

Unit of Practice

Title: Ornithology and Real-World Science in the 6th grade Classroom

Subjects: Science, math, reading, writing, art and technology

Level: 6th Grade

Overview: Our goal is to be actively engaged in real-world scientific investigations - identifying, classifying, collecting, analyzing and interpreting ecological data on and off our campus. We will be collaborating with our partners from the Central Arizona Phoenix Long Term Environmental Research (CAPLTER) project and the Center on Environmental Research at ASU. We will also be working together with other teacher student scientist at other valley schools on this long term research project.

PHASE ONE

Tasks:

1. Students will read and listen to fictional stories, non-fiction books and poetry about birds. The children will summarize, interpret and discuss characteristics and elements of story, as well as discuss and distinguish characteristics of birds and their habitats.
2. Students will learn to identify and classify birds by creating their own classification systems and by using the systems widely accepted by ornithologists and bird enthusiasts.
3. Students will use resources on the Ecology Explorers web site to learn about the seven most common birds in our area and learn to identify these common birds with ease.
4. Students will become familiar with the Peterson Field Guide for Western Birds as well as other common bird guide books by utilizing them during bird observation times on our campus.
5. Students will conduct individual studies of birds by choosing a bird from our region and researching particular questions chosen by the students and teacher. The students will use many sources including non-fiction texts, magazines, field guides, internet, CD Roms, and encyclopedias.
6. Students will write a creative story from the point of view of their chosen bird and incorporate the factual information they encountered in their research. This story will lead the reader from the least to most distinguishing information as the reader tries to guess which species of bird is telling the story.
7. Students will write in their science/math journals about what they have been learning.

Standards:

R-E2 Use reading strategies such as making inferences and predictions, summarizing, paraphrasing, differentiating fact from opinion, drawing conclusions, and determining the author's purpose and perspective to comprehend written selections.

PO 1. Identify the main ideas: critical and supporting details: and the author's purpose, feeling and point of view of the text.

PO 2. Distinguish fact from opinion

PO 3. Summarize the text in own words

PO 4. Compare and contrast the text (e.g., characters, genre, cultural differences, fact, fiction)



R- E3. Analyze selections of fiction, nonfiction and poetry by identifying the plot line (i.e., beginning, conflict, rising action, climax and resolution): distinguishing the main character from minor ones: describing the relationships between and motivations of character: and making inferences about the events, setting, style, tone, mood and meaning of the selection.

PO 1. Describe the setting and the relationship to the selection

PO 4. Differentiate fiction, nonfiction or poetry based on their attributes

W-E1. Use correct spelling, punctuation, capitalization, grammar and usage, along with varied sentence structure and paragraph organization, to complete effectively a variety of writing tasks.

PO 1. spell correctly

PO 2. Punctuate correctly (e.g, sentence endings, commas in a series, commas in compound sentences, abbreviations, quotation marks, colon in a business letter greeting, apostrophes)

PO 3. Apply rules of capitalization (e.g., sentence beginnings, titles, abbreviations, proper nouns, direct quotations)

PO 4. Apply standard grammar and usage (e.g., subject-verb agreement: simple, compound and complex sentences: appropriate verb tense: plurals: prepositions)

PO 5. Organize paragraphs with a variety of sentence structures (e.g., simple, compound, complex)

W-E2 Write a personal experience narrative or creative story that includes a plot and shows the reader what happens through well-developed characters, setting, dialog, and themes and uses figurative language, descriptive words and phrases.

PO 2. Write a story

-develop a story line in a sequence that is clear

-develop the characters

-describe the setting

-use dialog when appropriate

-use simile, metaphor or descriptive words and phrases

W-E8 Demonstrate research skills using reference materials such as a dictionary, encyclopedia, and thesaurus to complete effectively a variety of writing tasks.

PO 1. Implement a research strategy that includes:

-selecting best source for a specific research purpose

-taking notes that summarize and paraphrase information relevant to the topic

-incorporating notes into a finished product

4SC-E1 Construct classification systems based on the structure of organisms.

PO 1. Describe how organisms are classified

PO 2. Construct classification systems for grouping organisms

PO 3. Identify organisms based on existing classification systems

State Visual Arts Standard

Standard 1: Creating Art. Students know and apply the arts disciplines, techniques and processes to communicate in original or interpretive work.

