SOUTHERN CT STATE UNIVERSITY

ANALYSING DATA
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ACTIVITY 1: ROLLING THE DICE

Please answer each of the following questions alone. Then, discuss with your group members.

1) If you roll a die on time, what is the probability of getting a "2"? _____

2) How can you explain that to your students? Can you model it?
_____

Each of the group members gets a die.
Roll the die 12 times and tally the answers in the table. Then, collect the answers of your group and add them to the table:

	1	2	3	4	5	6
One person						
Group						

Time for discussion

Simulations
http://archives.evergreen.edu/webpages/curricular/2003-2004/doingscience/flash/dice.html

ACTIVITY 2: GRAPHING DATA

Rainbow trout (Onchorhyncus mykiss) taken from four different localities along the Spokane River during July, August, and October of 1999 were analyzed for heavy metals by the Washington State Department of Ecology. As part of the study, the length (in mm) and weight (in grams) of each trout were measured. Below is a subset of the data:

Length	Weight		Length	Weight
405	715		365	540
460	895		390	660
347	432		385	609
259	202		360	557
265	223		392	623
280	248		413	754
438	840		395	584
324	353		453	975
337	363		270	209
318	340		351	506

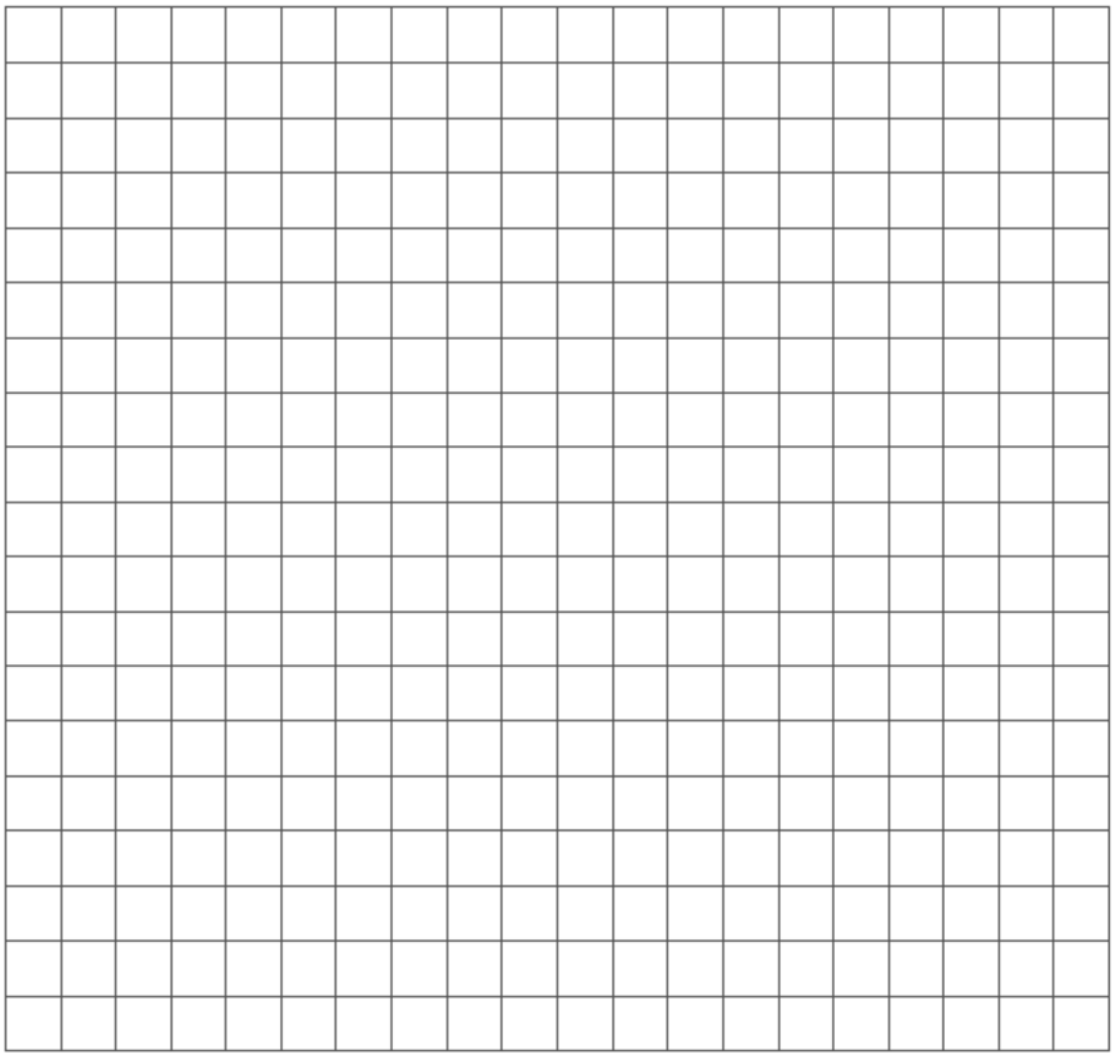
Graph the data on the next page.

