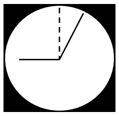
[41 minute lesson]

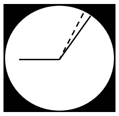
United States Public Release Lesson 4 Lesson Graph [8th grade]



$4\frac{1}{2}$ minutes

Whole-Class Seatwork: Class reviews what they did in their previous lesson

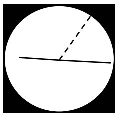
The class starts with a review of sedimentary rocks. The teacher asks students how to distinguish sedimentary rocks, He uses a laser disk to show a photograph of sedimentary rock and engages them in a discussion about the layers (strata). The teacher also draws sedimentary rock with the multiple layers on the chalkboard, asking students what would happen if the remains of an animal got deposited in one of the layers. The class talks about fossilization.



$1\frac{1}{2}$ minutes

Whole-Class Practical Work: Class observes sedimentary rock with fossil sample

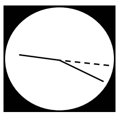
The teacher holds up a piece of sedimentary rock to show students a fossilized brachiopod. He walks around the room for all the students to see.



$9\frac{1}{2}$ minutes

Whole-Class Seatwork: Class develops new content information about fossils and igneous rocks

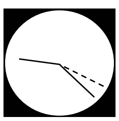
The teacher leads students to reason about fossils and their relative age based upon the layer of strata in which they may be found. He then shows a photograph of himself standing on a volcano to begin a discussion about magma, lava, and the formation of igneous rock.



3 minutes

Whole-Class Practical Work: Class observes igneous rock samples and identifies characteristics

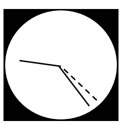
The teacher shows the class a piece of igneous rock. He asks students for evidence that the rock is an igneous rock. He leads them to pay attention to the surface where there are a lot of holes. The class concludes the holes are the result of gas that was in the magma. They continue discussing the characteristics of igneous rocks while going over an identification chart that is projected from the overhead. The students also observe two kinds of igneous rocks in cups that are being passed around.



5 minutes

Whole-Class Seatwork: Class discusses igneous rock and crystal formation

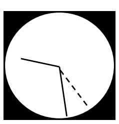
The teacher leads a class discussion about magma and igneous rock as he labels a diagram on the board. He describes the positively charged and negatively charged atoms aligning themselves in an orderly arrangement in the magma. To illustrate what this may look like when the magma cools into a solid, he holds up a piece of crystal. The class continues to talk about crystal formation and crystal size.



$2\frac{1}{2}$ minutes

Whole-Class Practical Work: Students use crystal size to identify rocks

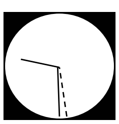
A student is asked to hold up one of the two igneous rocks that was passed around earlier. He holds up the rock that has the big crystals (i.e., granite). The teacher describes the big crystals as a result of a slow cooling process. The teacher then goes on to say, "But where the magma comes out at the surface and magma freezes really quickly, atoms don't have time to line up, you get small crystals." The teacher calls on a student to hold up that rock with the tiny crystals (i.e., rhyolite). The idea of using rock color as an identifying characteristic is then introduced.



3 minutes

Whole-Class Seatwork: Class discusses crystal size and cooling magma

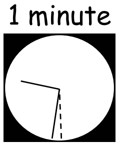
The teacher guides the students through the rock identification chart. They add notes to this chart, identifying rhyolite, granite, and pegmatite according to crystal size. The teacher then leads the students in a discussion of igneous rock and magma as they continue taking notes from the board.



1 minute

Whole-Class Practical Work: Students identify an unknown rock sample

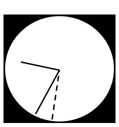
The teacher shows the class an unknown rock sample. He shows the rock to one student, asking whether or not there are crystals. He announces to the class that the rock is heavy. The teacher wants the class to identify the name of the rock by referring to the chart with characteristic features.



$1\frac{1}{2}$ minute

Whole-Class Seatwork: Teacher highlights characteristics on rock identification chart

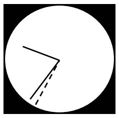
The teacher reviews the information on the rock identification chart for the class, which is projected on the overhead projector. He questions students about the different colors of the rocks (i.e., light and dark), asking about the corresponding mineral composition. He raises a question about a rock that has no time to cool. He asks the class, "Now, suppose you had an igneous rock that cooled so quickly no crystals had time to form. What's the name of that rock?"



3 minutes

Whole-Class Practical Work: Class observes characteristics of basaltic glass

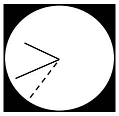
The teacher shows the class a sample of basaltic glass, which is a type of rock with no crystals. He asks students to explain how the chart can be used to identify it. He summarizes the information on the chart in terms of obsidian or basaltic glass. The teacher continues the discussion on basaltic glass, telling the class that it can be flaked and sharpened to a cutting edge. He then hits the sample with another rock and demonstrates the sharpness of the broken piece by cutting paper.



1 minute

Whole-Class Practical Work: Class observes Herkimer diamond

The class discusses a particular type of quartz that was used in a movie to represent diamonds. The teacher describes this type of quartz as a Herkimer diamond, which he holds up for the class. He describes this quartz as being clear and having two points. He shows the class a map of the United States to point out the region in New York where they could go to get their own sample of Herkimer diamond, and that this is the only place in the world that the teacher believes this type of quartz exists.



5 minutes

Whole-Class Seatwork: Class talks about Devil's Tower

The teacher uses the laser disk to show a photograph of Devil's Tower. Devil's Tower is a landform in Wyoming made of solid granite. The teacher poses a question to the class about this massive object, "How could you explain- since granite cools underground slowly…how in the world can this piece of granite be above the surface?" He calls on individual students around the room for responses. They discuss their ideas and conclude that the granite must have cooled underground in order for the big crystals to have formed, and that water may have pushed the soft rock away leaving only the solid granite. The bells rings during this class discussion and students prepare to leave.