

Title: Field Day Facts

Brief Overview:

One common end-of-year activity in school is Field Day. This unit highlights eight common field day activities. Students will use the activities to practice data collection and graphing skills. Final graphs will display statistics from each event for each grade level in the school.

NCTM 2000 Principles for School Mathematics:

- **Equity:** *Excellence in mathematics education requires equity - high expectations and strong support for all students.*
- **Curriculum:** *A curriculum is more than a collection of activities: it must be coherent, focused on important mathematics, and well articulated across the grades.*
- **Teaching:** *Effective mathematics teaching requires understanding what students know and need to learn and then challenging and supporting them to learn it well.*
- **Learning:** *Students must learn mathematics with understanding, actively building new knowledge from experience and prior knowledge.*
- **Assessment:** *Assessment should support the learning of important mathematics and furnish useful information to both teachers and students.*
- **Technology:** *Technology is essential in teaching and learning mathematics; it influences the mathematics that is taught and enhances students' learning.*

Links to NCTM 2000 Standards:

- **Content Standards**

- **Number and Operations**

- Students use numbers to represent measurements of time, length, or counts.

- **Geometry**

- Students use visual and reasoning skills to solve problems and representational systems in graphs.

- **Measurement**

- Students use a variety of standard measuring devices.

Data Analysis and Probability

Students ask questions, collect and organize data, and design graphs to display the data in an organized manner. They make predictions and inferences using the collected data and graphs.

- **Process Standards**

Problem Solving

Students use their knowledge of data collection and graphing to develop an appropriate visual display.

Communication

Students communicate the results of a variety of Field Day activities in a format that will be easily understood by different grade levels.

Connections

Students connect number concepts with measurement activities and relate those products to written and visual displays.

Representation

Students connect number concepts with measurement activities to recognize that the same data can be displayed in a variety of different graphs.

Links to Virginia Standards of Learning:

(The number preceding the objective indicates grade level & standard.)

- **Language Arts**

4.5 & 5.6

Students will use text organizers such as type, headings, and graphics to predict and categorize information; and locate information to support opinions, predictions, and conclusions.

5.7.1

Students will write for a variety of purposes to describe, to inform, to entertain, and to explain; choose planning strategies for various writing purposes; and organize information.

- **Technology**

C/T5.4

Students will communicate through application software; create a 1-2 page document using word processing skills, writing process steps, and publishing programs; use simple computer graphics and integrate graphics into word-processed documents; and create simple databases and spreadsheets to manage information and create reports.

- **Math**

- **Probability & Statistics**

- **3.21**

- Students, given grid paper, will collect data on a given topic of his/her choice and construct a bar graph showing the results. A title and key will be included.

- **3.22**

- Students will read and interpret data represented in bar and picture graphs.

- **3.23**

- Students will investigate and describe the concept of probability as chance, and list possible results of a given situation.

- **4.18**

- Students will determine the probability of a given simple event, using concrete materials.

- **4.19**

- Students will collect, organize, and display data in line and bar graphs with scale increments of one or greater than one.

- **5.16**

- Students will solve problems involving the probability of a single event by using tree diagrams or by constructing a sample space representing all possible results.

- **5.17**

- Students will collect, organize, and display a set of numerical data in a variety of forms, given a problem situation, using bar graphs, stem-and-leaf plots, and line graphs.

- **5.18.1**

- Students will find the mean and mode of a set of data.

- **Measurement**

- **3.14**

- Students will estimate and then use actual measuring devices with metric and U.S. Customary units to measure length-inches, feet, yards, centimeters, and meters; and liquid volume-cups, pints, quarts, gallons, and liters.

- **4.12**

- Students will estimate and measure length using actual measuring devices and describe the results in both metric and U.S. Customary units, including part of an inch ($\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$), inches, feet, yards, millimeters, centimeters, and meters.

- **4.13**

- Students will estimate and measure liquid volume using actual measuring devices and using metric and U.S. Customary units, including: cups, pints, quarts, gallons, milliliters, and liters.

5.11

Students will choose an appropriate measuring device and unit of measure to solve problems involving measurement of length-part of an inch, inches, feet, yards, millimeters, centimeters, meters; and liquid volume-cups, pints, quarts, gallons, milliliters, and liters.

• Science

Scientific Investigation, Reasoning, and Logic

Students will plan and conduct investigations in which

- pictures and bar graphs are constructed using numbered axes;
- measurements are made in and standard English units using appropriate tools (thermometer, meter stick, balance, graduated cylinder);
- questions are developed to formulate hypotheses;
- data are gathered, charted, and graphed using appropriate graphical representations;
- length is measured to the nearest centimeter;
- volume is measured to the nearest milliliter and liter;
- predictions are made based on data from picture graphs, bar graphs, and basic line graphs;
- appropriate instruments are selected and used for making measurements; and
- accurate measurements are made using basic tools

Links to Maryland Math Content Standards:

• Computation

1.3.1

Students read, write, and represent whole numbers (cardinal, ordinal) and simple fractions using symbols, words, and models.

