Leashing the Rattlesnake

Experimental Design; Careers; Creativity **Time Frame:** 1-2 periods **Grade:** 6-10

Overview:
Lessons about science process skills and procedures often leave something out. They do an excellent job teaching the nuts and bolts of science methods. However, they rarely show the creativity that is required to make the science become a reality. This lesson reinforces the idea that scientists often have to think creatively and "outside of the box" when carrying out their experiments.

Students will first watch a video of scientists in the field, tracking black-footed ferrets. Then, they will read a science article to study this issue in more detail. Finally, they will have the opportunity to apply their knowledge to a wildlife-related career as they solve problems around animal handling.

Portions of this lesson have been modified from "Zoo Veterinarian's Supply Drawer" provided by the Phoenix Zoo.

Essential Questions

- How can human activities harm and benefit wildlife?
- What place does creativity have in science?
- What role does technology play in the management of wildlife?

Objectives

- Use a graphic organizer to help comprehend a scientific article.
- Identify the main idea of a passage when presented with multiple options.
- Use evidence from the text to support or refute inferences.
- Use common materials to design a unique solution to a problem.

Arizona Department of Education Standards

6th Grade

Reading
- S1-C6-PO1
- S1-C6-PO4
- S3-C1-PO1
- S3-C1-PO2
- S3-C1-PO9

Science
- S1-C4-PO4
- S2-C1-PO1
- S2-C2-PO3
- S3-C2-PO1
- S3-C2-PO2
- S3-C2-PO3

7th Grade

Reading
- S1-C6-PO1
- S1-C6-PO4
- S3-C1-PO1
- S3-C1-PO2
- S3-C1-PO10

Science
- S1-C4-PO4
- S2-C1-PO4
- S2-C2-PO3
- S3-C2-PO1
- S3-C2-PO2
- S3-C2-PO3

8th Grade

Reading
- S1-C6-PO1
- S1-C6-PO4
- S3-C1-PO1
- S3-C1-PO2
- S3-C1-PO10

Science
- S1-C4-PO4
- S2-C1-PO4
- S2-C2-PO1
- S3-C2-PO1
- S3-C2-PO2
- S3-C2-PO3

High School

Reading – 9th
- S1-C6-PO1
- S1-C6-PO3
- S3-C1-PO8

Reading – 10th
- S1-C6-PO1
- S1-C6-PO3
- S3-C1-PO7
- S3-C1-PO8

Science
- S1-C1-PO1
- S2-C1-PO1

Materials and Resources

- Leashing the Rattlesnake Article (1 copy per student)
- Leashing the Rattlesnake Comprehension Activity (1 copy per student)
- Animal Examination Records (1 copy per group)
- Various household materials, including:
  - Corks
  - Ziploc bags
  - Plastic cups
  - Drinking straws
  - Tape
  - Envelopes
  - Zip ties
  - Plastic syringes
  - Magnets
  - Pencils
  - Paperclips
  - Scissors
  - String
  - Plastic tubes (from fluorescent light bulbs)

Teacher Preparation

- Divide the class into groups of three to four students.
- Make copies of the examination records. It is not necessary for each group to have all four records. They only need one. You can have different groups working on the same record.
- Make copies of the article ad comprehension activity for each student.
- The video in this activity is found on YouTube. Many schools and districts block this web site. Preview the video to insure that access is available. If not, work with the district to grant permission or simply skip this section.
- Gather the household materials. Additional or substitute materials can be used as long as those necessary for the solutions are still included.

Procedures:

Engagement:

1. Present the following challenge to students: "Ferrets live in burrows with many entrance and exit holes. You are a scientist that needs to capture a ferret for study. It is important, however, to know from which burrow a ferret came. What techniques and materials could you use?"
2. Discuss the scenario.
3. Inform students that they will now watch a video. This video describes efforts to reintroduce the black-footed ferret into Arizona. Students need to watch carefully to see how the biologists solve the same problem presented above.
4. View the Black Footed Ferret Recovery video found at: http://www.youtube.com/watch?v=3E0BmCu6g9E
5. When the video is finished, ask students to briefly summarize what they found. Ask them to discuss what materials the scientists used to help them capture the ferrets. Ask if anyone was surprised by this.

