

# Wright Stuff B/Wright Stuff Capacitor Event Supervisor Guidance

Last Updated 11/04/17, E. Pahuski

## National SO Resources:

<https://www.soinc.org/wright-stuff-b>

**Event Objective:** Students are to build a plane that achieves the longest possible flight time.

## General Comments:

- Overall objective is to deliver a fair and enjoyable experience to students and determine rank order of competitors according to rules provided.
- These instructions supplement 2018 Wright Stuff (Division B) and 2018 Electric Wright Stuff (Division C) rules
- These instructions are meant to be used with the 2018 Wright Stuff Team Checklist and Event Scoring Spreadsheet (may be another set for Electric Wright Stuff).
- Students may be nervous during competitions. Assist students with guidance and instructions that help them complete their events, but avoid providing strategies or suggestions for how to adjust plane, wind or fly. If event is invitational or regional competition, supervisors may elect to provide tips or suggestions once teams have completed their event. Caution - if multiple teams are competing from one school, the possibility exists that students could share tips providing an advantage to the second team.
- Parents, coaches, young spectators and students can be curious about other team's airplanes or winders. Monitor non-competitors to ensure accidents don't occur with fragile airplanes or accessories.
- Coaches and involved parents can often be more challenging than students before, during and after events. At the same time, these individuals are trying to learn about the event and how it will be run. Be courteous to adults and have extra sets of rules available and ready to answer questions or challenges. The best preparation is to have a sound understanding of the rules and to prepare for the most likely issues and occurrences.
- A significant challenge in delivering a fair event is in trying to maintain 'equivalent' air conditions during the entire day. Try to direct students and spectators through one or a few doors and try to keep doors open the same way during the day.
- It is important to have an accurate and reproducible balance for weighing airplanes and motors (Division B). Avoid having the balance in any breezes or downward drafts as the airplane wings can disrupt the mass measurement. Consider developing and posting a calibration chart to demonstrate the accuracy and reliability of your balance for the event.
- No impound, no eye protection, up to 2 competitors per team.
- New for 2018 - Parents and coaches may NOT handle planes or plane accessories. Parents may assist students in transporting devices.

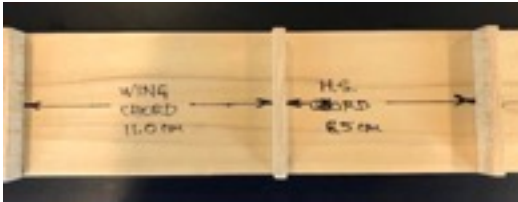
## Room Needs:

- 5 banquet tables (3 for students to stage airplanes, 2 for check in and inspection)
- 8 chairs
- Room dimensions (Length X Width X Height in feet); Height is distance from floor to bottom of first flying obstacle such as girders or fans
- Room dimensions must be announced to coaches prior to event
- Spectator seating only in corners of room and away from student staging and inspection tables; no seating near airplane flights which is typically in center of room
- Single door entry with other doors locked if not fire hazard; optimal entry location is corner of room near spectator seating
- All basketball hoops raised up to ceiling as high as possible and out of flight path
- All netting or room dividers raised as high as possible and out of flight path
- Bleachers retracted (closed) as far as possible to open up center flight path in room
- Room cleared of equipment or other items that would be in flight path or make it difficult for students to retrieve airplanes during 8 minute time allotment
- ***Critical - All ceiling and room fans turned off for duration of event (beginning when impound starts and ending with final flight of the day)***
- ***Critical - All HVAC systems turned off (beginning when impound starts and ending with final flight of the day)***
- If HVAC systems cannot be turned off, inspection station needs to be placed in location with minimal air flow to weigh very light airplanes
- Cell phone number of facilities person or event coordinator to contact during event if problems occurs

