



Critter Cam Kit Activity Guide

US Fish and Wildlife Service
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This document and the trail camera’s instruction manual are included on the kit’s external hard drive, so you can print additional copies as needed. Data sheets on the hard drive are in both pdf and MS Word formats, so you can print as is, or modify as desired.

Inventory of the Trail Camera Kit



Sharing Our Space – Learning Through Trail Cameras

Grade Level: 2-12 **Subject:** Science and technology **Skills:** Observation, inference, photography, data entry, and graph interpretation **Duration:** 5 days, 1-2 hours per day **Group Size:** class **Setting:** outdoors and indoors **Teaching Strategy:** Experiential and integrating technology

Purpose of Lesson

Young children are driven to explore. At an early age, they develop perceptions and values about their environment. Their awe and appreciation for fish, wildlife, and habitats creates a foundation upon which a stewardship ethic can be fostered. To ensure that future generations of Alaskans continue to value, protect, and benefit from Alaska's natural resources, children need to spend time outdoors interacting with nature. Unfortunately, today's children spend less time playing outdoors than any previous generation. Using motion-activated trail cameras is a way to get students to participate in collecting photos of wildlife and other animals that might use their schoolyards or other areas near their communities. The trail camera will capture photos of animals and behaviors the students might otherwise not see, and could ignite an interest in learning more about their outdoor environment. Because trail cameras rely on a variety of high technologies, such as motion sensors, infrared illumination, digital photography, and computers, many technology-savvy youth quickly embrace them.

Student Learning Objectives

Students will explore the habitats around their school and learn to recognize signs left by animals.

Students will learn what types of animals live around their school.

Student will practice recording field data on data sheets or in their field notebooks.

Optional extensions are available to allow students to display their best photos on an online map, and to develop data tables and graphs showing the timing of animal activity.

Background Material

Most wildlife has learned to avoid humans. The sound of footsteps may scare them off long before you can catch a peek of them. But most animals leave signs of their presence, such as tracks, droppings, trails, burrows, or feeding remains. Often the trails that humans use are also traveled by wildlife. To avoid humans, some wildlife is more active during dusk and dawn, or during the night.

Since wildlife can be elusive, a popular technology that is used to capture pictures of wildlife is the motion-activated trail camera. An animal walking in front of a trail camera triggers the shutter, taking its own picture. To get the best photos, a trail camera photographer must think like a trapper, to read signs left by animals, and place the camera in a location most likely to "capture" an animal using the area.

Biologists, curious wildlife enthusiasts, and hunters all use motion-activated cameras to capture images of animals. Trail cameras on bird nests have helped biologists document dates of egg laying, incubation, hatching, and fledging, and have provided data on type and amount of food delivered to chicks. Some species, like marten and wolverines, have distinctive markings that can be used to identify individuals, so trail cameras can be used to estimate population sizes and document movements. Hunters use trail cameras to scout an area for game, and to record the timing of animal movement. Some people just enjoy seeing what animals live around their homes, so they use trail cameras to satisfy their curiosity.

Most trail cameras work well during the day. Some also use flash to take photos at night. Other cameras use infrared (pronounced “Infra Red”) energy to illuminate the photos in low light, so there is no visible flash that can frighten animals. This results in black-and-white images. The cameras in your kit use infrared technology whenever the light is too low for regular color photos without flash. This will help you collect more photos of animals that are active at night, and at dawn and dusk.

Time/Duration

- Ideally this lesson would happen over the span of five or more days, up to several weeks
- 1st Day-2 hours
- Subsequent days-1 hour each (may skip days)
- Final day – 2 hours

Materials/ Resources

- Trail Camera kit (trail cameras, cable locks with keys, battery chargers, card reader, external hard drive, curriculum materials)
- Data sheets or field notebooks
- Computer
- Scent lures (These may be purchased at hunting supply stores.)

Teacher Prep

1. Upon receiving the Trail Camera kit, please check the included inventory list to see that you have all the parts. Initial the form to indicate that you've received a complete kit. If things are missing, immediately call the ADF&G Education & Outreach Office that you checked the kit out from: Anchorage (907) 267-2216, Fairbanks (907) 459-7230 or Juneau (907) 465-4292.
2. Remove all batteries from the cameras, load them into the supplied chargers, and charge them overnight. Reload the batteries into the cameras, and check the date and time to ensure the settings are correct (date and time are "stamped" on each photo, and we want these to be accurate). See separate instructions (or the included Trail Camera manual) for help setting the date and time.
3. Review the "Quick Guide" instructions for setting the trail cameras, and practice with a camera, so you know how to "arm" the camera.
4. Make a copy of the included data sheet for each student. If you use field notebooks in your class, show the students how to make a similar table in their notebooks, before venturing outside with the cameras.
5. Visit the "School Trail Camera Photos" group at <http://www.panoramio.com/group/63300>, look at the photos other schools have captured, and click on the link to "View on the map". Zoom in on the thumbnails to reveal other photos, and click on the thumbnails to see larger images.
6. Create a Panoramio.com account (free) and submit a request to join the "School Trail Camera Photos" group, so you'll be able to add your own photos to the map. (You may want to assign this task to a student or a small group to accomplish – only one account per classroom, please). Call the U.S. Fish and Wildlife Service in Juneau at (907) 780-1160 and email them at Juneau@fws.gov, to let them know you've requested membership in the photo group, and they'll approve your membership.

Procedure

Day One

Indoors

1. Introduce the students to trail camera technology by showing the cameras, explaining how they take pictures without a person there to snap the photo, and show some of the images from the included hard drive to show photos taken by trail cameras at schools elsewhere in Alaska.
2. Lead a discussion on who might use trail cameras, and why.
3. Optional: Demonstrate how the cameras work in the classroom by allowing the students to set (or "arm") the camera and walk in front of it. Download the photos from the camera's SD card to your computer using the included card reader, to show students the photos they've taken in the classroom.
4. Discuss possible sites to leave the cameras outside near your school. Consider a variety of habitats and physical features, such as near water, trees, shrubs, sheds, or other structure that small animals may hide under.

Outdoors

1. Head out to the selected site and let students scout it out. Before setting the cameras, spread out and look for small trails, burrows, droppings, tracks, or signs of feeding. Also look for good spots to secure the cameras with the cable locks. You may want to break into three teams, with each team responsible for identifying a location for one of the three cameras.
2. Gather the full group together and discuss the best locations. Choose what seem like the best locations for each of the cameras, and what would be the next places on your site to try later. Try to set the cameras in a variety of situations, with at least one the ground and others at different heights, where you expect to see animals of different sizes.
3. Secure the cameras at the chosen locations, and arm them to take photos. Vandalism and theft must be considered, so be sure to lock the cameras to trees, fences, or other structures, using the enclosed cable locks by threading the cable through the hole on the back of each camera, then around an immovable object. All three locks use the same key. You may want to hang scent lures around the area you've placed your camera to attract specific animals.
4. Have the students fill out data sheets, or take notes in their field notebooks, recording the Memory Card Number, Camera ID, Date Started, Location, and Habitat at each camera site. If you have a GPS, record the latitude and longitude of each camera.



Day Two

Outdoors

1. Take the class back outside and swap out the memory cards in the cameras with fresh memory cards. Three spare memory cards are included in your kit, so you can re-set your cameras and won't have to return to replace the cards after you've checked them for photos. You can leave the cameras operating in the same spots or move them to different places. Again, let the students suggest spots based on their inferences from signs of animals. (You should open the camera housing and turn the switch to "Off" when moving each camera, so you don't take photos as you walk along with the camera. Be sure to turn it back on and arm it when you re-set it in a new location.)
2. Have the students fill out their data sheets to indicate Date Ended and Time Ended, for each memory card that you take out of a camera. On a new line of the data sheet, have the students record a new Date Started, Time Started, Location, and Habitat for each new memory card that you install.

Indoors

3. Return to the classroom and insert each photo card into a card reader attached to your computer. Navigate to the folder containing your photos (DCIM). Rename the folder with a location that will help you remember where the camera was set. Select the folder, and use “cut” command (right mouse click) to get the photos off the memory card (you want to empty the memory card to collect more photos) and “paste” the folder into a photo folder on your computer. Remember where you’ve stored the photos on your computer.
4. Open the folder of photos on your computer, and double click the first image (.jpg format) to open it. Scroll through the photos to see what you’ve got.
5. Have the students record the species on their data sheets (or their field notebooks), in the correct location for each memory card.
6. Delete images that don’t show any animals or other interesting things. Also delete images that show people’s faces (there are privacy issues with photos of people, unless we have signed image releases).
7. Create a folder with your town, and inside that, a folder with your school’s name, on the external hard drive from the kit (follow the examples already on the hard drive). Copy your folders of photos into that folder on the external hard drive. Now you should have a folder of your images on your computer and on the kit’s external hard drive, but the memory cards should be empty.
8. Discuss which locations worked best for which species, and why.
9. If wildlife or other animals were captured, discuss their behavior.
10. Each photo has a date and time stamp across the top. When did animals visit each site?

Subsequent Days

Repeat day two activities for as many days as you have the cameras. You can skip one or more days and leave the cameras undisturbed.

Final Day

1. On your final day, bring your cameras in from the field. (Open the camera and turn the switch to “Off” before bringing it in, so it doesn’t take photos the whole time you’re carrying it!)
2. Download the photos from the memory cards to your computer, and delete the “misses” and photos showing people’s faces. **Copy your photos to the external hard drive, as described above, and delete the photos from the memory cards. IMPORTANT!**
3. Have the students record the species they photographed on their data sheets or in their field notebooks. Discuss what you found.
4. If you would like to keep a copy of all the photos other students have captured, you may copy the photo library from the external hard drive to your own computer. Don’t delete the images from the external library, though. (You may want to use these photos to develop a database of activity timing for each species, as described below, under “**Graphing Animal Activity**” instructions.)
5. There should be an inventory sheet listing all items in the kit, with a space to initial next to each item, indicating that it is present and accounted for. Repack all items into the Pelican case, and mail the kit to:

Alaska Department of Fish and Game Division of Wildlife
Attn: Brenda Duty, Project Wild & Youth Education Coordinator
333 Raspberry Rd.
Anchorage, AK 99515

If you have any questions, call Brenda Duty at (907) 267-2216.

The external hard drive will be shared with other groups and we may use some of your photos for promotional or educational purposes, so please don’t include photos showing faces of students or other people on the hard drive, as there are privacy issues.

Trail Camera Data Sheet

School _____ Class _____ Student _____ Page _____

[illegible]

Mapping Your Trail Camera Photos

In this tutorial you will:

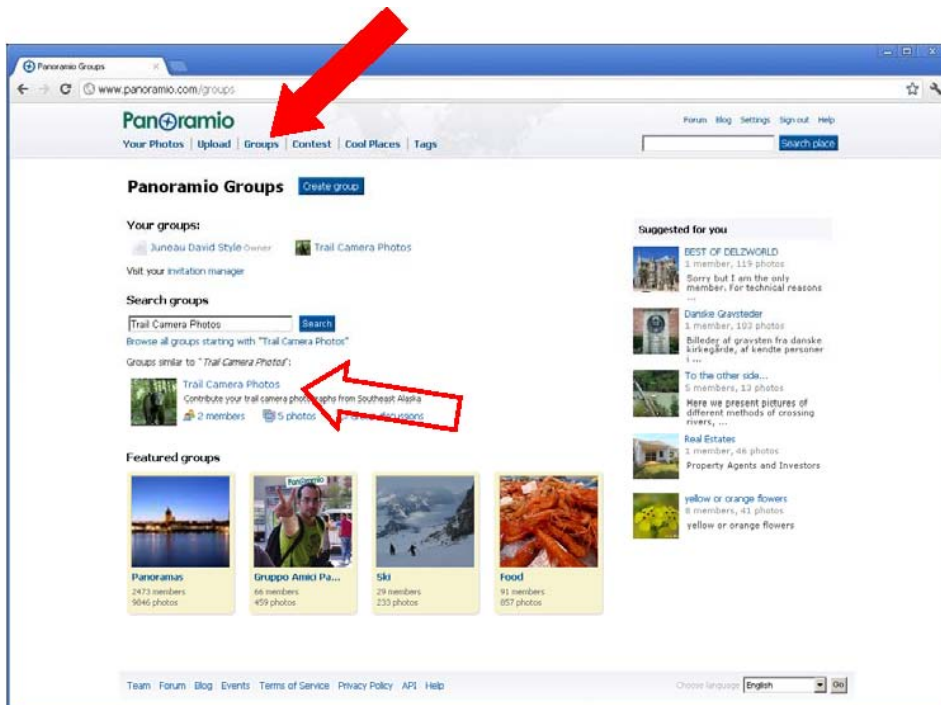
- Create a Panoramio account for your school or class
- Join the “School Trail Camera Photos” group
- Add your photos and map them

1. Create a Panoramio account

- Navigate to the Panoramio website: <http://www.panoramio.com/>
- Click on ‘Sign Up’ in the upper right-hand corner.

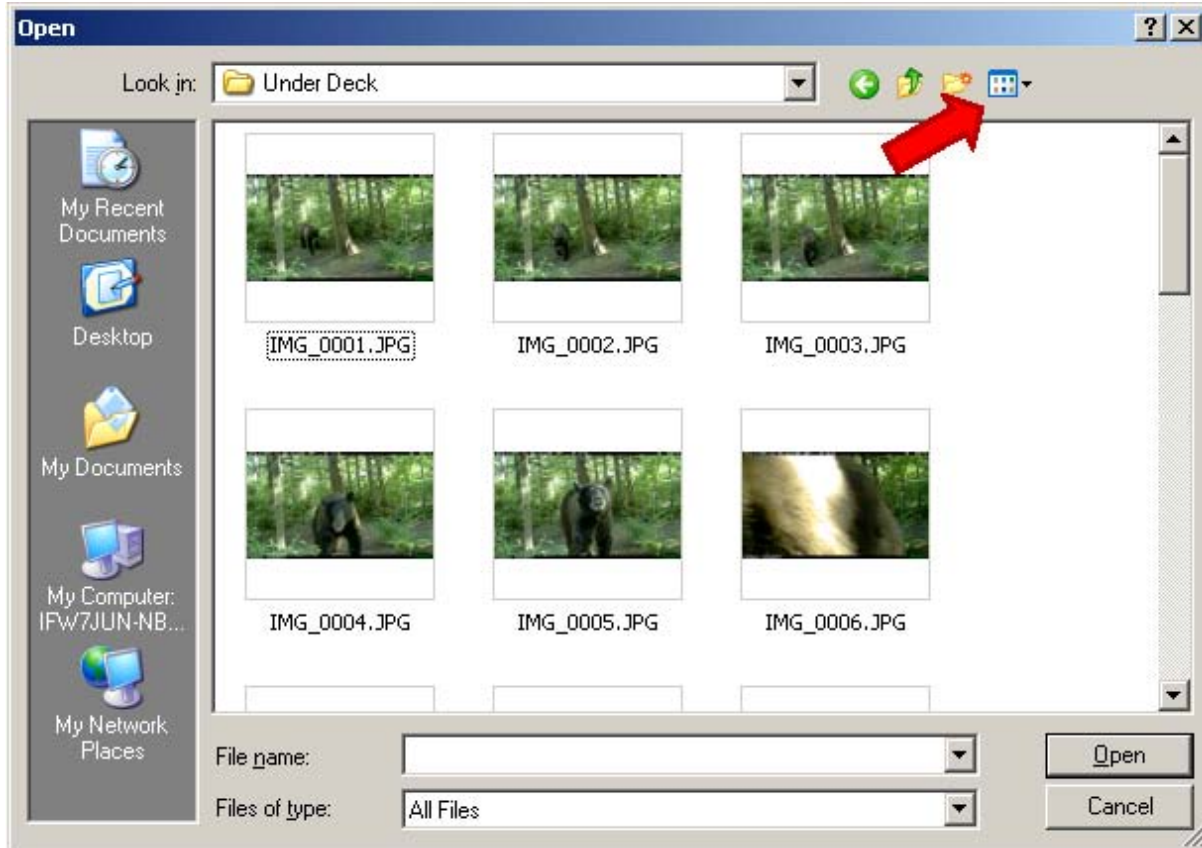


- Follow the instructions given for creating an account.
 - Give yourself an appropriate profile name (include your school name!) and description.
 - You can change your profile information at any time by selecting the “Settings” tab in the upper right-hand corner of the page.
 - Once you have created your account you can upload your photographs.
- ### 2. Join the “School Trail Camera Photos” group.
- If you are not already signed in, Navigate to the Panoramio website and sign in.
 - Select the “Groups” tab and search for the group “School Trail Camera Photos”.



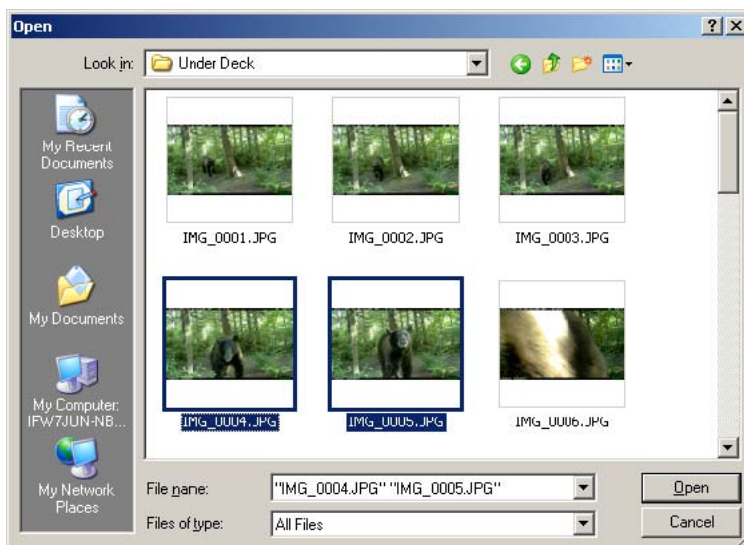
- c. Select the group when it appears below the search bar.
 - d. You will be directed to the "School Trail Camera Photos" group page. Here you can request to join the group by selecting "Join Group" and then "Send Application" on the following page.
 - e. **Send an email to juneau@fws.gov or call (907) 780-1160 to tell us that you've applied to join the group.**
 - f. Once the group Administrator approves your request you will be added to the group and you can add your photos to the group map.
3. Add your trail camera photos to the group map
 - a. Retrieve the photographs captured by the trail camera.
 - i. Connect the SD card from your trail camera to the computer using the USB card reader in the Trail Camera Kit, or another card reader attached to your computer.
 - ii. Create a folder on your computer for the trail camera photographs.
 - iii. Navigate to the folder that contains your photos on the trail camera's SD card.
 - iv. Select all your photos on the SD card. Use "Cut" and "Paste" commands to download the pictures from the SD card to the new folder on your computer.
 - v. If you "Drag and Drop" or "Copy/Paste" instead of "Cut" and "Paste" in step iv, you will need to delete the photos from the SD card after you've copied them to your computer, so you can reset the trail camera.
 - b. Sign in to your Panoramia account and select the upload tab.
 - c. Select "Upload Photos" and navigate to the folder on your computer where you've stored your photographs.
 - d. Use the drop-down menu at the top of the "Open" window to select "Thumbnails", so you can see your pictures.

e. Select the best of your photos by holding the “Ctrl” key while selecting files with a left click of your mouse.



f. Click the “Open” button at the bottom right of the window.

g. Once your photographs have been uploaded you can change the name and description by clicking on the text to the right of each photo. It is a good idea to include the trail camera location and the species in the title. This will help you remember where each photograph was taken from when you geo-tag them.



h. Map the location of each photo by selecting the “Map this photo” option to the right of each photograph.

i. Select a photograph from the left-hand side of the screen and navigate to where the picture was taken. Select that point with a left mouse-click. The picture will now be geo-tagged to that location.

- TIP: You can place the cursor over any of your uploaded photographs to the left of the map to see their title. This will help you distinguish between different trail camera locations.
- If you used a GPS to record latitude and longitude of your trail camera, you can use the coordinates to precisely locate your photos.

- Several photos from the same camera location should be spread apart slightly on the map, so the top photo doesn't cover the other images.
- j. Select "Done" when you are finished geo-tagging and "I'm done" when you are finished adding photographs.
- k. Select "Groups" from the main menu bar and then select the "School Trail Camera Photos" group.
- l. Once on the School Trail Camera Photos group page, select "Add photos".
- m. Select the photographs you want to add to the group map and then click "Add Selected". Don't add many duplicates of very similar photos – select the best few that show the species you captured with your camera.
- n. Your photographs will be added to the group map. It may take a few moments for them to load. Select "View on the Map". The tabs above the photographs allow you to see your photos or all of the photos in the Trail Camera Photos group.
- o. Check out what other schools have found by clicking on their photographs.

Discussion/Essay Topics:

- How similar or different were the animals at other schools, compared to the animals that you got photographs of? Why do you think they were similar or different?
- What other places could you put a trail camera to get some different animals?

Graphing Animal Activity

One way that wildlife behavior is categorized is based on when the animal is most active. Animals that are active during the night and sleep during the day are called **nocturnal**. Animals that are active during the day and sleep during the night are called **diurnal**. Animals that are active during dawn and dusk are called **crepuscular or twilight species**. Some species, and some individual animals, vary their daily activity patterns depending on food availability and threats from humans or other predators.

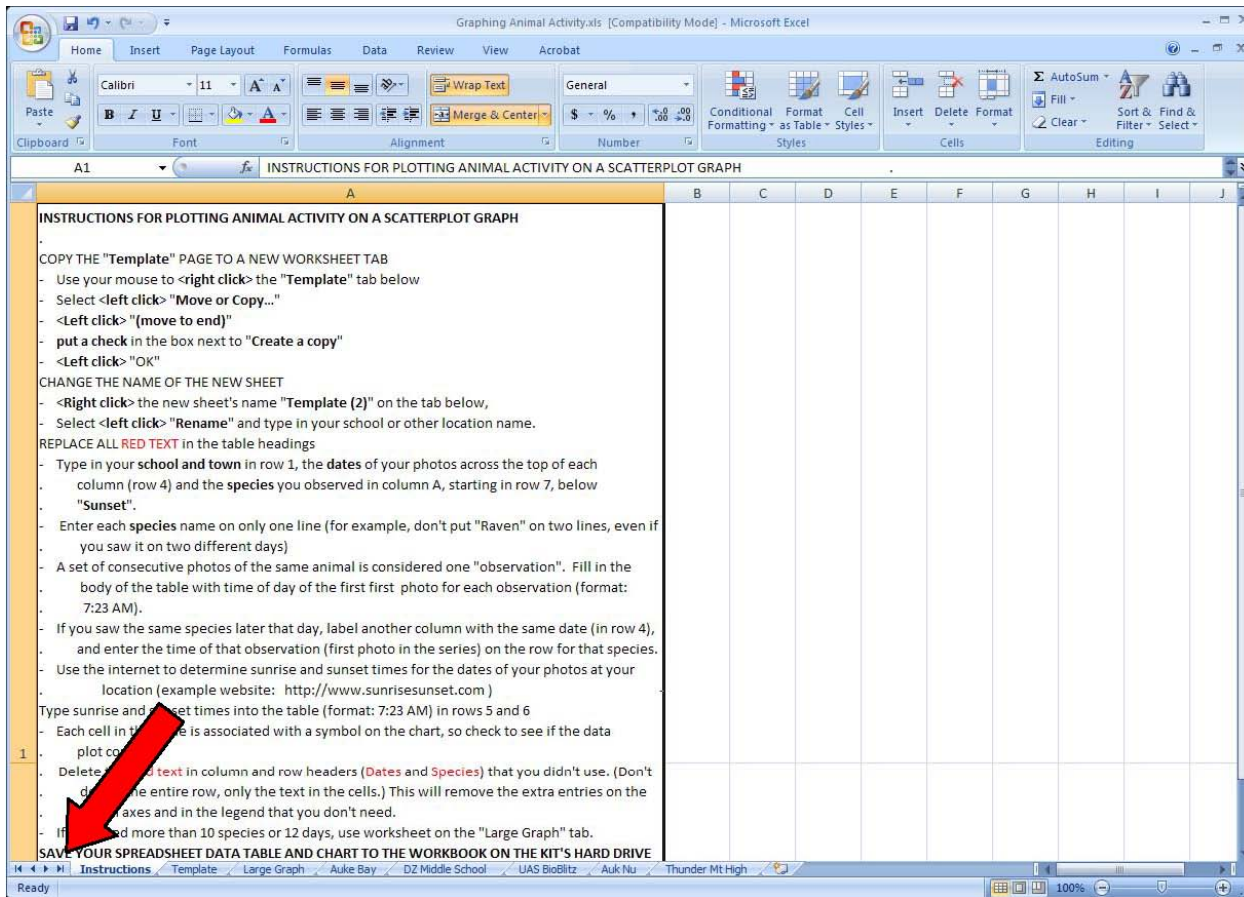
You can use the date and time stamps on the top of each trail camera photo to determine when each animal was active. By plotting these observations on a chart that also shows sunrise and sunset, you can make inferences about which animals are nocturnal, diurnal, or crepuscular.

To create a graph of your observations, you'll need to:

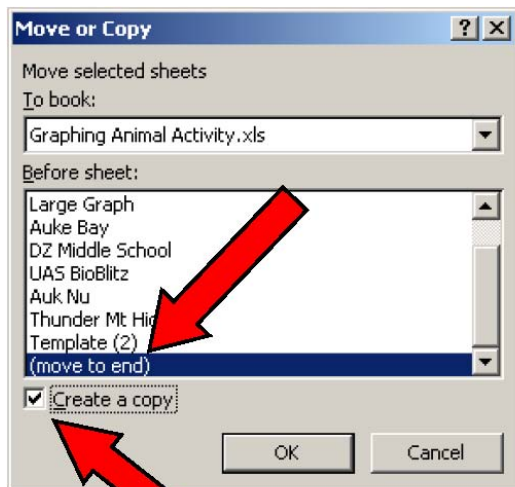
1. Develop a data table of the species, date, and time of each observation
2. Determine the time of sunrise and sunset at your location for the dates you collected photos and enter those times in the chart
3. Plot these data on a graph (Excel automates this process)

Develop a data table of the species, date, and time of each observation

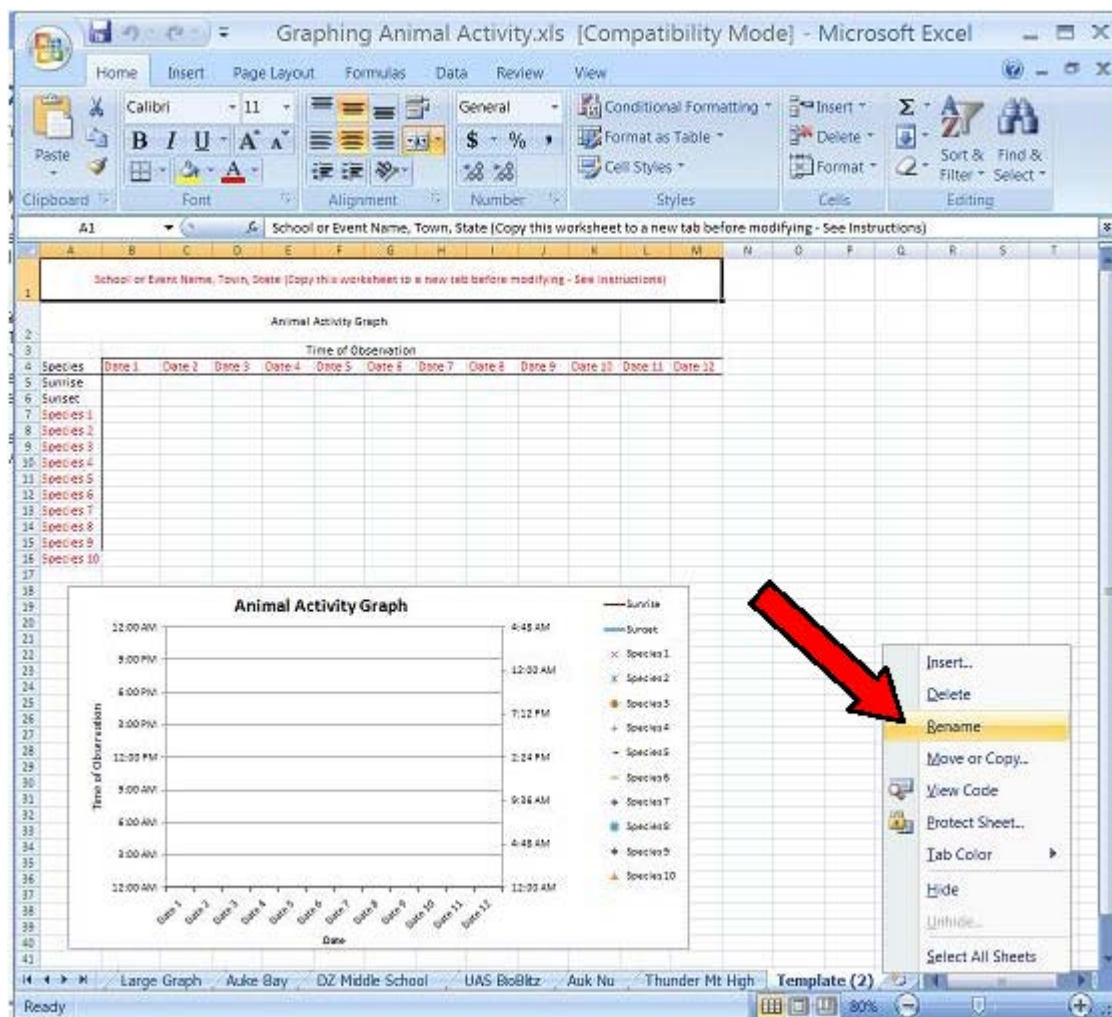
1. Open the Excel spreadsheet titled "Graphing Animal Activity". You will see that this spreadsheet contains several different sheets identified by tabs along the bottom. Open the first sheet titled "Instructions". You may need to use the scroll bar at the bottom left to see the first tab.



2. Copy the "Template" page to a new worksheet tab
 - a. Use your mouse to <right click> the "Template" tab
 - b. Select <left click> "Move or Copy..."
 - c. <Left click> the new tab and select "(move to end)"
 - d. put a check in the box next to "Create a copy"
 - e. <Left click> "OK"

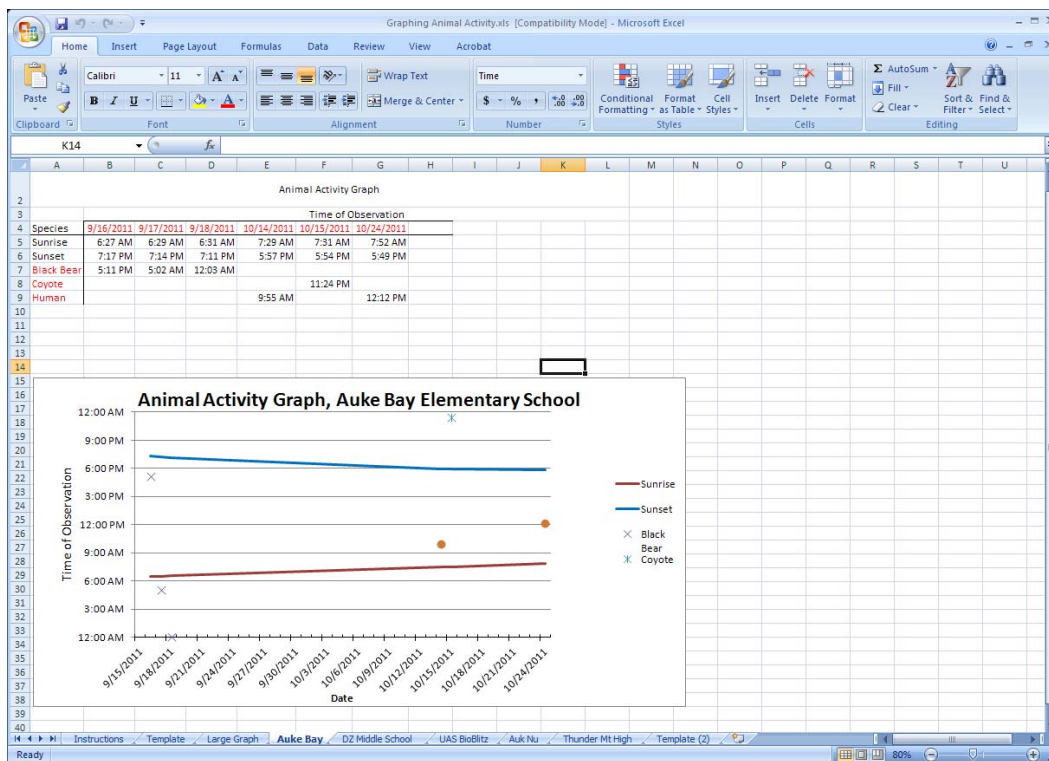


3. Rename the new sheet
 - a. <Right click> the new sheet's name "Template (2)".
 - b. Select "Rename" and type in your school or other location name.



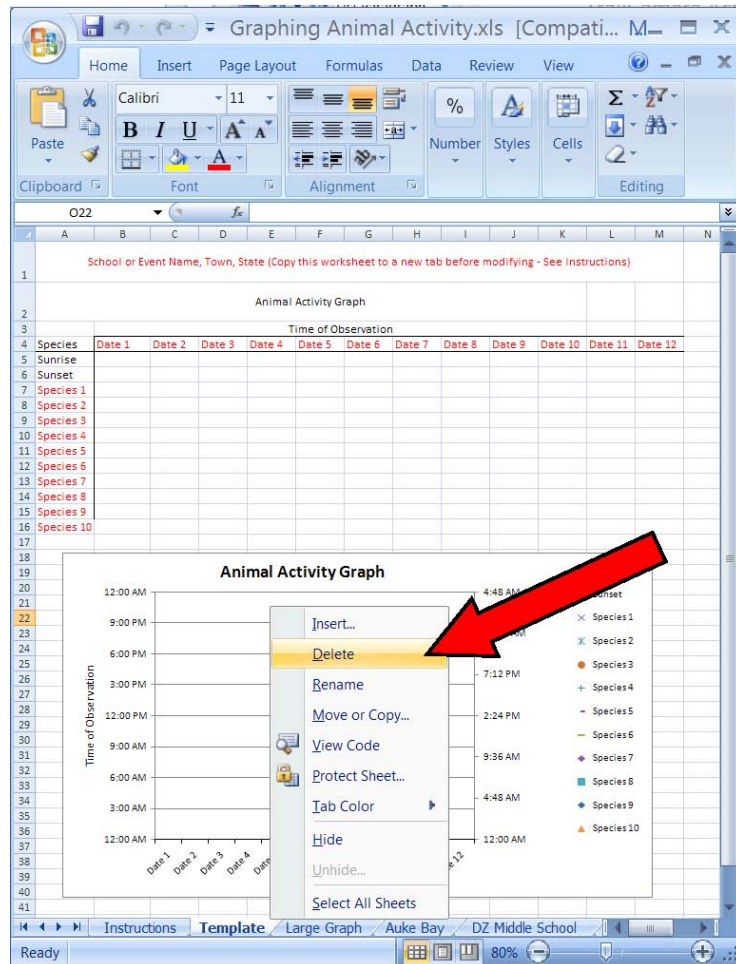
4. Replace all of the red text in the table headings with your information
 - a. Type in your school and town in row 1, the dates of your photos across the top of each column (row 4) and the species you observed in column A, starting in row 7, below "Sunset".
 - b. Enter each species name on only one line (for example, don't put "Raven" on two lines, even if you saw it on two different days).
 - c. A set of consecutive photos of the same animal is considered one "observation". Fill in the body of the table with time of day of the first photo for each observation (format: 7:23 AM).

- d. If you saw the same species later that day, label another column with the same date (in row 4) and enter the time of that observation (first photo in the series) on the row for that species. (Check the tab labeled "Thunder Mt High" for an example of how they handled "Domestic Dog", which was observed twice on 3/31/12 and twice on 4/1/12.)
5. Use the internet to determine sunrise and sunset times for the dates of your photos at your location (example website: <http://www.sunrisesunset.com>)
- Type sunrise and sunset times into the table (format: 7:23 AM) in rows 5 and 6.
 - Each cell in the table is associated with a symbol on the chart, so check to see if the data plot correctly.
 - Delete the **red text** in column and row headers (Dates and Species) that you didn't use. (Don't delete the entire row, only the text in the cells.) This will remove the extra headings in the graph axes and in the legend that you don't need.
 - If you need more than 10 species or 12 days, use worksheet on the "Large Graph" tab.
 - View the examples from other schools to get an idea for what your table and graph should look like.



6. Save your spreadsheet data table and chart to the workbook on the kit's hard drive so others can see what you've done.
- Save your spreadsheet workbook to your own computer, giving it a new name.
 - Attach the kit's hard drive using the USB cable, and navigate to the "Trail Camera Photos" folder
 - You should find a folder with your trail camera photos, which you previously copied to the drive. If not, create a folder here with the name of your location. Add your photos to the new folder.

- c. Delete all spreadsheets from your workbook except the one with your data table and graph.
- i. <Right click> each of the tabs you don't need ("Template", "Large Graph", "Auke Bay", etc.) and select "Delete". Confirm your selection and the sheet will disappear.



- d. When you only have your own sheet left, save the file in the folder with your trail camera photos.

Discussion

- Did you get nocturnal, diurnal, or crepuscular species? Some animals can fit into more than one group.
- Look at graphs of animal activity compiled from previous trail camera users (included on the hard drive with your camera kit). Discuss why the sunrise and sunset curves look different for different locations.
- Choose a few species that appear on graphs from several different areas (using charts included on the hard drive). Are the animals active at the same time of day (night, day, or twilight) in different places?
- What other species in your area are nocturnal? Diurnal? Crepuscular?
- Navigate to the following website: <http://www.gaisma.com/en/dir/us-ak-country.html> and take a look at the sunrise/sunset graphs for different areas of Alaska (labeled “sunrise, sunset, dawn and dusk times, graph”).
 - How does the daylight length (“photoperiod”) change from north to south – for example from Ketchikan to Barrow?
 - How does daylight length change from east to west – for example, from Juneau to Kodiak?
 - What is the significance of the changing hours of daylight?

Create a Video Slide Show or e-Book

Students can practice writing and express their creativity by producing a slide show or eBook showing what they did and what they found. This activity may be done individually, in small teams, or as a class.

Video Slide Show

Many software products are available to support production of a slide show. Common programs include Windows MovieMaker (typically included with Windows operating systems) and iPhoto or iMovie (for Apple users). Other programs are also available. Details of the video production process vary, depending on which program you use.

A typical project sequence would be to:

1. Write and record a script. (Think about providing a clear introduction, body, and conclusion)
2. Add the recorded narration to a video project file using the chosen video or slideshow program.
3. Select photos to illustrate the script and add them to the project file.
4. Identify, shoot, and add additional photos or video sequences to support the script.
5. Add sound effects, photo transitions, titles, and credits to the project file.
6. Save or “publish” the slide show in a standard video format.
7. Share the video by copying it to a DVD, or posting it at an online location for others to see and link to.

This project can be completed after you’ve returned the Critter Cam Kit. We’d still love to see it, though. Please share your slide show with us! Send us a note at Juneau@fws.gov with a link to your video, or send us a DVD version.

Produce an E-Book

An electronic book, or e-book, is simply a written document, often illustrated by pictures, produced in digital format. Ebooks are easily shared and are quickly becoming a standard way to distribute information. Depending on the format used, an e-book may be read on a computer, a dedicated e-book reader (like a Kindle or iPad), or on a compatible cell phone. Various software programs are available for publishing an e-book, such as Apple Pages, Desktop Author, Activ eBook, and Adobe Acrobat.

A typical sequence for developing an e-book might be:

1. Write and edit the text. Consider using chapters to organize the material into an introduction, descriptions and results of each phase of the project, and a conclusion.
2. Insert photographs, either embedded in the text, or in an appendix.
3. Create hotlinks in the text to link to relevant photographs, charts, or other sections of the e-book.
4. “Compile” the project, using your ebook software, to produce an eBook in a standard format.
5. Share the project with others by posting links to it online.

The sequence and specifics depend on which ebook compiler software you use. If you do produce an ebook, please share it with us, by sending a copy, or a link to it, to Juneau@fws.gov

Supplemental Activities from the *Alaska Wildlife Curriculum*

To learn more about this curriculum and other educational resources, go to Alaska Department of Fish and Game website at: <http://www.adfg.alaska.gov> and check out the “Education” section.

You may also download individual activities from the Alaska Wildlife Curriculum from the Alaska K-12 Science Curriculum Initiative at:

http://www2.gi.alaska.edu/STEP/nav_curriculum_life.html