National Headquarters, Civil Air Patrol
Aerospace Connections in Education (ACE) Program
105 South Hansell Street Maxwell AFB, AL 36112
PH: 877-227-9142 Email: ace@capnhq.gov Fax: 334-953-6891
Website: www.capmembers.com/aceteachers

2010-2011 ACE Curriculum

Grade 5 Table of Contents

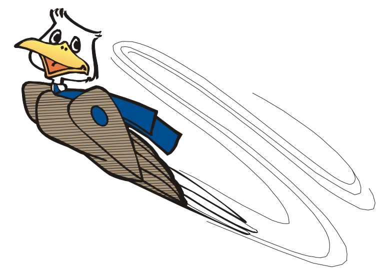
*** The balsa power planes provided by CAP to the fifth-grade students should be used with academic aerospace lesson #2, "Forces of Flight."**

PREVIEW

Civil Air Patrol's ACE Program

Fizzy Rocket

Grade 5 Academics Lesson #5



Topics: rockets, Newton's laws of motion, matter (science, math)

Length of Lesson: 45-60 minutes

Lesson Reference: http://spaceplace.jpl.nasa.gov/en/kids/rocket.shtml
http://www.fmalive.com/_downloads/fizzy20070511.pdf

National Science Standards:

- Content Standard B: Physical Science
  - Position and motion of objects
- Content Standard E: Science and Technology
  - Abilities of technological design
  - Understanding about science and technology

Objectives:

- Students will construct and launch a rocket.
- Students will explain and apply Newton's laws of motion.
- Students will identify a solid, liquid, and gas.
- Students will demonstrate a chemical reaction.

Background Information:

The lesson, which demonstrates rocketry and Newton's laws of motion, will take longer than thirty minutes if each step is followed. If time is an issue, you do NOT need to have students make the film canister look like a rocket. You may skip step 4 in this lesson plan. If this is your plan, have the film canisters already filled about 1/3 full of water. Distribute the prepared film canisters to students along with an effervescent tablet to use with either the "Fizzy Rocket Data Sheet" or "Fizzy Rocket Experiment Form."

Materials:

- plastic 35 mm film canisters (Keep and use them each year.)
  The film canister must have an internal-sealing lid, like many Fuji and translucent canisters. The canister MUST have a cap that snaps INSIDE the rim instead of over the outside of the rim. Photo shops and labs will be happy to save and donate some for educational purposes; however, these types of canisters are becoming difficult to find. They are available for purchase at the following online sites:
  http://www.teachersource.com/Energy/EnergyConversion/RocketFilmCanisters.aspx
  http://www.sciencebobstore.com/products.php?product=Bulk-Film-Canisters-for-Rockets
  http://www.stevespanglerscience.com/product/flying-film-canisters
- effervescent antacid tablet, such as Alka Seltzer
- paper (copy paper or construction paper)
- Fizzy Rocket Data Sheet **OR** Fizzy Rocket Experiment Form
- tape
- scissors

- paper towels
- water
- bucket or pitcher
- eye protection
- index cards (for fins)

NOTE: We suggest allowing students to work in pairs or groups of three for this activity. Determine what is appropriate for the students in your classroom. Also, determine which Fizzy Rocket data sheet you will use for this activity. (See step 8 below for more info.)

Consider watching the video available at http://www.stevespanglerscience.com/product/flying-film-canisters. Unlike examples in the video, this lesson plan asks the participants to flip the canister upside down after sealing the lid.

Lesson Presentation:

1. Show a film canister and ask students to record ideas on how to make it fly.

2. Discuss student ideas. Remind students that according to Newton's third law of motion, there must be some action to result in a reaction. Also, tell them that Newton's first law of motion says that an object at rest will stay at rest unless there is some force that disrupts its rest. The opposite is also true. An object in motion will remain in motion unless there is some other force or forces that cause it to stop its motion. For example, a kickball on the ground stays there resting until a force causes it to move. Ask students what would cause the kickball to move. (the force of the moving leg that strikes it) Ask students what force(s) will cause the kickball to, if it flies up, come back down and stop moving. (gravity and friction, if they have studied friction) Tell students that they should remember these concepts as they prepare a film canister to rocket upwards away from Earth.

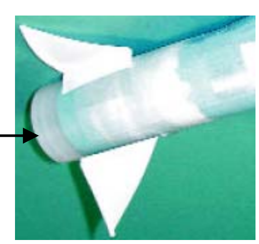
3. Distribute a canister for each student (or group of students).

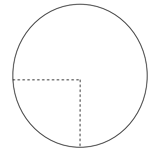
4. Distribute materials (paper, scissors, index cards, Fizzy Rocket Template, tape) to make the canister look like rocket. If time is an issue, you may omit this step.
    - Remove the lid from the film canister and put it in a safe spot so it will not get lost.
    - Cut out the body tube template for the rocket.
    - Wrap and **tape** the body tube of paper around the film canister without covering the open end!

Open end

- Using the template, cut and tape fins to your rocket.

Open end





- Construct a nosecone for the top of the "rocket," and tape the cone to the top (closed end) of the canister.

  To create a nosecone, cut out the partial circle in the fizzy rocket template. Overlap and twist the open ends of the circle to create a cone. Tape and cut as needed.

- Have students clean their work area.

5. It is EXTREMELY important to demonstrate how to correctly put the lid on the film canister. Tell students they should hear a "snap" sound. If they do not hear a "snap" sound when putting the lid on the canister, the lid is not on, and the canister will NOT launch correctly. With students seated, have each student or pair of students practice snapping the lid on and off of the canister. Tell them that they should hear a "snap" sound that lets them know the lid is on tight. It is very important to have the lid on correctly for the rocket to launch.

6. While students are practicing correctly opening and closing the canister, make sure you have a bucket or pitcher of water. Lay out a garbage bag or some type of drop cloth for a launch pad.

7. Demonstrate how the students will launch their rocket. Put on eye protection. Fill the film canister about 1/3 full of water (or about 10 ml). (You may choose to have students use a graduated cylinder to measure water, or you may have a plastic cup marked with the correct amount of water to pour into the canister. If students are measuring amounts of water used during the experiment, it is easy for them to see and test water as a variable for launching the fizzy rockets – if time allows for additional experimentation.) Place the half-sized seltzer tablet into the canister and quickly snap the lid shut. <u>Quickly</u> place the canister with "snap" side down on the launch pad. (The top has to be put on quickly to be able to produce the desired pressure inside the canister. The canister has to be placed quickly in its position for launch, as well.) Count how many seconds it takes for the rocket to launch and how many seconds the rocket stays in the air before hitting the ground. Record the times on the board.

