



Math and Science with a Flying Disc

Students will use flying discs to apply mathematical and scientific practices.

LESSON PLAN

Learning Objectives:

The students will:

- Record measurements
- Look for a pattern in their own flights
- Compare flights
- Discuss variables

Purpose:

Students will throw flying discs as a way to use scientific practices to think and act in ways associated with inquiry and to practice mathematical skills. This includes asking questions, planning and conducting investigations, using appropriate tools and techniques to gather and organize data, and thinking critically & logically about relationships between evidence and explanations.

Introduction:

Flying discs are recreational toys that display the scientific theories behind flight. This is different than several other objects because of its shape, ability to stay in the air, and fly in different directions. Flying discs and flying rings all abide by the same scientific phenomena but it depends on several factors. These flying discs are influenced by human interaction, so throwing them requires precise movements, release and speed. Flying discs show that any object can stay within the air for a certain amount of time if given enough power. What gives a flying disc more flying time is the speed, location of the throw, and most importantly the shape in regards to its interaction with the environment. For more information on these scientific factors, look at the **Resources** section below.

Grade Level: 4 - 5

[Ohio Learning Standards/Science \(2018\)](#)

Expectation of Learning

[Nature of Science](#)

Cognitive Demands for Science

[Demonstrating Science Knowledge](#)

[Interpreting & Communicating Science Concepts](#)

[Ohio Learning Standards/Mathematics \(2017\)](#)

Numbers & Operations

[4.NBT.4](#): Fluently add and subtract

Measurement & Data

[4.MD.1](#): Know relative sizes of metric measurements

[4.MD.2.c.](#): Add & subtract to solve measurement problems

[4.MD.4](#): Display & interpret data

[5.MD.1](#): Know relative sizes of U.S. measurements

[5.MD.2](#): Display & interpret data to solve problems

Materials Required:

- Measuring devices (tape measure, meter stick etc.)
- Orange cone or something to mark a starting point
- One flying disc per group
- One flying ring per group
- Four Foam plates per group
- Four plastic plates per group
- Masking tape
- Scissors
- Clipboard, paper, and pencils
- Scale

Procedure:

A. Warm-up

1. Discuss the information given in the Introduction.
2. Discuss different ways to measure distance: i.e., meters, yards, feet, or counting off using their feet, etc.
3. Discuss factors that can affect the flight of flying discs (wind, weight, etc.).

B. Activity

1. Have students create flying discs of both foam and plastic plates by following these steps:
 - a. Give each student a stack of 4 foam plates. The best way is to not pull apart the plates, but just give each student what is in the stack.
 - b. Take one plate off the stack and set it aside.
 - c. Cut the center out of the remaining stack of plates.
 - d. Put the first plate back on the bottom.
 - e. Using masking tape, tape around the edges to hold all the plates together.
 - f. Repeat steps (a.) – (e.) for plastic plates
 - g. After a demonstration, have each student gently try to fly their disc in the classroom before moving to a larger area.
2. Gather the rest of the flying discs and rings with the newly made ones for testing.
3. Use a scale to record the weight of each flying disc.
4. Find an area with enough room to fly the discs. Mark off a starting point so that you have accurate measurements to compare. (Take extra rolls of masking tape with you to create variables and also clipboards, paper and pencils to record flight measurements).
5. Have students work with a partner. One will gently throw every disc while the other records distance flown for every trial. Have all students start flying at the same time to avoid risk of injury.
6. Once all students have flown one disc three times, have them gather around to discuss how they could make the disc go a shorter or longer distance.
7. After all students have tested a variable, return to class for discussion.
8. Groups will create a chart that displays each flying disc, its weight, and the distance it flew.

C. Wrap-Up

1. Have students share their observations after they have created a chart with their information.
2. List the distances traveled by the flying discs on the board and compare.
3. Have students identify variables they think affected the flight (weight, size, etc.). Encourage students to look for patterns in the flight of their disc as well as those of their classmates.
4. Conclude with journal writing. Be sure students explain their observations and include measurements.

Assessment/Evaluation:

Use student charts and journal writings to evaluate understanding of the activity and to be sure that objectives were met.

Extensions:

1. Make discs of various masses or sizes and compare flights to previous activity.
2. Play games with the flying disc (golf, softball, pickle, relay races, etc.).
3. Decorate the flying disc.
4. Have students explain how the disk is like an airplane wing and how it is different.

Resources:

How does a flying disc fly:

<https://wonderopolis.org/wonder/how-does-a-frisbee-fly#:~:text=The%20curved%20top%20surface%20of,bit%20like%20an%20airplane's%20wing.&text=Th is%20creates%20lower%20air%20pressure,to%20fly%20through%20the%20air.>

<https://www.scientificamerican.com/article/bring-science-home-frisbee-aerodynamics/>

<https://afda.com/the-physics-of-disc-flight>

How to properly throw a flying disc:

<https://www.efdf.org/flying-disc-sports/freestyle/16-some-basic-techniques>

<https://youtu.be/INQexzgzvw4>

<https://youtu.be/Sgn6Os4YSW0>