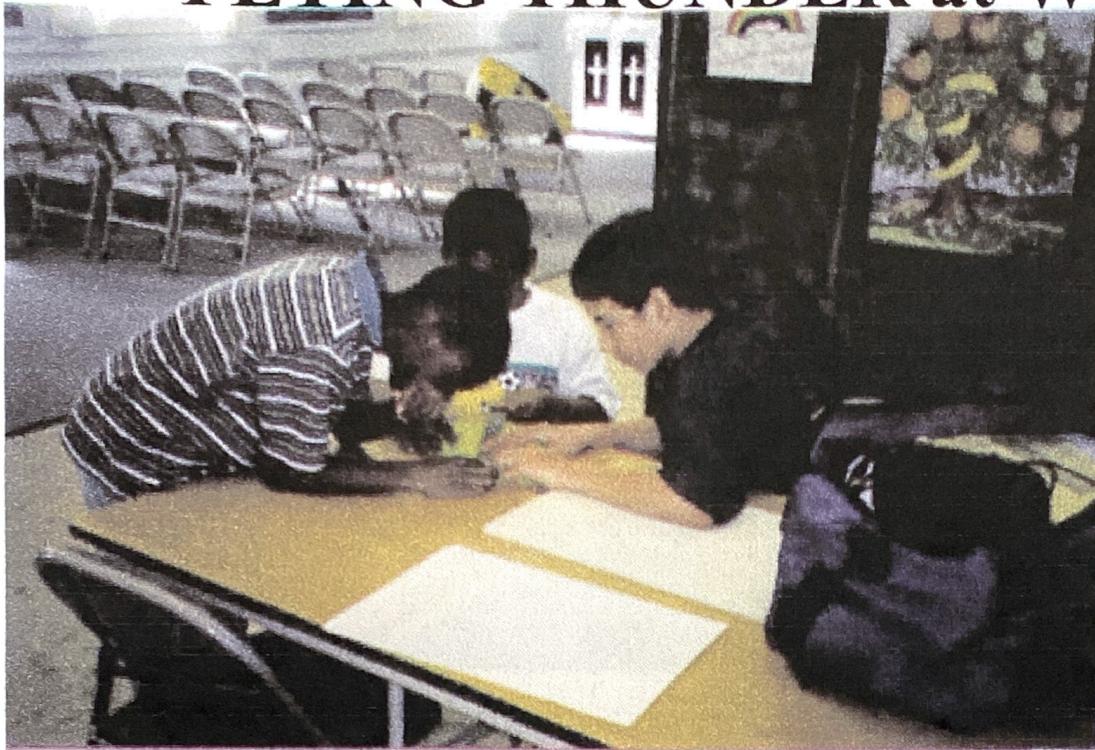
**Universal Hovercraft** website. URL: [www.hovercraft.com](http://www.hovercraft.com).