Exploration:

6. Explain that problems in science often require the scientist to use creativity to search for a solution. The students should have seen this in the ferret video with the use of cups to block the holes.
7. Inform students that they are going to read an article about creative problem solving in science.
8. Hand out the "Leashing the Rattlesnake" article and the Comprehension Activity.
9. Before the students are permitted to read the article, they should complete the first section of the worksheet. They should also preview the rest of the worksheet to make sure they understand what is being asked. If

necessary, explain how to complete the graphic organizer.

10. Allow time for the students to read the article and complete the worksheet.
11. Discuss the article and the questions.

Application:

12. Explain that the article showcased some rather ingenious ways to study animal behavior. Sometimes, like in the case of RoboBadger, high-tech equipment is required. Often, however, the solution can be found in everyday, household materials put to new uses.
13. Divide students into small groups.
14. Give each group an Animal Examination Record. There are four different records so divide them evenly throughout the groups.
15. Explain that they are all new interns for a wildlife rehabilitation center. They are spending their first day helping the veterinarians prepare for surgery.
16. Have students review all of the information on their Examination Record, paying particularly close attention to the "Note to Intern" section. This section briefly explains the problem they must solve.
17. Explain that they are to determine how to meet the request of the veterinarian using only the materials found in the laboratory (those listed in the materials).
18. Give students time to develop their solutions to the challenge.
19. Have each group share the scenario and their solution with the rest of the class. Allow time for other students to provide alternate suggestions as well.
20. Once all groups have had the opportunity to present their ideas, discuss the actual solutions with them. These are provided in the answer key below. Explain that each of these problems was based off of a real situation. The solutions presented were actually used by veterinary staff.
21. Even if the students did not come up with the same ideas, remind them that their ideas may work as well. Different veterinarians may have different solutions. One solution is not necessarily better than another.

Answer Key:

- **Gopher Snake** – An easy method of restraining a strong or venomous snake without using chemicals is by using the tubes that fluorescent lights are shipped in. The tube can be placed in front of the animal. Once it crawls part way into the tube, minor procedures, such as blood draws, can be safely performed.
- **Great Blue Heron** – For long billed birds, it is not uncommon to create an anesthetic mask using a Ziploc bag "zipped" over the bird's neck to create a seal. A corner can then be cut off and secured to the outgoing gas tube.
- **Ornate Box Turtle** – A common technique to keep a turtle or tortoise in place on a table is by putting them on top of an inverted cup or bucket.
- **Roadrunner** – For similar situations, one veterinarian has used two different items as splints for leg fractures – a plastic straw and an empty syringe. If necessary, these items can be cut lengthwise, opened up, slipped over the leg, and then secured with zip ties.

Differentiated Instruction:

Extensions:

- Do not provide a list of items and see if the students can come up with solutions without using any clues.
- Have students research and report on the training and skills required for different veterinary careers. These might include: small animal veterinarian, exotic animal veterinarian, veterinary technician, veterinary pathologist, veterinary radiologist, or veterinary inspector.
- Take a field trip to a local zoo, aquarium, or animal rehabilitation center. Have each student select five different animals and determine the challenges of providing veterinary care to each animal.

Modifications:

- Do not provide as many items from the supply list or only provide the materials necessary for their specific solution.
- For students that struggle with reading, the article can be removed. Students can move directly from the video to the application exercise.

Reflection:

Use the space below to reflect on the success of the lesson. What worked? What didn't? These notes can be used to help the next time you teach the lesson. In addition, the Department would appreciate any feedback. Please visit http://www.azgfd.gov/focuswild and submit a lesson evaluation.

Leashing the Rattlesnake

A behind-the-scenes look at experimental design

By Susan Milius

Science News; Sept. 27, 2003; Vol. 164, No. 13; pp. 200-202

Depending on how you look at them, snakes have no neck or nothing but neck, and either way, Ron Swaisgood had a problem. To finish his Ph.D. at the University of California, Davis he had to figure out how to put a rattlesnake on a leash. Obviously, dropping a slipknot around the snake's neck wouldn't do. Swaisgood's research project required that the snake comfortably slither, coil, and strike but still be tethered tightly enough that there was no chance it could escape.

Swaisgood eventually developed a great snake leash, finished his degree, and proceeded to his current job at the San Diego Zoo. The scientific paper based on the research just says he tethered the snake and then goes on to describe the ways that ground squirrels assess snakes as threats *(Science News: 10/9/99, p. 237)*. The leash joined thousands of other little unsung triumphs of creativity in experimental design that don't usually show up in scientific articles – or reports in *Science News*. Ask for the details, though, and another side of research appears. Here, many biologists say, is a lot of the fun.

