

7th Grade N.E.S.T. Plans

Airplane Challenge

This week in N.E.S.T.:

On Day One students will check in and share out. On Day 2-Day 4, students will participate in a fun group building activity to minimize stressors they feel during the holidays. On Day 2 and Day 3, groups will create two paper airplanes. On Day Four, each N.E.S.T. will compete against another N.E.S.T.. The competition will measure how far each airplane can fly (using Paper Airplane #1) and how long the airplane can stay in the air (using Paper Airplane #2.)

Routine Reminder

Students should walk into the meeting area and answer the DAILY NEWS on the board(s), get into their CIRCLE. After Circling Up, students GREET each other and then begin to check-in. Mondays are all about the CHECK-IN. It is important to really scaffold students to get them sharing as much as possible. Once each student has had the opportunity to check-in the group may begin the ACTIVITY. 5 minutes before transition, the group may REVIEW the answers on the daily news board and/or REFLECT on the activity.

Day 1

Objective: Student will check in and share out.

Materials Needed: none

1.Daily News: If you can spend the holidays anywhere in the world, where would that be? (5 minutes)

2.Greeting: Everyone Greets and is greeted (students sit in a circle)

3.Formal Sharing/ Check-in: (10 minutes)

- Today we will not only check in 1-5 but we will also share whatever we want with our group. We can share by answering these three questions:
 - What did you do this weekend?
 - What are you looking forward to doing during the break?
 - What class are you looking forward to today?
 - What is one thing you learned in school last week?

Holidays around the World: <https://www.youtube.com/watch?v=1GaGjKbWIZQ>

5. Review Daily News and Discuss: (5 minutes)

Ask the following questions to guide students in reflection:

- What does your family do every holiday?
- Do you eat specific food?
- Do you play specific games?
- Do you listen to specific music?

Day 2 and 3

OBJECTIVE: Each group will create TWO group Paper Airplanes, which they will use to compete against another N.E.S.T. on Day 4.

Materials Needed: one standard paper clip, three inches of tape, a dab of glue, three staples,

Day Two Daily News: Do you like building things/working with your hands?

Day Three Daily News: Who is the most creative person you know?

2. **Greeting:** Everyone Greets and is greeted (students sit in a circle)

3. **Check-in:** (5 minutes)

4. **Activity:** Creating TWO paper airplanes (per group)

Procedure:

- Review Daily News. Allow time for students to share their creations.
- Share with students that they will be participating in an N.E.S.T. challenge where they will be competing with other advisories on airplane challenges. Each N.E.S.T. will be creating two airplanes. One that will compete for the “Longest Distance” and the other which will compete for the “Longest Airtime.”
- Show this video to give students a better idea of what paper airplanes can do: YouTube title: Paper Airplane World Championship - Red Bull Paper Wings 2015
 - <https://www.youtube.com/watch?v=SUyqakRMrxo>
- Review the basics of aerodynamics and flight.

Aerodynamics

What makes a paper airplane fly? Air — the stuff that's all around you. Hold your hand in front of your body with your palm facing sideways so that your thumb is on top and your pinkie is facing the floor. Swing your hand back and forth. Do you feel the air? Now turn your palm so it is parallel to the ground and swing it back and forth again, like you're slicing it through the air. You

can still feel the air, but your hand is able to move through it more smoothly than when your hand was turned up at a right angle. How easily an airplane moves through the air, or its aerodynamics, is the first consideration in making an airplane fly for a long distance.

Drag and Gravity

Planes that push a lot of air, like your hand did when it was facing the side, are said to have a lot of "drag," or resistance, to moving through the air. If you want your plane to fly as far as possible, you want a plane with as little drag as possible. A second force that planes need to overcome is "gravity." You need to keep your plane's weight to a minimum to help fight against gravity's pull to the ground.

Thrust and Lift

"Thrust" and "lift" are two other forces that help your plane make a long flight. Thrust is the forward movement of the plane. The initial thrust comes from the muscles of the "pilot" as the paper airplane is launched. After this, paper airplanes are really gliders, converting altitude to forward motion. Lift comes when the air below the airplane wing is pushing up harder than the air above it is pushing down. It is this difference in pressure that enables the plane to fly. Pressure can be reduced on a wing's surface by making the air move over it more quickly. The wings of a plane are curved so that the air moves more quickly over the top of the wing, resulting in an upward push, or lift, on the wing.

