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ISSUE DATES	9/3	9/17	10/8	10/22	11/12-26	12/10	1/14	2/4	2/18	3/10	3/31	4/21	5/12

READY, SET, EXPERIMENT! Our annual guide to science-project success helps your students learn the secrets to creating winning science experiments. They will get tips from four teens whose projects have won awards and gained international attention.

As always, we welcome your suggestions. E-mail us at **scienceworld@scholastic.com**. **— The Editors**

Features

PAGE	CONTENT	TITLE SUMMARY	NATIONAL SCIENCE EDUCATION STANDARDS	LESSON IDEAS
5	Introduction	**Find a Science Project You'll Love** Generate a science project idea.	**Grades 5-8, 9-12:** • Abilities necessary to do scientific inquiry	Encourage students to enter national science competitions. For information, see **TE 2**
6	Life: Scientific Method	**Ad Busters** Understanding the scientific method.	• Understandings about scientific inquiry	Quiz students' comprehension of the scientific method with the **Check for Understanding questions** on **TE 3**.
10	Physical: Write a Procedure	**Your Laundry Can Make You Sick** Designing a well-organized procedure for an experiment.	• Evidence, models, and explanation • Abilities of technological design	Help students improve procedure-writing skills. Have them try the **critical-thinking activity** on **TE 4**.
13	Earth: Organize Your Findings	**Highway Hazard** Creating data tables and graphs.	• Nature of science	The **tip sheets** and **activities** on **TE 5** to **TE 7** will help students hone **graphing skills**.

Coming Next Issue

- Meet a teenage coroner
- Mind-controlling parasites
- Water crisis
- Name That Element!

Teacher to Teacher


Kathy Casteel

Tips for using *Science World* in the classroom

Help students learn how to display their science projects. **Kathy Casteel, a teacher at C.W. Stanford Middle School** in Hillsborough, North Carolina, suggests:

Each year, after my class has finished reading *Science World*'s annual science-fair issue, I have each student design and perform a mini experiment. Then I give him or her a template worksheet to fill in the following: headings, hypothesis, materials, procedure, data table, graphs, results, conclusions, and future study. Each student then cuts out the completed sections of the worksheet and pastes them on a cereal box to create a "mini" backboard.

TIP FINDER: Do you have a great activity or a demonstration that teaches about volcanoes or Earth's layers? Please e-mail a tip to **scienceworld@scholastic.com** by October 16, 2007.

Science Project Success Guide

SCIENCE FAIRS AWARDS PROGRAMS

Were your students inspired by the young scientists featured in this issue? Encourage them to enter their own project in these national awards programs:

The Discovery Channel Young Scientist Challenge
This awards program encourages leadership, teamwork, scientific problem solving, and the ability to be an effective science communicator. Open to students in grades 5 through 8.
http://school.discovery.com/sciencefaircentral/dysc/

The Young Naturalist Awards
This research-based essay contest is run by the American Museum of Natural History and is open to students in grades 7 to 12. The program promotes participation and communication in science.
www.amnh.org/nationalcenter/youngnaturalistawards/

Christopher Columbus Awards
This program challenges teams of middle school students to explore and discover opportunities for positive change in their communities using science and technology.
www.christophercolumbusawards.com

eCYBERMISSION
This web-based competition is open to students in grades 6 through 9. Student teams are invited to use their science, math, and technology skills to solve problems in their communities.
www.ecybermission.com/

RECOMMENDED READING

Science Fair Success Guide is a new book by *Science World* Executive Editor Patricia Janes. Published by Scholastic Teaching Resources (May, 2007), it features 200 project ideas and a wealth of resources. The guide is available for purchase online at **www.amazon.com**.

Science Fairs Plus: Reinventing an Old Favorite This book from the National Science Teachers Association is perfect for teachers of grades K–8 and offers many practical solutions to energize science fairs. To order, visit **http://store.nsta.org** or call 1-800-277-5300 between 9 a.m. and 5 p.m. ET weekdays. Outside the U.S. and Canada, call 301-638-0200.

INTERNET RESOURCES

Science Buddies is a non-profit organization that aims to help students develop a love for science and gain better understanding of the scientific method. For info, visit: **www.sciencebuddies.org**

This Exploratorium Learning Studio Web site is filled with links to science fair-related topics: **www.exploratorium.edu/ls/pathfinders/scifairs/index.html**

Dr. Shawn's Super Science Fair Support Center is filled with tips for creating winning projects. Visit: **www.scifair.org**

ANSWERS

answers available in print edition of the teachers edition

Name: ______________________________

Science Fair 101

In "Ad Busters" (p. 6), you learned about the basic parts of a science project. Test your understanding by completing this worksheet.

