Title: Creepy Crawling Through Line Plots and Graphs

Lesson 1

Brief Overview:

Students will collect, organize, display, and interpret data. Students will be able to interpret data contained in a line plot and bar graph using a variety of categories and intervals. Students will be able to use probability terms to interpret data to make decisions or predictions.

NCTM Content Standard/National Science Education Standard:

Data Collection
Data Organization
Interpreting Data
Probability Terms

Grade/Level:

1st and 2nd grade

Duration/Length:

Three to four days, approximately 40 minutes per lesson.

Student Outcomes:

- Students will be able to generate, organize and display the data they have collected in order to make decisions or predictions.
- Students will be able to convert the information they have generated into a graph or a line plot
- Students will be able to identify probability terms
- Students will be able to interpret information from a graph or line plot using probability terms

Materials and Resources:

Materials and Resources:

Lesson 1

- Sign – Bugs I Would Most Like To Live With – Teacher Resource Sheet 1
- Pictures of 5 Bugs – Teacher Resource Sheets 2, 3, 4, 5, & 6
- Counting Bars – Teacher Resource Sheet 7
- Sign – Bugs – Teacher Resource Sheet 8

Pre-drawn horizontal and vertical axis on the blackboard

Book – Insects and Crawley Creatures Author: Angela Royston. Publisher: Simon & Schuster, New York, New York, 1992

- Insects I have seen in the book – Student Resource Sheet 1
- Pictures for my graph – Student Resource Sheet 2
- Graph – Bugs I Saw in Insects & Crawley Creatures – Student Resource Sheet 3
- Glue
- Homework – Student Resource Sheet 4

Lesson 2

- 3 Toy or paper grass hoppers
- Index cards
- Markers
- Wall size number line (for line plot). {Masking Tape can be substituted, and numbers can be drawn on, if a floor number line is unavailable}
- Crayons
- Extra long measuring tape (at least five feet long)
- Chalk
- Student Resource Sheet 5

Lesson 3

- Pre-made bar graph - only color in the number of bugs you put in your bug jar. Label "Bugs" on the horizontal axis. Do not write title. Do not write any numbers on vertical axis.
- Clear Bug jar (fish bowl, plastic bowl)
- Insects (Dollar Store)
- Terms – cut out and placed on black board
- Master of Probability – Student Resource Sheet 7

Development/Procedures:

Pre-assessment /Launch

- Place a sign with the title, "Bug I Would Most Like To Live With" (Teacher Resource Sheet 1) on the board. Place the pictures of five bugs on the board: butterfly, mosquito, ladybug, spider, and a bee (Teacher Resource Sheets 2, 3, 4, 5, & 6).

- Distribute the counting bars (Teacher Resource Sheet 7) and ask the students, one at a time, to come up and tape their bar under the bug they would like to live with.

- Explain that the information they just collected on the table is called data. From this table they can make a graph.

- Construct a graph on the board with this information. The title Bugs I Would Most Like To Live With becomes the title. The pictures of the bugs become the horizontal axis titled "Bugs" (Teacher Resource Sheet 8). Tell the students that the other axis is used for the number of bugs. Use the numbers 1 to the highest number the students has voted for as a scale. Next, draw a rectangle up to the number and color it in.

- Tell the students that they have constructed a bar graph. This graph tells how many bugs they liked or how many they didn't like.

- Show the students the book, Insects and Crawly Creatures. Explain that students are going on a bug walk through this book and, as you read the book, the students will be collecting data so that they can graph it.

Teacher Facilitation

- Invite the students to the front of the room so that they can enjoy reading a book about bugs. Distribute Student Resource Sheet 1. Explain that as the students read the book they will put a mark next to the insect for the number of times they see that insect on the page.

- Show the book, Insects and Crawly Creatures. As you hold up the book, which has a picture of a ladybug on it, ask the students if they remembered to put a mark next to the Ladybug.

- Read the book, which has all the bugs that are on the Student Resource Sheet 1. Evaluate the students as you read to make sure that they are gathering the data.