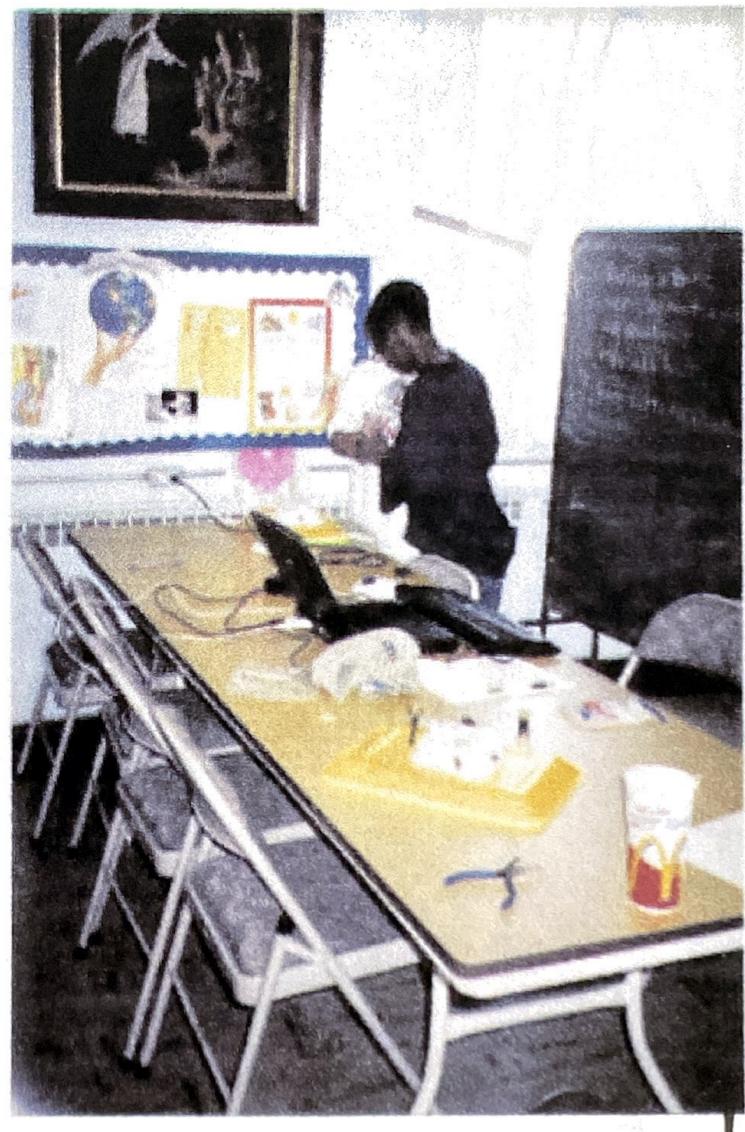
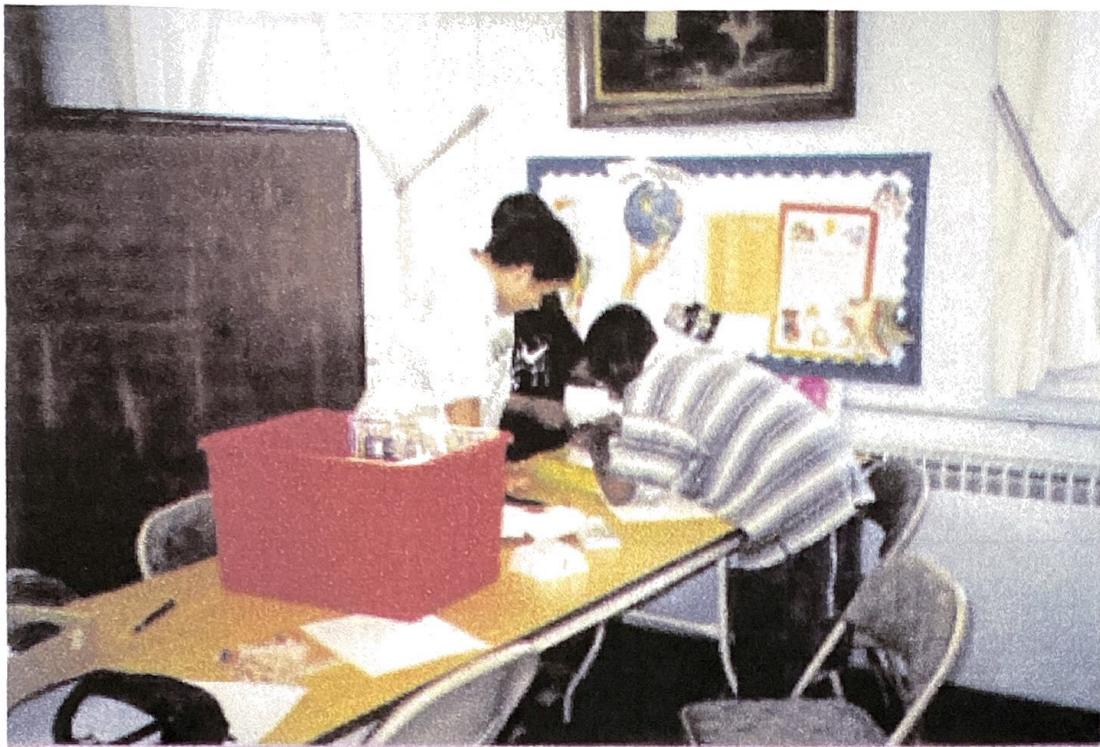
## Appendix A . . . . . Team Members

The team members in the group is Hugo that did mostly coloring, scanning, glueing, and helped make the skirt. Alex measured, installed propulsion motor and helped make the skirt. Konstantine did cutting, installing motor support, switch, and motor brace. Konstantine also helped on the skirt.