### Equipment Needs:

- Stop watches (3 count up, one count down for each team host)
- Weigh boats for rubber motors
- Foam “stand” for plane weighing (cut up a swimming noodle into short cylinders with slots to hold planes at or near their center of gravity)
- Balance with fresh batteries (or plugged into wall) - calibrated with calibration chart (if available)
- Extension Cords (2)
- Laptop with scoring sheet available from [www.soinc.org](http://www.soinc.org)
- Clipboards
- Pencils
- Signs to direct students
- Sign with room dimensions
- Caution tape to keep spectators from competition area
- Scoring sheets for each team available from [www.soinc.org](http://www.soinc.org)
- Extendable pole for retrieving airplanes snagged in unreachable locations
- Measuring devices. Rather than using a ruler or scale to verify sizes, it is easier to have students “put” wings, etc. into the measuring device to demonstrate conformance.
  - Wind Chord - XX cm

- Wind length - XX cm
- Horizontal Stabilizer Length - XX cm
- Propeller - XX cm



### Event Supervisor/Volunteer Assignments:

- Assign each person to their roles for the event. Try to have same individuals perform same function for all teams.
  - Team host
    - Welcomes students and stays with team until event completion
    - Completes team checklist entries
    - Brings students to inspection table - teams need planes, motors (Division B, off of plane to weigh separately) and flight logs
    - Watch students wind/charge or repair during event
    - Keeps 8 minute countdown timer after first flight starts
    - Keeps time for launch bonus
    - Enters final results
    - Ensures checklist is complete and verified
    - Communicates flight time results and any scoring violations to student team
  - Inspectors
    - Inspects for construction requirements
    - Div B - Weighs plane with prop (up to 2 planes are allowed); Div C - Weighs plane in ready to fly configuration
    - Div B - Weighs motors (as many as team wants); Div C - inspects capacitor for 3V/5F requirements and batteries for 3V maximum voltage
    - States Yes (acceptable) or No (unacceptable) to host for recording for each inspection parameter
    - May verify results logged by host
    - May time flights
    - May read final instructions to competitors and instruct host to begin timing
  - Flight Coordinator
    - Stages teams for flights
    - Keeps flight zone clear

- States flight time START and STOP for other timers
- Timers
  - Time flights and report results
  - May assist in inspections or verifications
  - May state flight time START and STOP for other timers
- Event Supervisor
  - Oversees all aspects of event
  - Reads instructions to students and answers questions
  - May state flight time START and STOP for timers
  - Resolves 'close calls' or irregularities using their best judgment
  - Manages appeals (if any)
  - Adds scoring data to scoring spreadsheet
  - Verifies entries and scoring is complete and correct
  - Reports final scores and rankings to event manager
  - Provides students guidance after event (if appropriate and time allows)

### **Prior to the Event:**

- Build (or purchase from Wards, etc) test measurement devices
- Contact event coordinator for room dimensions and remind that individual to report room dimensions (length, width, and ceiling height in feet) to coaches before competition
- Get coordinators cell phone number if you don't have it already in case a problem arises
- Notify coordinator of need for 3 student tables and 2 event supervisor tables (banquet tables ideal) and enough chairs for all event supervisors
- Ask coordinator to leave some seating for spectators and ask for seating away from center of space (corners of room are best)
- Ask coordinator if HVAC and fans in competition area can be turned off for duration of competition. If necessary, obtain cell phone number of facilities person who can turn off fans and HVAC.
- If event is being held in a gymnasium, ask coordinator to have all basketball backboards and any nets or other obstructions to be fully raised or moved for competition
- Place balance on flat and immobile surface. Calibrate balance and record results. Use newer coins if calibration standards are not available. Penny = 2.500 g, dime = 2.265 g, nickel = 5.000 g, quarter = 5.670 g, silver half dollar = 11.500 g, silver dollar = 31.103 g. Plot and print results to post at event.
- Print signs
  - Keep door closed
  - Room dimensions
  - Parent and Coach Instructions
  - Staging Instructions
  - Only competitors beyond this point
  - Calibration chart
  - SO Rules sheet