- After reading half of the book ask, "How many tally marks are there for the ladybug and the grasshopper?" After completing the book will ask the students how many marks they have for each bug. These marks will be changed into numbers.

- If there is a disagreement about the number, the misinformation can be adjusted while the students are still sitting on the rug.

Student Application

- Have the students return to their seats as you distribute Student Resource Sheet 2. The students will cut out each bug and glue it on the bottom of Student Resource Sheet 3.

- After the students have glued on their bug pictures on the paper, ask the students, "How many boxes should you color for the ladybug?" The students will be directed to refer to their data collection sheets. Explain that the number of marks is the number of boxes that should be colored in.

- The students will color in the correct boxes. The graph on the board and the student's graph will look the same.

- Encourage students to analyze the data displayed on the graph.

Embedded Assessment

- Evaluate the students understanding of data collection from Student Resource Sheet 1.

- Evaluate the student's knowledge of graphing by the graph that he/she turns in-Student Resource Sheet 3.

- Evaluating participation of the students during the entire class.

Reteaching

- Walk around the room, make sure that the students grasp the idea of data collection and make corrections with individual students.

Extension

- Give students a homework assignment on graphing (Student Resource Sheets 4 A-C). It will review and give practice for data collecting and graphing.

Lesson 2

Pre-assessment

Students should know how to measure to the nearest inch. They also should know how to compare items and distances and how to identify ways they are alike and different.

Launch

Review prior knowledge students have of measuring to the nearest inch. Make the toy or paper grasshopper hop four inches on a ruler. Students will break into groups of four. Each child will have a turn flicking the grasshopper. Have the students read the distance the grasshopper jumped. Have two more trials using the other two grasshoppers. This will reawaken prior knowledge about measuring in inches. For each jump, have the students read the measurement in inches. Write these measurements on the board. Afterwards, tell the students, they have just generated a group of data. Explain that with this group of data, they can create a line plot. Define what a line plot is. Make a small line plot on the board. Label the line plot. Briefly discuss the title, and axis label. Plot the data.

Teacher Facilitation –

Students will learn how to organize data they have generated into an easily readable format, the line plot. Students will use the line plot as a quick reference. They will learn that when data is organized on a graphing device, that it will be easier to interpret, evaluate, and analyze information.

Tell the students that they will now become grasshoppers. As they jump, they will collect data about their jumping distance. Explain that once they have generated their hopping data measurements, they will organize the information in a way that is easy to interpret, by organizing the information on a line plot. Give each student an index card. Tell them to put their name on the back, but not to write anything else on the front. Take the students outside. Draw a start box on the ground at the bottom of the tape measure. The start box is where each child stands and jumps from. They may not jump from in front of the box or behind it. They must jump from inside of the box.

Student Application

Have each grasshoppers (student) jump from the jump box, up the side of the tape measure. The idea is that each student will jump as far as they can using one large jump. You may choose to have each student write his/her name on the space they land on, using chalk. (For example, if a child lands at 23", mark a line there, and have the child place their name there.) Have the student read aloud the number of inches they have jumped. Each child gets only one jump. Write the distance that each child jumps, on the bottom side of the index card. (For higher levels, have them convert the number of inches into feet and inches.)

As the students re-enter the classroom, have them draw a picture of their face at the top of the index card. Remind them that by taking the measurement of each persons jump, that they have just gathered a group of data. Explain that the class will now organize that data by creating a line plot.

Embedded Assessment

First, (This section refers to the line plot on the floor.) Explain that a line plot needs a title and labels just like a graph.

Second, Have the students think of a pertinent title. Write the title the students have chosen on a sentence strip and have a student place it where it belongs (above the line plot.)

Third, Have the students tell what the numbers on the line plot represent. Explain that they represent how many inches each child has jumped. Each child who has jumped 23" will place his/her index card above the 23" mark. Each child who jumped 15" will plot his/her data on the 15" spot, and so on. Using a sentence strip, label the bottom of the line plot "Number of inches each student grasshopper traveled".

