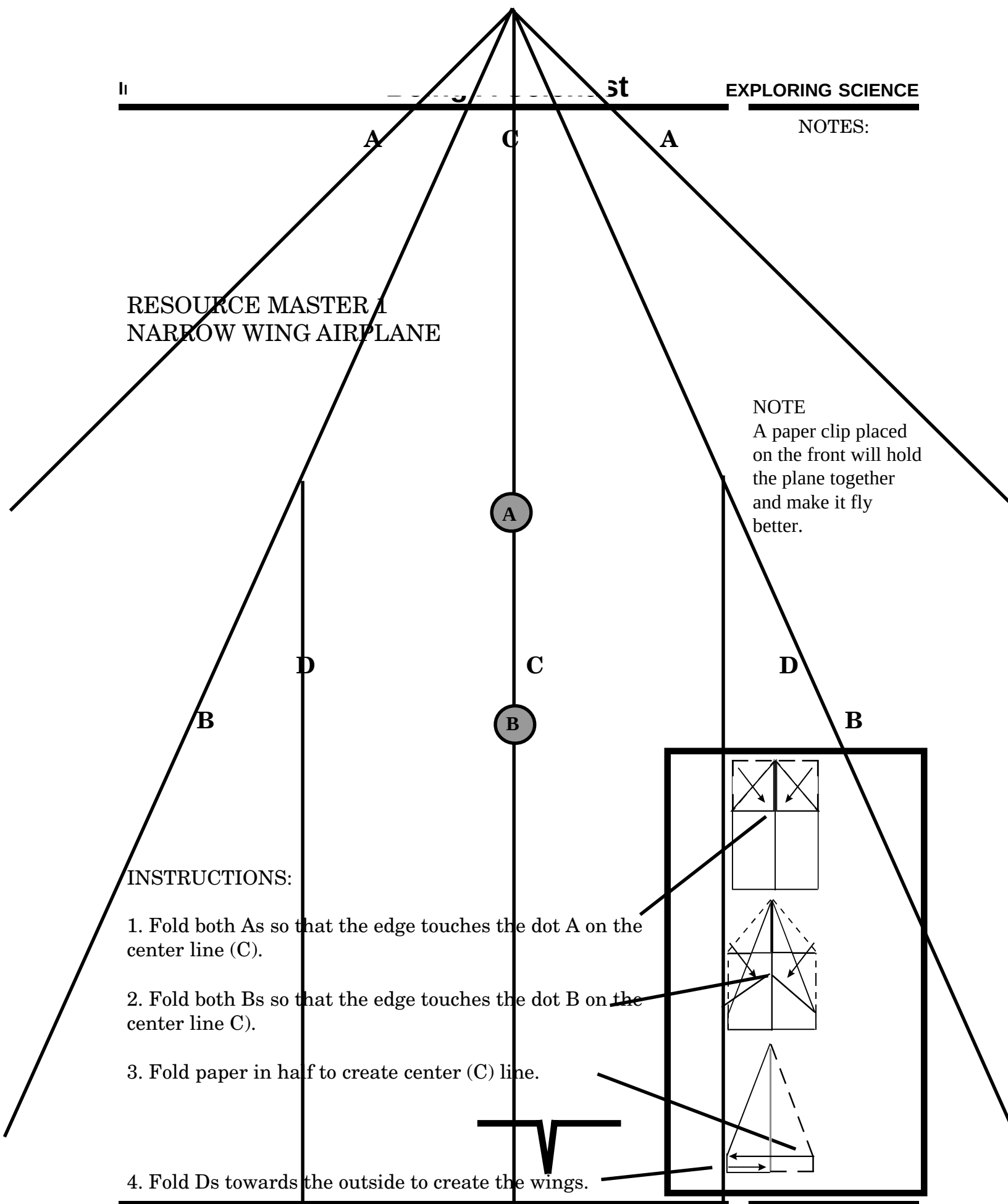
NOTES:

RESOURCE MASTER 1
NARROW WING AIRPLANE

NOTE
A paper clip placed on the front will hold the plane together and make it fly better.




