



NINTH GRADE CURRICULUM SEMESTER ONE

Materials Needed Throughout the Semester

- Interactive Notebooks (one per student)

Unit 1 - Aviation and Aerospace Today

- Unit 1A Day 2 - Heavy Lift Rocket Activity (materials per team)
 - Large binder clip
 - Fishing line/smooth string
 - 4 long balloons - 5" x 24"
 - Bathroom size (3 oz.) paper cup
 - 2 straight drinking straws
 - 50 small paper clips
 - Sandwich-size plastic bag
 - Masking tape
 - Wooden spring-type clothespins (optional)
 - Scissors
- Unit 1.A Day 3 - Graffiti Wall (materials per class)
 - Rolled paper or poster board
 - Markers
- Unit 1.B Day 1 – Commercial Aviation Challenges Activity (materials per class)
 - Rolled paper or poster board
 - Markers
- Unit 1.C Day 3 – B4UFLY Activity (students may share)
 - Smartphone (Android or Apple)
- Unit 1.C Day 3 - Drone Safety Poster Activity (materials per class)
 - Rolled paper or poster board
 - Markers and other art supplies



Unit 2 - Taking Flight—Early Aviation Innovations

- Unit 2.A Day 1 - Chinese Kites Activity (materials per class unless otherwise noted)
 - One manila file folder (per student)
 - Ribbon for the tail (12"-18" piece per student)
 - String
 - Scissors
 - Two bamboo skewers, chopsticks or small dowels (per student)
 - Hole punch
 - Art materials for decorating kites (optional)
- Unit 2.A Day 3-4 - DaVinci's Design Dilemma (materials per team)
 - Scissors
 - Rulers
 - Clear Tape
 - Fishing Line or string
 - Stopwatch/Other timing device (can use app on cellphone)
 - Washers or marbles
 - Small sealable sandwich bag
 - Template for spacecraft
 - Cardstock or old file folders for spacecraft template
 - Tissue paper or plastic tablecloths
 - Plastic grocery bags
 - Digital Scale or Balance (one per class)
[Amir Digital Pro Pocket Scale](#)
 - Other materials as provided by your teacher
- Unit 2.B Day 1-3 - Engage Activity (materials per class)
 - Large clear tank or tub filled with water
 - Pairs of sinking and floating objects (i.e. two cans of soda—regular and diet; orange with peel and orange peel only; two bowling balls—one more than 12 lbs and one less than 10 lbs)
- Unit 2.B Day 1-3 – Hot Air Balloon Activity
Materials per team
 - 13 sheets of tissue paper (approximately 20"x 30") (bright, mixed colors)
 - Glue stick
 - Scissors
 - Straight edge (yard or meter stick works best)
 - Marker (any dark color)
 - Large bowl with smooth, rounded bottom and sides



Materials per class

- Masking tape or duct tape
 - Metal ice bucket or small metal garbage can (should be large enough to hold multiple cans of gel fuel, sides should be more than 6 inches high)
 - 3-4 cans Sterno or similar gel fuel
 - Lighting device
 - Fire extinguisher
 - Heat protection for hands
 - Optional heat sources:
 - Hot air popcorn popper
 - Hair dryer set on low speed with high heat
 - Camp stove with propane fuel converter and metal heating duct to hold over camp stove
- Unit 2.C Day 2-3 - Paper Tent Activity (materials per student)
 - 8 1/2-inch x 11-inch piece of paper for each student
 - Unit 2.C Day 2-3 - Glider Building Activity (materials per team unless otherwise noted)
 - Balsa-wood gliders (one per student)
 - [Jetfire Balsa Gliders](#)
 - Extra balsa wood
 - [Small Box o' Balsa](#)
 - Craft knives (one per student pair)
 - Stopwatch or other timing device (may use cell phone app)
 - Tape measure
 - Glue
 - Other simple materials for modifying glider designs (index cards, paper, tape, sticky notes, paper clips, putty, etc.)
 - Unit 2.D Day 3-7 - Wind Tunnel Build (materials per wind tunnel)
 - Large pieces of cardboard cut into the following dimensions:
 - Four (4) 21" x 25" x 8"
 - Four (4) 40" x 8"
 - Box fan (highest powered fan available)
 - Box knife
 - Metal straight edge
 - Measuring tape/ruler
 - Drinking straws (recommend using jumbo size straws)
 - One (1) 8" x 10" piece Lexan/Plexiglass (can be purchased pre-cut at a major hardware store)
 - Duct tape
 - Hot glue gun and glue sticks
 - Digital scale (measures to 0.1g, at a minimum)
 - [Amir Digital Pro Pocket Scale](#)

MATERIALS LIST



- Safety glasses

- Unit 2.D Day 3-7 - Airfoil Build (per team)
 - Box knife
 - Metal straight edge
 - Measuring tape/ruler
 - Hot glue gun and glue sticks
 - Pliers/wire cutter
 - Protractor
 - Safety glassesThree (3) 7 ½" pieces of wire (can be from a wire hanger)
 - Foam board cut into the following pieces (recommend [Dollar Tree](#) foam board)
 - Airfoil Mount
 - One (1) 6" x 6"
 - Eight (8) 1" x 3"
 - Symmetrical Airfoil
 - One (1) 16" x 5 ¼"
 - Three (3) 5 ¼" x 1"
 - Asymmetrical Airfoil
 - One (1) 16" x 5 ¼"
 - Three (3) 5 ¼" x 1"