Fourth, It will be the student's job to find the spot where their index cards belong on the line plot. The students will wait until each is called up, and plot their cards where they belong on the big floor line plot.

Assessment

Ask the following questions. Which distance did students jump the most? Which distance did students jump the least? (If the data for your class is suitable,) which two or three distances were equally traveled? (For example, five students may have jumped 20 inches, and five students may have jumped 16 inches. These two distances were equally traveled). Have them develop a conclusive statement describing the data. "Most 1st (or 2nd) graders can jump _____ inches."

Reteaching/Extension – Homework, "Hopping Spiders"

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- Give students the "Hopping Spiders" homework activity (Students Resource Sheet 5 A-B), students will look at the top of the page where the group of jumping spider distance data is located. They will need to organize the data to display it on the line plot.
- Afterwards, the students will write the answers to the questions using the line plot they created in order to analyze the hopping spider data.
- Teacher may choose to have the students write brief phrases or complete sentences as they write their responses on the lines that are provided.

Extension

Go back outside, and have the students take a second jump. This time, let them chew a piece of gum first. After spitting out their gum, let each child

have a running start and jump from the start box to see if they can get even farther. You can create another line plot and compare your results.

Lesson 3

Preassessment

Review the data collection, graphing and line plotting terminology students have used to collect and organize data. Also review the types of graphs students have created, such as the bar graph and the line plot. There will be a partial bar graph on the board. Vertical axis will be number of bugs. Horizontal axis will be names of the bugs. Categories will be : Scorpions, Spiders, Ants, and Bees. The bar graph will show 40 scorpions, 20 spiders, 30 ants, and 0 (zero) bees.

Launch

Refer to the bar graph on the board and ask the students what is missing. (The title and scales are missing). The only things labeled on the graph are the names of the bugs. Title could be "Number of Bugs".

Teacher Facilitation

First Define the probability terms: certain, impossible, likely, unlikely. Give an example of each term. (For example, the teacher says, "Use one of these terms to tell me the answer to this question: Is superman going to come flying through this room?" The students think and then answer, "No." Explains the term that describes an event that will not happen, (impossible). Ask the students if they can think of a question in which the answer would be "certain". Go through each term until you see that the students have grasped the concepts. You may want to have the students define each word. Place the correct definition on the board.

Second

Refer back to the graph and explain that this graph represents the number of bugs present in the bug jar (Say this as you display the bug jar.) Explain that the graph tells us how many of each spider there is in the jar, (each bee, and so on.) Refer back to the graph and begins asking questions about the data having students use probability terms to answer the questions. [For example, the teacher says, "Will we see a scorpion in the jar?" If there are no scorpions on your graph, then the students should answer, "Impossible." {If there are a few scorpions on your graph the students would answer, "Likely".}] The idea is that students will practice using probability terms by making references to the graph to describe and determine the likelihood of certain creatures being present in the jar.

Student Application

One by one, select about five to seven students, to come up and select a bug from the jar. Before each student reaches in to pick up a bug, have he/she guess which bug they will pull out. Before they blindly pick a bug,

have the class use a probability term to describe how likely it is that they will actually pick the bug they guessed.

Embedded Assessment

For an ongoing assessment, ask the students to give reasons why they chose the probability term they selected. Have them refer back to the graph, and the definitions their class created for each term.

Reteaching/Extension

- Review the definitions of each probability term
- Review how we used the probability terms to make predictions.

Summative Assessment

Students will show that they have mastered the ability to collect, organize, display, and interpret data. Students will apply what they know about interpreting data contained in a line plot to create a bar graph using a variety of categories. Students will be able to use probability terms to interpret data to make decisions or predictions.

Teacher may select **Test Form A** or **Test Form B**.
Student Resource Sheets 7 and 8.

