

Ecology Explorers Online Data Analysis

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Ecology Explorers Data Analysis
Welcome!
Choose the data you would like to analyze

Birds
Arthropods
Bruchid Beetles

Choose a Subject

The application lets students develop hypotheses, questions and predictions based on the available data. Simple statistical procedures and two types of graphs are offered to test the hypothesis. A bar graph and a dot-plot / box and whisker series along with concepts of central tendency, median, mean and quartile were chosen to comply with 6th grade Arizona Department of Education Math standard requirements.

Ecology Explorers is a CAP LTER educational program for Kindergarten through 12th grade students. Protocols developed by CAP scientists are employed by the students for data collection in their schools. One goal of this project was to provide appropriate data analysis tools that allow students and teachers access to their data while providing tools to teach required concepts using graphs and statistics in an online environment. The second goal of this project was to accomplish this by using background technology developed for scientific data access applications and a design that provides extensibility to the use of scientific datasets collected by CAP researchers for their research.

Ecology Explorers Data Analysis
Ask A Question

The first step in the scientific method is to Ask a question.
What do you want to ask about?
The number of bird species observed
The total number of birds observed
Would you like more information about the data? [Click Here](#)

Ecology Explorers Data Analysis
Choose a type of question to ask:

Is the average number of bird species different between schools?
Does the number of bird species differ between sites at my school?
Does the average number of bird species vary over different years?
Does the average number of bird species vary under different amounts of cloud cover?

Ecology Explorers Data Analysis
Please choose a school:

Desert Mountain High School
Westinghouse High School
Arizona State University
Mesa Elementary School
Holmes Elementary
Desert Vista High School
Desert Harbor Elementary
Hendrix J. High
Orovalley School

Ecology Explorers Data Analysis
What is your Prediction?

The second step in the Scientific Method is: Make a Prediction.
I predict that there will be more bird species observations at ___(a)___ than at ___(b)___.

Choose a: canal power poles
 east parking lot
 football field grass
 Garden
 Hendrix Patio
 North grass
 patio
 Pond
 West grass

Choose b: canal power poles
 east parking lot
 football field grass
 Garden
 Hendrix Patio
 North grass
 Pond
 West grass

Form a Question

Ecology Explorers Data Analysis
Does the number of bird species differ between sites at my school?

speciesCount	siteName
2	east parking lot
1	east parking lot
1	east parking lot
2	east parking lot
1	east parking lot
1	east parking lot
1	east parking lot
1	east parking lot
1	east parking lot
1	east parking lot
1	east parking lot
1	east parking lot
3	east parking lot
3	east parking lot
3	east parking lot
1	east parking lot
1	east parking lot
1	east parking lot
1	east parking lot
2	Pond
2	Pond
2	Pond
1	Pond

View Data

Ecology Explorers Data Analysis
Does the number of bird species differ between sites at my school?

	east parking lot	Pond
N	20	19
Median	1.0	2.0
UpperQuartile	2.0	5.0
LowerQuartile	1.0	1.0
Mean	1.6	2.7
StandardDeviation	0.8	2.0
Variance	0.7	4.0
Mode	n/a	n/a
Range	2.0	6.0
Min	1.0	1.0
Max	3.0	7.0

Analyze Data

Ecology Explorers Data Analysis
Looking closer at the data
Does the number of bird species differ between sites at my school?

The following graph is a modified dot plot with the median shown as a blue line and a labeled box and whisker plot. The upper quartile and lower quartile are shown in red. The minimum and maximum make up the 'whiskers' and are shown in yellow.

What does this graph tell you about the data?

You have predicted that there will be more bird species observations at Pond than at east parking lot.
How does this add to or change your analysis?

Continue Analysis
View Statistics
View Raw Data
Start Again

Ecology Explorers Data Analysis
Looking closer at the data
Does the number of bird species differ between sites at my school?

The following graph is a modified dot plot with the median shown as a blue line.

You have predicted that there will be more bird species observations at Pond than at east parking lot.
Does this add to or change your analysis from the previous graph?

Continue Analysis
View Statistics
View Raw Data
Start Again

Ecology Explorers Data Analysis
Looking closer at the data
Does the number of bird species differ between sites at my school?

The following graph is a modified dot plot. Each dot represents a point count. If there are many dots with the same value, the dots run together to create a line.

You have predicted that there will be more bird species observations at Pond than at east parking lot.
Does the data support your prediction?

Why or Why not?
What else can you say about this data based on the graph?

Continue Analysis
View Raw Data

Ecology Explorers Data Analysis
Looking closer at the data
Does the number of bird species differ between sites at my school?

This graph shows the average number of species at Pond and east parking lot.

You have predicted that there will be more bird species observations at Pond than at east parking lot.
Does the data support your prediction?

Continue Analysis

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Powered By Xylopia

The technology for this web application is rather complex in that it employs web services and is based on a standardized internet messaging system through which the front-end user interface (the web pages that the user sees) sends requests to a background system for querying, analyzing and graphing data (a series of data processing services that the user doesn't see) in a JavaBeans/JSP interface. The database queries are managed by Xylopia, a series of web services built for the retrieval and analysis of data. This Ecology Explorers site is the pilot project for Xylopia. This decoupled design enables us to use the same back end technology for advanced data access applications as well as this guided inquiry. The significant advantage to this system is that the text, questions and databases are all set with a series of configuration files. No code writing or compilation is required to expand the application. More datasets will be added to the Ecology Explorers Online Data Analysis through configuration files without needing to change either the interface or the back-end services. These files contain the text prompts for the web pages and define the connection between the science questions and data queries need to address them.

