

ECOS Inquiry

1. Contributor's Name: Brooke B. McBride

**This inquiry was adapted from "Pipe Cleaner Animal Camouflage," originally written by T.J. Fontaine. It was adapted to fit within a short 10-15 minute time span, as one of four events in the "ECOS Olympics." The entire four-event Olympics was designed to fit in a 1-hour class period.

2. Name of Inquiry: ECOS Olympics...Observation Challenge!



3. Goals and Objectives:

a. Inquiry Questions (**these are simplified questions that can be addressed in the short time span of this inquiry. For more in-depth questions about animal camouflage, see original "Pipe Cleaner Animal Camouflage" inquiry):

- **In 5-10 minutes, students must determine...**
 - What are the five colors of prey camouflage?
 - How many prey of each color are hidden in the habitat?
- **Based on their results, students must answer (5 minutes)...**
 - If you were one of these prey, which color would you want to be, and why?
 - If you were one of these prey, which color would you NOT want to be, and why?
 - How would your answers change if it were a different season? (eg., winter instead of spring, etc.)

b. Ecological Theme(s): Animal Camouflage

c. General Goal: Students' skills of observation are challenged in this fun and fast-paced inquiry.

d. Specific Objectives:

- Students work in small groups (2-3 students) to identify and tally the number of pipe cleaner "prey" in each color of camouflage.

- Students must work as a team to identify as many hidden prey as possible, without counting any prey more than once, etc.
- Student gain practice filling in a data sheet with their observations, and then must interpret their results to answer the wrap-up questions.

e. Grade Level: 1st-6th. This is meant to be a fun, fast-paced, and relatively simple inquiry. It was more challenging for the younger students, but older students still had fun with it. See “Scalability” on p. 4 for tips on how we scaled the inquiry up or down in difficulty for the appropriate grade level.

f. Duration/Time Required:

→ Prep time:

- **~10 minutes** to make pipe-cleaner animals. Twist 2 pipe cleaners of the same color together at their centers to form a 4-“legged” prey animal. The five colors used for this inquiry were: green, black, brown, tan, and white. Make up to 10 of each color prey. *****It is important to have the same number of prey in each color of camouflage***.** After students have identified as many as they can in 5-10 minutes, you can tell them that there is the same number of each color hidden in the habitat, which always comes as a surprise! Typically, students will have found all of the white and black prey, but very few of the brown and tan. This will help them to interpret their results as they answer the wrap-up questions. Thus, it is important to have the same number of each color and to keep this a secret until the end of the inquiry.
- **~10 minutes** to hide prey in their habitat. Find a 20-30’ stretch of trail, sidewalk, or lawn bordering a treed, shrubby, or weedy area that provides good places to hide the prey. Hang prey from branches, nestle them in the grass, place them high and low! Place a rock or similar at the beginning and end of the challenge to mark the boundaries of the challenge. Students must stay on the trail and use their **EYES ONLY** to observe as many prey species as possible in the allotted time.

→ Implementing Exercise During Class:

- After explaining the challenge, split the group into small groups of 2-3 students and give each small group a data sheet. Give students **5-10 minutes** to identify and tally as many prey as they can. Use a stopwatch and call out the time to make it more exciting! During this time, students may ask you if they’ve found them all yet. You can look at their data sheets and tell them if they are missing any of certain colors, eg. “There are still a lot of tan ones hiding out there- keep looking!” but do not disclose the exact number yet.

→ Assessment:

- Call time on the search. Small groups now have **5 minutes** to answer the wrap-up questions. As students reflect on their results, many conclude that there were simply *more* of certain colors than others. At this point, you can disclose that there was actually the *same* number of each color hidden in the habitat. This helps students to interpret their results with respect to the questions, ie., certain colors provide better camouflage than others!

4. Ecological and Science Context:

a. Background (for Teachers): See original inquiry, “Pipe Cleaner Animal Camouflage,” for a more in-depth explanation of animal camouflage and coloration, and for how to extend this inquiry into a full 1-hour lesson.

b. Background (to present to Students): Welcome to the Observation Challenge! In this event of the ECOS Olympics, we are going to challenge your skills of making very careful observations. This is the most important skill for any ecologist to have, and we have been practicing it all year long. So this is a chance for you to show just how skilled you have become at studying your environment very, very closely!