## Day of the Competition:

- Arrive early (I target 1.5 hours before first flight) and set up tables where needed. Put student set up tables away from supervisor tables. Both types of tables should be placed away from spectators.
- Post signs for room dimensions, instructions for coaches and parents and directions to students.
- If doors can remain closed during competition, place signs on doors.
- Set up one table for paperwork, check in and laptop and second table for plane, motor and capacitor/battery inspections and weighing.
- Tape off areas to contain or direct spectators from student prep area, flight zone and inspection tables. Purpose of containment is to ensure students are competing on their own without coach or parent influences and prevents penalties.
- Consider chairs or means to 'stage' students waiting to compete. Provide plenty of space between staging teams.
- Place and spot check balance for level and accuracy using mass standards or coins. Avoid placing balance in location in direct drafts. If table is used, instruct students and others to refrain from leaning on table during weighing. Try to place balance in location where both students and one supervisor can easily see results. If balance readout is drifting, wait for readout to stabilize. If balance readout varies between 2 readings, use lighter of the readings. If time allows, ask student to state mass reading out loud and supervisor verifies and agrees with reading.
- Have sign in staging area to instruct students for exact needs when going to inspection station. Div B - plane with propellor on but no motors, motors (as many as students need) and flight log; Div C - plane in ready to fly configuration, capacitor, batteries and flight log. State that students will be on the clock immediately following inspection (i.e. have everything ready to go to fly in required time). Sign will state:
  - Following inspection, the clock will start to begin your Pre-Flight Period. If you are not ready to fly in 9 minutes, your 8 minute flight time will begin automatically.
  - Announce 'Ready' to event supervisor when you are ready to release plane.
  - You will have 8 minutes for up to 2 flights. The host will start the Flight Time timer when your first flight (either trim or competition) starts.
  - You may fly your plane up to 2 times in your 8 minute time allotment.
  - If you declare a trim flight, that flight will not be timed and will not count for the event.
  - If you do not declare a trim flight, the flight will count as one of your 2 competition flights.
  - Any competition flight starting before the end of your 8 minute time allotment will count for your scoring.
  - You may use any tools or materials you brought with you to repair or adjust your plane. You may not receive any materials or instructions from others outside the staging or inspection area once you begin.

- At any time you can ask your host how much time you have remaining in your 9 minute Preflight or 8 minute Flight allotment.
- Your flight will end when
  - Any part of the plane touches the ground
  - The plane is no longer under its own power
  - The event supervisor determines your flight to be over for any other reason
- If you have a balance calibration chart, post it near the balance and post another in the spectator area.
- Confirm that facility HVAC and/or fans have been turned off if possible.
- If desired, post signs on outside doors to direct spectators/students in through doors which will minimally impact flights in progress. If leaving one door open during event affix sign that the door remains open throughout the event.
- Practice timing with 3 timers to get timers comfortable with their timing devices and listening to Start and Stop instructions.

### Check In and Inspection:

- Host starts a Team Checklist sheet for each team. Enter Team Number, Name (including A or B or White or Blue for schools with multiple teams) and Student Names.
- Once students enter staging area, team cannot receive materials, instruction or guidance from coach, parents or spectators. Consider warning to coaches before penalizing team. If outside assistance occurs before or for a given flight, record as penalty on Team Checklist. Team will be tiered lower than other teams not having penalties.
- Note - Do not touch or pick up devices or accessories. Always let students handle their own devices.
- Have students go to inspection table (one team at a time) with all required items. Have 2 supervisors available for each check-in.
- Inspection points (yes answers indicate conformance to rules); inspect up to 2 airplanes and multiple motors (Div B) or capacitors/batteries (Div C) per team
  - No pre-glued joints or pre-covered surfaces (3a)
  - No boron filaments (3b)
  - Total airplane and prop assembly mass (no motor, Div B; fully configured, Div C) is  $>$  = 7.0g (3c)
  - Monoplane with (3d, must meet all requirements for Yes)
    - Wing span  $<$  or = 40.0cm
    - Wing chord  $<$  or = 10.0cm
    - Horizontal stabilizer  $<$  or = 20.0cm
    - Stabilizer chord  $<$  or = 7.0cm
- Propeller is single, 2 bladed with diameter  $<$  or = 14.0cm and not variable pitch controlled (3e)
- Motor
  - Div B - Rubber motor with attachments like O-rings  $<$  or = 1.5g. Students may weigh as many motors as desired for competition. Motors can be collected at check-in and

made available to students for testing. Alternately stay with students after check in to ensure only motors that were weighted are used. (3f)

