

TOPIC: RESEARCH ATTITUDE

Think About It!



I got a blue solution and she got a yellow one for the same procedure. We need to find out what is it that we missed.

Know What's Inside

Activity	Description
Engage	Participants understand the objectives of doing an experiment and the proper approach required for it. \camera, human's best sense organ – Eye!
Elaborate	They build a Gyrocopter and perform flight test on it. They are taught the importance of observation and how to record data and analyse it to get inferences from it.
Explore	Participants research with a flying fish and explore which scenario makes the best flight.
Explain	Proper approach and observation lead to a concrete inference.
Evaluate	Self-assessment

Mum: Why do you think birds are less in city lakes?

Swara: It maybe because the cost of living is high.

Ahana: Do birds also need to spend money to live on Earth?

Mum: No, she is saying birds don't get good water and food in the cities.

Swara: The city lake is polluted with contaminants from industries and domestic waste.

Ahana: These will harm the birds, right? They are toxic.

Mum: Yes, birds in city lakes cannot survive and tend to die soon.

Swara: That's why birds move to lakes in rural areas.

Mum: **Ornithologists** are the people who study birds and their habits.

Swara: Mom, then ornithologists must have studied why birds have moved to villages in a more elaborate manner. How do they do that?

Mum: That is what every scientist does. They have a method to find out changes and patterns in the nature.

Ahana: Can we make gyrocopters which you taught us the other day which helps us learn how birds fly?

Mum: That's a great idea!

Know how to question, question to know how!

- 1.....
- 2.....
- 3.....
- 4.....
- 5.....
- 6.....
- 7.....
- 8.....
- 9.....
10.



ELABORATE :

A. Materials Required:

B. About The Project.

A **gyrocopter**, also known as an autogyro, is a type of *rotorcraft* that uses an unpowered rotor in autorotation to develop lift. A gyrocopter is a spinning object that has rotor blades attached to a central axis which spins continuously as it falls down.

C. How Does It Work?

The gyrocopter which we will make will have **two wings** and a **central axis**. A different weight and length of wings will have a different effect on the time of flight.



The shape of the helicopter *rotor blades* makes the gyrocopter spin. When dropped from a height, gravity pulls the helicopter down. The air works against this movement and pushes up each *rotor* separately. This makes the helicopter spin.

Ahana: Let's try making different versions and see whose gyrocopter come faster to the ground.

Swara: With this challenge, I am wondering how some birds fly fast, even when they are huge. Some are tiny and are swift, while some others can't fly even if they are small.

Ahana: I think the size of the bird and also the nature of the wings; both influence the flight of birds.



Swara: How would nature choose all this?

Ahana: Through the process of evolution by finding the best fit.

Swara: Are you saying nature also does experiments and runs trials to get the best results?

Ahana: Yes, of course.

Swara: Wow! It's so amazing! Let us find out which of our gyrocopters is the best by varying its size and shape.

The Challenge

What is it that makes things fall? Why is it that whatever goes up comes down to the surface? Can we keep it in air for a longer time?

In this section, we make gyrocopters of different wing length and then observe and record their time of flight. We will also study the effect of weight on the gyrocopter. All these observations will be recorded in the given tables.

The outline of the gyrocopters provided will have cut marks at different lengths on the rotor. Once done with the cut marks, we will have gyrocopters with four different rotor lengths. This experiment has the following procedure:

- Mark G1, G2, G3, G4 on the gyrocopters with the rotor of 1 inch, 2 inches, 3 inches and 4 inches respectively.
- Once marked, throw the gyrocopter to a certain height and record its time of flight.
- Study the speed of the spin of each gyrocopter and record your observations in TABLE 1.



- Now, take G4 and add one more paper clip to it. Now, throw it in the air to record its time of flight.
- Again, take G4 and add a binder clip on the end. Now, throw it in the air to record its time of flight.
- Record all observations in TABLE 2.

Observation :



TABLE 1

Gyrocopter	Flight time (in seconds)	Speed of spin

TABLE 2

Gyrocopter	Weight attached	Time of flight (in seconds)
G4a	Paper clip x 1	
G4b	Paper clip x 2	
G4c	Paper binder clip	

EXPLORE

Activity 1: Flying Fish

Procedure:

- Cut the given outlines of the **flying fish**. Also, cut the two slots on both templates.
- Join the slots to form a cylinder and name it as C1 and C2. C1 is the flying fish of length 10 cm and C2 is flying fish of 20 cm.
- Drop the flying fish from a particular height and record its flight time and speed of spin in Table 3.

Observations:


TABLE 3

Flying Fish	Time of Flight (in second)	Speed of spin
C1 (10cm)		
C1 (20cm)		

Conclusion:



EXPLAIN :**Think and Work like a Scientist!**

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- Every scientific experiment has a few important features. These are – hypothesis, objective, procedure, observation and inference.
 - To find a new thing or to prove an idea, we first frame a **hypothesis**. A hypothesis is an unproven statement which we think to be true. It is the basic idea we have about something based on what we already know.
 - After hypothesis is **objective**. It is where we decide what we want to get from our experiment. This is very important because here we decide if our method will support the hypothesis or disprove it.
 - Based on the objective, a plan is made where many steps are put together as a **procedure**. This is an important step where we have to clearly set things to get proper results.
 - As we follow the procedure for experiments, we need to note down the data and **observations**. This is needed to get the results of the experiment.
 - Finally, after studying the observations, we have to make an **inference** and reach a conclusion. The inferences decide whether our hypothesis was correct or not. With such well-planned method and proper observations, we can get important conclusions from the experiment.

EVALUATE

A. Choose the right answer.

1. Gyrocopter is also known as _____.

- a. Helicopter
- b. Quadcopter
- c. Autogyro
- d. Quadrotor

2. The _____ resists the movement and pushes up each rotor separately, causing the helicopter to spin.

- a. Air
- b. Gravity
- c. Temperature
- d. Water

3. Different weight and length of wings affects the _____.

- a. Speed of rotation
- b. Number of spins
- c. Time of flight
- d. None of the above

B. Explain the working of a gyrocopter.

