



# Take Offs and Landings: The Risks of Taking Flight...

## Challenge (Asking Questions & Solving Problems):

Can you and your group (3 people) **create a paper airplane design** that will allow you to successfully **land** the airplane on the aircraft carrier (in the plastic container)?

## Materials

- 3 pieces of paper (22 cm x 28 cm)
- Plastic container (the aircraft carrier)
- Metric ruler
- A good attitude (always)
- A three meter (300 cm) measuring tape
- Wi-Fi Connected device to record data
- Link to input data (go to: [http://www.mytoe.org/weeklyhw/weekly\\_hw.htm](http://www.mytoe.org/weeklyhw/weekly_hw.htm) )

## Guidelines for Engineering Your Designs

1. **Write down** (in your notebook) what is the **purpose** of your airplane. This will help guide you in engineering the best plane to meet the **purpose** of the lab.
2. Go online and **research**: paper airplane design, how to make them, and flight.
3. **Sketch, draw**, or include **pictures/prototypes/designs** in your notebook. You may also include digital links to sites or videos to view at home.
4. Based on your online research **create 3 to 6 different paper airplane designs** that you think will **best allow you to land** your plane into the plastic container.
5. After you build your 3 to 6 planes we will go outside and **test them to see which one your group will use** (you should **only select one**, otherwise there will be too much *variability* in the experiment).

## Testing Your Design's Ability to Land Safely and Collecting Data

1. **Each person** in your group will get **5 attempts** (15 total per group) to land the airplane in plastic container.
2. Each person will **decide at which distance to launch** the paper airplane. You are welcome to do all launches from **one distance or change the distance** for each attempt. It is up to you and if you value **landing safely** or **earning points** more.
3. You are welcome to use any method you like to get the plane in the plastic container as long as you **do not move your feet past the launch** distance you select and **remain upright while you throw**.
4. Below are the points you can earn for each landing from five different distances:
  - **10 cm = 5 points**
  - **100 cm = 25 points**
  - **150 cm = 125 points**
  - **200 cm = 600 points**
  - **300 cm = 1000 points**
5. **Record the data** for each attempt in your notebook so you can later enter it (using a device) in the [Google Form](#) (see **BOK**) when we get back to class.

## Reflective Component

Write a brief response (1-2 sentences each) addressing the following key points:

- How did your group do in regards to the **purpose** of the lab (look at your data and look at the purpose)?
- What **worked well** for your group (or did not work well)?
- What would you **do differently** if you had a chance to do the lab activity again?
- How **willing** were you to **take a risk** and try from the 200cm or 300cm distance?
- Was it **more important** for your group to **land safely** or try for the **big points**?
- Explain how this lab activity relates to the real world or your daily life. It does not necessarily need to be about airplanes, but any component of the lab activity (designing, building, engineering, testing, risk-taking, collaboration etc.).