- Div C - Capacitor  $\leq 3.0V/5.0F$  and batteries not to exceed 3.0V (in series or parallel)
- Plane is labeled in some way (team name or team number or other unique name) and at least one non-horizontal surface is covered in a non-transparent, non-white material (Div B - 3h, Div C - 3g)
- Bonus - Airplane has surface of wing that is at least the length of wing chord and at least between 2 ribs or a wing tip fence completed marked with black marker or black tissue. If no wing ribs, whole wing surface must be black (5c).
- Flight log
  - Div B - 10 or more flights, 6 parameters total, 3 parameters must be motor size before windup, number of turns of motor or torque at launch, and flight time. Must have 3 additional parameters of students' choosing. Scoring - Complete (has log with all requirements) Incomplete (has log but missing one or more requirements), None (no log presented).
  - Div C - 10 or more flights, 6 parameters total, 3 parameters must be capacitor charging details before launch, flight surface adjustments, and flight time. Must have 3 additional parameters of students' choosing. Scoring - Complete (has log with all requirements) Incomplete (has log but missing one or more requirements), None (no log presented).
- Complete team checklist and have second supervisor verify results for each item.
- For any construction or flight log violations, inform students immediately.

### The Competition:

- When students have completed inspection, ask if they have any questions.
- Supervisor tells students and host that Pre-flight time starts 'Now.'
- Host watches students wind or charge plane and tracks time to 'Ready' announcement. Note time on Team Scoring Sheet.
- Three timers get in position to begin timing. Timers should be close enough to see students release plane, but away from likely plane flight path (most planes fly in left handed circles with ~10 to 25 foot diameters.)
- Listen for 'trim flight' comment from student. If not formally announced as trim flight, time as competition flight. If trim flight announced, there is no need to time.
- Instruct student to wait until timers are ready, then countdown "3, 2, 1, Go" in loud voice to begin flight.
- Event supervisor states 'Start' as soon as plane leaves students hands. Some students 'walk' with plane to start flight, or release is not at 'Go' announcement, but flight does not start until plane leaves hands. Host begins (or tracks start time) for 8 minute flight period.
- At end of each flight supervisor or timer states 'Stop'. Flight ends when

- Any part of airplane touches floor at any time including immediately after release. Note - planes hitting walls are still considered 'in flight' until hitting the ground or otherwise stopping
- Airplane lands on girder or basketball hoop and no longer flies under its own power.
- Judges determine the flight to be over for any other reason. In these instances, event supervisor should announce 'stop' to complete timing by timers.
- Record flight time for each of 3 timers to the nearest tenth (0.1) of a second.

#### **Completing team checklist for scoring:**

- Enter results on each team checklist as described above.
- Have second supervisor verify checklist for completeness and accuracy.
- Report flight time to team as well as all construction, competition or disqualification violations.

#### **Completing spreadsheet for scoring:**

- To enter spreadsheet results, hosts read results out loud to person completing spreadsheet.
- Have spreadsheet person read results back to scorer to verify entries.
- When all entries completed, double entries against team checklist.
- Do not report ranks or any other team scores to students, coaches or spectators.

#### **Final Scoring:**

- Put team ranks on the official scorecard or Avogadro as provided by the tournament coordinator. Take all Team Scoring Sheets to tournament coordinator for possible double checking or appeals.

# Room Dimensions



61 feet long

34 feet wide

16 feet high

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Please keep doors  
closed.