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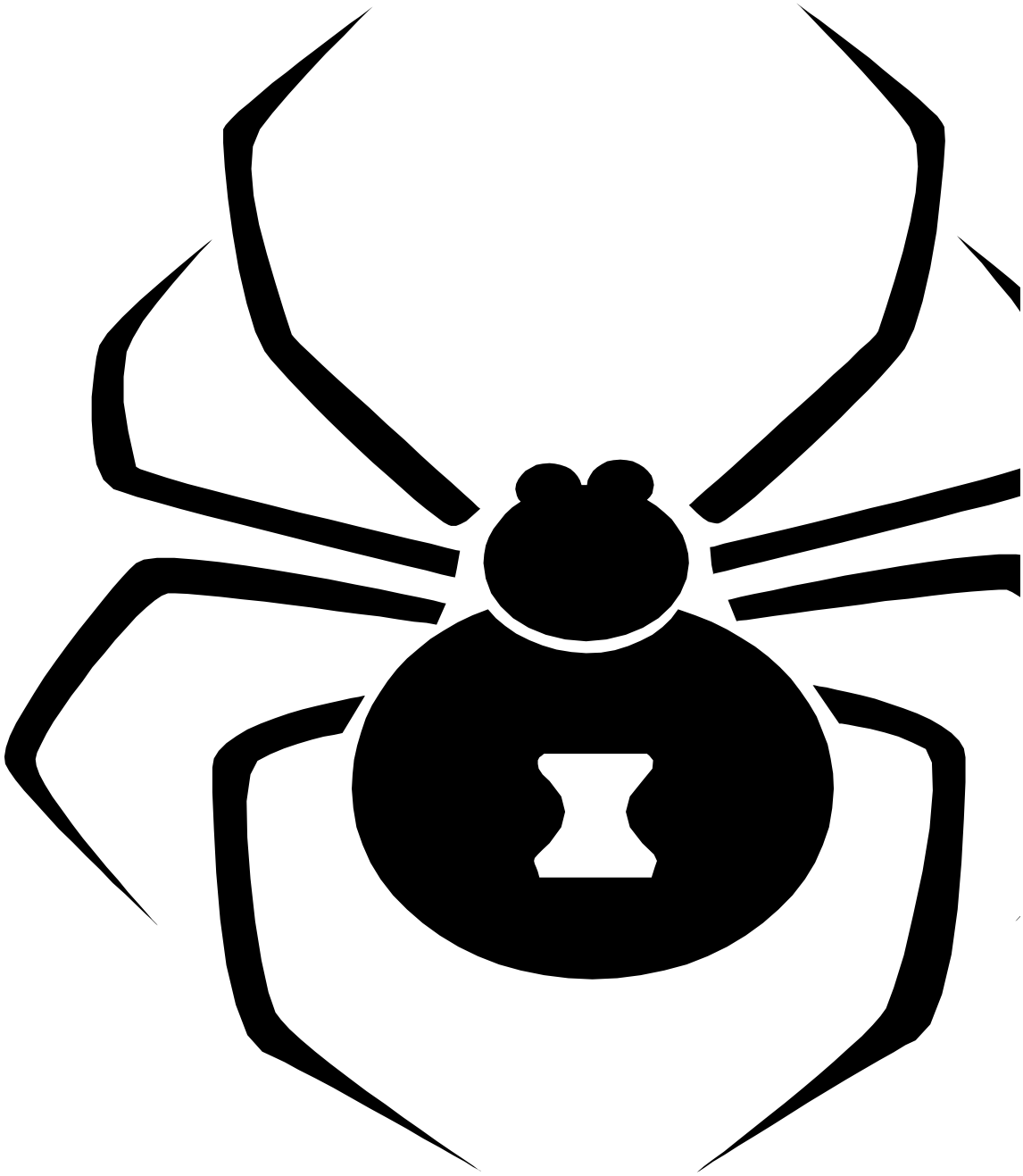