8. Distribute either the "Fizzy Rocket Launch Data Sheet" or the "Fizzy Rocket Experiment Form," depending on which you prefer for your students. Use the "Fizzy Rocket Experiment Form" if students are using a combination of ¼, ½, and whole tablets. Go over the directions for the sheet that you have selected for your class.

9. Tell students that they will go outside to launch their rockets. Prior to launch, if students are in groups of three, they should rotate among the following tasks for each launch: (1) set up the canister to launch (2) count how many seconds it takes to launch after the rocket is placed in launch position (3) count how many seconds the rocket stays in the air before it hits the ground. The students should record the times on their data sheet.

10. Prior to the first launch, ask a volunteer to explain the steps they will follow to launch the rockets. (Put on eye goggles. Fill the canister about 1/3 full of water (or 10 ml). Put the tablet in. Make sure the lid snaps on. Place the canister in launch position. Count to see how many seconds it takes to launch and how many seconds it stays in the air. Record the results of both counts.)

11. Distribute the effervescent tablets. Take the water and students outside and allow the students to conduct their launches.

12. Once the students have launched the rockets and completed their information, have students clean up the area and assemble together in the classroom. If the "Fizzy Rocket Launch Data Sheet" was used, allow students time to figure out the average launch and flight times.

13. Discuss how Newton's Three Laws of Motion were at work in this activity.
    - Law #1 (Inertia): The rocket lifts off due to a force acting upon it. That force is the pressure that has built up inside the canister and escaped.
    - Law #2 (F=ma): The amount of force created is directly proportional to the mass and acceleration of the water and gas expelled from the canister.
    - Law #3 (Action/Reaction): The top is forced off the canister due to the pressure produced by the fizzy gas. That fizzy gas is actually carbon dioxide. Ask students if they know what caused that gas to occur. The carbon dioxide is a result of the chemical reaction that took place when the fizzy tablet was added to the water. A result of the chemical reaction is the accumulating pressure due to the buildup of gas inside the canister. The pressure of the carbon dioxide bubbles builds up so much that it finds the weakest structural point in the canister through which to escape. The weakest structural point is the area where the lid snaps onto the canister. The action of the high pressure escaping out of the canister causes the reaction of the canister being propelled into the air.

14. Allow students to discuss the results of their data sheet and what they feel they have learned from the experiment.

Summarization:
Ask students what might account for some differences in the number of seconds to launch and land. (Some students may have counted faster or slower. Some students may have had a little bit more or less water in their canister. Some students may have had a little bit more or less of the effervescent tablet. Part of the tablet may have been protruding out from the water when the canister was placed in launch position.)

Ask students to identify the liquid in their experiment. (water) Ask students to identify the solids in the experiment. (canister, tablet) Ask students to explain what created the gas in their experiment. (a chemical reaction: the tablet reacting in the water produced gas bubbles) Ask the students to explain what made the rocket canister "explode" and allow the rocket to launch. (Newton's Laws of Motion)

A great explanation from http://spaceplace.jpl.nasa.gov/en/kids/rocket.shtml:

When the fizzy tablet is placed in water, many little bubbles of gas escape. The bubbles go up, instead of down, because they weigh less than water. When the bubbles get to the surface of the water, they break open. All that gas that has escaped from the bubbles pushes on the sides of the canister.

Now when you blow up a balloon, the air makes the balloon stretch bigger and bigger. But the little film canister doesn't stretch and all this gas has to go somewhere!

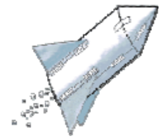
Eventually, something has to give! So the canister pops its top (which is really its bottom, since it's upside down). All the water and gas rush down and out, pushing the canister up and up, along with the rocket attached to it.

Real rockets work kind of the same way. But instead of using tablets that fizz in water, they use rocket fuel. The ***action*** *is the gas rushing out of the rocket. The* ***reaction*** *is the rocket taking off in the other direction. In other words, for every action there is an equal and opposite reaction. The rocket goes in the opposite direction from the gas, and the faster the gas leaves the rocket, the faster the rocket gets pushed the other way.*

Character Connection: Tell students that the fizzy rocket should remind us of something we do not want to do in life: "pop-off." Sometimes, we feel ourselves getting very upset. It feels like the pressure building up inside that small canister and builds until we want to explode. We are not rockets. We must find other ways to deal with bad pressure. Have students name ways they can prevent "popping their lid." When we find alternative ways to handle frustration and anger, we gain control in our lives. We become our own directional fins able to travel steadily through life.

Assessment:

- teacher observation
- constructed rocket
- data sheet
- student answers to class discussion questions
- "Fizzy Rocket Reflections" worksheet (optional)



Additional activity ideas to enrich and extend the primary lesson (optional):

- Have students complete the "Fizzy Rocket Reflection" worksheet. **Answers:** 1) water 2) tablet 3) pressure, gas, or chemical reaction 4&5) answers will vary
  Bonus: chemical reaction

- Find the mean, median, and mode of a list of launch times and flight times.

- Experiment with the launch performance of canisters with and without fins and with and without nosecones. Real rockets have nosecones to reduce drag, and they have fins to create stability.

- Write an expository paragraph explaining how to make a film canister fly.

- Help students gain a better understanding and an appreciation for rockets that deliver payload (e.g., satellite, rover, humans) by having them participate in this **"Rocket to Mars" design challenge**.

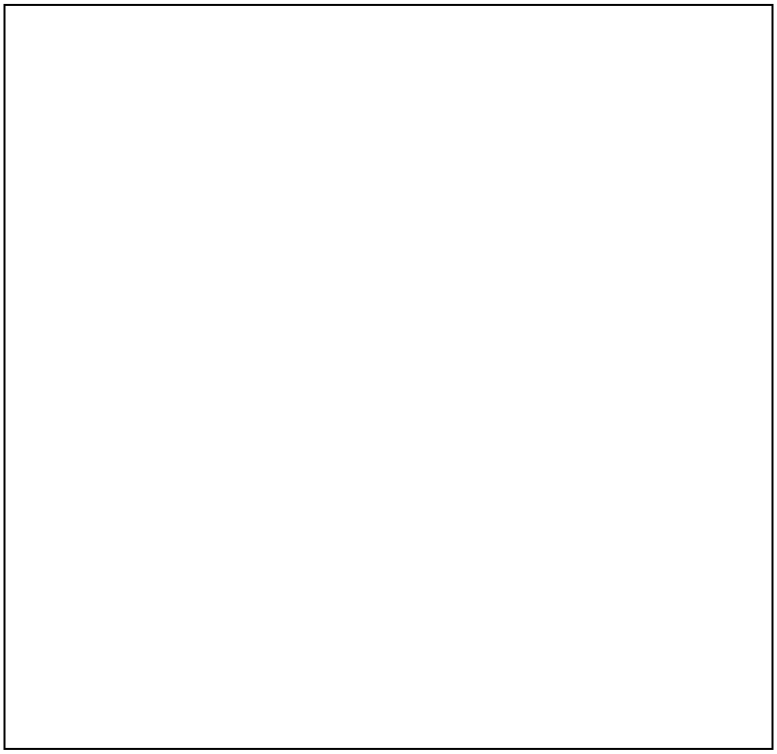
  Room set up: Place three 50 cm circles (Mars – destination) in three separate places with masking tape on the floor. Place a line of tape (Earth – launch site) 3 meters from each circle. Have extra balloons on hand as students re-launch their rockets!