- Unit 2.D Day 8 - Graffiti Wall (materials per class)
 - Rolled paper or poster board
 - Markers

PROPRIETARY



Unit 3 - From Theory to Practical Reality—Rapid Developments in Powered Flight

- Unit 3.B Day 1-2 - Jigsaw Activity (materials per team)
 - Poster board
 - Markers
- Unit 3.D Day 1-3 - Innovation Advertisements Activity (per student)
 - Poster board or rolled paper
 - Markers and other art supplies
- Unit 3.D Day 4 - Riveting Activity
 - Pop rivet gun (minimum one gun per class)
 - [Hand Rivet Tool](#)
 - 1/8" x 1/8" aluminum rivets (minimum one per student)
 - [Aluminum Rivets](#)
 - No. 6 metal washers (minimum two per student)
 - [Steel Flat Washers](#)
 - Safety goggles
- Unit 3.D Day 6 - Graffiti Wall (materials per class)
 - Rolled paper or poster boards
 - Markers

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Unit 4 - To the Stars—Making Jet and Space Travel Possible

- Unit 4.A Day 1-3 - Jet Engine Lab Activity (materials per class)
 - Intake Station
 - One desk fan
 - Sheets of paper
 - Compression Station
 - Two desk fans
 - Six-inch pieces of string
 - Index cards
 - Tape
 - Markers
 - Paper clips
 - Combustion Station
 - 250-500 milliliter Erlenmeyer flask
 - Balloon
 - Can of sterno or other heat source
 - Matches or lighter
 - Tongs
 - Heat/oven mitts
 - Timer
 - Safety glasses
- Unit 4.A Day 1-3 - Jet Engine Model Activity (materials per student)
 - One paper towel or toilet paper tube (approximately 4-inches long)
 - One flexible straw
 - One 12x12-inch sheet of aluminum foil
 - Four paper circles 1 ½ inches in diameter
 - One small paperclip
 - One three-ounce paper cup
 - Scissors
 - Tape
 - White glue
- Unit 4.A Day 4-5 - Timeline Activity (materials per class)
 - Rolled paper
 - Markers

MATERIALS LIST



- Unit 4.B Day 1-3 - Rocket Launch Activity (materials per student unless otherwise noted)
 - Scissors
 - Clear tape
 - Straw
 - Paper
 - Pencil
 - Digital scale (one per class)
 - Ruler
 - Protractor
 - Clay
 - Masking tape
 - Tape measure (minimum one per class)
 - Other materials as provided by teacher
- Unit 4.B Day 4-6 Apollo Movie Poster Activity (materials per team)
 - Rolled paper or poster boards
 - Markers
- Unit 4.B Day 7 - Let's Dock Activity (materials per team)
 - One larger water bottle representing the Apollo module (empty)
 - One smaller water bottle representing the Soyuz module (empty)
 - Four 6-foot strings
 - Ring cut from a Styrofoam cup
 - Clear tape



Unit 5 - Creating the Future—What’s New and Next in Aviation and Aerospace

- Unit 5.A Day 2 - Drive or Fly? Activity
 - Rulers (one per student)
 - Sectional aeronautical charts (one per student or small group – see Explore section of lesson plan for ways to acquire charts)

- Unit 5.A Day 3 - Build-Your-Own Composite Activity (materials per class unless otherwise noted)
 - Balance or digital scale (to measure the weight of the flour and measure the weight of the composite structures)
 - Graduated cylinders (50-100 mL, several per class)
 - Counterweights or other weights (i.e. books) to test strength
 - Measuring cups and spoons
 - Several types of flour for use in making paste
 - Warm water
 - Materials to cover work surfaces
 - Vaseline
 - Variety of fabrics (biodegradable and other), such as paper towels, newspaper, tulle, cotton, burlap, nylon, etc. Each student will need several strips of one or two types of fabric about 2 inches x 6 inches.
 - Mixing bowls and utensils for making paste
 - Empty plastic containers to use as molds (empty yogurt cups, sour cream containers, margarine tubs work well). One per student
 - Safety goggles
 - Hair dryer or fan

- Unit 5.A Day 4-5 - Chevron Activity (materials per class)
 - Thunder drum (small or large ones will work for this activity). One needed, or, if possible, several small ones to help with productivity
[Thunder Drums](#)
 - Scissors
 - Rulers
 - Tape
 - Paper, cardstock, various building materials (i.e. aluminum foil)
 - Decibel meter (real or smart phone app)

There are many free decibel meter apps that are constantly changing. Simple app searches for “decibel meter” will show popular apps that include “Sound Meter,” “Decibel Meter” and “SPL Meter.”

MATERIALS LIST



- Unit 5.B Day 1 - Timeline Activity (materials per class)
 - Rolled paper or poster board
 - Markers
- Unit 5.B Day 3-5 - Game Building Activity (materials per class)
 - Samples of popular board games
 - Game supplies (dice, timers, spinners, game piece markers)
 - Building materials for board games (poster board or foam board, materials for game pieces, materials for spinners, index cards, markers, construction paper, modeling clay, etc.)
- Unit 5.C Day 1-5 - End of the Semester Project (materials per student)
 - Suggestions for physical exhibits include, but are not limited to, poster board/foam board, markers, pencils, scissors, glue, video presentation device, other basic presentation materials

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