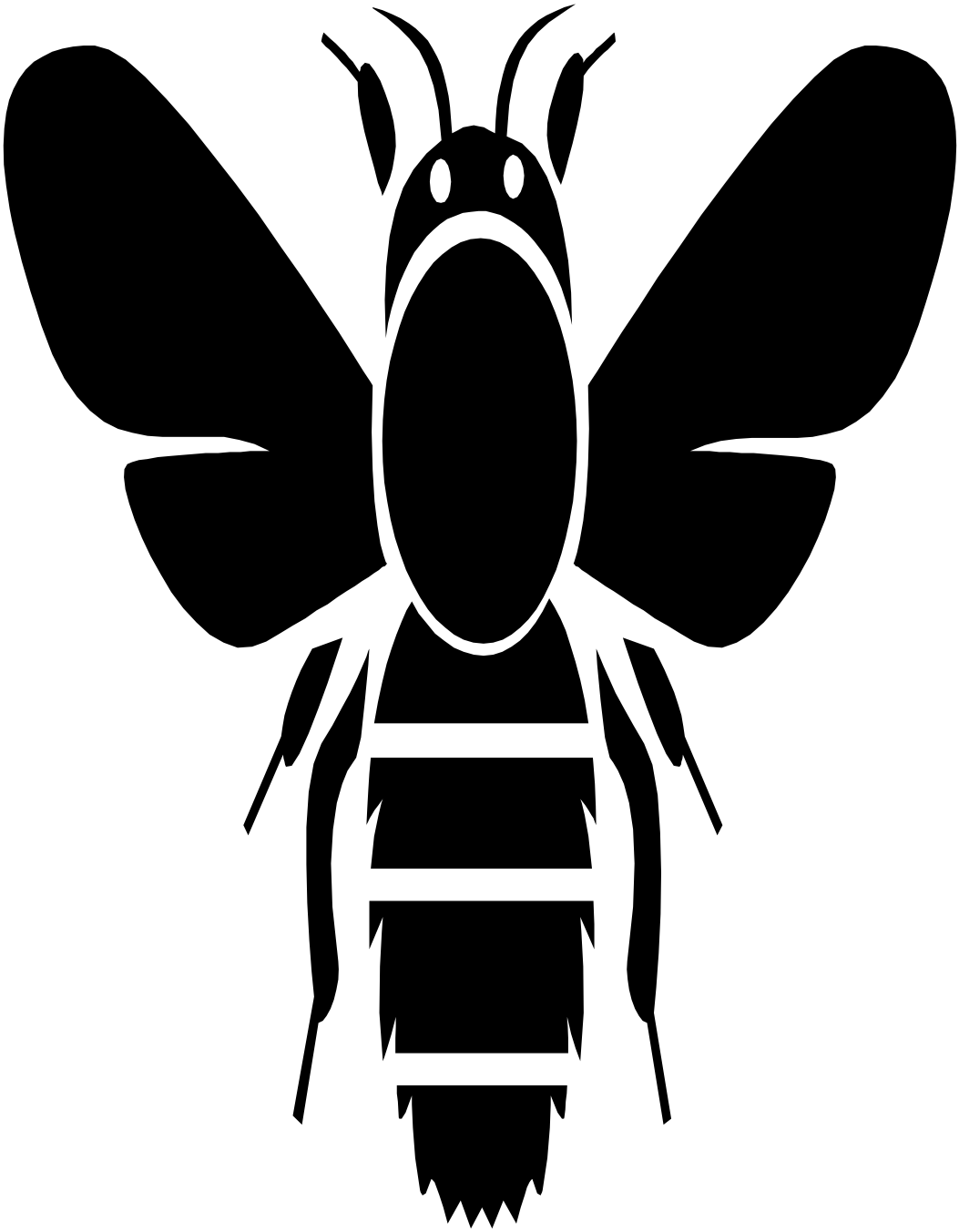
Bugs I Would Most Like To Live With