  Materials per team of 3 students: 1 toilet paper tube, 1 drinking straw, 1 wooden skewer (with ends cut off or blunted), 1 balloon, 1 ping pong ball
  - Additional materials available to all: construction paper, aluminum foil, and a variety of tape (duct tape, scotch tape, masking tape, etc.)

  Instructions:
  1. Explain/demonstrate the difficulty of hitting a moving target. Lead into challenges of launching a spacecraft or satellite from a moving Earth to land on another moving target, such as the International Space Station (ISS) or Mars.
  2. Explain the design challenge to the students: Each team must use the items to create a rocket that can deliver the ping pong ball (the payload) to Mars (represented by the circles on the floor) from Earth (tape lines). To make things easier, the targets are not moving. The teams have 50 minutes to design and test their vehicles. If they are unsuccessful, they may make modifications and try again (waiting their turn at one of the 3 stations). The "propulsion system" for their rocket is the balloon. Each team will slide its straw over the skewer to create a "launch pad" that can be adjusted to the team's desired angle of launch by the person holding the skewer. The straw should be secured to the team's rocket design. To succeed, the rocket must land in the circle, not slide into it. Teams who succeed may make additional modifications to try to reach a target that is farther away.

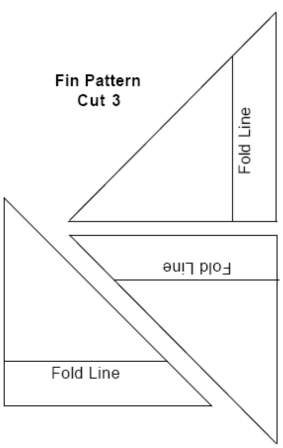
     Closing: This is a real challenge, and few teams will succeed. Emphasize that the students were trying to land a rocket and its payload onto a non-moving target. Mars, Earth, and the International Space Station are all in motion, which means designing is even more challenging! Students probably came to the realization that weight was a factor in their launch vehicle. Rockets that were the simplest (no extra decorations and lightest weight tape) traveled the farthest.

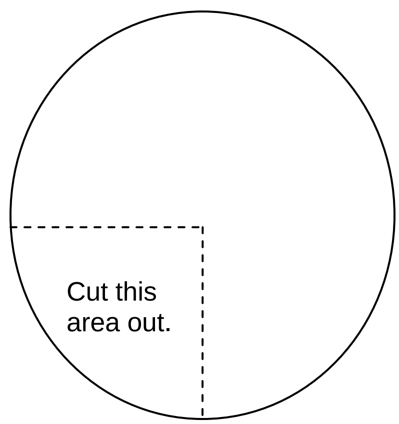
Fizzy Rocket Template



for body tube

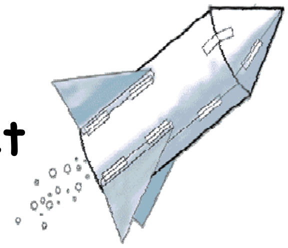
Cut out the square. Use tape to attach one edge to the canister. Wrap the paper around the canister, and tape it to hold it in place. (Trim paper as needed)





Cut out to make nosecone.

Fizzy Rocket Launch Data Sheet



Name(s):

____

What size tablet are you using for your 3 launches? ____________

Fizzy Rocket Launches	**Launch 1**	**Launch 2**	**Launch 3**	**Average** Add all three launch times and divide by 3; Add all three flight times and divide by 3.
Launch Time (in seconds) from the time the canister is placed in launch position to launch				
Flight Time (in seconds) time in the air from launch to landing				

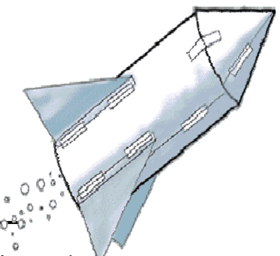
Enrichment: If your teacher has extra supplies and time, try additional launch experiments and complete the following chart, or obtain your own film canister and try this at home. Remember to wear eye protection!

Fizzy Rocket Launches	**Draw and indicate size of tablet. ($\frac{1}{4}$, $\frac{1}{2}$, etc.)**	**How much water?**	**Launch Time** (in seconds) from the time the canister is placed in launch position to launch	**Flight Time** (in seconds) time in the air from launch to landing
Launch 1				
Launch 2				
Launch 3				

What can you conclude from your experiments? (Use the back of this paper if you need more room to answer.)

NAMES:____

Fizzy Rocket Experiment Form



Tablet Size	Launch Time (in seconds)	Flight Time (in seconds)
$\frac{1}{4}$ tablet (quarter)	_______ seconds	_______ seconds
$\frac{1}{2}$ tablet (half)	_______ seconds	_______ seconds
1 tablet (whole)	_______ seconds	_______ seconds

1) Which tablet size launched the fastest?

____

2) Which tablet size took the most time to launch?

____

3) Which tablet size stayed in the air the longest?

____

4) Why do you think the tablet that launched in the shortest amount of time (fewest seconds to launch) did so?

____

5) Were you surprised by any of the results? If so, name something that surprised you and try to explain why you think this "surprise" result occurred.

____

6) What do you feel you have learned from this activity? (Use the back of this paper to answer if you need more room.)

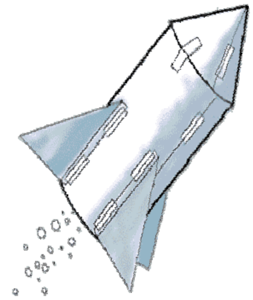
- -

ENRICHMENT: Conduct your own experiments!

Tablet Size	Amount of Water	Launch Time (in seconds)	Flight Time (in seconds)
		_______ seconds	_______ seconds
		_______ seconds	_______ seconds
		_______ seconds	_______ seconds

What do you feel you learned from your experiments?