1.3.2

Students compare, order, and describe whole numbers using place value concepts.

1.3.4

Students demonstrate proficiency with addition and subtraction facts.

1.5.2

Students compare, order, and describe decimals using place value concepts.

• Probability and Statistics

4.3.1

Students gather relevant data and compile the results to answer a question.

4.3.2

Students organize data and display it using tables, pictographs, and bar graphs.

4.3.3

Students interpret tables, pictographs, and bar graphs.

5.3.1

Students list possible outcomes for an activity.

5.3.2 a and b

Students describe the likelihood of an event by applying basic probability concepts such as certain, impossible, likely, more likely, less likely, and equally likely; and interpret fairness by applying basic probability concepts.

4.5.1

Students gather relevant data, compare data sets, and compile their results to answer a question.

4.5.2

Students organize data and display it using stem and leaf plots and line plots.

4.5.3

Students analyze and interpret stem and leaf plots, circle graphs, line plots, and line graphs.

• Measurement

3.3.1

Students identify the measurable attributes (for example: length, area, weight, volume/capacity).

3.3.2

Students use appropriate tools and units to measure length, weight, capacity, and temperature.

3.3.4

Students use length, capacity, weight, temperature, and time to solve problems.

4.5.4

Students find the mean, median, mode, and range of a data set.

5.5.1

Students list all possible outcomes of an activity with a limited number of possible results.

5.5.2

Students find the probability of an event with equally likely outcomes and express as a fraction.

5.5.3

Students conduct an experiment and use the results to make a prediction.

Grade/Level:

Grades 3 - 5

Duration/Length:

Four class periods

Prerequisite Knowledge:

Students should have working knowledge of the following skills:

- Addition and subtraction of whole numbers and decimals
- Constructing and interpreting data recording sheets and graphs
- Measurement using U.S. customary or metric devices

Student Outcomes:

Students will:

- design a data collection sheet.
- count and record data on a tally sheet or time recording sheet.
- design a graph to visually represent information.
- make predictions about the relationship between grade level/age results.
- present information in a visual format and explain results of their activities to the class.

Materials/Resources/Printed Materials:

- Clip boards
- Rulers, yardsticks/meter sticks, measuring tapes
- Stopwatches
- Measuring cups
- Pencils and paper
- Poster board
- Student Resource Sheet #1
- Teacher Resource Sheets #1-12

Development/Procedures:

Background

These activities assume that students prepare for their field day by practicing the games in Physical Education class. Students will need to be familiar with their assigned event(s) in order to design the tally sheet and graph. Introduce the Day One activity at least three days prior to the scheduled field day. Depending upon the number of activities, events should be assigned to a class by the PE teacher or chosen by teachers during a staff meeting. Although data will be collected for each class in each event, only one data collection sheet and graph will be created for each event at each grade level. See Attachment A. for a sample assignment spreadsheet.

Day 1 - CLASSROOM

1. Introduce **Vignette #1** (Student Resource #1) to the class. Review the name(s) of the class's event(s) and any rules and tasks associated with it. Examples can be found on Teacher Resource #2.
2. Brainstorm what data can be collected about the event. Write the list on the board.
3. Emphasize that the students will be collecting data about individual student or team results.
4. On the planning worksheet (Teacher Resource #4) fill-in the name(s) of the class events in column #1. In column #2 list the possible data collection (tally, count, times, distances) forms. In column #3 list the different graph styles that could be used to display the data.
5. With teacher guidance, select the best choice for a data recording form for each event and the type of graph the students will create.
6. The teacher then divides the class into the required groups and assigns each group an event.
7. Individual groups meet to design their data recording form. The final form needs to include lines for the 1) event name 2) grade level/teacher name 3) student names/teams & results. (See examples in Teacher Resources #5-12.)
8. Allow the students enough time to complete a final copy of their data collection sheet.

If needed, extend this activity into a second class period. Final copies should be in black ink. The teacher will then need to make copies of each form for each class in their grade level. The data collection forms will be stacked on a clipboard and kept by a volunteer at each activity.

Day 2 – FIELD DAY

1. Groups of students in each class are responsible for recording the results of their assigned event. Prior to Field Day, the students will need to decide which students will record the data for each different event. Each class is responsible for recording their own data on the collection sheets that are provided at each event station. This may mean that a few students will miss participating in an activity while they are collecting data.