The Four Forces in Balance

A long flight occurs when these four forces — drag, gravity, thrust, and lift — are balanced. Some planes (like darts) are meant to be thrown with a lot of force. Because darts don't have a lot of drag and lift, they depend on extra thrust to overcome gravity. Long distance fliers are often built with this same design. Planes that are built to spend a long time in the air usually have a lot of lift but little thrust. These planes fly a slow and gentle flight.

- After explaining the basics of aerodynamics and flight, **break your N.E.S.T. into two groups.** Each group will create two paper airplanes (one for distance competition and one for airtime competition.)
- Give students the basic instructions on how to create a basic paper airplane (see supporting documents) (This will take two days.)
- Allow students time, prior to passing out materials to do research online on how to make a paper airplane. I have provided the simplest form of how to create a paper airplane in "supporting documents," but there are many websites and YouTube videos dedicated to improving the basic model that focus specifically on distance and airtime.

TIP: If your plane doesn't fly well, make a few adjustments. This is known as trimming your plane. Here are some adjustments to try:

- If the plane dives into the ground, bend up the backs of the wings. A little bend goes a long way.
- If the nose of the plane rises first and then drops, the plane is stalling. Bend down the backs of the wings. Keep your adjustments small.

- If the nose is still rising, add a paper clip to the nose. Trim your plane, and practice throwing it until you're happy with how it flies.
- After each group builds their two paper airplanes, review the test rules:
 - **Distance Test Rules**- For the distance category, each student throws his or her paper airplane while the teacher records distances in feet and inches. All distances must be measured from the starting line to the point where the plane first touches the ground or floor -- not the final resting place if it slides. Each student has up to three chances to get his or her best distance.
 - **Time in Air Test Rules**-For the time in air category, each student throws his or her airplane while the teacher times the flights with an accurate stopwatch. Report the times in seconds and hundredths of a second. (Example: 2.45 seconds.) Each student has up to three chances to get his or her longest "time in air."
- Review some safety guidelines:
 - Never throw planes at or towards people
 - Never throw planes over people, they may take a dive at the wrong moment
 - Always warn people around you that you are about to throw a plane, so they can keep a look out for it coming at them
 - Remember planes don't always fly as planned, a plane may take a 90 degree turn in the middle of its flight, and hit someone you thought was well out of the way.
- Have your two groups compete against each other for practice.

Each N.E.S.T. must select their best “distance airplane” and “airtime airplane” for the “N.E.S.T. VS. N.E.S.T.” competition that will take place on Day 4.

- Have students create a cool name for their paper airplanes that include the aviation alphabet. (Example N 831 FE represents November 831 Foxtrot Echo. Identification numbers and letters must not exceed 7; and the identification must begin with N, which stands for the United States.)
- Remind students to cheer each other on during the competition.

5. Review Daily News and Discuss: (5 minutes)

Ask the following questions to guide students in reflection:

Day 3: Skills that people use when working as a team are: communication skills, participation skills, brainstorming skills, listening skills, turn-taking skills- these are all important skills to develop.

Day 4

OBJECTIVE: Students will compete against another N.E.S.T..

Materials Needed: 2 paper airplanes (Distance and AirTime)

1. **Daily News:** GO TEAM!!! (Write words of encouragement for today's race.)

2. **Greeting:** Everyone Greets and is greeted (students sit in a circle)

3. **Check-in:** (5 minutes)

4. **Activity:** Paper Airplane Competition

Procedure:

- After attendance and quick check in, meet with your competitor in the assigned location.
- CHECK WHO YOU ARE MATCHED UP WITH ON THE WEEBLY SITE UNDER SUPPORTING DOCUMENTS.)

Advisors will facilitate this completion.

1. To facilitate the completion you **MUST** create a start line and a finish line (Use masking tape to mark each line on the ground.) I suggest starting with a finish line 5 feet away from the start line and then increasing it depending on students' progress.
2. Pair 1 student from your N.E.S.T. with one student from your competitors N.E.S.T. (for example, 1 student from TEACHER As N.E.S.T. will compete with 1 student from TEACHER Bs N.E.S.T..)
3. Have each pair take turns throwing their paper airplanes. Best out of three throws wins.
4. Feel free to play more than one round (For fun only.) First round should be used to pick a winner.
5. Remember that there are two categories (one for distance and one for airtime.) Compete in both categories.

6. Communicate with other 7th grade advisors and compete against winners from those partner peers.

- **Debrief the activity:**

1. Ask the groups-

- How did you feel about the competition?
- What do you think made one airplane fly longer than another airplane?
- What do you think made one airplane fly more distance than another airplane?
- Did your N.E.S.T. cheer you on?
- Do you think cheering each other on helps us be better competitors?
- How did we handle losing the competition? How did we handle winning the competition?