FIZZY ROCKET REFLECTION



NAME ______________________________

1. Name the liquid that was used in your fizzy rocket experiment. ________________

2. What was the solid fuel that was used during your fizzy rocket experiment?

   ____

3. What was produced when the tablet was added to the water? __________________

4. Explain one of Newton's laws of motion.

   ____

   ____

   ____

   ____

5. Explain why the canister launched into the air. (Your answer must include more than just, "Newton's 3rd Law of Motion.") Use the back of this paper if you need more room.

   ____

   ____

   ____

   ____

   ____

   ____

   ____

BONUS: What type of change caused the gas to form inside the canister?

____

Civil Air Patrol's ACE Program

Counting Your Lucky Stars
Grade 5 Academic Lesson 8

Topics: stars, sampling (science, math)

Lesson Reference: The NASA SCI Flies: The Case of the Galactic Vacation (Segment 4)
http://scifiles.larc.nasa.gov/docs/guides/guide2d_03.pdf

Length of Lesson: 35 minutes

Objective:

- Students will understand how astronomers use sampling to estimate the number of stars in the universe

National Standards:

Science Standards

- Content Standard A: Science as Inquiry
- Content Standard D: Earth and Space Science
  - Earth in the Solar System
- Content Standard E: Science and Technology
  - Understanding science and technology
- Content Standard F: Science in Personal and Social Perspectives
  - Science and technology in society
- Content Standard G: History and Nature of Science
  - Science as a human endeavor
  - Nature of science
- Unifying Concepts and Processes
  - Systems, order, and organization
  - Evidence, models, and explanations
  - Change, constancy, and measurement

Math Standards

- Number and operations
- Algebra
- Measurement
- Data Analysis and Probability
- Problem Solving
- Communication
- Connections

Background Information:

There are two principal ways of gathering data: using census (counting) or sampling. Sometimes it is impractical to count every single item such as each character on a classified ad page in the newspaper. Instead, you can count the number of characters in a small area and then mathematically calculate an estimate of the total number on the page. This method is called sampling. Astronomers use sampling to estimate the number of stars in a galaxy and even in the universe.

Materials:

- "Counting Your Lucky Stars" student copies
- scissors
- pencils
- dry erase board or chalkboard and marker or chalk

Lesson Presentation:

1. Ask students to predict how many stars are in the sky. Ask them to explain their answer.

2. Explain how scientists gather data using the background information.

3. Distribute one "Counting Your Lucky Stars" copy to each student.

4. Ask students to observe the star field (all 36 squares that make up the star field) and predict the number of stars it contains. Emphasize that they are NOT to count the stars, merely make a prediction! Have them record their prediction in #1 on their paper.

5. Have students cut out the sampling window (top square on right side of page) along the <u>solid</u> lines. Then, have them cut out the inside of the window along the <u>dotted</u> lines. (They can fold the window in half with the pattern dotted lines showing on the outside and cut along the dotted lines, and then unfold the window.)

6. Have students hold the sampling window about 30 cm above the star field area and drop the window onto the paper. Students should make sure the window lands completely within the boundaries of the star field. If it doesn't, they should drop again.

7. Have students count the number of stars in the window, being careful not to bump or move the window. Students should count any stars that have at least 50% of their area in the window.

8. Have students record the number of stars located within the window on the paper for "Sample #1."

9. Have students complete two more samples and record the data on their paper.

10. For step #4, have students average their three samples and record it.

11. Ask students how they might be able to estimate how many stars are on the star field sheet using the data (information) they have obtained.

12. In order to create an estimate of the number of stars on the star field sheet using the data they have obtained, have students multiply the number of squares in the star field (36 squares total) by the average number of stars they counted in their samplings. Have them record their estimate for step #5 on their paper.

13. For step #6, rather than having each individual student count the stars in each star field square to determine the total number of stars in the star field, you may wish to do the following: Using an extra "Counting Your Luckey Stars" worksheet, cut out each square of the star field. Distribute the squares among the students. (Some students may have more than one square if there are less than 36 students in the class.) Have each student count the stars on the star square(s) that he/she received. They should write the total on the back of the star square(s) they received. Have each student return his/her star square(s) to the teacher and record the total number of stars for EACH star square he/she had on the board. (Ultimately, there should be 36 numbers on the board.) Have students add the numbers listed on the board to determine the total number of stars in the star field. (There are approximately 447 stars on the star field sheet.)

14. Allow students to compare their original prediction and final star estimate with the actual number of stars on the star field sheet. You may wish them to calculate the difference on the back of their paper. Allow students to share some of their data.

15. Discuss examples of when sampling would be better than actually counting each individual item. (Possible answers include: # of stars; # of people in an area; # of trees, plants, or animals in an area)

Summarization:
Ask students what they learned from today's activity. Ask students to provide criteria for when it is better to obtain data by sampling as opposed to counting. Discuss how we arrive at better answers when we have more information.

<u>Character Connection:</u> Tell students that because they all helped to determine the exact number of stars on the star field sheet, they were able to determine how many stars were on the sheet much faster than if each of them had tried to count all of the stars on the sheet by themselves. In life, tasks we have to do get done much faster when more people pitch in to help.

Companies rely on teams of people to help get jobs done quickly and efficiently. Charities rely on people to help ease the burden of those less fortunate. Habitat for Humanity is an organization where people can volunteer to help build a house for someone less fortunate. With enough volunteers helping, the house can be built in a timely manner. Another example closer to home is chores at home. If all family members help with the laundry, dishes, trash, and yard work, for example, no one person has to spend endless hours cleaning the house or maintaining the yard. Each family member should do his/her part to help with household chores. When people do their part at home, at school, and on the job, it makes everyone's day better.

Assessment:

- teacher observation and answers to class discussion questions
- "Counting Your Lucky Stars" worksheet

Additional activity ideas to enrich and extend the primary lesson (optional):

- Conduct a sampling experiment using the classified ad section of a local newspaper. Instead of stars, the students will be determining the number of characters on a page. Spaces don't count. To determine the actual number of characters on the page, cut the page into enough pieces for all students to have one and have them count the characters in their own sections.

Associated Website:

- NASA SCI Files: The Case of the Galactic Vacation
  http://scifiles.larc.nasa.gov/docs/guides/guide2_03.pdf

Counting Your Lucky Stars

NAME ___________________________

1. Predict how many stars are in the star field below. **Total Star Prediction:** ________
2. Listen to your teacher's directions for how to cut out the "sampling window" to the right.
3. Listen to your teacher's directions for how to conduct a "sampling" of the stars below.