2. The data recording sheets have been collected and distributed on clipboards to a parent volunteer at each event. Appropriate measuring devices are also provided at each station. These can be assembled by volunteers or provided by the class that designed the data collection sheet. If a parent is not available, the clipboards should be left at each station for the students to use. (It would be helpful to attach a pencil or two to each clipboard with a string.)
3. As Field Day begins, the classroom teacher will need to remind students to complete their data collection.
4. When all the data collection sheets are complete, the forms can be redistributed to teachers at the end of Field Day.

Day 3 - CLASSROOM

1. Distribute the completed data collection sheets to each event group. Depending on the data they collected, students may need to order the results for each class or determine high and low scores. * Data for each class should be displayed on one grade level graph. Graph labels should indicate the results by teacher name.
2. Students should plan a rough draft of their graph and fill-in the data.
3. Each group needs to review their data and graph drafts with the teacher before they receive their poster board.
4. Once the teacher has approved the data and graph drafts, the group may begin drawing their final graph on the poster board. Remind the students to use resources like rulers or yardsticks and creative fonts/printing styles. Final posters should be drawn in pencil and then colored with markers or crayons.

The P.E. teachers should arrange for ways to present/share the poster graphs with the rest of the school. Possibilities include:

- *Grade level groups sharing their posters on the morning news show*
- *Posters displayed in the gym hallway or walls*
- *Posters displayed in the media center or cafeteria*
- *Graphs created by computer programs displayed on school web pages*
- *Digital photographs can be taken of graphs and displayed on school web pages*
- *Posters assembled into an oversize "book" for the gym or media center*
- *Grade level posters displayed in their hallway.*

Performance Assessment:

- Student learning will be assessed throughout the daily tasks and scored using rubrics in Teacher Resource #1. In addition to final products like a data collection sheet and graphs, student performance will be evaluated for behavior and cooperative learning.
- Students can complete teacher-designed group rating sheets to assess group members in cooperation and participation.
- Extension activities including written explanations of graphs, web page contributions or descriptive letters can be scored according to established grade level guidelines.

Extension/Follow Up:

- Prior to Field Day, conduct surveys to determine the most popular activities to hold.
- Reinforce geometry and plotting concepts by designing the layout of the events on the field and gymnasium areas.
- Allow students to plan the rotation schedule chart for grades and classes for each Field Day.
- Compare the Field Day results of individual classes or grade levels with those in other schools.
- Post the results of your school's events on a web page and invite other schools to share their results.
- Transfer the high scores or best times to a permanent school record board.

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Vignette #1

The Physical Education teachers want to share the results of each grade's Field Day events with the rest of the school.

Your class is responsible for creating a data collection sheet and a poster-size graph for several events at your grade level. You also must present the results of your work to the other classes. For each event your class graphs, you will need to collect results from the other classes at your grade level.

Remember to:

- Consider the type of information being collected.
- Choose the most easily understood graph style.
- Use size, color, and graphics to best display the data.

Data Collection Sheet Scoring Rubric

- 3= Appropriate event title, class identification, and date lines are labeled **AND**
Space is provided for participant's names and results
- 2= Some space for the event title, class identification and/or date information
is provided **AND/OR**
Some space for participant names and/or results is provided
- 1= Few or none of the requested event labels are provided **AND/OR**
Little or no space is designated for participant names or results

Graphing Sheet Scoring Rubric

- 3= **Graph is complete & includes the following (as appropriate for the style):**
Title, axis labels, straight/ruled lines, equal interval numbers or spaces,
numbered lines (not spaces), accurate data placement, accurate key,
appropriate units of measurement, accurate scale **AND**
Appearance
Outstanding use of color, easily read font/print size, accurate spelling
- 2= **Graph is almost complete but missing 1-2 of the following elements:**
Title, axis labels, straight/ruled lines, equal interval numbers or spaces,
numbered lines (not spaces), accurate data placement, accurate key,
appropriate units of measurement, accurate scale **AND/OR**
Appearance
Some use of color, legible font/print style, few spelling errors
- 1= **Graph is incomplete or missing 3-5 of the following elements:**
Title, axis labels, straight/ruled lines, equal interval numbers or spaces,
numbered lines (not spaces), accurate data placement, accurate key,
appropriate units of measurement, accurate scale **AND/OR**
Appearance
Little use of color, illegible font/print style, and many spelling errors

Field Day Activities and Graphs

Face Painting- Have clowns, the art teacher, or even students paint student's favorite designs on their faces.

- Survey, Bar Graphs, Pictographs

Water Balloon Toss- Students pair up and toss a water balloon back and forth, taking a step back between each toss.

- Line Plot, Stem and Leaf Plot, Double Stem and Leaf Plot

Oversize Clothes Relay- using very large, old clothes, have students try and dress and undress as quickly as possible.

