

Activity Title: Outfit a Scientist

Learning Objectives

"In the Testable Question Relay, teams of student "fieldworkers" are asked to categorize a set of written questions as scientifically "testable" or "untestable." The object of the race is for each team to "outfit a scientist" by placing all cards in the correct category. Correct placement is rewarded with pieces of scientific gear, such as clothing or tools."

Ocean Literacy Principles:

#7 -- The ocean is largely unexplored

- b. Understanding the ocean is more than a matter of curiosity. Exploration, inquiry and study are required to better understand ocean systems and processes.

National Science Education Standard A: Science as inquiry

- Abilities necessary to do scientific inquiry
- Understanding about scientific inquiry

Supplies and Materials

- Game questions (1 pack of 16 questions per team)
- Masking tape
- Marker
- Space (approx. 30' x 30')
- 3 quadrats (0.5 m x 0.5 m)—optional (areas may also be delineated with masking tape)
- Prizes for student "scientists"
- Tools of the field ecologist used as prizes for student "scientists," including bucket, shovel, quadrat, transect tape, and rubber boots. Quadrats, square grids made out of plastic pipe, designate study areas, whereas transect tapes are used to mark a line along a study site.
- Suggestions for scientific tools that may be used as costumes for student "scientists:"
 - Field Ecologist: shovels, boots, buckets, transect tape
 - Scientific Diver: mask, snorkel, field notebook, fins
 - Ornithologist: binoculars, field guide, map, compass

Background

"Students must know how to ask appropriate questions in order to use a scientific method to systematically explore their surroundings. We have found that the testable question relay is a good precursor to lessons on developing questioning strategies and to open inquiry lessons. This activity

best follows a structured inquiry lesson, as it acts as an introduction to discerning differences between testable and untestable questions. Not only do students find the testable question relay exciting and engaging, they also leave the classroom better prepared to design scientific investigations that explore their surroundings, facilitate learning, and solve real-world problems.”

Duration

Approximately 45 minutes, excluding prep time.

Audience

Grades K-4.

Procedure

Please see full lesson at:

[http://pages.uoregon.edu/oimb/Academics/GK12/published_lessons/Morgan & Hiebert.pdf](http://pages.uoregon.edu/oimb/Academics/GK12/published_lessons/Morgan_&_Hiebert.pdf)

Assessment

Available inside original lesson.

This lesson plan was provided by COSEE Pacific Partnership. For more information, please contact Trish Mace at tmace@uoregon.edu

The original and complete lesson is available online at:

[http://pages.uoregon.edu/oimb/Academics/GK12/published_lessons/Morgan & Hiebert.pdf](http://pages.uoregon.edu/oimb/Academics/GK12/published_lessons/Morgan_&_Hiebert.pdf)

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Figure 2.

"Study site" quadrat.



Figure 3.

Classroom setup for the testable question relay.

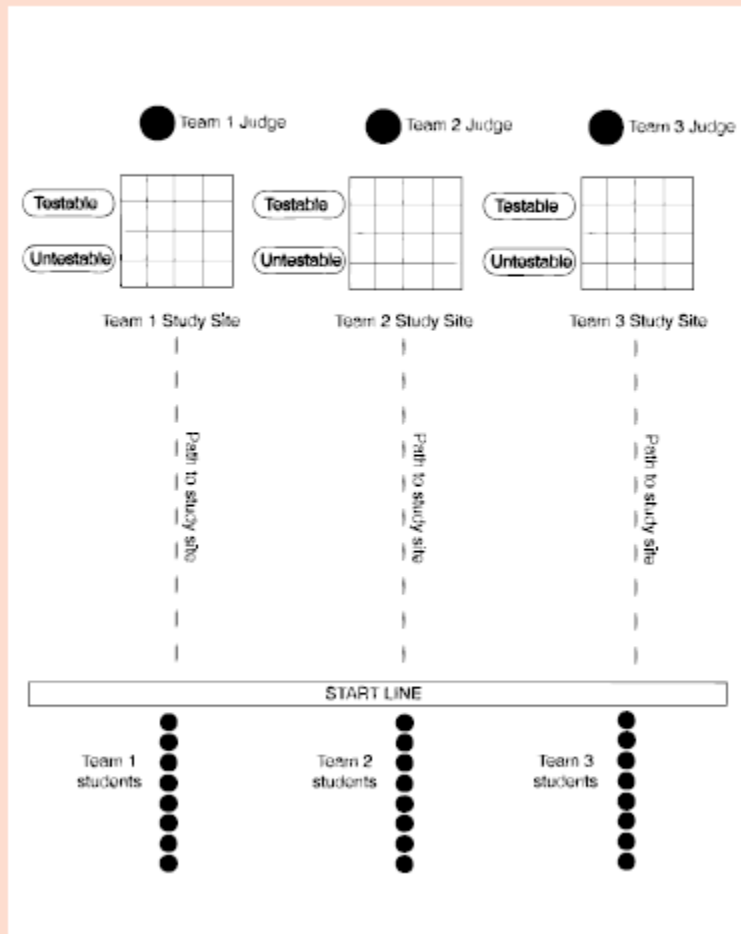


Figure 4.

Example questions, organized by themes.

Theme 1 Immeasurable variables	Theme 2 Nonspecific time frames	Theme 3 Nonspecific terminology
<p><i>Untestable:</i> Does a fish get angry if you take away its food? Will a frog be lonely if it is kept in a tank by itself? Do red and green algae smell different to a shore crab?</p>	<p><i>Untestable:</i> Will hermit crabs always use empty shells for protection? Does a turtle usually hide in its shell in the afternoon? Do birds often return to the same tree to nest?</p>	<p><i>Untestable:</i> Will "sea monkeys" (brine shrimp) react to freshwater? Will a plant respond to additions of fertilizer? Are fish eggs affected by temperature?</p>
<p><i>Testable:</i> Will purple sea urchins eat the green alga "sea lettuce"? Do ants follow specific paths from their burrows to a food source? Will seeds from salt marsh plants sprout in freshwater?</p>	<p><i>Testable:</i> Does kelp grow faster during the day or night? Does a turtle spend an equal amount of time hiding and foraging over 12 hours? Will a hummingbird nest in the same bush each spring over a five-year period?</p>	<p><i>Testable:</i> Will "sea monkeys" (brine shrimp) survive in freshwater for one week? Will plants potted in fertilized soil grow taller than plants potted in unfertilized soil, over the course of one month? Will salmon eggs hatch in water that is 70°F?</p>