INSTRUCTIONS:

1. Fold both As so that the edge touches the dot A on the center line (C).

2. Fold both Bs so that the edge touches the dot B on the center line C).

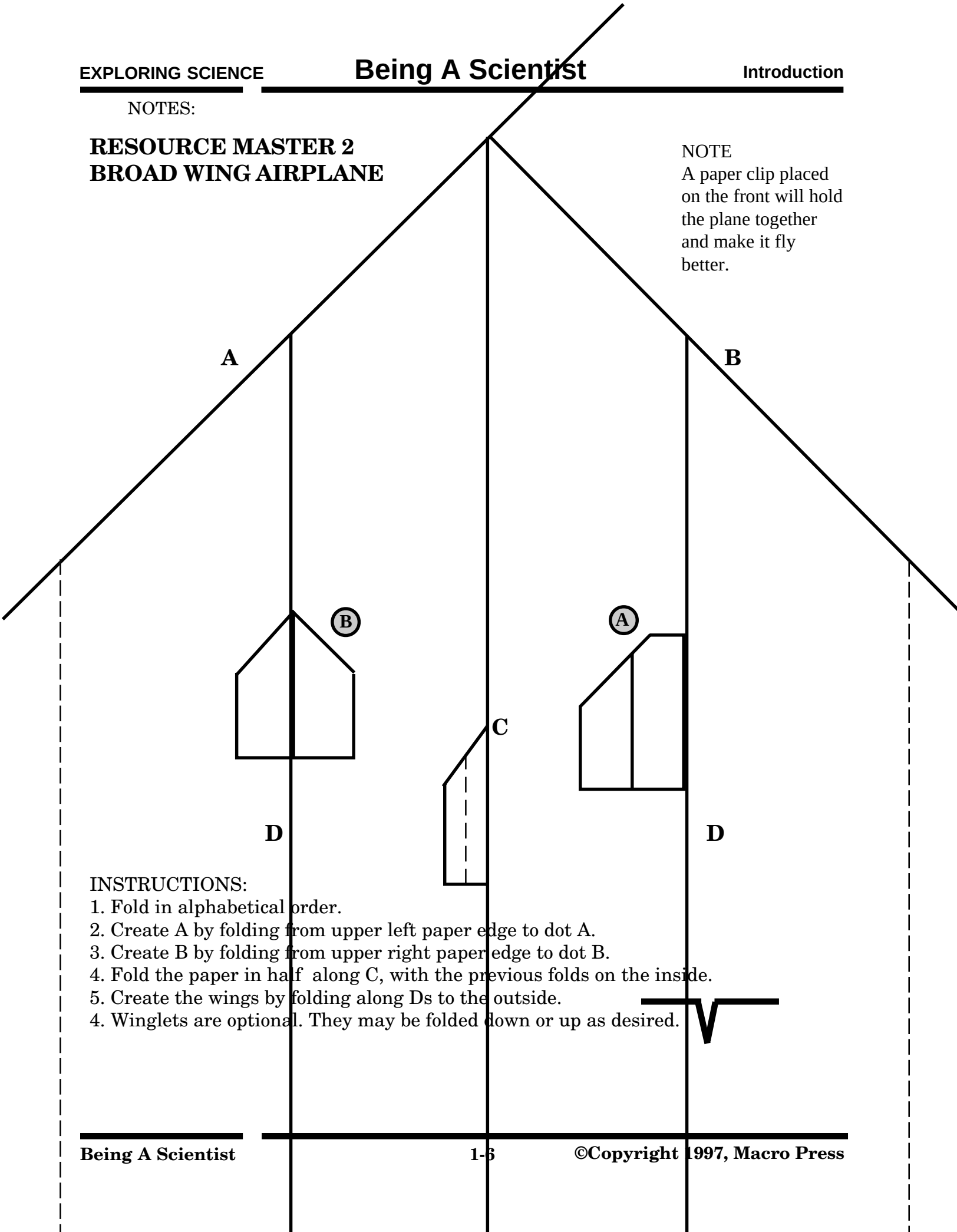
3. Fold paper in half to create center (C) line.