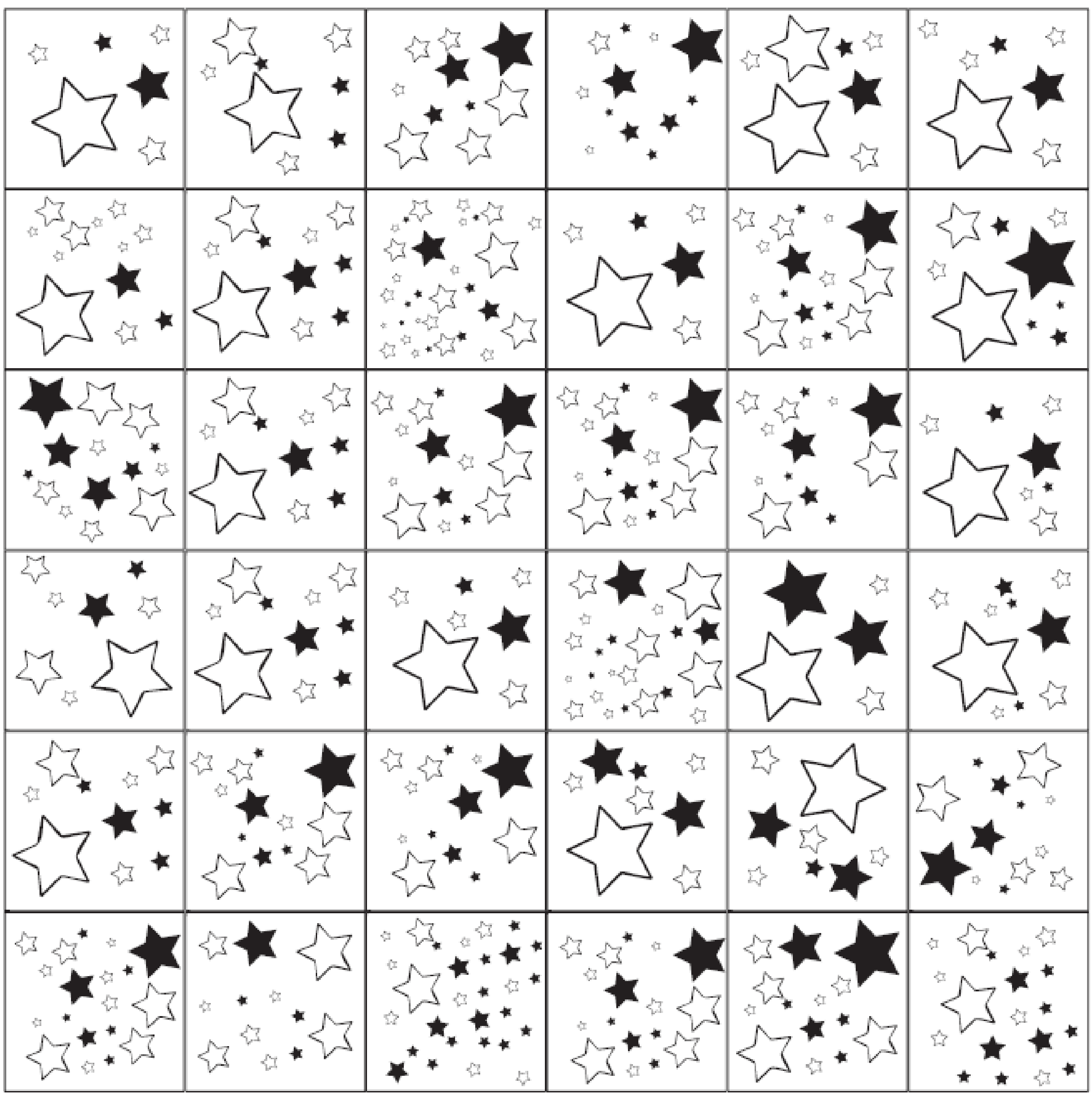
   SAMPLE #1: Number of stars in the window (include stars when at least 50% of the star is visible): _______

   SAMPLE #2: Number of stars in the window (include stars when at least 50% of the star is visible): _______

   SAMPLE #3: Number of stars in the window (include stars when at least 50% of the star is visible): _______

4. **AVERAGE of the 3 samples:** ___________
5. **Total Star Estimate** (using average # of stars and total # of squares on star field): ___________
6. Count each star in the star field squares. **Total number of stars** ___________

Star Field



Proud to Be an American!
Grade 5 Character Lesson #1

Topics: diversity, acceptance (language arts, social studies, science)

Length of Lesson: 30 minutes

Objectives:
- Students will describe how diversity in Americans helps enrich America.
- Students will reflect on how leaders deal with diversity in groups.

National Standards:
<u>Social Studies</u>
- Standard 2: Basic Values and Principles of American Democracy
- Standard 5: Roles of the Citizen

<u>English</u>
- Standard 4: Communication Skills

Background Information:
During the immigration wave of 1830-1890, about 7.5 million immigrants entered America from countries such as Great Britain, Ireland, West Germany, The Scandinavian Nations, Austria, Hungary, Italy, and Russia. They left their countries in search of political and religious freedom, as well as for jobs and property. In many countries, America was seen as the "Land of Opportunity." Immigrants continued to enter the U.S. in great numbers until World War I began and the numbers began to decline.

Today, in America, we have persons of all nationalities, colors, religions, and cultures living amongst us. They have become American citizens through the years and no matter what they think or believe, or how they look or worship, they are Americans. Tensions between some religions, cultures, or nationalities still exist today, as if we were not all Americans. Helping young people learn to accept others' diversities and view all Americans as one family of people should help develop a new generation of peace among American people that will serve our nation well.

Materials:
- pencils
- "TEAM: Together Each Achieves More: Finding Out About Others' Unique Characteristics" copies

Lesson Presentation:

1. Write the following discussion topics on the board and ask each student to spend one minute thinking about the topics before beginning a class discussion. As the discussion evolves, list the ideas from students on the board for both comparison categories- alike and different. Then list ideas for America's Best.
    - Comparison Topic- How are Americans "Alike" and "Different?"
    - America's Best Topic- Name and explain ways that America is a better place to live because of people's differences.

2. Select one or more of the included activities to demonstrate how to appreciate the uniqueness of other people:
    - Activity Option #1: Rock Our World!
    - Activity Option #2: Amazing Oobleck!
    - Activity Option #3: Venn We Share, We Win!

3. Close the lesson by having the students work in small groups to complete the *TEAM: Together Each Achieves More* activity sheet, included in this lesson.

