

1. **Contributor's Name: Jen Marangelo and Alison Perkins**
2. **Name of Inquiry: ECOS Olympics...Pursuing Predictions!**



**3. Goals and Objectives:**

**a. Inquiry Questions:**

- In **10 minutes**, students must...
  - think about habitats on their schoolyards
  - think about where they might find insects
  - make connections and predict where they might expect to find the greatest diversity of insects on their schoolyard.
- Based on their data, students have to (**5 minutes**)...
  - follow through. Do some quick searching for insects to see how their predictions fared.

**b. Ecological Theme(s): Insect Diversity**

**c. General Goal: This fast-paced and challenging inquiry is designed to get students to use the information they have about insects and their lifestyles to predict where they might find the greatest diversity of insects.**

- **What evidence (data, samples) do students collect?** Once students have thought about their schoolyard's habitats and made predictions, they do some preliminary investigations in their schoolyard.

- **How do students present the evidence (data)?** Students make connections between their thoughts on habitats and insect, and use those connections to make predictions about insect diversity.
- **What conclusions are drawn from the evidence students collect?** Students should be able to distinguish between habitats that potentially support high insect diversity (such as habitats with abundant and varied plant life) and those that support low insect diversity (habitats altered by humans such as playgrounds).

**d. Specific Objectives:**

- Students work as a team to define a “prediction.”
- As a team, students discuss where they might find insects and what habitats are available on their schoolyard.
- As a team, students make connections between finding insects and habitats to make predictions that compare insect diversity across habitats on their schoolyard.

**e. Grade Level: 1st-6th.** This is meant to be a fun, fast-paced, and relatively simple inquiry for a variety of different age and ability students.

**f. Duration/Time Required:**

- **Prep time: 10 minutes**
- **Implementing Exercise During Class: 15 minutes**

**4. Ecological and Science Context:**

**Background (for Teachers):**

Biodiversity, short for biological diversity, is the variety of all forms of life within a given ecosystem or biome. The broad definition encompasses genetic diversity, an important pre-requisite for natural selection and evolution. Investigating biodiversity requires an understanding of what organisms are found where, even on small scales such as schoolyard habitats. These assessments let us know the different kinds of organisms an area supports, and how unique one area is compared to other such areas.

Making predictions are an important part of the scientific process. It is important to stress that predictions are not guesses; they are reasoned and informed assessments of the situation. Most predictions are in the form of *If A, then B*. The first part of the statement indicates a known set of circumstances; the second an outcome that is unknown (if it is known, then it is a consequence, not a prediction). Scientists then design fair tests of their predictions. This inquiry is designed to get students to think about this reasoned and informed approach to scientific questions.

**5. Motivation and Incentive for Learning:** This inquiry is presented as one of four events in the ECOS Olympics. Teams are competing against each other not only to complete the task, but to display good teamwork and attitude. The short duration of the event adds a degree of excitement to the process!

## 6. Vocabulary:

**Biodiversity** – the variety of all forms of life within a given ecosystem or biome

7. **Safety Information:** Some insects can sting or bite. Students should be cautious when approaching insects.

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

- Predictions about Insect Diversity Worksheet**
- Clipboards** – 1 per group
- Pencils** – several per group

9. **Methods/Procedure for students:**

### a. Pre-investigation work:

- Explore your schoolyard. Look for insects in different habitats and note the differences and similarities in the number and kinds of insects found in those habitats.

### b. Investigation work:

- Ask students what a prediction is. Make sure they understand that predictions aren't just wild guesses; they are informed and reasoned. Have them think about the kinds of knowledge they must have to make a prediction.
- Have students share what they know about habitats. Discuss the various habitats in and around the schoolyard, such as woods, meadows, grassy fields. Include man-made habitats, such as playgrounds, buildings, and athletic fields.
- Ask students where they might expect to find insects. They will likely focus on specific places like under rocks and on the ground. Have them think about where they might find insects within a specific habitat (e.g., a field) as compared with another specific habitat (e.g., their playground) and another specific habitat (e.g., the woods). Help them make connections between specific places and the habitats that have more (or less) of those specific places. Is there great variety, or diversity, or do habitats have only a few kinds of places?
- Have students fill out the **Predictions about Insect Diversity Worksheet**. Older students will be able to fill out the datasheet themselves. Younger students will need assistance.

### c. Follow up:

- Have students do some preliminary investigation by looking for insects in their school's different habitats. Stress that the exploration is building on the knowledge that they will need to refine their predictions about the habitat with the highest insect diversity.
- Have students revisit their prediction. Have them revisit their reasoning. If there's time, talk about some of the problems they may have encountered "sampling" insects and how that might affect their thinking.

**10. Assessment:** Students should be able to complete the worksheet, come up with at least 2 habitat types on their schoolyard, and locate insects.

**11. Extension Ideas:** This inquiry can easily be extended to explore biodiversity in the schoolyard. Insects can be tallied by general group (e.g., ants, beetles, dragonflies, etc.) for different habitats and compared. Counts can be conducted at different times of day to see if estimates vary by habitat and time of day. Insects also are a great group to discuss the limits of scientific knowledge, the impacts sampling techniques can have on outcomes, and the importance of biodiversity.

**12. Scalability:** We found that for students of all ages, building on what they already knew about insects and habitats could be challenging. Younger students could locate insects in the habitats around the schoolyard, and older students could record the numbers and different kinds they found in different areas and compare diversity among areas.

**13. Science Standards Accomplished:**

- Science as Inquiry
- Life Science
- History and Nature of Science

**14. References:**

The *American Museum of Natural History* (<http://www.amnh.org/education/resources/biocounts/>) has a special resources collection called Biodiversity Counts! The lessons are designed for Grades 6 and up, but many can be scaled to younger students.

For older students, the *Smithsonian Institute* (<http://www.mnh.si.edu/mna/TeacherResources.cfm>) has an awesome site for measuring mammal biodiversity in North America.

**15. List of Experts and Consultants:**

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**16. Evaluation/Reflection by Fellows and Teachers of how it went:** This inquiry was a lot of fun for the students. It was fast-paced and a challenge as students responded to the questions with a serious effort to try to get them answered in the allotted time. They really enjoyed searching for and finding insects in different habitats as part of the “competition.” It was very easy to repeat the inquiry over and over again with new groups of students as part of the ECOS Olympics.

# Predictions about Insect Diversity

Names: \_\_\_\_\_

1. What does it mean to make a prediction?

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2. If you wanted to find insects where would you look? List as many places as you can.

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3. Look around your schoolyard. Predict where you would find the most types of insects.

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4. Why do you think that?

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