Part A: Vocabulary Check
DIRECTIONS: Match the word(s) in the left column with the correct phrase in the right column.

__ **1.** scientific method	**a.** summary of results
__ **2.** variables	**b.** variable you change or adjust on purpose
__ **3.** dependent variable	**c.** step-by-step approach to conducting scientific studies
__ **4.** independent variable	**d.** repeated tests in an experiment
__ **5.** constants	**e.** characteristics in an experiment that don't change from trial to trial
__ **6.** control	**f.** factor that responds to a change in the manipulated variable
__ **7.** trials	**g.** characteristics in an experiment that change or could be changed
__ **8.** conclusion	**h.** standard to which you compare the results of an experiment

Part B: Comprehension Check
DIRECTIONS: Answer the following in complete sentences.

1. What is a hypothesis?

2. What was the hypothesis of Anna and Jenny's experiment?

3. How did Anna and Jenny conduct background research for their experiment? What did they hope their research would uncover?

4. What did Anna and Jenny choose as their experiment's independent variable and dependent variable?

5. Did Anna and Jenny accept or reject their hypothesis? Explain why.

 ANSWERS ON TE 2

Name: ______________________________

Recipe for a Successful Experiment

In "Your Laundry Can Make You Sick" (p. 10), you learned about the importance of writing clear steps for an experiment. This activity will help you hone your procedure-writing skills.

YOUR MISSION:
Write a procedure for making a peanut butter and jelly sandwich.

PART A: MATERIALS YOU'LL NEED
DIRECTIONS: Write down a list of materials that one would need to make a peanut butter and jelly sandwich.

PART B: STEPS TO TAKE
DIRECTIONS: Write a procedure for making a peanut butter and jelly sandwich. (**Hint:** Be as specific as possible. For instance, instead of saying, "Take out a piece of bread," say, "Open the bag of bread and remove a piece of bread from the bag.")

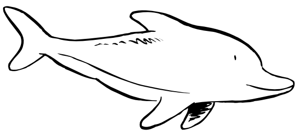
PART C: TEST IT
DIRECTIONS: Find a lab partner. One student will read his or her list of materials and steps. At the same time, the other student will follow the instructions in the procedure and mime each step to making a peanut butter and jelly sandwich. After the last step, reverse roles with your partner.

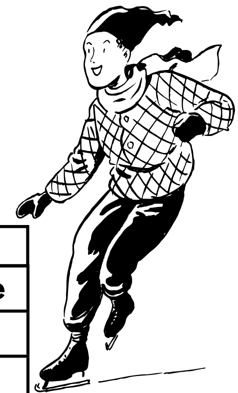
Was your partner successful in making the sandwich? If not, evaluate your steps and improve your procedure.

Name: ______________________________

Your Guide to a Winning Display

How do you keep track of the data from your science experiment? And how do you turn the collected information into something visually interesting, such as charts and graphs? First, read “Highway Hazard” on p. 13. Then, follow this step-by-step guide to practice making tables, graphs, and charts.

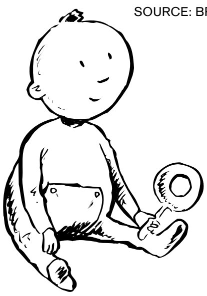




Brain Weights of Animal Species (in grams)

	Test Subjects			
Species	**A**	**B**	**C**	**Average**
Human (adult)	1,300	1,400	1,350	1,350
Human (newborn)	350	400	375	
Rabbit	11	12	13	
Cow	425	458	431	
Bottle-nosed dolphin	1,600	1,500	1,550	

SOURCE: BRAIN INFORMATION ADAPTED FROM **HTTP://FACULTY.WASHINGTON.EDU/CHUDIER/FACTS.HTML**



1. DATA TABLE

Use a data table to record experiment findings. An organized data table should list the independent variables of an experiment clearly. It should also have blank spaces for you to fill in the data from the experiment. Suppose one were to study the brain weights of various species. The different species are the independent variables. And the brain weight of each of the test subjects is the dependent variable.

