What Rocks on Your Block?

Midtown East
Building Stones Walking Tour

Teacher's Guide

Introduction

The following guide was created to help fellow educators design small walking tours around their schools, so students can explore a variety of rock types. While this particular tour covers a few blocks and avenues in Midtown East, you can easily apply this exploration method to any area you see fit! Please feel free to use the ideas presented here as a guide to making your own building-stone tour that's tailored to both your teaching style and your students' preferred inquiry-based learning methods.

Rationale for Experiential Learning

As an educator, I often hear the comment, "There's only so much you can do in the classroom." While the NY State Physical Setting/Earth Science curriculum provides a good foundation for a general background in Earth science, academic time constraints prevent it from delving into any one topic in much depth.

Supplementing traditional content curriculum with experiential learning activities allows both educators and students to enlarge their perspectives and gain a better understanding of the material being taught. Experiential learning offers excellent opportunities for educators and students to go beyond the generic curriculum and engage with the finer points of the subject. Experiential activities also allow multiple learning styles to shine and flourish, helping students develop greater motivation.

Timeframe

One 45-minute class period

Materials

- StoryMaps Walking Tour
- Student Worksheets
- Venn Diagram and Data Tables Student Worksheet
- Phone or digital camera
- Pen or pencils and clipboards
- Copies of Earth Science Reference Tables (optional)
- Rock samples of photos of rock samples (optional)

Objective

This walking tour uses the constructed world to teach geology and Earth science. Although building stones lack their original context, they offer students excellent opportunities to practice their observational skills. Additionally, the tour allows us to connect the cross-cutting concepts of science, architecture, art, and history.

Key Goals & Takeaways

This activity works best when presented toward the end of the unit on rocks and minerals. That way, students can recognize what they've learned in the classroom and apply their new skills to real-world examples. However, the timing is not crucial; you can schedule the tour at any time that fits your calendar.

At the end of the tour, students should be able to do the following:

- Recognize the differences among igneous, sedimentary, and metamorphic rock types.
- Identify distinguishing characteristics that allow them to classify each station's rock.
- Identify examples of characteristics associated with key rock-forming processes (such as interlocking crystals, embedded fossils, and foliation).
- Identify a variety of minerals present at each station.
- Recognize the correlation between grain/sediment size and texture.

Strategies and Suggestions

The best part of experiential learning is, of course, the experience! Allowing students to explore and investigate at their own pace and according to their individual learning styles should not be undervalued. If you take the walking tour near the end of the rocks and minerals unit, students should already be familiar with most or all of the concepts they will encounter. Below is a list of strategies and suggestions that you may find useful.

- Be sure students are familiar with each task before they begin it.
- Allow students to work in small groups (groups larger than four can become difficult).
- Suggest students touch and feel the rocks at each station. This gives them a better idea of how mineral crystals and sediment grains can yield specific rock textures.
- Encourage students to take multiple pictures at each station.
- Bring along a few copies of the Earth Science Reference Tables as an identification guide. There are always a couple of students who like to identify the rocks first!
- Bring some familiar rock samples from the classroom for comparison. Not too many, though—the weight can add up! You might want to bring large, laminated photos instead.
- At the conclusion of the tour, ask students to explain briefly what they observed at each station.

Standards

Physical Setting/Earth Science Core Curriculum Standards

Standard 4
Students will understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.

Key Idea 3
Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.

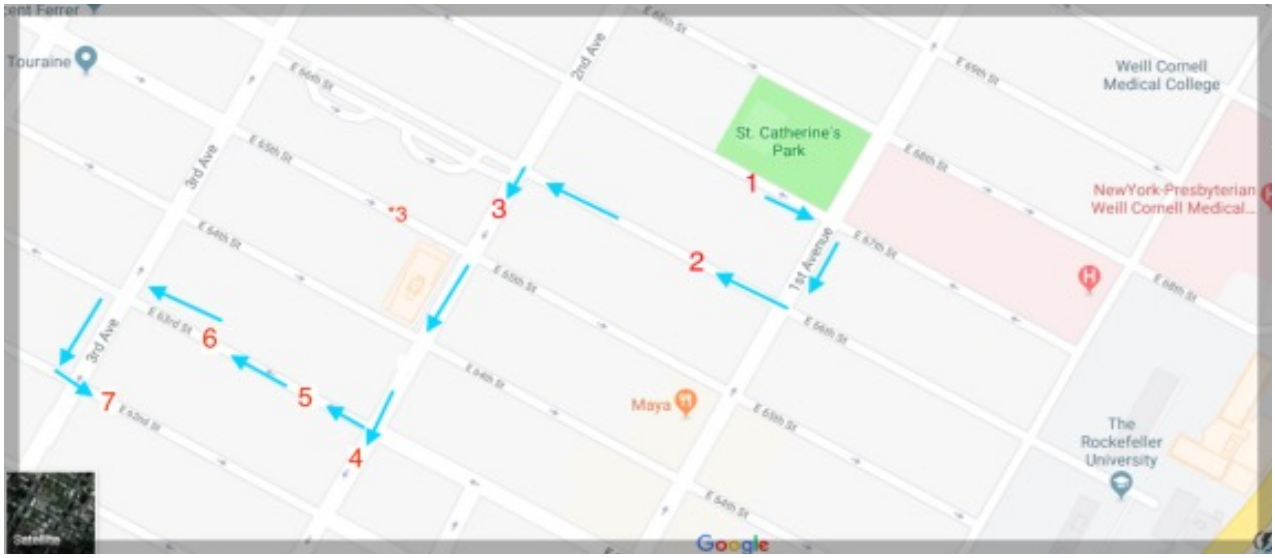
Performance Indicator 3.1
Explain the properties of materials in terms of the arrangement and properties of the atoms that compose them.