4. Fold Ds towards the outside to create the wings.

NOTES:

## RESOURCE MASTER 2
## BROAD WING AIRPLANE

NOTE
A paper clip placed on the front will hold the plane together and make it fly better.




INSTRUCTIONS:
1. Fold in alphabetical order.
2. Create A by folding from upper left paper edge to dot A.
3. Create B by folding from upper right paper edge to dot B.
4. Fold the paper in half along C, with the previous folds on the inside.
5. Create the wings by folding along Ds to the outside.
4. Winglets are optional. They may be folded down or up as desired.

NOTES:

**ACTIVITY 4: DESIGNING THE LABORATORY**

Enlist students to help develop at least one bulletin board focusing on science. These ideas are possibilities.

A. Create a display depicting **What Scientists Do** (use cards with the scientific thinking process skills - **observing, communicating, comparing, ordering, categorizing, relating, inferring, applying**). It could be arranged in sections identifying each skill with a picture. This display might feature pictures of your class as they perform these skills throughout this unit or pictures from newspapers or magazines.

B. **Science in our Lives** - This bulletin board is an ongoing, up-to-date display of science topics in the news today and how they affect our lives. Encourage students to bring in interesting and timely articles from magazines and newspapers.

**ACTIVITY 5: WHY**

As we start these activities on flight, and throughout the chapter, REMEMBER, the goal is launching scientists. The activities are meant to contribute to that goal in an enjoyable way.

**Materials:**
per class
1 large piece chart paper

Every child and every scientist is filled with continuous "whys". Flight has fascinated mankind throughout the ages. Everyone dreams about soaring with the birds at some time. The following activities will help give the students a common experiential base to approach their initial Being a Scientist Explorations while developing the questioning and communicating skills of a scientist. The students are introduced to the methods of finding the answers to the "whys".

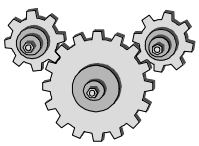
A. Inquiry Chart - "What do you already know about why birds and airplanes fly?"

It is important to assess students' background information and validate the experiences that they bring to a topic. Say, ***We all know that birds and airplanes, like us, are heavier than the air we breathe. We also know that they can fly and we can not. Why do you think that is? Pair/Share your ideas and information.*** Allow students a few minutes to discuss. Have ESL students discuss with others in the primary language, if possible.


After PAIR/SHARE time, quickly create an inquiry chart. Leave room to the side of questions for T or F and source of information. This should take only a few minutes so that interest does not wane.

Post this inquiry chart in the class for future reference.

| What Do You Already Know About Why Things Fly? | True or False | Source | What Else Would You Like To Know About Flight? |
|---|---|---|---|
| birds flap wings | T | observation | |
| planes have wings | T | observation | |
| planes have motors | | | |



Technology

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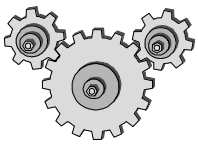


Technology

**Materials:**
per student
Any Text

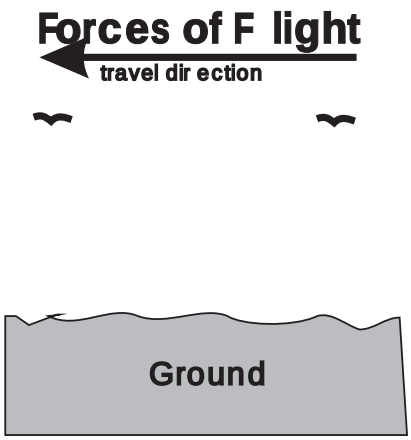
per teacher
2 pieces of chart paper

per team
2 sheets light-weight paper
2 sheets med. paper
2 sheets heavy paper

Student Text

B. Add another column to the Inquiry Chart that will guide the students study for the next few weeks. Ask, ***What else would you like to know about flight?*** Either have the students discuss in partners or teams. Write a new chart with the student questions. Emphasize that more questions can be added at any time.