Summarization:

Through the activity (or activities) completed about how to recognize and appreciate differences, we can see that it is important to get to know a person in order to find out all of the unique characteristics that make that person special. Although the characteristics may be different from our own, they are significant and can be important contributions to our overall success as a country.

Even though the United States is considered "The Melting Pot" because so many Americans have settled here from a variety of countries, most Americans share similar values and beliefs. As American citizens, when we work together for the good of the people to ensure freedom and happiness, we gain strength from one another and help enrich each other's lives.

Assessment:

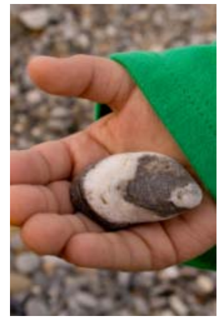
- teacher observation
- group interaction

Additional activity ideas to enrich and extend the primary lesson (optional):

- The students can design collages titled "Proud to be an American". The collages should represent diversity and Americans working together.
- Have small groups research the immigration process.
- Students can write essays titled "I'm Proud to Be an American" describing what being an American means to them.

Associated Literature:

- *A Very Important Day* by Maggie Rugg Herold
- *C is for Citizenship: Children's Literature and Civic Understanding* by Laurel Singleton
- *Ellis Island: Doorway To Freedom* by Steven Kroll, 1995 ISBN 0-8234-1192-3
- *How My Parents Learned to Eat* by Ina Friedman



Rock Our World! (Activity Option #1)

Materials:

- 10 different varieties of rocks
- 3 X 5 note cards (1 per student)
- Pencils

Step 1: Get on your explorer gear, and go on a lunar rock hunt!
Either bring to school, or have the students bring, at least 10 interesting-looking rocks that are very _unalike_.

Step 2: Share the following information with the students:

As mankind on planet Earth seek to find out how to live on other surfaces in space, such as Mars or the Moon, they have to work together, no matter in what country they live. Countries from around the world are working to build and support the International Space Station (ISS) and it will be important that we all work together to continue our Mission to the Moon and Mars. The international space initiatives can bring peace throughout our world, if young people learn how to accept each other no matter what the differences. It is up to the young people in classrooms today to learn how to identify differences and similarities that will work to make each person's unique contributions of great value to an overall team. To prepare for this endeavor, the rock activity should help to develop skills needed to identify the uniqueness of each person, place or thing.

Imagine that you have landed on the moon and must work as lunar geologists to gather samples of lunar rocks to share with the scientists on earth. The lunar rocks can not all be brought back to earth, so it is important that you look very carefully to describe unique aspects of each lunar rock to share with the scientists. There are a variety of properties which can be described, so put on your geology goggles and get ready to "rock" the earth scientists' world!

Step 3: Put all the rocks out on a table and arrange them side-by-side. Each student should observe each rock carefully, and secretly select one that they would like to describe as a scientist. Students should not let the other students know which rock was chosen!

Step 4: After choosing a favorite rock, each student should write on his/her 3 X 5 note card a description of the rock using as many details as is possible. Explain that the rock's unique characteristics need to be described carefully to ensure students can determine about which rock they are writing. Tell students to be very specific by observing the rock's *properties*, i.e. what color it is, what shape, what texture it has, etc.

Step 5: After the rock's properties are described in writing by each student, the students should exchange cards with a partner and try to figure out which rock the other student chose. The more detailed the students are as a descriptive scientist, the easier it will be for the other students to select the correct rock.

Summary: Explain to students that when we observe closely the unique properties of persons, places, and things, we can learn to appreciate them more. This is especially true of people. When we learn to appreciate the differences in others, we can all be more productive and peaceful on this earth.

Amazing Oobleck (Activity Option #2)

Description: In this lesson, students will work with a substance called Oobleck. Children's literature can be incorporated into this activity by reading Bartholomew and the Oobleck by Dr. Seuss. Oobleck has the properties of both a solid and a liquid. Students will be amazed at what they see! This will help them see that you can not judge what an object is just by looking at it. The same is true of people- we should not judge them because each person has unique qualities that make them look, act, and think the way they do. We should try to interact with them and get to know and understand them so that we can work and play with them.

Materials:

- Bartholomew and the Oobleck by Dr. Seuss
- pie pans
- newspaper (to cover desks)
- small objects (paper clips, pennies, confetti, marbles, toothpicks, string)
- Oobleck
  Directions for making Oobleck prior to class:
  Pour 4 cups of water into a large bowl. Add a few drops of green food coloring. Use your hands to mix in 4 boxes of cornstarch. [Each box contains about 2 cups (16 oz.) of cornstarch. All four boxes together equal about 8 cups of cornstarch.] Add another 1 3/4 cups of water and mix thoroughly. This should make enough Oobleck to divide into pieces for each group in the class.

Step 1: Begin the lesson by reminding students of the principles of solids and liquids. Inform students that it is possible for a substance to have both the properties of a solid and a liquid.

Liquid:

- assumes the shape of the container which it occupies
- is not easily compressible (little free space between particles)
- flows easily (The particles can move/slide past one another.)

Solid:

- has a fixed volume and shape (The particles are locked into place.)
- is not easily compressible (little free space between particles)
- does not flow easily (The particles cannot move/slide past one another.)

Step 2: Read the book Bartholomew and the Oobleck by Dr. Seuss. Discuss what Oobleck is and tell students that they will have an opportunity to experiment with Oobleck.

Step 3: Divide the students into groups of 4. Have one student from each group come to the front of the room to gather materials. Explain the activity: Students will be free to handle and explore the consistency of the Oobleck. Students will then place the objects given to them (marble, paper clip, penny, confetti, toothpick, and string) in the Oobleck and observe what happens with each.

[**Note:** The students will discover that the marble, penny, and paper clip sink in Oobleck; the confetti, toothpick, and string float in Oobleck. The students may come to the conclusion that any object will either sink or float depending on its density. Objects that are denser than the Oobleck wil sink. Objects that are less dense than the Oobleck will float.]

Step 4 - Conclusion:
Ask students to share their group findings with the rest of the class. Explain that Oobleck is a non-Newtonian fluid. Introduce the new term non-Newtonian fluid -- a substance that exhibits characteristics of both solids and liquids. A Venn diagram or other chart can be used to compare the Oobleck with a solid and a liquid. In science journals or in a friendly letter or class newspaper article, have students write about their experiences with the Oobleck. In writing about the experience, students will have better understanding and retention of the concepts.

Assessment: Informal observations can be used (i.e. teacher observation of group work). Evaluation can also come from students' responses in their writing activity.