ISTE 1. Basic operations and concepts

>Students demonstrate a sound understanding of the nature and operation of technology systems.



>Students are proficient in the use of technology.

ISTE 2. Social, ethical and humans issues

>Students practice responsible use of technology systems, information and software.

> Students develop positive attitudes toward technology uses that support lifelong learning, collaboration, personal pursuits, and productivity.

ISTE 4. Technology communications tools

> Students use telecommunications to collaborate, publish, and interact with peers, experts, and other audiences.

> Students use a variety of media and formats to communicate information and ideas effectively to multiple audiences.

ISTE 5. Technology research tools

>Students use technology to locate, evaluate and collect information from a variety of sources.

Activities and Procedures:

These activities will occur over a period of many days up to two weeks.

Many of these activities are ongoing and will continue throughout the unit of study. We will also be doing more than one activity at a time and children will rotate through 4-5 activities (computers, reading/researching, journaling/writing, or creating visual art)

1. The teacher will reintroduce birds as one of the classifications of vertebrates that we studied prior to this unit by reading the book *El Primer Pájaro de Piko Niko*. The Students will discuss the book orally and summarize the plot. The discussion of character and many of the story elements will take place. The teacher will guide this discussion with key questions if certain elements do not arise naturally in the flow of the discussion. In this discussion some of the characteristics that make birds distinguishable from any other class of vertebrates will definitely come forth as well as information about habitat and range. Each day the teacher will read a book aloud to the students and remind them of the elements of story. There will also be many books about birds displayed around the classroom for children to read during free time as well as for check out. (R-E2. PO1, PO2, PO3, PO4, R-E2. PO1, PO 2)

2. The teacher will introduce the computer program *Inspirations* and demonstrate how to write and organize the characteristics of birds using this program. The children will share their ideas on how they want to divide these characteristics into categories thus creating their own basic classification system. The students will then be given the opportunity to create their own classification systems in small groups and use the *Inspirations* program to organize and present their information. These systems of classification will evolve over the next several days. (ISTE 1,2, 4. 4SC-E1 PO 1, PO 2)

3. The students will be given a poem for homework on that first night as well as other nights throughout the study. They will be ask to respond to these poems in written form as well as some kind of visual art form. (R-E2. PO 1, PO 3, PO 4,R-E3. PO 4, W-E1. PO 1, PO 2, PO 3, PO 4)

4. The class will go outside daily to observe birds on our campus. These observations will be guided by the teacher. The children may create a visual art piece and write about their observations. Each day the students will list the birds seen, if not by name then by description. This list will grow as the



children become more familiar with identification of birds. The children will use their own classification systems to identify these birds. (4SC-E1 PO 2, PO 3, W-E1. PO 1, PO 2, PO 3, PO 4)

5. The children will add to and modify their classification systems as characteristics are identified or classifications become more sophisticated. The teacher will lead discussions about the different classification systems and problems will be discussed. The discussion will also focus on which system should they use? How are birds truly classified? (4SC-E1 PO 2, PO 3)

6. At this time the teacher will introduce the children to the Ecology Explorers web site, which is part of the CAPLTER project for the schools. Students will use the resources on this web site to learn about the seven most common species of birds in our area as well as keys to classification and identification. Children will be given time to explore the site using a scavenger hunt created by the teacher. (see appendix A) (4SC-E1. PO 4, ISTE 1, 2, 4, 5)

7. The teacher will then introduce the students to the Peterson Field guides and other field guides used to identify birds. The children will begin to formulate a species list of birds by common name that they have seen on our campus. The teacher will also display the pictures of the seven most common birds in our area. (W-E8 PO 1, 4SC-E1. PO 3)

8. After the students have formulated the species list and have a number of birds listed the children will be asked to select a bird they would like to research. The students will be looking for specific information the students and children have selected together. Each child will begin research on their bird using a variety of resources including web sites I have collected and CD roms. On this day the teacher will lead the children through a lesson on use of the internet. She will demonstrate how to locate a site by both entering the URL in the address/location line and by entering key words using kid friendly search engines provided by the teacher. (W-E8 PO 1, ISTE 1, 2, 5)

9. Children will continue to read about, research, identify, classify and observe birds throughout the entire study of birds.