Experimental science demands creativity in solving problems great and small, and the study of animal behavior makes a dramatic showcase for the process. Animals clearly have minds of their own, and to elucidate such foreign perspectives, researchers have to design cleverly, from the basic strategy of the experiment to dozens of lesser details. The traditions of animal behavior celebrate do-it-yourself flair, and experiments mix the sublimely high tech with the ridiculously simple. Consider the snake leash.

Swaisgood reminisces that the first Northern Pacific rattlesnake he'd caught for his experiment "was kind of a phlegmatic snake." The university veterinary surgeons who frequently prepare animals for experiments gave the rattler an implant of a little plastic loop. Swaisgood then just clipped a line to the loop and staked the snake in place.

The next snake, however, had a completely different personality and moved vigorously. A loop implant didn't look like a good idea. "We were concerned he might hurt himself," Swaisgood says. "We started going through our tackle box of research gear looking for something else." He finally leashed his rattlesnake by attaching fishing line to it with – bonus points to readers who saw this coming – that icon of invention: duct tape.

JOGGER MASK. Desert iguanas wouldn't wear the helmets designed for monitoring other lizards' oxygen consumption. So, Stephen Adolph of Harvey Mudd College in Claremont, Calif., and Todd Gleeson and Tom Hancock, both currently with the University of Colorado at Boulder, turned to laboratory cousins of eyedropper bulbs. With scissors, they tailored them to fit a desert iguana snout and fastened them on with strips of athletic tape. "They look like clown noses," Adolph recalls, but the iguanas don't seem to mind.
Photograph courtesy of Steve Adolph

Fooling Mother Nature

The core of an experiment in behavioral science depends on changing one thing about an animal's world but leaving everything else the same. This challenge sometimes demands a mix of scientific sophistication and parlor tricks.

Ken Kardong couldn't use a silk handkerchief as a blindfold since the eyes he needed to cover belonged to a rattlesnake. After Kardong's lab at Washington State University in Pullman had documented the biomechanical marvels of the snake's strike, he began thinking that the snake's sensory systems needed to be equally marvelous to take advantage of that natural engineering. He decided to study how the snake's senses contributed to strike targeting, so he wanted to block, and then restore, each of its senses.

Snakes' eyes carry a clear, protective layer that lacks the nerve endings that make human eyeballs so tender. "It's like they're wearing glasses," says Kardong. So, with a conventional snake-handling stick, he held a rattler down on a counter, got a firm grip at the back of its head, and placed a patch of black electrical tape over each eye.

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Kardong next had to invent another kind of blindfold, this one for the infrared-sensing pits on the snake's face. Depending on the size of the snake, the pair of pockets varies from depressions the size of a pinhead to pits that could hold a BB.

Again, Kardong thought of electrical tape, but he wanted extra insulation to block heat. At first, he considered rolling up little balls of paper. Then, a brainstorm came from a Styrofoam coffee cup. He sliced it into strips and rolled bits between his thumb and forefinger until he had the right size for each snake.

Kardong says, "My definition of cleverness includes 'simple.'" Blindfolding either the eyes or the pits, by the way, made no difference in the accuracy of a rattlesnake's strike. Sight or heat sensing was sufficient on its own.

Other scientists have also needed to jam and unjam a sensory organ. For instance, Alejandro Purgue invented earmuffs for bullfrogs.

Now at Cornell University's Laboratory of Ornithology in Ithaca, Purgue had been studying the acoustics of North American bullfrogs. He began to suspect that the power of the male's commanding "ribit" came not from the throat but from vibrations in ear membranes. Purgue needed to damp and then release the membranes to document any differences in calls.

He tried smearing globs of standard laboratory silicon grease on the membranes to prevent them from vibrating. However, cleaning grease off the frogs' ears to reverse the effect turned out to be a nuisance. So, Purgue cut little ear pads out of the shock-absorbing foam used for inserts in running shoes. (He bought the foam at a supply company; no shoes were harmed in this experiment.) To link the pads, Purgue wound a tiny, tight coil of piano wire into a spring that would go over the frog's head.

This proved the sticking point of the design. "The angle between their ears was so shallow," says Purgue. "If your head was like that, you'd have trouble keeping your earmuffs on, too." He got a prototype to cover a bullfrog's head just long enough for him to admire the effect. "It just looked adorable," he says.

For the actual experiments, Purgue came up with a better solution: tidy devices that stay in place – the researcher's fingertips.