Students need to know that their interests and questions serve as a guide to their own learning. As their questions are answered during the explorations, write the answers on the chart. Not all questions can, or need to be, answered. Some can become avenues for further student research. Some will be questions for future scientists. However, this chart with questions and answers serves as a motivation, a focal point, and an on-going review of information.

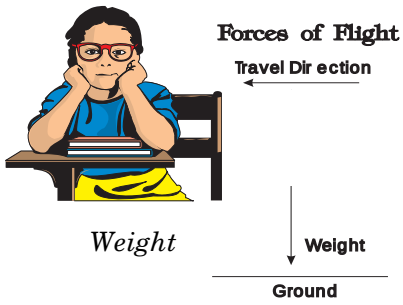



Creating a Graphic Organizer - The Forces of Flight,
As you do the following mini-activities, create the following chart using the key words. Begin with a diagram like this:

**ACTIVITY 6: HOW**

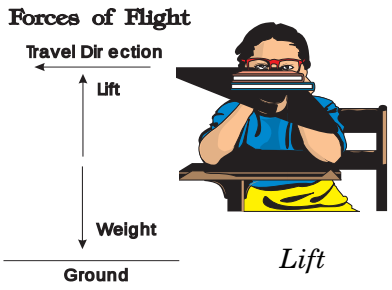
As each of the terms are given, create the graphic organizer, Forces of Flight to show the major terms.

***Look at pages 8 and 9 of your STUDENT TEXT. Leonardo da Vinci used his notebooks to study everything. While studying birds and how they flew, he found that he could duplicate their activity. Notice his lines depicting forces acting on the birds in flight. Even great scientists use graphics and notebooks to remember their thoughts and observations and to obtain understanding. He wanted to know why they were able to fly as he observed.***




*Weight*

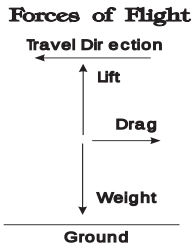
***There are four basic forces of flight that work for birds and planes. First, place your books down on your desk. Why***




*Lift*

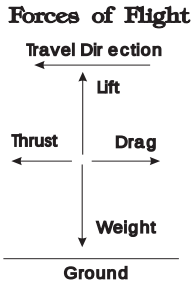
 

***does it stay there?*** Give the students chance to answer. ***Right, it has <u>weight</u>. It is heavier than air.*** Add the down arrow and the word weight to the diagram.




***Now pick your book up. It is no longer on the desk. What is another word used for 'pick up'?*** Allow the student responses. ***Again right, lift is the words used to describe the flight force which raises an object (bird, plane).*** Add the up arrow and the word lift to the diagram.

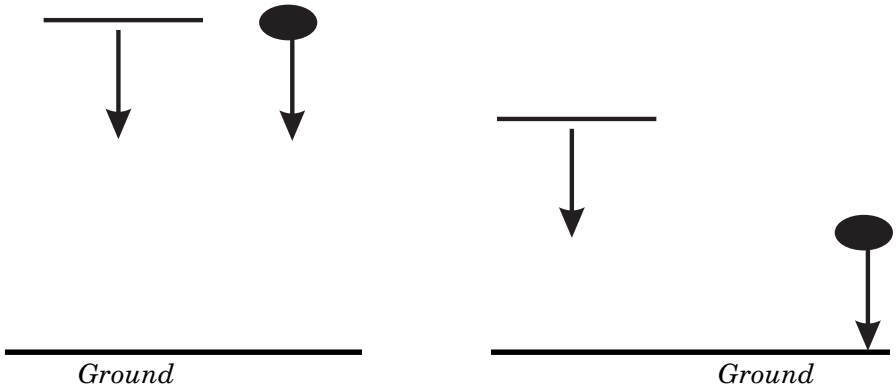
***Has anyone put their hand out into a strong wind, such as a high speed fan or a moving car? What happens?*** Response. ***Yes, your hand tries to go with the wind. Does anyone know what the force pulling the hand is called?*** Pause. ***What is another word for pulling a heavy box across the floor? Good, <u>drag</u> is the proper term for the force that makes it harder to go forward. Add Drag to the Forces of Flight Chart.***




***The final term is possibly unfamiliar, <u>thrust</u>. Thrust is a term that is sometimes used instead of throw. In flight, it is the term for the force that moves a body upward or forward.*** Add **Thrust** and its forward arrow to the chart.