Based on your graph, what would you predict a 326-mm trout would weigh? What would you predict a 502-mm trout weigh?

How confident are you with your predictions? Why? Is there anything you could have done to obtain a "better" prediction?

Problem from: Langkamp, G. & Hull, J. (2007). *Quantitative Reasoning and the Environment: Mathematical Modeling in Context*. Pearson: NJ.

Data from: https://fortress.wa.gov/ecy/publications/documents/0003017.pdf



ACTIVITY 3: EXCEL

Excel activities will be on the computer

Line of Best Fit applet: http://tube.geogebra.org/student/m336497

ACTIVITY 4: STATISTICS WITH GEOGEBRA

1) From the **view menu**, **open a Spreadsheet**
2) Enter the following data in column A. The data represent the sales of soda in a restaurant over 15 days. {Sales, 2, 4, 5, 6, 12, 12, 34, 100, 12, 52, 45, 65, 23, 1, 12}
3) Select the data to analyze and **choose "one variable analysis**"
   - *If you highlight the data, you can only analyze that amount of data; you can modify it and study it but cannot add more values. If you select the column, when you enter more values, statistics are modified accordingly. For this task, please select column A*
4) Click on "**One Variable Analysis**", and from the option menu, select "use header as title".
5) Click on the icon at the top right side of the pop up window to show the view in the main menu.
6) From Options (right arrow, right hand), modify the dimensions of the graph (min and max for y and for x and the steps).
7) Change the classes manually
8) Answer the following questions:
   How would the histogram change if we change the classes?
   What is the advantage of choosing small classes? Large classes?
9) Modify the data values and observe the changes in the histogram.
10) From the **"Data Analysis Window**", show statistics.
11) Add 5 more values to column A so that the mean becomes "30"
12) Choose "2nd plot" and plot another histogram
13) From Options menu (right arrow, right side), set the class width for the first histogram to be 20 and to the second histogram to be 5. Compare the graphs. Which graphs tell more info about data?
14) Right click on the first graph and copy it to graphics. Change the color of the graph.
15) Using the tool "Insert text", add a text with your own remarks.
16) From the spreadsheet, create a table with the raw data (the table is created in Graphics)
17) Add title to the graph, label axes.

ACTIVITY 5: BEST FIT CURVES WITH GEOGEBRA

1) Enter the following data to spreadsheet (Number of birds)

age	survivors
0	210
1	91
2	78
3	70
4	65
5	62
6	42
7	23
8	15
9	14
10	11
11	10
12	4
13	3
14	2
15	1

2. Choose "Two-variable regression analysis"

3. Data analysis: choose the regression model that you want.

FitLine	Regression line
FitExp	$a.e^{bx}$
FitGrowth	$a.b^{x}$
FitPower	$a.x^{b}$
FitLog	Log. Regression Curve
FitLogistic	$\frac{a}{1+be^{(-kx)}}$
Fit[list of points, list of fucntions]	Create a linear combinations of functions that best fit the points

ACTIVITY 6: STACKED BOXPLOTS WITH GEOGEBRA

1) Let column 1 represent the sales of Juice, Column 2 the sales of burgers and Column 3 represent the sales of Soda in 10 days.

