



Module:
Focus:
Duration:

Material Structure
Crystal Structures
43 minute period



- Objectives:**
1. Students will be able to distinguish between crystalline and amorphous structure.
 2. Students will be able to observe and diagram various crystal defects.

Materials:

- Petri Dish
- BB's
- Marker

- Procedures:**
1. Review with the class crystalline structure.
 2. Students will perform a lab on crystal structure.

Assignment: 1. Complete lab write up.

Assessment: 1. Laboratory Experiments, Classroom Participation, Quizzes & Test.

Contact:
Daniel Steinberg, PhD
Director of Education and Outreach
Princeton University Center for Complex Materials/PRISM
316 Bowen Hall,
70 Prospect Ave., Princeton University
Princeton, NJ 08540
609-258-5598
dsteinbe@princeton.edu



Module:
Focus:
Duration:

Material Structure
Crystal Structures
43 minute period



Teacher Notes:

After a brief review of crystal structures and defects, have the students place a handful of BB's into a Petri dish. They are to rearrange them so that there are no gaps between each b-b. This arrangement will represent a single crystal. They are to diagram and label this arrangement.

Students are to place the cover on their Petri dish and shake their dish from left to right. They are then to place their dish flat on the table. This arrangement will represent an amorphous structure. They are to diagram and label this arrangement.

The students are to place the cover onto their Petri dish and shake the dish back and forth. When they are done shaking, they are to quickly hold the Petri dish upright at a 45° angle. They are now to tap the dish gently on the table. This arrangement will represent a polycrystalline structure. They are to diagram and label this arrangement. Instruct the students to also label any grain boundaries they observe in their dish.

Keeping the cover on their Petri dish, students are to shake them causing an arrangement that illustrates vacancies. They are to diagram and label this arrangement.

For their last procedure, they are to open their Petri dish and remove 2-3 BB's. Using their marker, they are to color these 2-3 BB's as best as they can. When done, they are to place the colored BB's back into their Petri dish. Cover the dish shake the dish just as they did in the prior procedure. This arrangement should illustrate impurities. They are to diagram and label this arrangement.

Contact:

Daniel Steinberg, PhD
Director of Education and Outreach
Princeton University Center for Complex Materials/PRISM
316 Bowen Hall,
70 Prospect Ave., Princeton University
Princeton, NJ 08540
609-258-5598
dsteinbe@princeton.edu