Create a T-Chart labeled **Help - Hinder**. Have the students tell you where to place each of the forces. Let them discuss any disagreement.

*Student holding two papers* *After drop*




Post all charts in the classroom. Leave up throughout the Explorations on flight for student reference, reinforcement of vocabulary, concepts, and additional discussion.

NOTES:

*P.E. Idea:*
*Have the students throw balls / bean bags with a little <u>thrust</u>, more <u>thrust</u>, a lot of <u>thrust</u> to reinforce the vocabulary and concept.*

*Forces of Flight*

| Help | Hinder |
|---|---|
| Lift | Weight |
| Thrust | Drag |

NOTES:

Gate

**ACTIVITY 7: LIFTING**

In this activity, the basic causes of lift will be introduced. Use RESEARCH TEAMS. Issue each team 2 pieces each of identical size (light, medium, and heavy) paper. The two parts of this activity are designed to make the student ready to think, and hopefully answer, during the last activity.

A. **Drop test** - Prepare for the test saying, ***Each team is to crumple ONE of the light weight papers into a ball. Then get the other light weight paper. Raise both light papers to the same height and then drop them at the same time. Note the difference in time to strike the floor, if any.*** Repeat this activity for the other two weights. Using stop watches and repeated tests will show deviations and raise questions. Questions, and answers, are what we desire from the students.

B. **Questions** - Have the teams discuss their results for a couple minutes. Then ask, ***Which paper fell faster? How might you explain that?*** Record student responses.

*NOTE*
*For a student needing help making a paper airplane, use RM-1. Help them to fold, if necessary.*

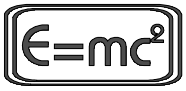
**ACTIVITY 8: Build A Plane**

Every child likes to make and fly paper planes. Pass out a piece of paper for them to make a plane of their design. Also pass out a copy of GM-2 with an appropriate quote such as, "The world is a laboratory to the inquiring mind." **Martin A. Fischer**

The GM-2 page provides space for each budding scientist to describe his/her plane design and what they wish it to achieve. Allow 20 minutes for the construction and writing. ***The note page will go in your SCIENTIST'S NOTEBOOK. You are to write up how your plane will fly and why you think it will perform in the way described. Save space to write up what actually happened after the flights.***

**ACTIVITY 9: Free Exploration**

The flying of the planes should be performed outdoors with extra observers. While this activity serves as an exciting release of energy and introduction to Being A Scientist for the children, it is important that they begin thinking.



Scientist Notebook

***We will be going outside to fly your planes. Each of you are to take turns so that none of the planes are accidently damaged. When you come back, you will act like a real scientist by describing how the plane performed.***

Allow time for at least 3 flights for each child.

Return to the classroom for review. ***Take out your SCIENTISTS NOTEBOOKS and write about how your plane performed. Did it meet your expectations? What would you like to change in the plane design or construction?***