All of us worked on the report. Alex had wrote the Introduction, Procedures of the hovercraft, and Conclusion. Hugo wrote Purpose, and Procedures of team logo and lettering. Konstantine did Results, and also worked on Purpose.

# FLYING THUNDER at WORK

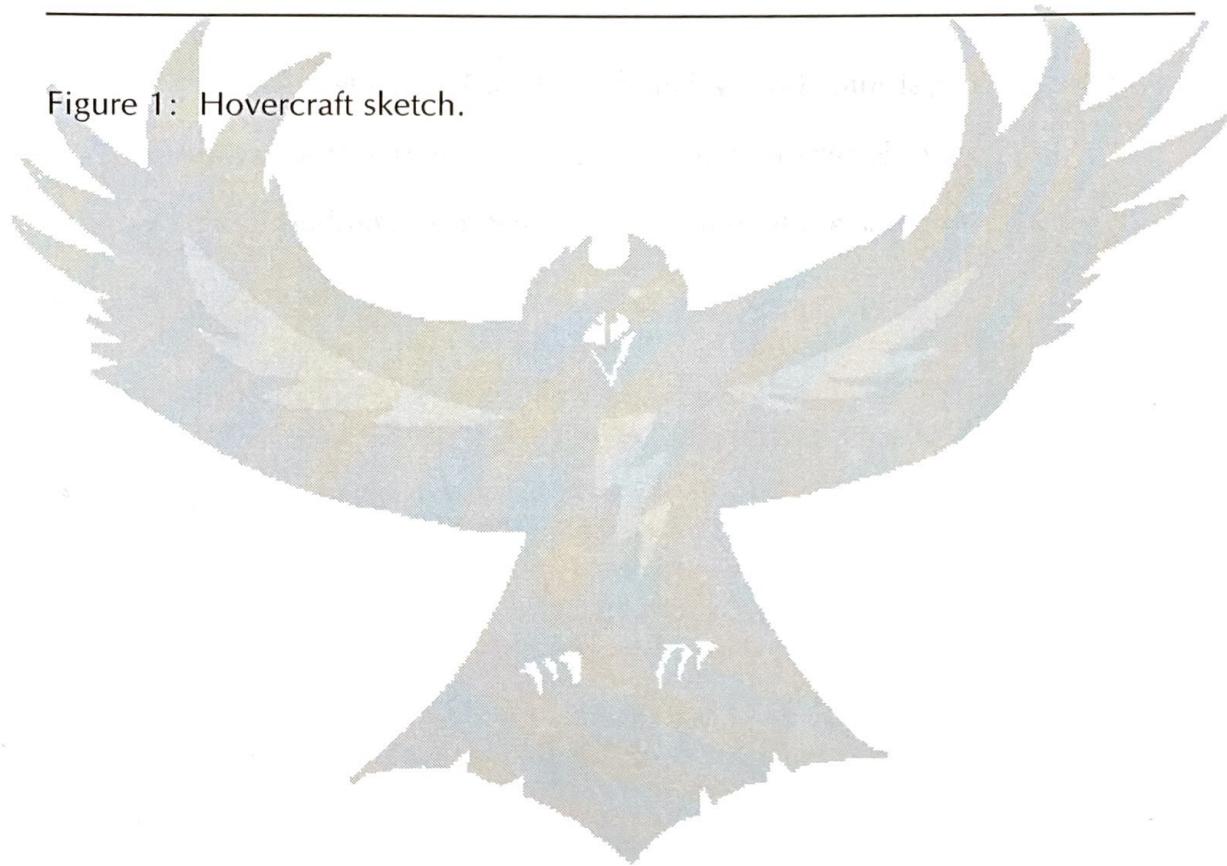




## Apendix C . . . . . Figures

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Figure 1: Hovercraft sketch.



