

Mining for Knowledge

This presentation will look at how a networked Stella computer simulation is incorporated into a unit on Copper mining in the high school chemistry classroom. The computer simulation is the culminating activity in the unit and asks for the students to apply the chemistry from the unit to running a copper mining business.

We will present some of the activities and labs that students complete before starting the simulation. The labs include identification of ores to determine the presence of copper containing minerals. Qualitative and quantitative labs determine the presence and amount of copper in these rock samples. For quantitative analysis we use absorption spectroscopy and displacement of the copper with aluminum. The samples used are mixtures of crushed sand and copper chloride salt.

Prior to the networked simulation students run a HyperCard simulation that looks at the mines that will be available during the networked simulation. There are currently 14 mine sites for the students to investigate, students explore the site and get information about the ore types and reserves in each of the sites. In conjunction with their assay results using displacement with aluminum the students decide which mine sites they believe to be the most profitable.

Using this mine site information students enter the networked simulation. In the simulation students work in teams of 3 – 4 to form a mining company. Each team is responsible for mining and economic decisions that affect both their company and the copper market as a whole. At the start of the simulation 7 of the original 14 mine sites are auctioned to the highest bidder and the game begins. Each team decides how much copper ore to mine and makes financial decisions about research and development for their company. These decisions are networked onto the teacher machine where a supply and demand algorithm determines the impact of company decisions on the price of copper. The teacher computer sends back updated price and reserves information to the student machines and the cycle begins again. At any point in the simulation the teacher can auction one of the remaining 7 mine sites, teams may also buy and sell mines between themselves.

We will discuss the de-briefing activities that our students go through at the end of the simulation and unit. They include plotting behavior over time graphs, discussing the impact of their decisions on the market and the impact of the market on their decisions.

Participants will have an opportunity to interact with both the HyperCard and networked simulation during the presentation. We will discuss the logistics and computer requirements for running these programs in a classroom.

Presenters:

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