

Grade Level: Grade 6

Science Concept: This lesson is aimed at teaching students the concept of open scientific inquiry. They will have an opportunity to conduct an open inquiry of their own by choosing a topic related to arthropods and doing legitimate research on their topic. Finally, they will have an opportunity to communicate their research to the class through a method of their choosing.

Relationship to California Science Content Standards:

7. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:

b. Select and use appropriate tools and technology (including calculators, computers, balances, spring scales, microscopes, and binoculars) to perform tests, collect data, and display data.

Learning Objective:

1. Students will present their research findings on a topic of their choice (related to arthropods) through a presentation method of their choice. They can choose to present individually or in groups.

Evaluation Ideas:

1. formative:

- a) Before the presentation is due, I can check with students one-on-one in order to assess their progress on the assignment.
- b) Before the presentation is due, I can have students turn in written paragraphs about the progress they have made on the assignment.
- c) Before the presentation is due, I can have students meet with me one-on-one and talk me through the key components of their presentation to ensure they are on the right track.

2. summative:

- a) Students will present their research findings through a presentation method of their choosing that I have approved of.

Conceptual Background:

Scientists can gain pertinent information about subjects that interest them through research and investigation. Research can be performed in a variety of ways and include the use of scholarly books and articles. Scientists can share their discoveries with their colleagues through a variety of methods in order to enhance the collective knowledge of the scientific community and set the stage for future research.

Arthropods are the largest phylum on earth and include various types of animals

including crustaceans and arachnids. They are distinct from other phylums because of a variety of physical traits: they have jointed appendages, segmented bodies, and an external skeleton.

Arthropods are prevalent in nearly every ecosystem due to their large numbers, diversity, and adaptive abilities. They can thrive in various environments including the ocean floor and the rain forest.

Lesson Implementation Plan: This lesson is designed as an open inquiry for students. Each student (or group of students) will find a topic relevant to arthropods and conduct research on the topic through legitimate sources such as scholarly books and articles. Students will present their research findings through a presentation method of their choosing, which will be chosen in advance and approved by the teacher (in order to prevent inappropriate presentations from occurring). On the day of their presentations, students will turn in an annotated bibliography with at least five sources that they used in their research.

ENGAGE- I will tell students that their next assignment will be unique because they will have a high amount of freedom as to how they complete it. I will explain the basic parameters of the assignment and allow for questions. I will assign students the role of scientific researchers looking to expand the body of knowledge on arthropods and share their findings with each other. Next, I will facilitate a class discussion about various acceptable presentation methods, steering students towards the idea that they can be as creative as they wish as long as their presentations communicate the results of their research and are appropriate for school. I will then give them time to form groups of up to five students (if they wish) and to discuss possible topics and presentation ideas.

EXPLORE- Students will choose and explore any aspect of arthropods by doing research through legitimate sources such as scholarly articles and books. I can check in with students before their presentation to assess the progress of their research.

EXPLAIN- Students will share the results of their research through a presentation method of their choice. Acceptable presentation methods include research papers, oral presentations, song performances, and original videos.

ELABORATE- Students will turn in their annotated bibliography to confirm that their presentation was based on legitimate research. I will facilitate a discussion about why it is important to use legitimate research sources, steering students towards the idea that some sources are more reliable than others, and that reliable sources will make one's research seem that much more credible.

Future assignments could have students experience other aspects of scientific inquiry such as performing experiments, observational studies, or conducting surveys. Students may also address topics other than arthropods. Students will experience a

broader spectrum of scientific research methods by experiencing them firsthand.

EVALUATE-

1. formative: I can check in with students before the presentation is due and assess the progress of their research and presentations.

2. summative: Students will be evaluated on the content of their presentations. Presentations should include scientific information about a topic relevant to arthropods.

Differentiation Plans:

Behavioral for Student A: Students who are highly disruptive during another's student's presentation may have their presentation grade penalized.

Cognitive for Student B: Students with low concentration ability may receive additional scaffolding from the teacher through extra check-ins to assess progress.

Cognitive for Student C: Students with low attention span may be seated in the front row during the presentations of their classmates.

Affective for Student D: Students with public speaking anxiety may receive slight guidance from the teacher during their presentation. The teacher can ask such students facilitating questions to guide the flow of their presentation or ask clarifying questions when necessary.

Language Demands for Student E: English learners may receive the parameters of the assignment written in their native language.

Language Demands for Student F: English learners may receive the option to meet with the teacher before their presentation and rehearse it with the teacher. The teacher can give helpful feedback.

Language Demands for Student G: English learners with trouble presenting in English may receive guidance from the teacher during their presentation. The teacher may provide scaffolding in the form of asking clarifying questions and making minor linguistic corrections when necessary.