Venn We Share, We Win! (Activity Option #3)

For this activity, the students need to be divided into 2-person groupings. Distribute one *Venn Diagram* for every pair of students. Ask the students to write their name above one side of the diagram.

Explain that a Venn Diagram is a great way to compare and contrast ideas. The students will be comparing things that are alike and contrasting things that are different about the two students. Things that are different are to be written on the side of the diagram with the student's name to denote the contrast of the characteristic from the other person. Things that are alike are to be written in the middle section of the diagram, to denote the comparison of a like characteristic of the two students.

One student begins the activity by telling one thing about himself/herself. The other person then tells if he/she has the same characteristic. It he/she does, the first person writes that characteristic in the middle section of the diagram. If he/she does not share that characteristic, the first person writes the characteristic only on his/her own side of the diagram.

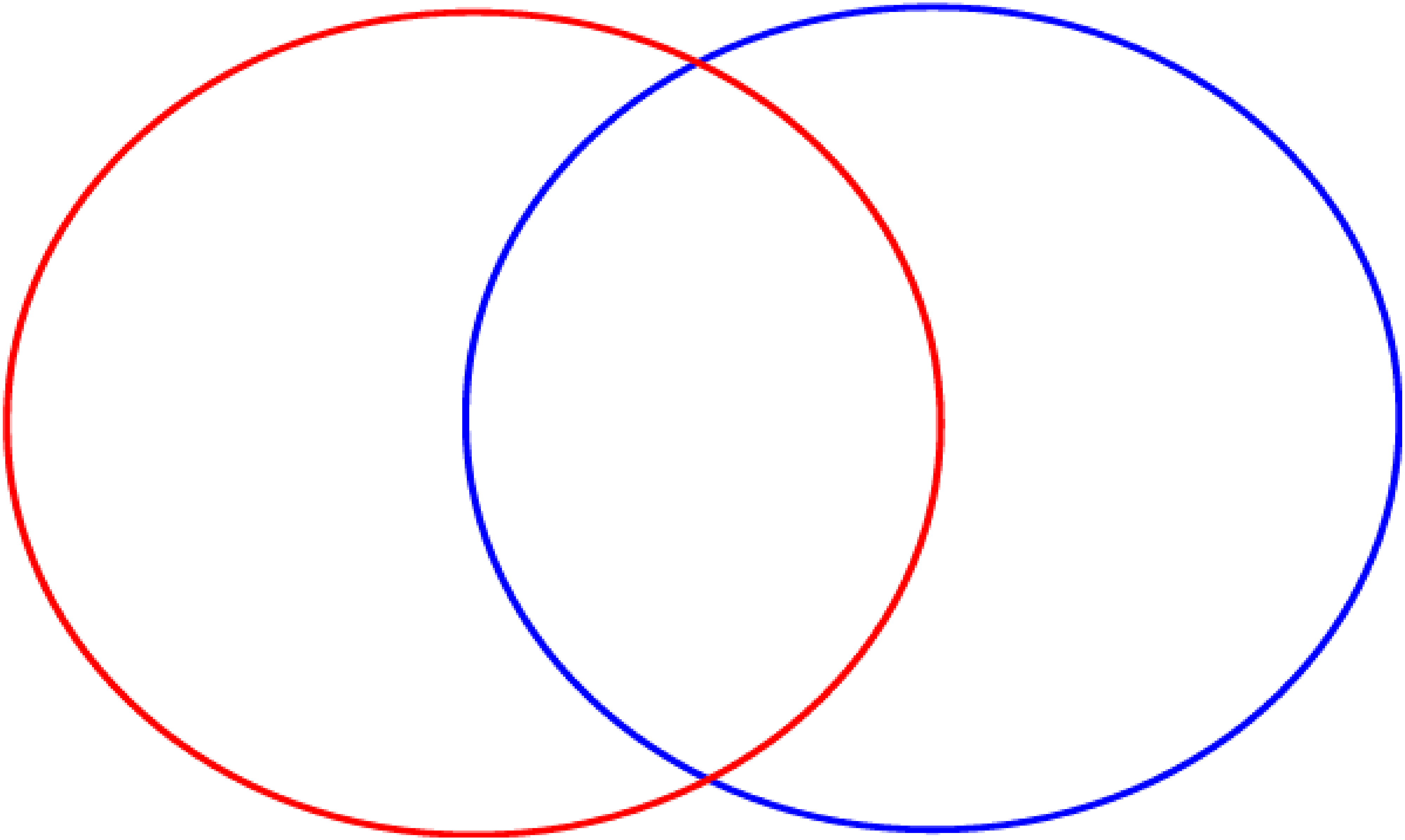
The sheet with the diagram is then passed to the other student who follows the same procedure for a characteristic that he/she has. The sheet is passed back and forth as the students write words and phrases that describe themselves.

For example, if Sara and Billy are doing the activity together, they would each write their name above one circle. Sara might begin by saying, "I like chocolate ice cream." If Billy agrees that he likes it too, then Sara writes "chocolate ice cream" in the middle. If Billy did not like chocolate ice cream, she would write the words in her side of the diagram only. Then Sara passes the paper to Billy who names something about himself. He might say, "I have one brother." Together they decide where to place the statement. They continue passing the paper back and forth, taking turns as they write statements in the appropriate places on the Venn Diagram.

When time is up, the teacher should have the student pairs each tell the rest of the class about their uniqueness and similarities. The teacher will list these things on the chalkboard under the correct category: Compare and Contrast. After all pairs have shared their Venn Diagram, the class should discuss the contrasting, or unique, characteristics that would be important in making their classroom a better place.

The students should then be lead in a discussion about how limiting it would be if every student was alike. (Lack of creativity, knowledge, experience, strength, talent, etc.) Students should be made aware that each of them have unique characteristics that truly make the classroom a better place for everyone to work and play together.

Name ______________________________ **Name** ______________________________



TEAM: Together Each Achieves More
Finding Out About Others' Unique Characteristics

As a team, discuss the following questions, giving each person in the group time to answer each question. Be prepared to select a representative of your group to share the answers with the other team.

1. Have you ever had difficulty doing something that someone else in the class seemed to have no trouble with at all?

2. How could someone else's strengths have benefitted you?

3. How could your strengths benefit someone else?

4. Have you ever been able to help someone else because of your strengths? If so, how did it make you feel?

5. How is the class better because of everyone's differences (variety of strengths, weaknesses, talents, and interests)?

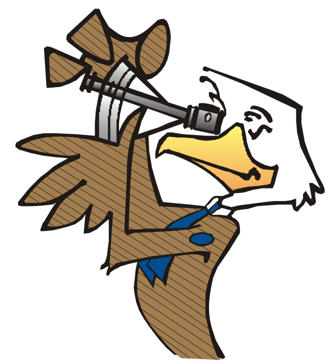
Civil Air Patrol's ACE Program

Meteor Shower
Grade 5 Physical Fitness Lesson #2

Topics: meteors, endurance dribbling

Length of Lesson: 30 minutes

Objective:
- Students will practice dribbling a basketball while making offensive and defensive maneuvers for one-minute periods of engaged physical activity.