BUTTERFLY

LADYBUG

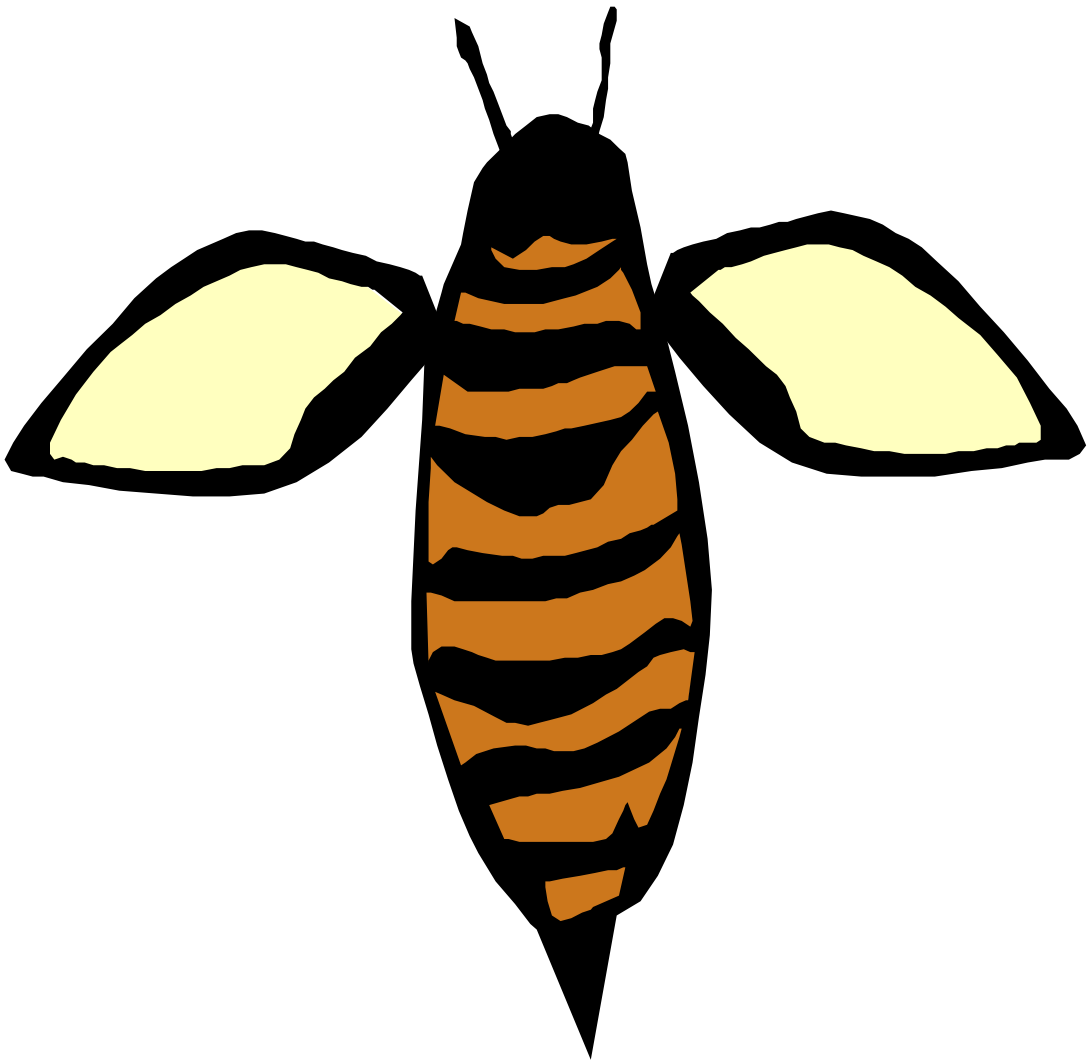


SPIDER



MOSQUITO

Teacher Resource Sheet 6



BEE

BARS

B U G S

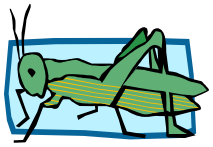
Student Resource Sheet 1

Data Collection Sheet for Insects and Crawly Creatures

Put a mark for the number of times you see the bug in the book:

Ladybug

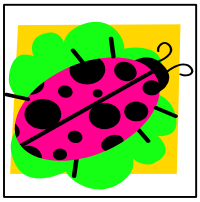
Grasshopper



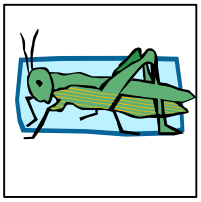
Bee

Spider

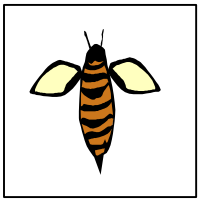
Pictures For My Graph



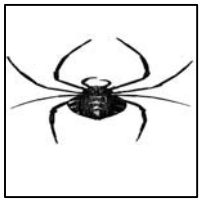
Ladybugs



Grasshoppers



Bee



Spiders

Student Resource Sheet 3

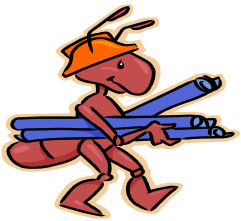
Bugs I saw in Insects and Crawly Creatures

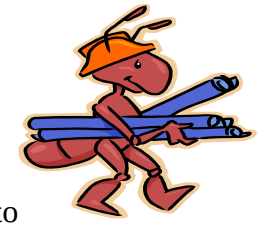
Number of Bugs

13				
12				
11				
10				
9				
8				
7				
6				
5				
4				
3				
2				
1				
0				

Homework for Collecting Data and Making a Graph

Read the story and answer the questions.

One day there was a going to work. His name was Sammy. He met his friend, James,  on the way. Sammy said he had a big lunch with lots of fruit. He could not wait to eat his apples, oranges, and bananas.

was going to give his grapes and peach to  .

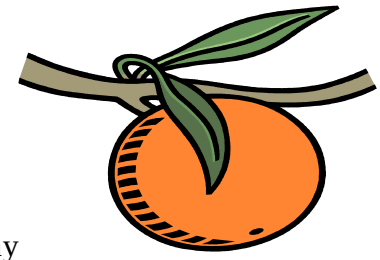
This is what Sammy's fruit looked like.

Student Resource Sheet 4B

Please count the pieces of fruit with marks on the first line and place a number on the second line.

How many did have? _____ _____

How many did have? _____ _____

How many  did have? _____ _____

Name _____ Date _____

Hopping Spiders

One day four hungry jumping spiders saw their prey. They were tired because they hadn't eaten for a long time. Each one saw the delicious treat at once so they could not decide who would go after the treat. Great Mufado, the Black Hawk suggested that each jump just one time, and whoever jumped closest to the food would be the one to eat it. The forest animals watched as the spiders prepared to jump, they wanted to see if spiders could really jump different distances.

Horner jumped 7 inches

Capty jumped 6 inches

Indy jumped 11 inches

Impoto jumped 12 inches

Mabutu jumped 7 inches

Isha jumped 7 inches

<u>Directions</u>: **Plot the jumps the Spiders took by placing an x on the line plot below.**

Hopping Spiders

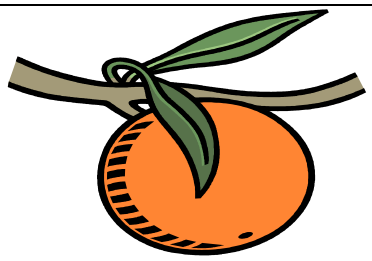
<_|__|____|____|____|____|____|____|____|_____|____|____|_____|
1 2 3 4 5 6 7 8 9 10 11 12 13

Distance in inches

Student Resource Sheet 4-C

Graph of Sammy's Fruit

Pieces
Of
Fruit

6			
5			
4			
3			
2			
1			
0			
		Fruit	

Name _____ **Date**_____

Hopping Spiders

Answer the following questions using the line plot you made from the previous page.

