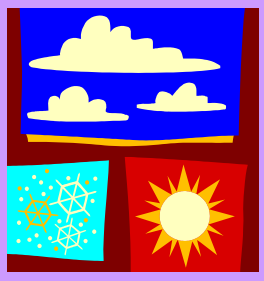
Become A Wildlife Detective

5 DAY FORECAST



Day One:
Lesson 1: Identify Arizona's living state symbols
Day Two:
Lesson 2: Learn field research skills such as observation and data collection
Day Three:
Lesson 3: Develop a field research project for your schoolyard or community; gather and practice using the tools of your new trade (research equipment, field guides, data collection sheets)
Day Four:
Lesson 4: Field observations
Day Five:
Lesson 5: Share your data; celebrate new learning

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Education Branch
2221 W. Greenway Road
Phoenix, AZ 85023
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Enduring Understandings:

- There is great diversity of life in Arizona.
- The essentials of wildlife habitat are food, water, shelter, and space, all in a suitable arrangement.
- Wildlife responds to its environment through physiological or behavioral adaptation.
- Wildlife has many values to humans and should be respected and conserved.

Core Questions:

- What skills does a wildlife researcher (detective) need?
- How does a researcher set up a field experiment (research project)?
- What tools does a researcher use?
- Why is safety important during field research?
- What does a researcher do with his/her data?
- How do others use the results of a researcher's data and report?

Overview:

Set up and conduct a field research project, which looks at birds that visit your school community

Objectives:

1. Identify Arizona's state wildlife and plant symbols and learn when and how they were selected
2. Classify data according to identifiable characteristics
3. Formulate questions to answer during a scientific inquiry
4. Itemize safety procedures to follow while conducting an outdoor investigation
5. Select appropriate procedures for collecting data
6. Determine equipment to be used during the inquiry and practice appropriate use of each item
7. Demonstrate safe procedures during an inquiry
8. Record data in an appropriate format
9. Create a visual representation of data and share results with classmates

Resources:

- State Symbols PowerPoint
- Arizona Game and Fish Poster: "Arizona's State Symbols"
- State Symbols Graphic Organizer (1 per student)
- "Critters of Arizona" (1 per student)*
- Variety of 10 Small Classroom/Household Items
- Tray
- Small Sheet or Towel
- Pencils
- Birds on My School Grounds Data Table (1 per team)
- Binoculars (recommended – 1 per team)

Vocabulary
The following words will be defined at the end of the lesson:

DATA
FIELD GUIDE
FIELD MARKS
RESEARCH
WILDLIFE

- Thermometer (to record daily temperature)
- Clock (to record time of day)
- Clipboard (1 per team)
- Field Guides for Arizona or Western Birds (recommended – 1 or more per team)
- Various Photos of Native Birds (5 or 6 per class)
- Art Paper (poster board, construction paper, newspaper or other large paper)
- Markers or Colored Pencils
- Become a Wildlife Detective Quiz (1 per student)

Lesson 1: "Arizona State Symbols"

Goal: Recognize diversity in Arizona's wildlife

Objective: Identify Arizona's state wildlife and plant symbols and learn when and how they were selected

Activity:

1. Present the media production available via the Arizona Game and Fish Web site at azgfd.gov (or CD available free from the Arizona Game and Fish Department education branch).
2. Students complete the State Symbols Graphic Organizer during and/or following this presentation.
3. Discuss the value of wildlife to humans. Ask students to write a journal entry describing any encounter they've had with wildlife and how it affected them. Have students share their responses if time allows.

Lesson 2: "Looking for Clues in all the Right Places"

Goal: Learn basic field research skills such as observation and data collection

Objective: Classify data according to identifiable characteristics

Skills: observation, data collection, classification

Activity 1: Recollection of items

1. Gather 10 small items and arrange randomly on a tray. Keep hidden from students until you are ready to have them observe these items.
2. Show tray to students and ask them to study what they see on the tray. Allow 30 seconds for students to observe the items on the tray, without talking to others.
3. Remove tray and cover with small sheet or towel. Ask each student to each write down as many of the 10 items as he/she remembers.
4. When all students have completed their lists, have them compare their lists with other classmates.
5. Bring the tray back and uncover.
6. Discuss: Which items were most often remembered? Missed? Why might some items have been remembered while others were not? What tools might researchers use to help them accurately remember their field observations? Why is it important for a researcher to accurately record data, and what might happen if (s)he does not?