Flying competition in  
progress

Please keep doors  
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Flying competition in  
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progress

**WRIGHT STUFF**

**INSPECTION AND  
TESTING  
STATION**

**WRIGHT STUFF**  
**STUDENT STAGING**  
**AREA**

**Competitors ONLY**  
**Beyond**  
**This**

# Point

# Spectator Seating



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Flying competition in  
progress

**Please keep doors  
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**Flying competition in  
progress**

**WRIGHT STUFF**  
**STUDENT STAGING**  
**AREA**

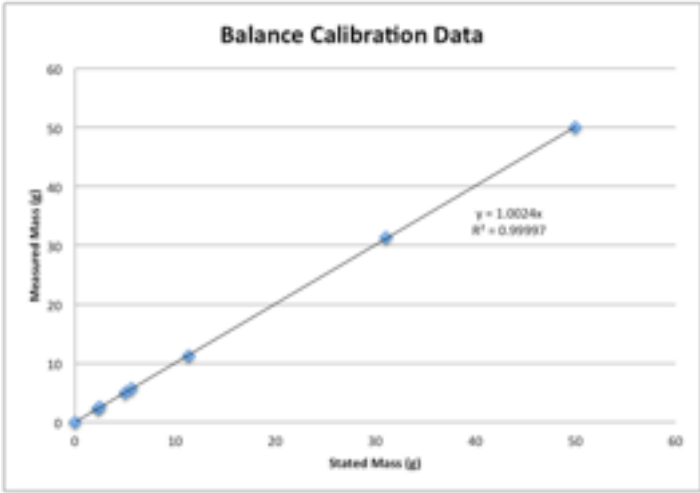
**Competitors ONLY**  
**Beyond**  
**This**

# Point

## Balance Calibration Chart (Example)

	Stat ed (g)	Measur ed (g)
Zero	0	0
Dime	2.27	2.26
Penny	2.5	2.49
Nickel	5	4.96
Quarte r	5.67	5.71
Half dollar	11.3 4	11.23
Silver dollar	31.1 0	31.36
50 g	50	50.04

US Absolute Balance (0 - 200g)



# **Student Instructions -** **COMPETITORS READ THIS**

- Prepare what you need for inspection.  
Once you go to the inspection table, you cannot return to staging area until you are on the clock for Pre-flight.
- Bring to Inspection table
  - Div B - planes (up to 2) with propellor on but no motors, motors (as many as students need) and flight log;
  - Div C - planes (up to 2) in ready to fly configuration with capacitor motor and propeller attached, batteries and flight log.
- Following inspection, the clock will start to begin your Pre-Flight Period. If you are not ready to fly in 9 minutes, your 8 minute flight time will begin automatically.
- Announce 'Ready' to event supervisor when you are ready to release and fly your plane.
- You will have 8 minutes for up to 2 flights. The host will start the Flight Time timer when your first flight (either trim or competition) starts.
- You may fly your plane up to 2 times in your 8 minute time allotment.
- If you declare a trim flight, that flight will not be timed and will not count for the event. However, your 8 minute flight time will start at the beginning of your first flight, even if it is a trim flight.
- If you do not declare a trim flight, the flight will count as one of your 2 competition flights.
- Any competition flight starting before

**IMPORTANT NOTES TO**  
**STUDENTS, PARENTS AND**  
**COACHES**



## New rule for 2018 Wright Stuff and Electric Wright Stuff Competitions

There is a new emphasis this year to ensure that only students competing handle their devices. This extends to ALL events with devices with the intention that parents and coaches must not provide assistance during competitions.

“Handling” includes holding, unpacking, winding, repairing or in any other fashion TOUCHING airplanes or airplane accessories. Non-participants MAY assist students in transporting airplane or airplane containers or boxes, but should otherwise avoid any further assistance before or during the event. Shouting instructions to your students after they have entered the competition area will result in that team dropping a tier in the rankings.

### Practice Flights:

- **FLYERS FLY PRACTICE FLIGHTS AT THEIR OWN RISK**
- Competitors may take practice flights prior to competing
- Preparations for practice flights must be made away competition staging and inspection areas
- No practice flight can take

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