Aerodynamics

Paper Airplanes and **Hovercrafts**

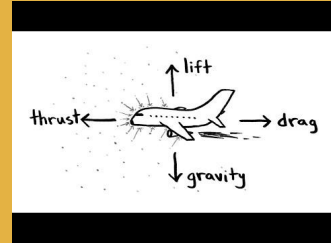5549 GRYPHON ROBOTICS

Learn About How Objects Fly

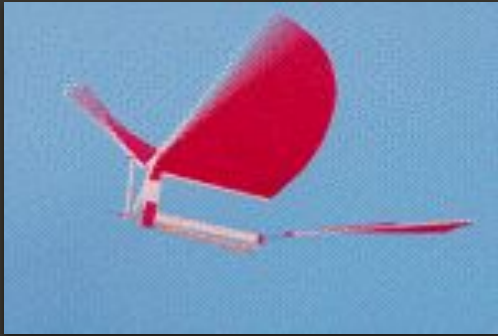## How Do Objects Fly?? Watch This!

Simple

Detailed

Ornithopters

Airplanes

Hot Air Balloons

Helicopters

Drones

Paper Airplanes

Paper Airplane - STEP 1

Materials:
- Paper
- Ruler or Tape
- Scissors
- Paper Clips
- Space to fly the plane

Build your Paper Airplane!

You can make your design as simple or as complex as you'd like. Make a few different designs and decide which one you want to work with.

Use these resources to help you design your paper airplane or research your own!

- [3 Easy Paper Airplanes - Video](#)

- [Lots of Different Designs and Difficulties- Website](#)

- [Origami Airplanes - Website](#)

Paper Airplane - STEP 2

Establish Your Baseline Data

In order to see the effects of any modifications you do to your airplane we need to know how your airplane reacts normally, how far it goes, observations, etc.

Find a good place to fly your plane. Here are a few suggestions!

Indoors
- Hallway
- Large Room

Outdoors (parent permission)
- Backyard
- Avoid excess wind if possible!

Once you found your location make sure you mark where you will be throwing the plane from each time

- Suggestion to use tape or place an object next to where you will be throwing the plane

Establish Your Baseline Data

In order to see the effects of any modifications you do to your airplane we need to know how your airplane reacts normally, how far it goes, observations, etc.

Trial	Distance	Observation	Modification
1			None
2			None
3			None
4			None
5			None
AVERAGE		N/A	None

Paper Airplane - STEP 3
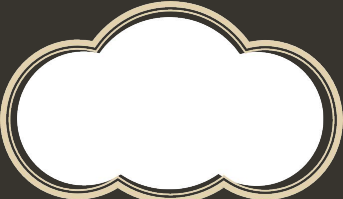
Modify your Paper Airplane!

You can make the modifications as simple or as complex as you'd like. To the right are some suggestions but feel free to go beyond these.

Suggested Modifications

- Curl the wing tips up
- Curl the wing tips down
- Curl the wing tips opposite directions
- Paper clip weight added to back
- Paper clip weight added to front
- Cut wings to make flaps

Paper Airplane - STEP 4

Test your MODIFIED Plane

Trial	Distance	Observation Comparison to Baseline	Modification
1			
2			
3			
4			
5			
6			
7			
8			

Hovercraft

Simple Hovercraft- STEP 1

Materials:

- CD (you don't listen to!)

- Bottle cap that has open/close mechanism (think dish soap top or sports bottle)

- Balloon

- Hot Glue Gun or masking tape

- Stopwatch / Timer

Build your Hovercraft!

Follow along with the instructions ([website](#) or video) to build your basic hovercraft. Feel free to modify and adjust any supplies to fit your needs!

Look at these examples of hovercrafts in the real-world!

Learn more about hovercrafts [here](#)!

Simple Hovercraft - STEP 2

Establish Your Baseline Data

In order to see the effects of any modifications you do to your hovercraft we need to know how your hovercraft reacts normally, how long does it goes, observations, etc.

Find a good place to fly your hovercraft. Here are a few suggestions!

- Smooth surface

- Avoid wind

- Large area (so it doesn't bump into anything)

Once you found your location make sure you mark where you will be launching the hovercraft from each time

- Suggestion to use tape or place an object next to where you will be starting

Simple Hovercraft - STEP 2

Establish Your Baseline Data

In order to see the effects of any modifications you do to your airplane we need to know how your airplane react normally, how long it goes, observations, etc.

Trial	Hover Time	Distance Traveled	Observation	Modification
1				None
2				None
3				None
4				None
5				None
AVERAGE			N/A	None

Simple Hovercraft - STEP 3

Modify your Hovercraft!

You can make the modifications as simple or as complex as you'd like. To the right are some suggestions but feel free to go beyond these.

Suggested Modifications

- Different sized balloons

- Different levels of inflation

- Adding paper to the bottom of the CD hole and adjusting airflow

- Different surface

- Use a different base instead of a CD (foam board, cardboard)

Simple Hovercraft- STEP 4

Test your MODIFIED Hovercraft

Trial	Hover Time	Distance Traveled	Observation	Modification
1				
2				
3				
4				
5				
6				
7				
8				