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Activity 2: Comparison of eye color

1. Ask students to group themselves according to their own eye color. (Allow up to 5 minutes – You may need to offer some suggestions as to what to do with students who have eye colors that are not readily identifiable as brown or blue or green.)
2. Discuss: How would you record this data? As a class, develop a simple method to display this data – e.g., Venn diagram, bar graph, pie chart. How might others use this visual representation? Is one method better than another? How might you select the "ideal" display for your data? How important is it to make sure that every piece of data is accurately recorded? If you need to round numbers to the nearest whole number (e.g., when using percentages in a pie chart), does that make any difference in how you represent your data?

Activity 3: Classification of shoes

(**Note**: Once you have demonstrated classification using Activity 2, this activity lends itself well to independent or group/team learning as students model the process used in the previous activity.)

1. Divide class into groups of 8-10 and have each group gather in a circle on the floor.
2. Within each group, ask each student to remove one shoe, placing it in the center.
3. One by one, each student should pick out a shoe (not his/her own) and describe the physical characteristics of that shoe - e.g., size, color(s), number of eyelet holes, Velcro closure, type of tread.
4. As each one finishes describing a shoe, the group should give suggestions as to how they think these shoes should be grouped - e.g., by color? by size? by tread? by shoelaces vs. Velcro closure? How many different methods might you use to group these shoes?
5. As a class, discuss different classification possibilities and the pros and cons of each. Why do scientists use classification when studying nature? (Refer to the "Animal Classification" section in the "Selecting a Class Symbol" section for basic information on how they classify animals.)

Lesson 3: "The Nuts and Bolts of Research"

Goals: Develop and prepare to launch a field research project

Objectives:

1. Formulate questions to answer during a scientific inquiry
2. Itemize safety procedures to follow while conducting an outdoor investigation
3. Select appropriate procedures for collecting data
4. Determine equipment to be used during the inquiry and practice appropriate use of each item

Skills: identify a research question to be explored, formulate predictions, practice field observation skills, develop and practice safety procedures, record data, organize equipment and resources

Special note: Because birds are found in every ecosystem of Arizona, the focus of our attention will center around birds – specifically the cactus wren – in relationship to other species found within an area. If no cactus wrens live in your geographic region, substitute another bird species readily found in your area, to create a basis for comparison.

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Activity 1: Classroom preparation for fieldwork

1. Ask the question: How can I identify different birds like the cactus wren? Solicit responses from the students.
2. Display a photo of a cactus wren and discuss major identifying field marks.
3. Using field guides or the "Critters of Arizona" book and a variety of bird photos provided in the resources section, compare field marks. (Alternate: If the birds included are not commonly found in your area, substitute with pictures of local birds.)
4. Using a field guide to bird identification and a photo of an unidentified bird, practice your skills in observing field marks to determine what kind of bird it is. (Alternate: Tape pictures of birds around the room and have students practice using binoculars to identify the species.)
5. Ask the students what safety rules they need to consider in order to prevent harm to themselves, other students, and the plants and animals. Some procedures that should be emphasized:
    a. Watch where you walk. (The desert can be a spiny place.)
    b. Leave the desert alone. (That rock does not need to be picked up.)
    c. Use appropriate behavior. (Look at the animals; don't act like them.)
    d. Use common sense. (If it sounds wrong, it probably is.)
6. Develop a question to answer during a field research project on your school grounds - e.g., "Do cactus wrens live on my school grounds?" – OR – "Do cactus wrens migrate through my schoolyard?" – OR – "Are cactus wrens the most frequently-seen bird on my school grounds?" (More advanced students may decide to set up a research project that incorporates observation of bird behavior or type of food eaten.)
7. Ask the students what type of data they need to collect in order to answer the following question: What equipment is needed for your research? How can we easily record the information so that we can use it later?
8. Based upon the answers to those questions, develop a sheet to use when collecting data. (A sample data sheet has been included.)