For this challenge, we are going to imagine that we are predators, and that these four-legged fuzzy creatures (hold up example of a pipe cleaner animal) are our prey. These prey have five different shades of camouflage, and they are hiding from us in their habitat. Your challenge is to use your *best* skills of observation, using your eyes only (ie. not collecting them), to find as many of these prey as you possibly can, in only FIVE MINUTES (time can be extended to fill the allotted time). So first, you have to figure out what the five colors are. Then you have to tally up the number of prey in each color. Finally, you and your partners have only FIVE MORE MINUTES to answer the questions about what you found.

5. Motivation and Incentive for Learning: This inquiry is presented as one event in the ECOS Olympics. As such, it is framed as a competition to see which group can get closest to the actual number of hidden prey species, has thoughtful answers to the questions, and works best together as a team. Additionally, because the event is timed, it adds a degree of urgency and excitement to the process of discovering the camouflaged creatures!

6. Vocabulary:

Camouflage: To conceal by the use of disguise or by protective coloring or garments that blend in with the surrounding environment.

7. Safety Information: Be on the lookout for thorns, nettles, etc. when hiding the prey in their habitat. Remind students that they are to use their eyes only when participating in this challenge (ie., do not collect the prey, stay on the designated trail or walkway).

8. Materials List (including any handouts or transparency masters):

- Pipe cleaners, up to 20 of each color. Twist 2 pipe cleaners of the same color together to make a 4-legged prey animal. For this inquiry, we used green, black, brown, tan, and white.
- Data sheets (attached).

9. Methods/Procedure for students:

a. Pre-investigation work: n/a

b. Investigation work:

1) What evidence (data, samples) do students collect? Using their eyes only, students identify the five colors of prey camouflage, and then tally the number of prey of each color.

2) How do students present the evidence (data)? Students fill in data tables (see attached data sheet) with the 5 colors of camouflage and the number of prey that they find in each color.

3) What conclusions are drawn from the evidence students collect? At first, students may conclude that there are simply more of certain colors than others, because they found more white than tan, for example. When you reveal that there are actually the same number of prey in each color, students will realize that, in fact, certain colors of camouflage are superior to others. Students will also reflect on how this may vary seasonally (this question must be prompted by the instructor, as it is not included on the data sheet).

4) Include examples of data sheets (attached at the end).

10. Assessment: Based on their results, students should be able to provide meaningful answers to the wrap-up questions after completing the challenge (the question about seasonal variation is posed by the instructor).

11. Extension Ideas: See the original “Pipe Cleaner Animal Camouflage” inquiry by T.J. Fontaine for instructions on how to extend this into an entire 1-hour lesson, and how to supplement the inquiry with additional activities.

12. Scalability: We found that this was a fun and fast-paced “competition” for 1st through 6th graders. To make it more accessible for 1st-graders, we wrote the camouflage colors on the data sheets for them, prior to the inquiry, so that all they had to do was find the prey and tally them. We also hid fewer prey (5 of each color) in more obvious locations and gave them more time to search. For 6th graders, we hid more prey (10 of each color) in more obscure locations, and gave them less time to search. This inquiry is very flexible to be scaled up or down in terms of difficulty and available time.

**13. Science Standards Accomplished: Science as Inquiry (Standard 1),
Life Science (Standard 5).**

14. References: See the original “Pipe Cleaner Animal Camouflage” inquiry by T.J. Fontaine.

15. List of Experts and Consultants: n/a

16. Evaluation/Reflection by Fellows and Teachers of how it went: This modified form of the original Animal Camouflage inquiry went surprisingly well, showing that it WAS possible to conduct a fun, fast-paced, and exciting inquiry in only 10-15 minutes. It worked especially well as part of the 4-event “Olympics,” as it was extremely easy to repeat the inquiry over and over again with new groups of students.

ECOS Olympics: Observation Challenge!

Team Name: _____

Color:	Color:	Color:	Color:	Color:
Tally:	Tally:	Tally:	Tally:	Tally:

If you were one of these prey, which color would you want to be, and why?

If you were one of these prey, which color would you NOT want to be, and why?