- Line Plot, Stem and Leaf Plot

Frisbee/Garbage Can Catch- Two students hold up a garbage can and try to catch as many Frisbees as they can.

- Scatter Plot, Bar graphs, Line Plot

Soak and Fill Race- A relay race where students try to get as much water in a bucket as they can by soaking a sponge and running to the bucket.

- Bar Graph, Back to Back Stem and Leaf Plots

Parachute Ball Toss- Students hold on to handles on the outer rim of the parachute. Five balls of varying colors will be thrown in the center. Students will make a prediction as to which ball will come off most often, least often, etc. Then students popcorn the balls (shake the parachute up and down) trying to knock the balls off.

- Double Bar Graph, Pictograph

Miniature Golf- Have a small golf course set up and record student's scores for the entire course.

- Scatter Plot, Back to Back Stem and Leaf Plots

T-Ball- Students get three tries to knock a wiffle ball as far they can and then measure the distance.

- Line Plot, Stem and Leaf Plot, Double Stem and Leaf Plot

Sample Event Assignment Table

<i>Event</i> <i>Teacher</i>	Face painting	Water balloon toss	Oversize clothes relay	Garbage can frisbee	Soak & Fill race	Parachute ball toss	Mini golf	T-ball
KIND								
Smith	X		X		X		X	
Jones		X		X		X		X
FIRST								
Ruiz	X			X			X	
Keller		X			X			X
Blandon			X			X		
SECOND								
Chou	X			X			X	
Metford		X			X			X
Baxter			X			X		

<i>Event</i> <i>Teacher</i>	Face painting	Water balloon toss	Oversize clothes relay	Garbage can frisbee	Soak & Fill race	Parachute ball toss	Mini golf	T-ball
THIRD								
Webb	X			X			X	
Palmer		X			X			X
Kohl			X			X		
FOURTH								
Shell	X			X			X	
Wikopf		X			X			X
I reton			X			X		
FIFTH								
Lourdes	X			X			X	
Freeman		X			X			X
Phipps			X			X		

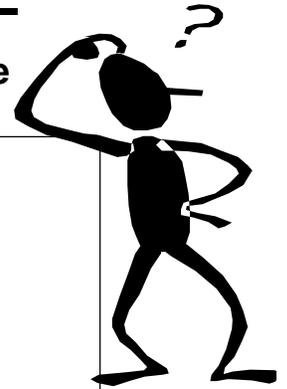
Field Day Planning Chart

Field Day Event

Data Collection Possibilities

Graph Style Choices

Field Day Event	Data Collection Possibilities	Graph Style Choices



Oversize Clothes Relay

Teacher's Name _____

Room Number _____

Grade _____



Time

Team #1	
Team #2	
Team #3	
Team #4	

Oversize Clothes Relay

Teacher's Name _____

Room Number _____

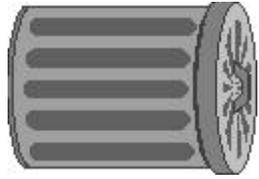
Grade _____



Time

Team #1	
Team #2	
Team #3	
Team #4	

Garbage Can Frisbee



Student's Name	# Caught	Student's Name	# Caught

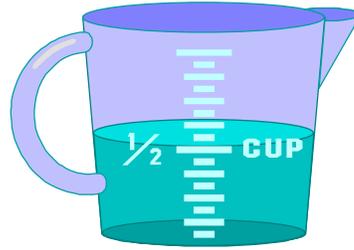
Teacher's Name _____
Room Number _____
Grade _____

Soak and Fill Race

Teacher's Name _____

Room Number _____

Grade _____



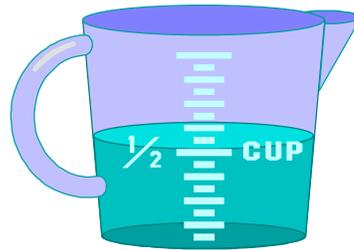
	Time	Water Measurement
Team #1		
Team #2		
Team #3		
Team #4		

Soak and Fill Race

Teacher's Name _____

Room Number _____

Grade _____



	Time	Water Measurement
Team #1		
Team #2		
Team #3		
Team #4		

Parachute Probability Toss

Ball Color	Prediction	Outcome
Red Balls		
Blue Balls		
Yellow Balls		
Green Balls		

Interesting Observations _____

We were finding the probability of _____

Teacher's Name _____

Room Number _____

Grade _____

Parachute Probability Toss

Ball Color	Prediction	Outcome
Red Balls		
Blue Balls		
Yellow Balls		
Green Balls		

Interesting Observations _____

We were finding the probability of _____

Teacher's Name _____

Room Number _____

Grade _____