10. Students will use the Apple Works word processing program to write a creative story from the point of view of their chosen bird and incorporate the factual information they encountered in their research. This story will lead the reader from the least to most distinguishing information as the reader tries to guess which species of bird is telling the story. (W-E2. PO 2, W-E1 PO 1, PO 2, PO 3, PO 4, PO 5, ISTE 1, 2, 5)

Remedial:

I will have peer partners for the children who need assistance reading and writing. I already have these partners in place. I also allow for alternative ways of expressing knowledge such as visual arts, drama and song. I have literature selections at all reading levels. When I read I am also very animated and many times use gestures and facial expressions.

Language strategies:

I am a bilingual and dual language teacher so I use many sheltered language strategies as well as having language brokers and materials in the language of use. Spanish web sites and search engines.



Enrichment:

I always have great books the children can read and learn gather information about the topic of study. I would allow a child to come up with their own idea on what they would like to do to carry a project further or go at it from another angle. I don't believe in creating something special or extra but encourage these children to carry what we are doing to a high level of expertise or understanding.

Materials:

Computers
Fiction, non fiction and poetry books about birds
Internet
CD-Roms
Apple works program
Ecology Explorers web site address
Inspirations computer program
Paper/ pencils
1 computer presentation device
Peterson Field Guides
Other field guides
Visual arts materials journals
Binoculars
pictures of the 7 most common birds

Evaluation:

I will use the district developed rubric for writing a creative story when evaluating the students' stories. I will also use teacher observation during discussions to check on the students' understanding of the concepts discussed. The children will also do daily self-evaluations. (see appendix B) I will also conduct an attitude survey about the lessons and the technology.



PHASE TWO

Tasks:

1. Each student will create a hyperstudio stack using their story, drawings and graphics they have collected on the internet.
2. Students will learn how to cut and paste text and graphics from other documents and the internet. They will also learn how to scan pictures they have created into their hyperstudios.
3. Students will use the Ecology Explorers web site to find specific information about following scientific protocol.
4. The teacher will lead a discussion about the importance of protocol and how the class will go about following this protocol when conducting bird counts on our campus.
5. Students will conduct habitat surveys of the sections chosen for our research. The children will estimate percents of grass, cement, bushes, trees, and soil. They will create circle graphs with the percentages found.
6. Children will conduct daily bird counts following the protocol. Children will continue to improve their bird identification skills.
7. Students will be introduced to the CAPLTER data base and learn how to input the data they have collected.
8. Children will continue to read and be read about birds. They will be asked to periodically respond in a variety of ways to what they have read. They will also be observing weekly at a particular site at home.

Standards:

R-E2 Use reading strategies such as making inferences and predictions, summarizing, paraphrasing, differentiating fact from opinion, drawing conclusions, and determining the author's purpose and perspective to comprehend written selections.

PO 1. Identify the main ideas: critical and supporting details: and the author's purpose, feeling and point of view of the text.

PO 2. Distinguish fact from opinion

PO 3. Summarize the text in own words

PO 4. Compare and contrast the text (e.g., characters, genre, cultural differences, fact, fiction)

R- E3. Analyze selections of fiction, nonfiction and poetry by identifying the plot line (i.e., beginning, conflict, rising action, climax and resolution): distinguishing the main character from minor ones: describing the relationships between and motivations of character: and making inferences about the events, setting, style, tone, mood and meaning of the selection.

PO 1. Describe the setting and the relationship to the selection

PO 4. Differentiate fiction, nonfiction or poetry based on their attributes



W-E1. Use correct spelling, punctuation, capitalization, grammar and usage, along with varied sentence structure and paragraph organization, to complete effectively a variety of writing tasks.

PO 1. Spell correctly

PO 2. Punctuate correctly (e.g., sentence endings, commas in a series, commas in compound sentences, abbreviations, quotation marks, colon in a business letter greeting, apostrophes)

PO 3. Apply rules of capitalization (e.g., sentence beginnings, titles, abbreviations, proper nouns, direct quotations)

PO 4. Apply standard grammar and usage (e.g., subject-verb agreement: simple, compound and complex sentences: appropriate verb tense: plurals: prepositions)

PO 5. Organize paragraphs with a variety of sentence structures (e.g., simple, compound, complex)

1M-E5 Represent and use numbers in equivalent forms (integers, fractions, percent, decimals, exponents, scientific notation and square root)

PO 2 Demonstrate the relationship and equivalency among

A. decimals, fractions, and percents with halves, fourths and tenths)

B. decimals, fractions, ratios, and percents

2M-E1 Construct, read analyze and interpret tables, charts, graphs and data plots (e.g., box and whisker, stem and leaf, and scatter plots)

PO 1. Construct:

A. bar graphs, line graphs, frequency tables and Venn diagrams

B. histograms, stem-and-leaf plots, scatter plots, circle graphs, and flow charts

2SC-E4 Identify characteristics of scientific ways of thinking

PO 1 Describe the following scientific processes: observing, communicating, comparing, organizing, relating, inferring and applying

4SC-E1 Construct classification systems based on the structure of organisms.

PO 3. Identify organisms based on existing classification systems

State Visual Arts Standard

Standard 1: Creating Art. Students know and apply the arts disciplines, techniques and processes to communicate in original or interpretive work.

ISTE 1. Basic operations and concepts

>Students demonstrate a sound understanding of the nature and operation of technology systems.

>Students are proficient in the use of technology.

ISTE 2. Social, ethical and humans issues

>Students practice responsible use of technology systems, information and software.

> Students develop positive attitudes toward technology uses that support lifelong learning, collaboration, personal pursuits, and productivity.

ISTE 3. Technology productivity tools

> Students use technology tools to enhance learning, increase productivity, and promote creativity.

>Students use productivity tools to collaborate in constructing technology-enhanced models, preparing publications, and producing other creative works.



CES
Center for Environmental Studies

ISTE 4. Technology communications tools

- > Students use telecommunications to collaborate, publish, and interact with peers, experts, and other audiences.
- > Students use a variety of media and formats to communicate information and ideas effectively to multiple audiences.

ISTE 5. Technology research tools

- > Students use technology to locate, evaluate and collect information from a variety of sources.
- > Students use technology tools to process data and report results.

Activities and Procedures:

These activities will occur over a period of many days perhaps up to two weeks. Many of these activities are ongoing and will continue throughout the unit of study. We will also be doing more than one activity at a time and children will rotate through 4 activities (computers, reading/researching, journaling/writing, or creating visual art)

1.The teacher will begin this phase by demonstrating on the presentation device how to make a hyperstudio. The students will learn to cut and paste texts and graphics from other documents and the internet. The students will learn how to scan their pictures and use them in their hyperstudio. The students will learn the specifics of the hyperstudio program and be able to create their own stack to share with their classmates. (ISTE 1, 2, 3, 5)

2.Early on in this phase the students will be introduced to scientific protocol. The students will explore the protocol section of the Ecology Explorers web site. They will be given specific questions to answer about the bird protocol. (2Sc-E4. PO 1, ISTE 1, 2, 5)

3.After the children have had time to explore the web site and find the answers to the question the teacher will facilitate a discussion about protocol and why it is important in scientific research. (2SC-E1. PO 1)

4.The next day the students will begin to follow the protocol and do the habitat surveys of the sites the class will be using to do bird counts. The children will estimate the percentages of grass, cement, soil, bushes, and trees. The teacher will emphasize strategies taught in the MCI curriculum on estimation and arriving at percents. (1M-E5. PO 2)

5.With this information the children will create circle graphs by hand and then on the computer of these habitats. The teacher will use a method of graph making she learned in her USI classes where the children use "percentotractors". She will also introduce to the children the ClarisWorks chart maker and the Excel database and graph maker. (2M-E1. PO1, ISTE 1, 2, 5)

6.After these sites have been surveyed the teacher will take a fourth of the class to observe her conduct a bird count in the garden. The other three fourths of the class will continue to work on their hyperstudios, reading, journaling or creating visual art. The children who observed will then discuss how this count was conducted and what they noticed the teacher doing or not doing. The children will then be divided into groups of 3 to conduct their own practice bird counts. The groups will rotate through this demonstration. (2SC-E4. PO 1)



7. The teacher will use the presentation device to demonstrate data entry. The students will be introduced to the CAPLTER data base as a whole group. The teacher will demonstrate how this is done and what the dos and don'ts are when using this database. The child will be able to enter their own data. The children will then be able to do data entry daily as they collect the information.(ISTE 1, 2, 5)

Remedial:

Students will work with their partners. Children will be given opportunities to express themselves through the different intelligences. The work and reading level may need to be modified. I will have some books and reading materials at lower reading levels. I will work one on one with some of the children who have difficulty with the percents and estimating.

Language strategies:

I am a bilingual and dual language teacher so I use many sheltered language strategies as well as having language brokers and materials in the language of use. Spanish web sites and search engines. I will have materials in the appropriate language of usage.

Enrichment:

I always have great books the children can read and learn gather information about the topic of study. I would allow a child to come up with their own idea on what they would like to do to carry a project further or go at it from another angle. I don't believe in creating something special or extra but encourage these children to carry what we are doing to a high level of expertise or understanding.

Materials:

Books, poems about birds
computers
internet
scanner
ClarisWorks program
Excel program
Paper/pencils
journals
percentottractors
visual arts materials
Peterson Field guides
binoculars

Evaluation:

The students and teacher will develop together a rubric to evaluate the hyperstudios. The teacher will also use observation and checklists during discussions and bird counts. At the end of this phase the teacher will ask the children to respond in written form about what they have learned. The teacher will also read the children's journals and self evaluation papers in order to evaluate the students' progress.



PHASE THREE

Tasks:

1. The students will be placed in small groups and will formulate questions about birds and the data we have been collecting.
2. The students will then follow the scientific process and conduct real life investigations on our campus.
3. The students will enter new data and/or use data previously entered to draw conclusions about their questions.
4. Students will learn about validity, accuracy and preciseness in research.
5. Students will use randomly selected data when appropriate.
6. Students will learn how to run a correlation on two or more variables and analyze the information.
7. Students will look at the numbers/ statistics that they have come up with and be able to formulate a conclusion based on their data analysis.
8. The students will create a poster presenting the audience with the their study and results using computer generated graphs, scanned pictures, digital camera generated images, internet graphics and their own written information.

Standards:

1M-E5 Represent and use numbers in equivalent forms (integers, fractions, percent, decimals, exponents, scientific notation and square root)

- PO 2 Demonstrate the relationship and equivalency among
- A. decimals, fractions, and percents with halves, fourths and tenths)
 - B. decimals, fractions, ratios, and percents

2M-E1 Construct, read analyze and interpret tables, charts, graphs and data plots (e.g., box and whisker, stem and leaf, and scatter plots)

- PO 1 Construct:
- A. bar graphs, line graphs, frequency tables and Venn diagrams
 - B. histograms, stem-and-leaf plots, scatter plots, circle graphs, and flow charts
- PO 2 Interpret and analyze data from graphical representations and draw simple conclusions:
- A. Bar graphs, line graphs, circle graphs, frequency tables and Venn diagrams
 - B. histograms, stem-and-leaf plots, scatter plots, circle graphs and flow charts
- PO 3 Choose an appropriate graphical format to organize and represent data.

2M-E2 Make valid inferences, predictions and arguments based on statistical analysis

- PO 1. Formulate predictions from a given set of data and justify predictions
- PO 2. Compare a given prediction with the results of an investigation
- PO 3. Critique the conclusions and recommendations of others's statistics
- PO 4. Consider the effects of missing or incorrect information



1SC-E1 Identify a question, formulate a hypothesis, control and manipulate variables, devise experiments, predict outcomes, compare and analyze results, and defend conclusions.

- PO 1. Design an experiment using a scientific method
- PO 2. Conduct an experiment using a scientific method
- PO 3. Analyze the results of an experiment
- PO 4. Defend conclusions drawn from the analysis

W-E1. Use correct spelling, punctuation, capitalization, grammar and usage, along with varied sentence structure and paragraph organization, to complete effectively a variety of writing tasks.

- PO 1. spell correctly
- PO 2. Punctuate correctly (e.g, sentence endings, commas in a series, commas in compound sentences, abbreviations, quotation marks, colon in a business letter greeting, apostrophes)
- PO 3. Apply rules of capitalization (e.g., sentence beginnings, titles, abbreviations, proper nouns, direct quotations.
- PO 4. Apply standard grammar and usage (e.g., subject-verb agreement: simple, compound and complex sentences: appropriate verb tense: plurals: prepositions)
- PO 5. Organize paragraphs with a variety of sentence structures (e.g., simple, compound, complex)

ISTE 1. Basic operations and concepts

- >Students demonstrate a sound understanding of the nature and operation of technology systems.
- >Students are proficient in the use of technology.

ISTE 2. Social, ethical and humans issues

- >Students practice responsible use of technology systems, information and software.
- > Students develop positive attitudes toward technology uses that support lifelong learning, collaboration, personal pursuits, and productivity.

ISTE 3. Technology productivity tools

- > Students use technology tools to enhance learning, »increase productivity, and promote creativity.
- >Students use productivity tools to collaborate in constructing technology-enhanced models, preparing publications, and producing other creative works.

ISTE 4. Technology communications tools

- > Students use telecommunications to collaborate, publish, and interact with peers, experts, and other audiences.
- > Students use a variety of media and formats to communicate information and ideas effectively to multiple audiences.

ISTE 5. Technology research tool

- >Students use technology to locate, evaluate and collect information from a variety of sources.
- > Students use technology tools to process data and report results.



Activities and Procedures:

These activities will occur over a period of many days perhaps up to two weeks. Many of these activities are ongoing and will continue throughout the unit of study. We will also be doing more than one activity at a time and children will rotate through 4-5 activities (computers, reading/researching, journaling/writing, creating visual art, conducting experiments/ collecting data)

1. The teacher will begin a discussion of what they have been learning about the bird population on their campus. She will ask the children if they have noticed any patterns or anything interesting they would like to share. Questions will naturally begin to surface and she will talk about the beginning of the scientific process. (1SC-E1. PO 1)
2. On the same day the teacher will break the children up into science groups of about 4 or 5 students. They decide as a team a question they would like to investigate. They will write their question down and then make hypotheses. The group will then decide how they are going to test or gather the information they need to answer their question. Each group will record their question, hypotheses and their ideas for testing their questions. Each group will begin their investigations the following day. (SC-E1. PO 1)
3. Before the groups begin their actual research the teacher will lead a discussion about validity, accuracy, precision, random and fairness. The discussion will be on going throughout the investigations.
4. The groups will carry out their investigations and collect the data they need through observations and maybe previous data already in the database. Children will continue to input new data and access old data using the Ecology Explorers web site. Some children may need to access other valley schools' data that is also in the data base. (SC-E1 PO 1, PO 2, ISTE 1, 5)
5. When the groups have collected the data they need for their investigation the teacher will do a whole group demonstration on making graphs using ClaarisWorks/AppleWorks software and what kinds of graphs can be used to illustrate different kinds of information. The students will then makes graphs with the small groups using the data they have collected. (2M-E1, PO 1, PO 2, PO 3, ISTE 1, 2, 3, 4, 5)
6. The following day the students will participate in an activity that illustrates correlation using height and weight that she learned from a USI class. The teacher will then use the presentation device to demonstrate how this data can be entered into the database and then run as a correlation. The emphasis is that some of the groups may be interested in running a correlation to strengthen their conclusions. The students will learn how to use the Excel data analysis tool and create graphs that illustrate the correlations they ran. (1SC-E1. PO 3, PO 4, ISTE 1, 2, 3, 4, 5)
7. The groups will then create a poster for their final projects that present their studies and results using computer generated graphs, pictures and written information. The groups will make these posters keeping in mind they will be presenting and defending them to their peers, parents and a group of scientists from the CAPLTER project. (see appendix B)
(1SC-E1. PO 3, PO 4, W-E1. PO 1, PO 2, PO 3, PO 4, PO 5,)



Remedial:

Students will be working in small groups and will be able to help one another. I allow for and encourage alternative ways of expressing knowledge.

Enrichment:

Groups who finish early may want to begin another investigation/experiment. These groups may also want to video their presentations.

Materials:

Computers
Excel program
ClarisWorks Works/AppleWorks program
pencil/paper
butcher paper
calculators
colored printer

Formative Evaluation:

Throughout the unit I will be evaluating my students' progress by reading their journals. I will jot them notes about their progress and understanding of the concepts being taught and reinforced. I also have activities throughout the unit that I can use as formative evaluations.

Summative Evaluation:

The group poster will be used as my evaluation. The children and I will develop a rubric to be used as an evaluation tool. This completed poster will demonstrate the children's ability to use the scientific process, the technology tools they have been introduced, writing as a means of communication and visual arts to make a project esthetically pleasing to the eye.