Purgue's hypothesis indeed proved correct. When he covered the frog's ears, the sound lost its power in midcroak *(Science News: 1/3/98, p. 12)*.

Threat on wheels

Scientific trickery often demands a faux animal, and researchers turn puppeteers. One of the more famous of these stand-ins goes by the name RoboBadger. Its creator, Dan Blumstein of the University of California, Los Angeles, studied alarm calls of marmots and needed something harmless that the rodents would find alarming. Old taxidermy mounts have a long and distinguished history in the study of animal behavior, but the tricky part comes in revealing the stuffed menace to the creatures under study. It's not going to jog into place by itself, so researchers have an equally long and distinguished history of rigging drop cloths on strings to raise the curtain on the pretend threat.

WHAT THE…? A souped-up badger taxidermy mount proves just the thing to provoke calls of alarm from marmots in the wild.
Photograph courtesy of Dan Blumstein (http://www.eeb.ucla.edu/Faculty/Blumstein/)

Blumstein saw a way to render the arrival of his menace, a stuffed badger, a little more realistic. He dismantled a remote control model called Monster Truck and mounted the badger on the wheels and motor. RoboBadger now whirs into view on his own, though Blumstein has to select experimental sites near suitable trails that make good motorized-badger highways.

For a fake aerial predator, Blumstein developed Eagle Knievel, a customized, remote control model glider. "Marmots live in rocky places, and there's never a good place to land a model plane," he sighs. "I've spent days by now gluing him back together."

Lizard specialists like Diana K. Hews take a simpler approach. Based at Indiana State University in Terre Haute, she relies on one animal to

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provoke specific behaviors from its companions. She attaches a looped string to a fishing pole, lassos a real lizard, and then sets it down where she needs territorial conduct or flirtation. As she stands patiently nearby holding the end of the fishing pole, "they'll display, they'll even mate," Hews says.

Some experimenters fool their subjects with a fake environment rather than a phony or scientist-controlled animal. Paul Switzer of Eastern Illinois University in Charleston was investigating whether male dragonflies were more likely to switch to a new territory after a string of mating setbacks. He had to jinx a dragonfly's love life without changing its style.

"I was working at my aunt and uncle's farm, and they had plenty of sticks and wire," Switzer says. So, he set out sticks good for egg laying in dragonfly territories along a pond edge and attached them to a handle. Switzer lurked nearby until a male started to impress a female prospect with a tour of a stick. Then Switzer dunked the stick out of sight. The male dragonflies seemed to search for it, but in the confusion, the females typically flew away. And yes, sexual discouragement did incline a male to seek new ground.

Details, details

Even after the research designer has worked out the central stage magic for an experiment, dozens of other challenges may loom ahead.

Aaron Krochmal, who grew up in New York City without a lot of personal wildlife experience, recalls that his surprises started when he received the first shipment of his test animals. For his dissertation, he'd devoted months to perfecting a protocol to test rattlesnakes' perception of environmental hiding spots, but he'd never had to manage a live rattler. Disturbingly, his first shipment didn't arrive as he expected, with snakes in a bag, but with each coiled in a 2-pound deli container. Krochmal says, "My first thought was, 'How did they get them in there?' Which was followed rapidly by, 'How am I going to get them out?'"

He'd practiced basic handling routines on nonvenomous snakes, but not extraction methods from deli containers.

To anyone else who should suddenly confront this dilemma, Krochmal, now at Whitman College in Walla Walla, Wash., passes along his solution: Put the snakes in the fridge to chill them to sluggishness. Then, weigh down the top of a container – a length of rebar does nicely – while working loose the seal. With very long-handled clamps, move the container to the snake's new home, turn the container sideways, and gently squeeze.

Just keeping animals of unfamiliar species healthy in the laboratory can bring its own puzzles, says Hews. She recalls one husbandry crisis when she began rearing lots of little lizards in isolation containers. She fed them mutant fruit flies that can't fly, the cuisine that lizards usually enjoyed in her lab. In the solitary containers, though, many of the fruit flies evaded capture by roosting out of reach on the upper walls or outright escaping.

Hews therefore made her containers roost proof by dipping their upper sections in a nonstick coating that comes as a liquid.

Will Mackin of the University of North Carolina at Chapel Hill found a sweet way to measure how deep a bird called a shearwater dives. After finding the serious electronic wizardry that's available to be far too expensive, he came across journal articles describing equipment that costs about a dime. Mackin subsequently updated the technique. In his experiment, he sucked up confectioners' sugar to dust the insides of thin plastic tubes and then used a cigarette lighter to close one end. He attached the tube to a shearwater, and when the bird dove to forage, the increasing pressure drove water into the tube.

