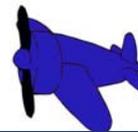




# Principles of Flight



## Lesson Plan: Household Things That Fly and Why!!!

**Grade Level:** 2-3

**Subject Area:** Science and Math

**Time Required:** *Preparation:* 1 hour  
*Activity:* 2-3 hours

**National Standards Correlation:**

*Science (grades K-4)*

- Science as Inquiry Standard: Abilities necessary to do scientific inquiry.
- Unifying Concepts and Processes Standard: Evidence, model, and explanation.
- Unifying Concepts and Processes Standard: Change, constancy, and measurement.
- Unifying Concepts and Processes Standard: Systems order and organization.

**Summary:**

Students will become acquainted with the four “forces of flight” as they have fun flight-testing various objects commonly found around the house (such as Tupperware bowls, crackers, hats, and pie tins). Prior to test-flying the objects, students will predict whether or not they think the objects will fly and how far they think they will fly. Students will fly the various household objects, measure distances flown and record their observations in a flight log. As a culminating activity, each student will write a description of the flight of their favorite object, detailing the “forces of flight” at work.

**Objectives:**

Students will:

- Learn the four “forces of flight”
- Predict which objects will fly and how far they will fly
- Measure and record the distance flown by each object
- Create a flight log of observations of each flight
- Describe their favorite flying object
- Explain how the “forces of flight” were at work during the various flights

**Background:**

There are four “forces of flight” which act upon an object in flight:

1. **Lift:** the force that pushes the object up
2. **Gravity:** the force that pulls the object down (the opposite of lift)
3. **Thrust:** the force that pushes the object forward
4. **Drag:** the force that pushes against the object (the opposite of thrust)

Using the suggested household objects (listed in materials below), the Ritz cracker had no lift; however the thrust was greater than the gravity and drag. The Ritz cracker flew. The brimmed hat, ball cap, square plastic lid, round plastic lid, aluminum foil pie tin and small plastic bowl flew because lift and thrust were greater than gravity and drag. Gravity and drag were greater than lift and thrust, and the toilet paper roll and styrofoam plate did not fly as well as the other objects. Results will vary depending on the samples used.

**Materials:**

You will need:

- Various household objects such as:
  - Ritz cracker or any round cracker
  - Empty toilet paper roll
  - Brimmed hat



- Ball cap
- Square plastic lid
- Round plastic lid
- Aluminum foil pie tin
- Round Styrofoam dinner plate
- Small plastic bowl
- Test Objects worksheet for each student
- 3 Flight Log worksheets for each student
- Butcher block paper and markers for making graphs
- Tape measurer (metric or standard)
- Masking tape

**Safety Instructions:** Use caution when flying the objects. Create a single direction flight zone. Be sure that students stop flying the objects when other students are retrieving objects that have already landed.

**Procedure:**

**A. Warm-up**

1. Explain and demonstrate the four “forces of flight” using a Frisbee or other familiar flying object.
2. Show the class the various household objects to be test-flown.
3. Give students Test Sample worksheets and have them predict which objects they think will fly. Predict how far objects will fly.
4. Create a class bar graph. On the horizontal axis of the bar graph indicate each object to be test-flown and on the vertical axis write, “Number of Students Who Think the Object will Fly.” Complete the graph as a class.

**B. Activity (in the gymnasium or other large indoor area)**

1. Using masking tape, mark a line on one end of the gym floor. This will be the line that the student will stand behind when launching the objects.
2. Designate a student to be the “flyer” of the objects. The “flyer” stands behind the line and using a Frisbee-like throwing motion, “flies” each object (same “flyer” flies all objects).
3. A pair of students will place a piece of masking tape on the landing spot of each object, write the name of the object on the tape, and remove the object.
4. Each student will complete a flight log, which is a record of observations of each flight. Explain how the “forces of flight” affected each flight.
5. Place students into pairs. Using the tape measure, each pair of students will measure the distance flown by each object, and record that distance in their flight log.

**C. Wrap-up**

1. Students will compare flight logs and discuss which “forces of flight” were at work during each flight.
2. Create a class bar graph showing each object and the distance it flew.



**Assessment/  
Evaluation:**

Each student will describe (in paragraph form) their favorite flying object. The description should include the “forces of flight” at work during the flight. Students should refer to their flight logs and the bar graph for information.

**Extensions:**

1. Classify the objects. Possible categories are:
  - Objects that did not fly
  - Objects that flew
  - Objects that flew more than half the distance of the room
  - Objects that flew less than half the distance of the room
  
2. Test other household objects at home, complete a flight log, and report findings to the class. (*Note: Students should have parental permission and supervision for home test flights.*)



# Test Objects Worksheet

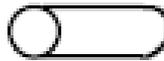
## Household Things That Fly and Why

Name \_\_\_\_\_

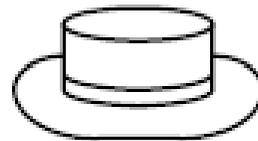
Directions: Circle the objects you think will fly.



Ritz cracker



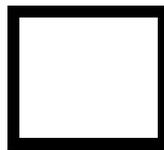
toilet paper roll



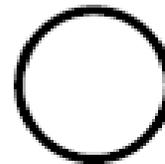
brimmed hat



ball cap



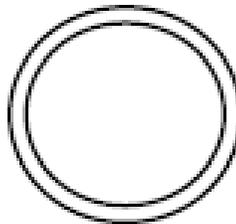
square plastic lid



round plastic lid



foil pie plate



styrofoam plate



small plastic bowl



# Flight Log

Name \_\_\_\_\_

Object: \_\_\_\_\_

Circle one:

Flew - The forces of Lift and Thrust were greater than the forces of gravity and drag.

Distance flown \_\_\_\_\_

Didn't Fly - The forces of Gravity and Drag were greater than the forces of lift and thrust.

Object: \_\_\_\_\_

Circle one:

Flew - The forces of Lift and Thrust were greater than the forces of gravity and drag.

Distance flown \_\_\_\_\_

Didn't Fly - The forces of Gravity and Drag were greater than the forces of lift and thrust.

Object: \_\_\_\_\_

Circle one:

Flew - The forces of Lift and Thrust were greater than the forces of gravity and drag.

Distance flown \_\_\_\_\_

Didn't Fly - The forces of Gravity and Drag were greater than the forces of lift and thrust.

Object: \_\_\_\_\_

Circle one:

Flew - The forces of Lift and Thrust were greater than the forces of gravity and drag.

Distance flown \_\_\_\_\_

Didn't Fly - The forces of Gravity and Drag were greater than the forces of lift and thrust.