2) Enter Juice in Column A and then enter the following 10 values, representing the sales of juice during 10 days {4, 5, 6, 7, 12, 14, 15, 25, 34, 12}

3) Enter "Burgers" in Column B an then enter the following 10 values, representing the sales of juice during 10 days {34, 35, 46, 47, 12, 44, 35, 55, 44, 65}

4) Enter "Soda" in Colum B an then enter the following 10 values, representing the sales of juice during 10 days {34, 45, 26, 57, 12, 48, 55, 95, , 75}

5) Choose Multiple variable analysis to compare the three boxplots

6) Copy the graphs to clipboard and copy it to a Word document

ACTIVITY 7: TELEPHONE

First determine who is going to be the gossip king or queen. That person is going to think of a "secret" and tell one other person. The gossip starter and the other person should be standing side by side. One member of the group needs to record the time (to the nearest hundredth of a second) it takes for the gossip starter to tell their secret to the other person. Most cell phones have a pretty accurate stopwatch feature. Record that result in the table below.

Now, another member of the group should be added to the line and again, record the time it takes for the secret to be passed down the line.

Continue until everyone in the group has been added to the line.

Number of Persons TOLD the secret	Seconds to Reach the End of the Chain
1	
2	
3	
4	
5	
6	
7	
8	
9	

Find the equation of your line of best fit.

Predict how long it would take to tell your secret to 100 people; 1000 people

How many people could hear the message in one hour?

ACTIVITY 8: BARBIE BUNGEE

In this activity, you will simulate a bungee jump using a Barbie® doll and rubber bands.

Before you conduct the experiment, formulate a conjecture:

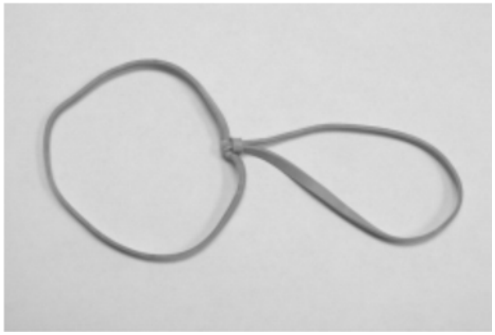
I believe that _____ is the maximum number of rubber bands that will allow Barbie to safely jump from a height of _____.

Now, conduct the experiment to test your conjecture.

PROCEDURE:

Complete each step below. As you complete each step, put a check mark in the box to the left.

- Tape a large piece of paper to the wall from the floor to a height of about six feet.
- Draw a line near the top to indicate the height from which Barbie will make each jump.
- Create a double-loop to wrap around Barbie's feet. A double-loop is made by securing one rubber band to another with a slip knot, as shown (below left).
- Wrap the open end of the double-loop tightly around Barbie's feet, as shown (below right).



- You now have ONE rubber band on Barbie. We do not count the one around her feet.
- Hold the end of the rubber bands at the jump line with one hand, and drop Barbie from the line with the other hand. Have a partner make a mark to the lowest point that Barbie reaches on this jump.
- Measure the jump distance in centimeters, and record the value in the data table. You may wish to repeat this jump several times and take the average, to ensure accuracy. Accuracy is important—Barbie's life could depend on it!

- Attach a second rubber band to the first one, again using a slip knot. Jump again and record.

Number of Rubber Bands (X)	Jump Distance in Centimeters (Y)
1	
2	
3	
4	
5	
6	
7	
8	

Find the equation of your line of best fit.

Now, predict how many rubber bands you would need for a jump of _____ cm