**ACTIVITY 10: Closure**


Student Text

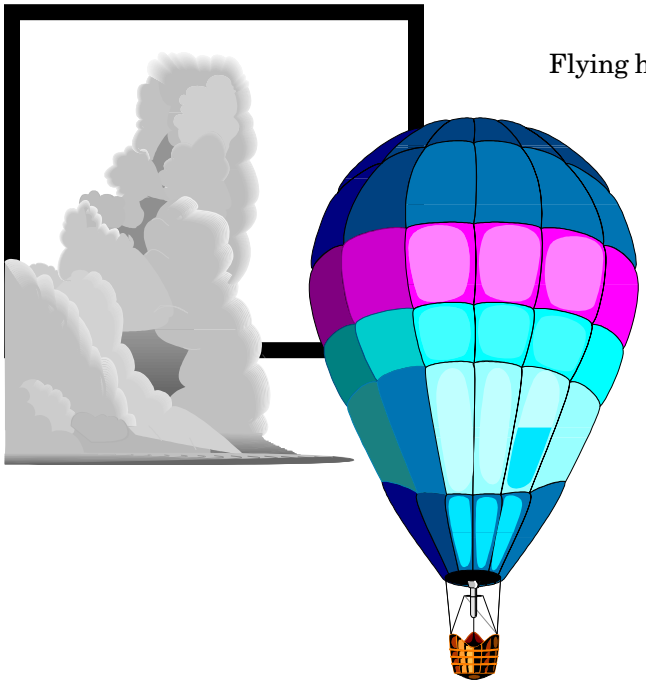
Revisit the Activity 5 Inquiry Chart. Discuss the items listed. For items now understood, add the appropriate T or F and the source of the knowledge (activity, video, book, etc.). After processing the chart, ask, What else would you like to know about flight? Add additional student questions.

Finally, have the students read pages 10-11 of the STUDENT TEXT, Dreaming The Dream. ***Science comes in many forms. Bessie Coleman used and studied science every day of her flying career. She has also inspired many others to follow her lead not only into flying, but also into science careers.***

NOTES:

# DREAMING THE DREAM



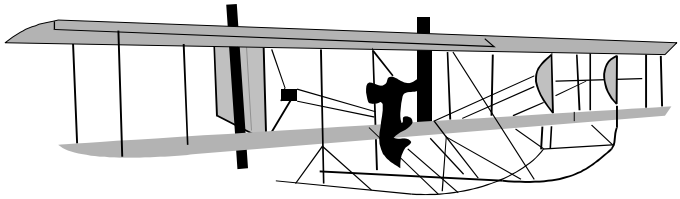
Flying high over the trees, over the mountains, and across the plains is a dream of many young people. From Leonardo daVinci to Burt Rutan, children and adults have imagined themselves flying balloons, dirigibles, gliders, and airplanes. Their dreams have placed them in the pilot's seat.

Learning to fly requires an understanding of how something that is heavier than air can remain aloft. Physics, weather, mathematics, and map reading are a few of the subjects learned by would-be pilots.

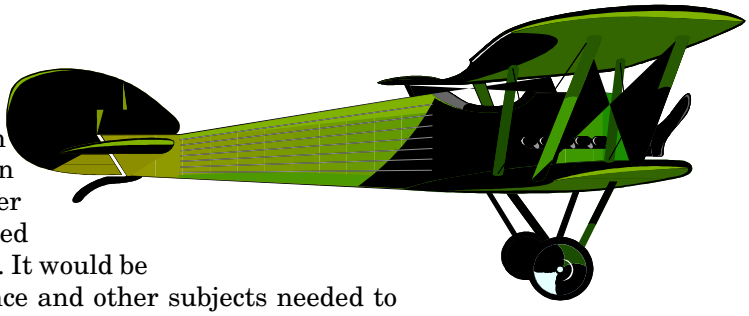
Bessie Coleman, daughter of a Native American father and African American mother, was born in Texas in 1893. To help her family, Bessie picked cotton and did laundry for others. She worked hard in school too and, unlike many young people of her time, graduated from high school.

NOTES:

# Bessie Coleman



Bessie was ten when Orville and Wilbur Wright flew their first powered plane 97 feet. By the time Bessie was out of school and working in Chicago, she was dreaming of flying. Aviation schools turned her down. As a woman, and an African American, she was not wanted. Encouraged by a friend, she went to Europe to get the training she needed. Bessie Coleman became one of the first women, and the first African American woman, to earn an international pilot's license.



There were many men flying in exhibitions across the United States. Bessie Coleman became the first African American woman "barnstormer"! She inspired others with her abilities and nurtured another dream. She hoped to start a flying school for African Americans. It would be a place for African Americans to learn science and other subjects needed to become pilots.

Bessie Coleman crashed in 1926. Her dream lives on. A group of African American women formed the Bessie Coleman Aviators to encourage young women to study, and seek careers in aviation and aerospace.