When Mackin recovered the tubes, he checked the ring marking the lowest point that water had dissolved the sugar and from that he could calculate the lowest point of the dive. He learned that the birds routinely dive about 7 meters.

FLY BALL. A Ping-Pong ball painted with dots provides a monitor of how a tethered Ormia *fly tracks sounds. Optical sensors picked up the shifting of the dots and sent the information to a computer.* **Photograph courtesy of Andrew Mason.**

Andrew Mason also figured out a modern version of old equipment as he monitored an *Ormia* fly's tracking the direction of a sound. Decades ago, German researchers who wanted to monitor the movement of an insect used a globe made for a streetlight. An optical sensor detected when an insect on top of the globe moved off center, and gearing underneath shifted the globe to keep the insect scrabbling on top. That system inspired Mason to paint irregular dots on

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a Ping-Pong ball and rest it in a modified cradle from an optical computer mouse. When he tethered the fly on top, the optical sensors picked up shifting dots and sent the information directly to a computer.

Who's who?

A basic question in studying social behavior is how to distinguish among the research animals. Even time-tested marking systems, such as colored bands for birds, can turn unexpectedly tricky. The commercial bands don't work on birds such as red-winged blackbirds, says Ken Yasukawa of Beloit College in Wisconsin. The birds fidget with the bands, squeezing them in their beaks until the bands eventually break off.

An idea from a colleague who custom-made bands for smaller birds, sent Yasukawa off to a craft store. He made his birds ankle bracelets, literally, from the plastic beads that melt together into colorful jewelry when pressed with an iron. He cuts a slit in the ring and pries it open just enough to slip it onto a bird's leg.

Yasukawa says a lot of his scientific equipment has come from Kmart, Ace Hardware, and craft stores, and that a good grasp of their offerings enhances creativity in scientific design. "Sometimes, I go just to look around," he says.

Other experimental behaviorists give close consideration to beauty products. Jill Mateo of the University of Chicago says that she's happy with the blue-black Lady Clairol for dyeing individual marks on the Belding's ground squirrels she studies.

Blumstein, however, has switched to a cattle dye for marking wild marmots. It's great, he says – easy to apply and long-lasting. Unfortunately, it dyes researchers' hands, too, a drawback when his field crews go into town for some sociability.

But that's not the most embarrassing social situation an innovative researcher has faced. Consider a string of experiments designed to see whether nonhuman primates have a sense of self. The researchers dyed a few pink streaks on an animal's ear or eyebrow and gave it a mirror. Apes appeared to notice something amiss, but experiments had not found similar reactions in monkeys. Marc Hauser of Harvard University wondered whether somehow changing the dye protocol, using more or different colors, might lead to different results. He asked a student in his lab, whose hair on that day was orange, to recommend a nontoxic dye with lots of colors. "Manic Panic," she told him. The best local source turned out to be Hubba-Hubba, a store that advertises itself as "a boudoir of sin."

When Hauser bought four colors of dye, the clerk asked what he was going to do. He told her that they were for animals but immediately regretted the remark.

Back at the lab, Hauser found that he needed even more colors. When he arrived at Hubba-Hubba the next day, the clerk remembered him. "You were just in here yesterday," she said. "Now, what do you really want?"

To prepare budding young scientists for such eventualities, Steve Nowicki of Duke University in Durham, N.C. starts raising the theme of experimental ingenuity in introductory biology courses. Plenty of concepts abound for great experiments, he tells his students, but they can lie around for decades stalled by some obstacle.

"The idea was there – what you had to do was make it work," he says.

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Leashing the Rattlesnake Comprehension Activity

Before Reading the Article:

1. Preview the article. Pay close attention to the title, section headings, and images. What do you think this article is going to be about?

2. You are a biologist. Your experiment requires you to be innovative and develop some interesting solutions to some problems. Briefly describe how you would create:
    a. A leash for a rattlesnake, that would still allow it to slither, coil, and strike without escaping?

    b. Earplugs for a frog that would allow you to stop the ear membranes from vibrating when the frog called?

While Reading the Article:

As you read, complete table below. For each of the scientists listed, try to explain their problem, the solutions they tried, and discuss their success. Each scientist may not have made three attempts. In the last two columns, choose two additional scientists to describe.