1. What was the least amount of inches that a spider jumped?

_____

2. Who jumped the farthest? How many inches did that spider travel?

_____

3. How many data samples were used to complete this line plot?

_____

4. Which distance did the spiders jump the most?

_____

5. The food was really only 7 inches away, who got to eat the food?

_____

6. What do you think the forest animals learned about jumping spiders?

_____

_____

7. Finish this sentence:
Most Hopping Spiders can jump _____

Student Resource Sheet 7 A

_____ _____

Name **Date**

Master of Probability

Read the following sentences. Then decide if the phrase really could happen. Circle your prediction of the likelihood of that event actually happening. Beneath your circled prediction, write a sentence describing why you chose the probability word that you selected.

1. Your parents will cook your favorite food for your birthday.

certain likely unlikely impossible

Why?_____

_____

_____

2. You sprout wings and fly home from school.

certain likely unlikely impossible

Why?_____

_____

_____

3. You will read a book today.

certain likely unlikely impossible

Why? _____

_____

_____

Test Format –A

Student Resource Sheet 7 B

_____ _____

Name Date

Directions: Review the line plot below, and use it to answer the questions that follow.

Number of Caterpillar Babies who Hatched in the Forest This Week

```
                                    X
                              X     X
                              X     X
                              X     X     X
          X     X             X     X     X
  X       X     X             X     X     X     X
<I_________I_________I_________I_________I_________I_________I_________>
  1       2     3     4     5     6     7     8
```

Day the baby caterpillars hatched

1. How many baby caterpillars hatched on Day 1? _____

2. How many baby caterpillars hatched all together? _____

3. What day did the most baby caterpillars hatch? _____

4. What days did only two baby caterpillars hatch? _____, _____,

Use the data from the line plot above to create a Baby Caterpillars graph.

1. Make up a Title for your graph
2. Place a scale up the side of the graph
3. Color in your graph to show how many caterpillars were born each day.

Place title here_____

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8

Day the baby caterpillars hatched

Name: _____

Date: _____

Javon blew plastic insects down the table to see how far they would go in inches. He tried six times.

His results were the following:

6 inches	8 inches	10 inches
8 inches	5 inches	11 inches

Please put the above information into the line plot below using the letter X for each time that Javon blew on the insect.

Please give your line plot a title.

Title: _____

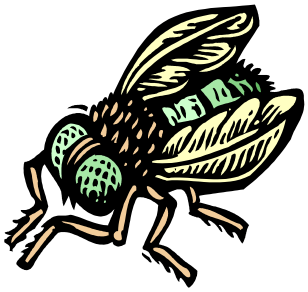
6 inches 7 inches 8 inches 9 inches 10 inches 11 inches

Test Format Student Resource Sheet 8B

Name: _____

Date: _____

Jason wished that he had 3 butterflies.



He wished that he had 2 flies.

Jason also wished for 5 caterpillars.

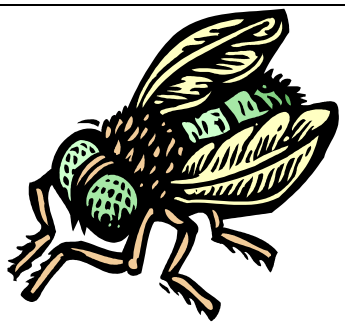
Please put Jason's wishes on a bar graph.

Test Format B

Student Resource Sheet 8 C

Jason's Wishes

Number of Wishes

6			
5			
4			
3			
2			
1			
0			
Bugs			

Test Format B Student Resource Sheet 8D

Name: _____

Date: _____

Please answer the following questions by circling the correct answer.

1. You will see an ant this summer.

Impossible **Unlikely** **Likely** **Certain**

2. You will be stung by a bee.

Impossible **Unlikely** **Likely** **Certain**

3. You will see a pink butterfly this summer.

Impossible **Unlikely** **Likely** **Certain**

4. You will never see an insect this summer.

Impossible **Unlikely** **Likely** **Certain**

5. You will swallow a fly.

Impossible **Unlikely** **Likely** **Certain**