Major Understandings 3.1a, 3.1b, & 3.1c
- Minerals have physical properties determined by their chemical composition and crystal structure.
- Minerals are formed inorganically by the process of crystallization as a result of specific environmental conditions
- Rocks are usually composed of one or more minerals

Procedure

1. Use the map below and the StoryMaps Walking Tour to find the following stops. Have students take photos and answer the worksheet questions for each stop. (Please feel free to change any part of the activity so that it best suits your students' needs and learning styles.)

   - Stop 1: Cement wall surrounding St. Catherine's Park
   - Stop 2: Stone posts in front of 338 East 66th Street
   - Stop 3: Limestone with marine fossils within building walls along Memorial Sloan Kettering Building
   - *Alternate for Stop 3: Limestone with marine fossils at HSS
   - Stop 4: Duane Reade entrance
   - Stop 5: Apartment building at 250 East 63rd Street
   - Stop 6: Decorative Fill at 220 East 63rd Street
   - Stop 7: Building at 3rd Avenue at 62nd Street



2. Back in the classroom, you can have students use their worksheets to complete the Venn Diagram and Data Tables worksheet.

ANSWER KEY

What Should Student Responses Look Like?

Observational assignments like this walking tour generally produce a variety of answers. Understand that student responses may not match the answers you're imagining. They might surprise you—perhaps in good ways! That said, the tour is designed to explore specific content pieces that are clearly recognizable. If the students miss these, be sure to point them out. The following is a list of important points to note at each location.

Stop Number	Rock Name	Rock Type	Rock Texture	* Crystal or Sediment Size	Special Features
Stop 1	Conglomerate*	Sedimentary	Clastic	Varied/Large	Rounded and angular fragments mixed together
Stop 2	Granite	Igneous	Intrusive	Large	Large, interlocked crystals. Potassium feldspar is the dominant mineral.
Stop 3	Limestone (with marine fossils)	Sedimentary	Organic/ Bioclastic	Varied	Sediment feels fine grained. Many varied, easily visible marine fossils.
Stop 4	Gneiss	Metamorphic	Foliated	Large	Mineral alignment and banding present in cross-sectional parts.
Stop 5	Serpentinite	Metamorphic	Foliated	Varied/Large	Clear distortion waves and swirls visible.
Stop 6	Scoria	Igneous	Extrusive	Small	Vesicular texture
Stop 7	Gabbro/ Bronzite	Igneous	Intrusive	Large	Large iridescent crystals

* Small = less than 1mm.

Stop Number	Examples of Possible Student Observations
Stop 1	There are many different pieces of rocks together in the wall. They are not made of living things. It is a clastic sedimentary rock.
Stop 2	I see many large crystals that are stuck together. The pink mineral is potassium feldspar. I can also see quartz. The texture is intrusive and coarse. It feels rough when I touch it.
Stop 3	This is an organic sedimentary rock. There are many different fossils. Some look like snails. I can see different shells. The wall feels smooth, but also a little grainy.
Stop 4	This stop has black and white banding. The crystals are all facing the same way. Heat and pressure made this. It is metamorphic and foliated.
Stop 5	I can see swirls and distortion. This is metamorphic. I don't see any layers, so it is non-foliated. The color is green and beautiful.
Stop 6	The rocks have holes in them. They were made from gases bubbling out of the lava as the rock was cooling. The crystals are very small. The rock has an extrusive texture and is igneous.
Stop 7	I can see large crystals that are dark in color. They have a beautiful shine with a rainbow effect on them. The rock cooled slowly and has an intrusive texture.

*Stop 1 is a cement wall that was built with a variety of small pebbles and sediments.
While it demonstrates the properties of a naturally occurring sedimentary rock, it, of course, is not one.