

How These Experiments Can Be Used in Courses That Do Not Have Laboratory Components

Most of the ten Experiments that have been placed online are discovery experiments, in which groups of students carry out or examine experiments in which students can discover important principles of the text just before the textbook covers the principles. Students are expected to learn these principles more thoroughly this way than if they only hear them in lecture or read them in the book.

Since Foundations of Inorganic Chemistry courses do not routinely have laboratory components, we suggest other ways in which students can have the discovery experience.

1. Most of these can be used in a classroom as **Demonstrations followed by Discussion**, using modest amounts of lecture time. During demonstrations by the professor, students record data (on worksheets that are provided online), then discuss (in groups of three) the interpretation of their data. To minimize the class time required for discussion, we play a game of “Publish or Perish”—the first group of students to turn in a correct or acceptable interpretation gets more points for the assignment than the other groups (who still get some points). Since some groups of students are more extroverted than others, we apply a rule that once a particular group of students has achieved maximum points on a part of the experiment, other groups are given first chance to submit their interpretation of the next part of the experiment.
2. Two of the experiments (Experiments 2 and 7) do not require demonstration at all: they have been recorded as .mp4 videos and can be shown with student recording of data followed by student discussion of the interpretation. The article that follows describes and evaluates these experiments in their earlier VCR video format, but they work the same way with the .mp4 videos. Again, worksheets are provided classroom or laboratory use.
3. Experiment 1 is a laboratory experiment, but involves such an elementary concept that we do it in an Honors General Chemistry lab. Nonetheless, it includes some spectacular explosions that are too dangerous for students to perform, so they have been recorded as .mp4 videos.
4. Experiment 9 uses the Institute for Chemical Education Solid-State Model kits to build up lattices. This is easily done at tables in the classroom.
5. Experiment 10 is designed for computer-laboratory use.