## Flying Thunder

Figure 1.  
Drawn by: Konstantine Offoha  
April 18, 2000

On Battery

Cabin

Hull in Front

Motor Brace

Switch

Propeller Fan

Hull in Back

Tail

Skirt

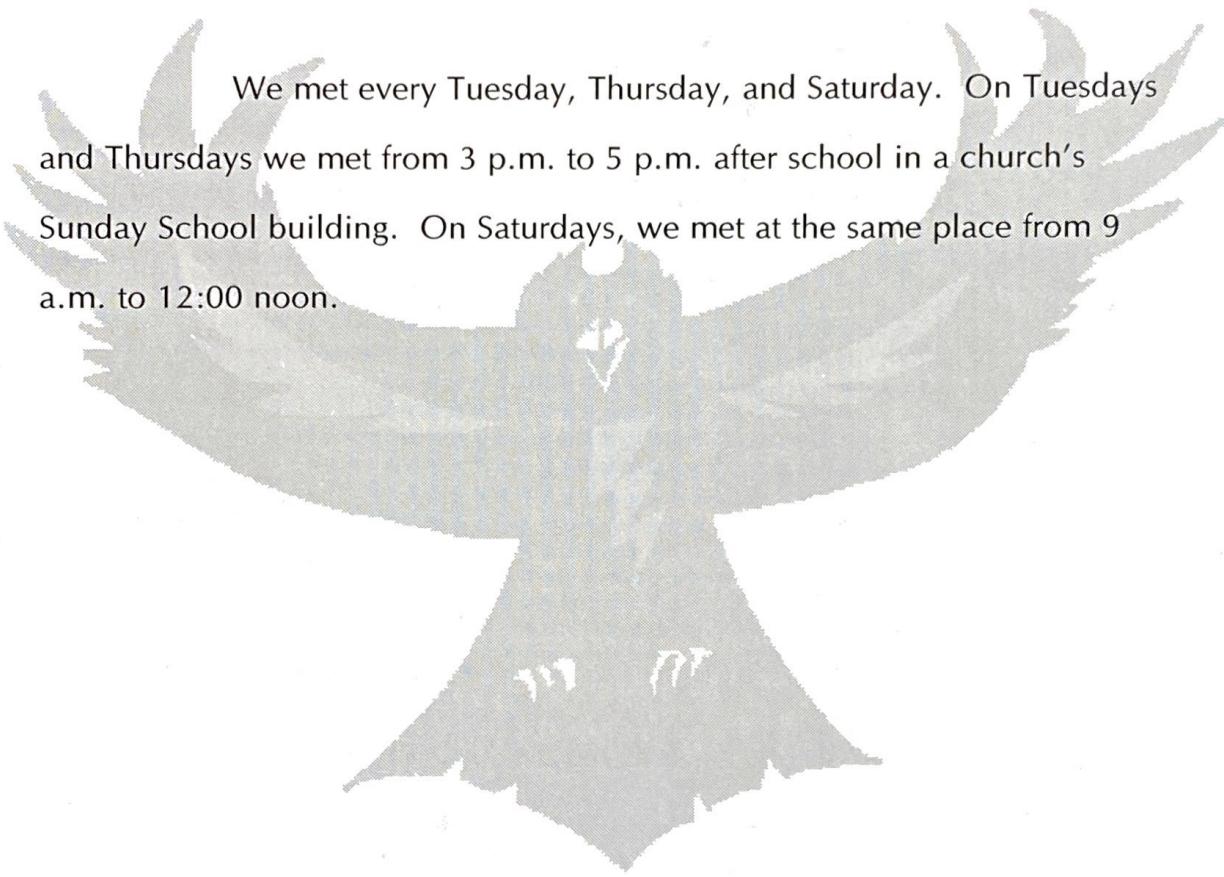
Hovering Motor

Hovering Fan

KELVIN  
1-800-KELVIN 9

PROJECT HoverCraft  
STUDENT Konstantine Offoha  
APPROVED BY Mrs. Kathy

## Appendix B . . . . . Schedule



We met every Tuesday, Thursday, and Saturday. On Tuesdays and Thursdays we met from 3 p.m. to 5 p.m. after school in a church's Sunday School building. On Saturdays, we met at the same place from 9 a.m. to 12:00 noon.