Problem	Who	Ron Swaisgood	Alejandro Purgue		
	What				
	Why				
Solutions	Attempt 1				
	Attempt 2				
	Attempt 3				
End Results					

Following the Reading:

1. Which of the following sentences from the reading could best be described as the main idea of the article?
    a. A basic question in studying animal behavior is how to distinguish among the research animals.
    b. Some experimenters fool their subjects with a fake environment rather than a phony or scientist-controlled animal.
    c. The core of an experiment in behavioral science depends on changing one thing about an animal's world but leaving everything else the same.
    d. Experimental science demands creativity in solving problems great and small, and the study of animal behavior makes a dramatic showcase for the process.

2. Write a brief paragraph summarizing the article. Your paragraph should be 4-7 sentences.

3. If you were going to rename the article, what would you call it?

4. Read each statement below. Determine whether you agree or disagree with each one. Explain your answer by providing support from the text.
    a. Scientists often have to use creativity to complete their experiments.

    b. Good science requires using the latest and greatest technology available.

    c. Once a solution to a problem is found, it can be used repeatedly to solve the same problem.

Animal Examination Record

ID#: 10145

Species: Gopher Snake

Gender: Male Female Unknown

Blood Draw Required: Yes No

Prior Activity: Calm Active Excited

Site: Jugular vein Tail vein Ear vein Cephalic vein Metatarsal vein Femoral vein

Reason for Admittance:

Annual examination of education program animal.

Observations:

Animal appears in general good health.

Procedure Required:

Draw blood for general testing and chemistry sample.

Note to Intern: Snake is difficult to handle and will not be chemically immobilized. Please devise method to safely secure animal for blood draw.

Restraint Method:

Visual Manual Chemical Immobilization

Radiographs:

None required.

Assessment:

Pending results from blood tests, healthy animal will continue to be used for education programs and presentations.

Suggested Plan:

Animal Examination Record

ID#: 8862

Species: Great Blue Heron

Gender: Male Female Unknown

Blood Draw Required: Yes No

Prior Activity: Calm Active Excited

Site: Jugular vein Tail vein Ear vein Cephalic vein Metatarsal vein Femoral vein

Reason for Admittance:

Animal is having difficulty eating.

Observations:

Bill appears to be slightly "scissored" and is crossing over itself at the tip.

Procedure Required:

Top bill will be slightly shaved down to correct "scissor" growth.

Note to Intern: Current anesthetic machine does not have a mask to fit over the heron's six inch bill. Please create a new mask before surgery.

Restraint Method:

Visual Manual Chemical Immobilization

Radiographs:

None required.

Assessment:

Cast should be worn for a minimum of 6 weeks. It can be removed pending a follow-up assessment.

Suggested Plan:

Animal Examination Record

ID#: 10023

Species: Ornate Box Turtle

Gender: Male (Female) Unknown

Blood Draw Required: (Yes) No

Prior Activity: Calm (Active) Excited

Site: Jugular vein (Tail vein) Ear vein
Cephalic vein Metatarsal vein Femoral vein

Reason for Admittance:

Animal has been displaying unusually lethargic behavior and has not been eating or moving as much.

Observations:

Area around neck and chest appear puffy.

Restraint Method:

Visual (Manual) Chemical Immobilization

Radiographs:

X-ray required to observe lungs and chest.

Procedure Required:

Animal required blood draw to review white blood cell count to check for infection. X-ray will help identify infection of lungs.

Note to Intern: Turtle does not like to remain still to get suitable x-ray image. Please devise a method to keep turtle in place on x-ray table.

Assessment:

Upon final analysis of white blood cell count and x-ray, treatment with oral medicine may be required.

Suggested Plan:

Animal Examination Record

ID#: 9721

Species: Roadrunner

Gender: Male Female Unknown

Blood Draw Required: Yes No

Prior Activity: Calm Active Excited

Site: Jugular vein Tail vein Ear vein Cephalic vein Metatarsal vein Femoral vein

Reason for Admittance:

Animal was found collapsed and unable to stand up.

Observations:

Obvious single break to right leg.

Restraint Method:

Visual Manual Chemical Immobilization

Radiographs:

X-ray required of right leg to determine exact position and severity of break.

Procedure Required:

Animal requires lightweight cast over break.

Note to Intern: Roadrunner has lost or unraveled previous casts. Please devise a new method of bracing and immobilizing leg.

Assessment:

Cast should be worn for a minimum of 6 weeks. It can be removed pending a follow-up assessment.

Suggested Plan: