Infrared Photography Comparison of Warm and Cold Blooded Animals

Objectives
- Students will be able to name similarities and differences between warm and cold blooded animals
- Students will gain a basic understanding of infrared
- Students will successfully create a paragraph about either warm or cold blooded animals

Suggested Grade Level
Pre-K through Second

Subject Area(s)
Science
Technology
Language Arts

Timeline
3-4 Forty minute sessions

Background
Teacher- A general knowledge of either mammals or insects is needed. Also a basic understanding of infrared photography must be obtained. Become familiar with graphic organizer choice and 3 websites of lesson.
Student- An introductory knowledge of either mammals or insects is needed. Most will not have any background on infrared photography. There should be some graphic organizer experience whether personal or in-group. This could be a T-graph or Venn diagram, for example.

Materials
Books on Mammals and Insects
Science notebooks
Computers with Internet access
Graphic Organizer (see background explanation)

Lesson
1. Vocabulary
   Mammal- an animal that has hair or fur, gives birth to their babies (no egg hatching) and is able to feed their babies with milk of their own
   Insect- a bug that has 6 legs, 3 body parts and a skeleton (shell) on the outside
   Photography- taking a picture, the process of it
Infrared- a way of showing heat inside something

2. Day 1- Ask students to take out their notebooks and write at the top of a page “What I know about Mammals and Insects” or write this on a journal page for pre-K and Kindergarteners. In 10-15 minutes, teacher either has students write or group brainstorm. Share items if not group.

3. Students use books from the library or class collection to research in depth about either mammals or insects. Assign this to small groups if doing group option.

4. Day 2- As a class share what has been learned about both topics. Write on the board if not on class chart already.

5. Graphic organize above information. (T-Graph and Venn Diagram in addendum section)

6. Be sure the following are on chart:
   Mammals- Give live birth, nurses their young or gives milk, have hair or fur, are warm blooded
   Insects- Have jointed legs, exoskeletons, hatch eggs, and is cold blooded

7. Day 3- Computer lab or in front of class computer. Explain you are going to show a way of looking at temperature but not with a thermometer. It is called an infrared camera. It takes pictures in infrared which measures heat not light.


9. This sight talks about infrared and has a color line that shows which colors are the hottest and which are the coolest. Talk about how the darker the color is, the colder the object will be. The redder/ whiter the color is, the hotter the object is.

10. Students may also play a game. They get to match up 4 infrared characters with 4 corresponding pictures. Give students a chance to play the game. They will learn that someone who eats ice cream would probably have blue lips, while the hot cocoa drinker will be white in the face due to all the heat.

11. Have students go to http://sirf.caltech.edu/EPO/Faces/portraits.html

12. On this site there are faces of people. Ask the students to find the ones with cold noses or which people are the warmest.

13. Now that they have some ideas of what humans (which are mammals) look like in infrared, what do you think that other mammals might look like? Have them write down in their notebook or teacher write as a group their prediction of what they think other mammals might look like, as well as write down what they think insects would look like in infrared.

14. To test their knowledge, go to http://sirf.caltech.edu/EPO/Zoo/zoo.html

15. Show the students where the mammals and insects are and have them look up several of each.

16. Students should begin to notice that the hair or fur on most of the malls is there to keep it cool and the warmest areas are where skin is showing or where heat is released, such as through the mouth. Insects, however, are the opposite. They are dark all over unless they were warmed by the sun or are getting heat from the human holding it. In some of the infrared
pictures, students can actually see the warmth going from a human into the insect.

17. Day 4- Now that the students have had a chance to learn about mammals (warm-blooded animals) and insects (cold-blooded animals) have them write a 5-7 sentence paragraph of what they have learned. The paragraph can be about mammals, insects, or both. For younger grades, write as group or write pictorially.

Extensions
1. Scholastic Book The Magic School Bus Gets Cold Feet and/or copy of the episode of the animated TV series produced by Scholastic Entertainment Inc.
2. Take students to a museum of Nature and Science for a field trip. Hands on experiments would be best.
3. A hide and seek game on http://sirf.caltech.edu/EPO/Zoo/zoo.html
4. Obtain some way to actually photograph in infrared and collect own specimens

Evaluation/ Assessment
- Students are able to name similarities and differences between warm and cold blooded animals
- Students participate and display understanding of infrared websites
- Students successfully create a paragraph about either warm or cold blooded animals

Resources

http://sirf.caltech.edu/EPO/Faces/portraits.html
http://sirf.caltech.edu/EPO/Zoo/zoo.html

Lecture notes from Denise Cook-Clampert in Space Technologies for the Classroom Space Foundation Course

Addendum
See two attached diagrams