TO MAKE A DATA TABLE:

1. Draw a blank data table.
2. Give your table a title that identifies the experiment’s variables [“Brain Weights of Animal Species” (in grams)].
3. Label the column on the left as the independent variable (Species). Underneath, list the different species in the study (Adult human, Newborn human, Rabbit, Cow, Bottle-nosed dolphin).
4. Label the columns to the right as the dependent variable (Test Subjects). Draw boxes under these columns in which you can record the brain weight of each test subject for each species.
5. Include columns at the far right to record the average brain weight of each species. To calculate the average, add up the weight of the brains in each species to get the total weight. Then divide the total by the number of test subjects.

Your Turn: Complete the data table by calculating the average brain weight of a newborn human, a rabbit, a cow, and a bottle-nosed dolphin.

ANSWERS ON TE 2

Name: ______________________________

2. BAR GRAPH

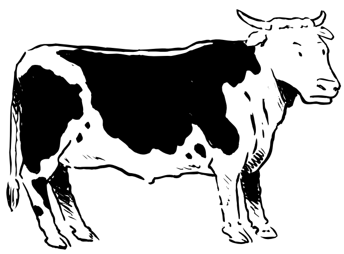
Use a bar graph to compare trends in data.

A bar graph is a great way to show how the independent variables in an experiment stack up against each other. The graph below compares the average brain weights of various animal species.

TO MAKE A BAR GRAPH:

1. On graph paper, draw a set of x- and y-axes.

2. Give your bar graph a title ("Average Brain Weights of Animal Species").

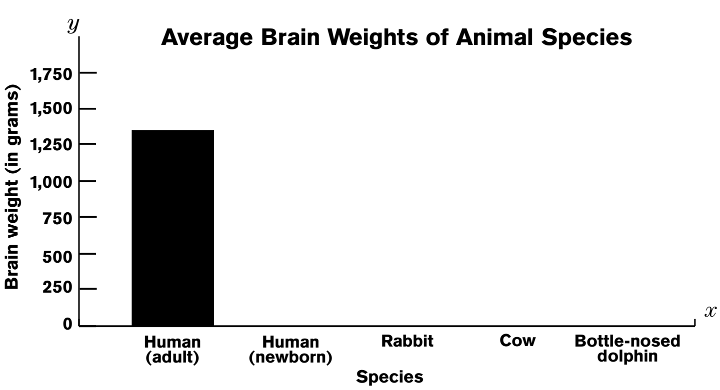


3. Label the horizontal (x) axis with the independent variable (Species), including a label for each species (Adult human, Newborn human, Rabbit, Cow, and Bottle-nosed dolphin).

4. Label the vertical (y) axis with the dependent variable (Brain Weight) and a scale from 0 to at least the highest number in the dependent variable results.

5. For each independent variable, draw a solid bar to the height of the corresponding value of the dependent variable. **Example:** The average weight of the adult human brain is 1,350 grams. Draw a bar above the "adult human" label on the x-axis to the "1,350 gram" mark on the y-axis.

Your Turn: Use the information in the data table to help you complete the bar graph.



3. LINE GRAPH

Use a line graph to pinpoint changes in data.

Choose a line graph when you want to see how continuous changes to the independent variable affect the dependent variable. According to the U.S. Social Security Administration, the most popular name given to a newborn girl in 2006 was Emily. Suppose one were to graph how the popularity of the name Emily has changed over time. The independent variable is the year, and the dependent variable is the number of newborns named Emily.

TO MAKE A LINE GRAPH:

1. On graph paper, draw a set of x- and y-axes. (*See page TE 7.*)

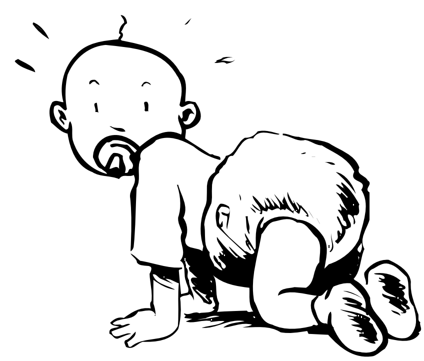
2. Give your line graph a title ("Number of Newborns Named Emily Through the Years").

3. Label the x-axis with the independent variable (Year) and include the values of the independent variable (1966, 1976, 1986, 1996, 2006).

4. Label the y-axis with the dependent variable (Number of Newborns). Use a scale from 0 to at least the highest number in the results of the dependent variable.

5. Plot a point on the graph for each piece of data. **Example:** The number of newborns named Emily in 1966 was 1,250. To locate this point on your graph, draw an imaginary vertical line from the "1966" label on the x-axis. Then, draw an imaginary horizontal line from the "1,250" mark on the y-axis. Plot the point where the lines intersect.

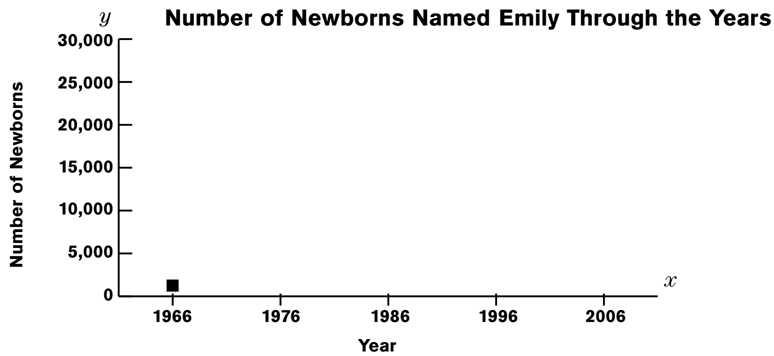
6. Once you've plotted the points for all your data, connect the points.



ANSWERS ON TE 2

Name: ______________________________

Your Turn: Here are selected years along with the number of newborns named Emily that year: 1976: 5,541; 1986: 13,216; 1996: 25,136; and 2006: 21,118. Use the information to complete the line graph.

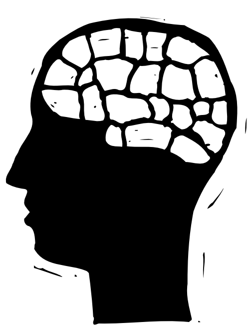


SOURCE FOR LINE GRAPH: U.S. SOCIAL SECURITY ADMINISTRATION

4. PIE CHART

Use a pie chart to illustrate numbers expressed in percent of a whole.

A pie chart is a circle divided into wedge-shaped sections. The circle represents 100 percent. Wedges inside that circle represent data that are a percent of a whole.



In a recent survey, 1,262 students between the ages of 8 and 18 were asked how likely they are to believe the news stories found on the Internet. They were asked to select an answer from the following categories: Extremely/Very likely; Likely/Somewhat likely; Not very/Not at all likely; Don't look up that information. Suppose one were to graph the survey results on a pie chart; the total number of responses represents 100 percent, and each category of response represents a different wedge of the pie chart.

TO MAKE A PIE CHART:

1. Use a compass to draw a circle.

2. Give the pie chart a title ("How Likely Youths Are to Believe the News Stories They Find on the Internet").

3. Mark the center of the circle with a point; this is where each pie "slice," or wedge, will start.

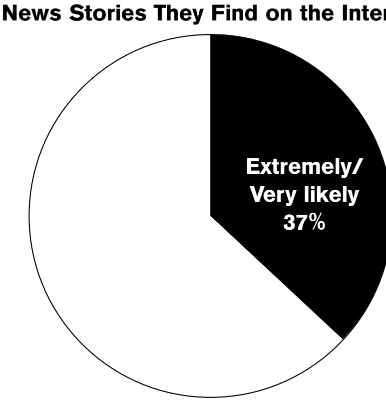
4. Measure a wedge for each independent variable (Extremely/Very likely; Likely/Somewhat likely; Not very/Not at all likely; Don't look up that information). First, convert your data from percents to angle degrees. **Example:** 37 percent of the students surveyed answered "Extremely/Very likely," so the pie wedge for that response category would be 37 percent of the 360° circle, or 133° (360 x .37 = 133.2, rounded to 133). Position a protractor at the center point of the circle. Mark 0° and 133° angles with points on the edge of the circle. Draw a line from these points to the center of the circle.

5. Label the wedge (include its percent).

6. Measure your next wedge from the edge of the first. When finished, the entire circle should be filled and the wedges should add up to 360°.

Your Turn: In the survey, 45 percent of the students answered "Likely/Somewhat likely," 4 percent answered "Not very/Not at all likely," and 14 percent answered "Don't look up that information." Use this data to complete the pie chart.

How Likely Youths are to Believe the News Stories They Find on the Internet



SOURCE FOR PIE CHART: HARRIS INTERACTIVE YOUTHQUERY

ANSWERS ON TE 2