National Physical Education Standards:
- NPH.K-12.1
- NPH.K-12.2
- NPH.K-12.5
- NPH.K-12.6

Background Information:
Leading researchers are beginning to question the American College of Sports Medicine's long-standing recommendation of at least 20 minutes of exercise at 60% of maximum heart rate for at least three days per week. They suggest, instead, that any daily exercise at a moderate intensity should be sufficient. For fitness development to become a vital component of physical education program, daily lessons must include activities designed specifically to increase the amount of time students are engaged in moderate to vigorous physical activity. The cardiovascular workouts students receive from game play are as effective as those they receive from specifically-designed fitness activities.

The following activity will allow students to dribble a basketball while making both offensive and defensive maneuvers to compete in a game utilizing a space theme.

Materials:
- basketballs for half the class (If that's not possible this can be adapted to use only one basketball by playing one "team of two" at a time.)
- Hula hoop or hula hoop-sized circle- one each for half of the class (One, if playing one "team of two" at a time.)

Lesson Presentation:

1. Explain to the students that this activity will enable them to practice both offensive strategies (turning body while dribbling, changing directions, non-dribbling arm out to block defense) and defensive strategies (trying to steal,

pivoting with one foot) while dribbling the basketball for one-minute rounds. They should further be told that they will act as if they are in space wherein meteors are attacking the space stations. The space stations have to protect themselves from the meteor shower and, by doing so, will win a competitive game.

2. Divide the class in half. Half of the students are METEORS - they travel and dribble their ball. The other half of the students are SPACE STATIONS - they stand in one place without a ball. The meteors and space stations "pair up" making "teams of two."

3. The meteors must try and dribble the ball into the hula hoop or hula hoop-sized circle of the space station without the ball being stolen by the space station. If the meteor makes it, the meteor earns a point. The meteor continues this effort over and over for a one-minute period.

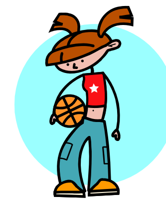
4. Space stations must keep one foot in a hula hoop or hula hoop-sized circle but can pivot to try and steal the ball as it is dribbled past them by the meteor. If the space station can steal the ball without moving their foot out of the circle, and without allowing the meteor to enter the circle, the space station earns a point. The game continues in the same manner for a one-minute round.

5. After the one-minute period, the teacher adds up all points of all meteors and all space stations to determine which category won that round.

6. Another one-minute round begins with the "teams of two" exchanging places as the meteors and space stations, thus alternating the students who will dribble the basketball. This continues until time is up for the period.

Summarization:
Explain to students that they should have become aware of how to coordinate their bodies to dribble the ball and maneuver their bodies, as needed, while doing endurance exercising for specific time periods. They should have also become aware of how to work in competition with another person, following designated rules and having fun at the same time. The transfer of knowledge to be shared with the students at the end of the activity is that of how the International Space Station, the Space Shuttle, and astronauts working in space are in constant danger of being pelted with meteors, asteroids, and other space debris. This demonstrates the extreme courage it takes to become an astronaut and to travel into the unknown areas of space. Thus, much investigation and preparation is involved in space travel. Tell students that this is aligned with life… that young people need to prepare their minds and bodies to be able to succeed in life.

Assessment:



- Students will be observed for dribbling and maneuvering skill, working with the opposite partner in a competitive, yet cooperative manner.

Additional activity ideas to enrich and extend the primary lesson (optional):

- Let the students play "Space Music Basketball" using the same or different partners from the original game. On the "go" signal the students begin dribbling the ball between them. Add music, and when the music starts, the player with the basketball at that time begins to dribble the ball in a small space while the partner tries to steal it. If the ball is stolen, the players reverse roles until the music stops. When the music stops, the partners go back to passing the ball to each other until the music starts again, wherein the competition efforts resume. The game continues until the time in class in completed.

- Add a challenge to the games by playing "Bouncing in Space." Tell students that in space, once the basketball has started bouncing up, it would not come back down as it would do on earth because there is no gravity to pull the ball back to the ground. Thus, to keep the balls bouncing up and down in space, the students would have to keep on dribbling the balls to keep them bouncing.

<u>Bouncing in Space</u>

The directions for the game are as follows: Scatter the basketballs on the gym floor or the ground and have the students stand in pairs next to a basketball. On the "go" signal, one student will pick up the basketball and dribble it two times, pass it to the partner who also dribbles for two times, and then both students leave their ball and move to another ball to do the same procedure. The object is to keep all of the basketballs bouncing until the "stop" signal. To add a challenge, after the students have become comfortable with dribbling, add one or more of the following additional options:

- ➢ Dribble three times and move to another ball.
- ➢ Dribble with the dominant hand.
- ➢ Do crossover dribbles (from one hand to the other and back again).
- ➢ Do patterns: one dribble, two dribbles, three dribbles, then back to one dribble, then two, then three, etc.

The following activities can continue the dribble and maneuvering action using different strategies with partner play.

- ❖ "Orbit Knock-out": Give each partner a basketball. Both players dribble at the same time while trying to knock the basketball away from their partner. Players must keep dribbling at all times.

- "Alien Toss": Activities include distributing a beanbag to each student to represent an alien found in space:
  - While dribbling the basketball, toss a beanbag from right hand to left hand.
  - Dribble with the dominant hand while tossing and catching with the non-dominant hand, then switch to dribbling with non-dominant and tossing and catching with the dominant hand.
  - Partners face each other and toss one beanbag back and forth while continuing to dribble.

- "Lunar Sample Collections": Scatter 30 or more poly spots (plastic base markers) on the gym floor or the ground. Make teams of four to six players and line them up in relay style, facing the poly spots. On the "go" signal, the first person in line will dribble to any poly spot and while dribbling the basketball will pick up the spot, bring it back to their team and hand the ball to the next person in line. This continues until all of the poly spots are gone. The team with the most spots collected wins that round.

- "Black Hole Dribbling": Students will act as if they are in a Black Hole and can not see their basketball. One student is blind-folded and will dribble the ball while their partner tells them in what direction to continue dribbling. Students then exchange positions and try this again.