Activity 2: Outdoor site preparation

1. Identify potential study sites on your school grounds where you think you might find cactus wrens. (**HINT**: Use a field guide to identify the kind of habitat these birds prefer. Do you find any of that habitat on your school grounds?)
2. Set up student teams. Define site boundaries for each team and make sure each team understands the boundaries of its assigned site.
3. Discuss potential safety hazards in each one.
4. Discuss who will record an observation of any bird that might be seen on the boundary between two study areas. (If both teams collect data on the same bird, how might that skew the final tally/results?)

Activity 3: Classroom follow-up

1. Teams list all equipment they will need when collecting data, assemble what they will need, and organize it so it is ready to take into the field. Remind them to have adequate data collection sheets in their research bags or packs.
2. If necessary, students should practice using any equipment that may be new to them *before* they use it in the field.

Lesson 4: "Into the field…"

Goal: Conduct basic field research within a limited study site

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Objectives:

1. Demonstrate safe procedures during an inquiry
2. Record data in an appropriate format

Skills: observation, individual/team participation, data collection

Special note: This part of the project can be extended as long as necessary. As with any research project, the key to reliable data lies partly within the number of data points gathered across the year and seasons.

Activity:

1. Students make field observations, collecting data and practicing safe procedures, for an established length of time.
2. If collecting data over several days, weeks or months, remind students that, for the most accurate and reliable data possible, they need to be consistent with data collection – i.e., they need to collect their data at the same time each day, use the same people to collect data (to ensure consistency), record observations in the same manner each time, etc.

Lesson 5: "Delightful Data"

Goal: Share results of this field research project with others

Objective: Create a visual representation of data and share results with classmates

Skills: organization, analysis, synthesis, formulating predictions

Activity:

1. Each team should create a visual representation of the data it has collected.
2. Share each visual with the class. Compare and contrast the similarities and differences of: methods of presentation, data collected among groups, and changes in data over time (if this has been a long-term project).
3. Draw conclusions about the reliability of data collection, presentation, and interpretation.
4. Discuss: What additional questions might be answered through continuing your field research? What is the purpose of this kind of research? How do biologists learn about wildlife, and how do they share their information with others? How can the results of one investigation lead to a second? How might data from this classroom compare to that from a school located in a different geographic region from yours – e.g., a low desert, Colorado plateau, grasslands, or mountain setting?

Assessments

- Completion of State Symbols Graphic Organizer
- Adherence to safety procedures while collecting data
- Data corroboration (compared to that of other students/teams)
- Creation of visual representation of data
- Become a Wildlife Detective Quiz

Extensions

The Arizona Game and Fish Department is conducting a long-term tracking project on several bald eagles, our national symbol. To find out the movements of these birds, visit http://www.usbr.gov/lc/Phoenix/SWBEMC/migrationmaps/migrate_map.html and select one or more birds to follow.

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Vocabulary

Data:	factual information, especially information organized for analysis or to make decisions
Field guide:	reference book or brochure which identifies species or items found within a certain area and which uses a classification system (e.g., "Field Guide to the Birds of North America")
Field marks:	specific features that are used to classify an individual (e.g., shape of a bird beak)
Research:	careful investigation or study, especially of a scholarly or scientific manner
Wildlife:	any animal that is not tamed or domesticated

*** One free copy of this publication will be provided to every 4th grade student whose classroom teacher registers with the education branch of the Arizona Game and Fish Department. Visit http://www.azgfd.gov for more details.**

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Become A Wildlife Detective Quiz

Your Name: _____

1. Look at the animals below. Divide them into two groups. Write the names of the animals in the spaces below each group.


BAT


SKUNK


RABBIT


OWL


WOLF


HAWK

Group 1

_____
_____
_____
_____

Group 2

_____
_____
_____
_____

2. How did you group the animals? _____

3. What is the purpose of a field guide? _____

4. What are two safety considerations when performing research?
   a. _____
   b. _____

5. How does a scientist keep his or her research organized? _____

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Birds on My School Grounds

Date	Time	Observer(s)	Temperature	Climate Conditions (e.g. sunny, rainy, cloudy)	Species Observed	Number Observed

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