LEARNING OBJECTIVES:
• Students will be able to name rocks, minerals, and metals that were commonly used for by ancient cultures
• Students will be able to document the location of items on a room-plan map
• Students will be able to describe how geology is expressed in the Metropolitan Museum of Art.

PREREQUISITE KNOWLEDGE AND SKILLS:
• Minerals lab
• Building Stones of the Brooklyn College Campus lab

PRE-LAB PREPARATION:
• Review common building stones from the Building Stones of the Brooklyn College Campus lab

MATERIALS FOR STUDENTS TO BRING:
• No materials needed

Note: This lab requires two lab sessions to complete in its entirety
Rocks and Stones

The Metropolitan Museum of Art was founded in 1870 to bring art and art education to the American people. In 1880, the Metropolitan Museum moved to its current site on the east side of Central Park. The Museum has been expanded greatly in size in order to house its collections of more than two million works of art spanning 5,000 years of world culture.

The museum’s Department of Scientific Research employs approximately 10 scientists (geologists, chemists, biologists). They study works of art to identify the constituent materials and manufacturing techniques, date and authenticate objects, investigate the mechanisms of aging and degradation, and monitor environmental conditions in the museum’s display and storage areas.

This group-based lab exercise will focus on the museum’s collections of artifacts from ancient cultures, including the 36,000 objects in it’s Egyptian collection which is ranked “among the finest outside Cairo”, and the more than 35,000 works of Greek and Roman Art, which is “among the most comprehensive in North America” (www.metmuseum.org). The museum’s scientific personnel have identified the earth materials from which most of these artifacts were crafted, thereby providing us with an opportunity to investigate how the properties of earth materials, and their availability, impacted the legacy of ancient cultures.

Directions and Meeting Place

The closest subway stop to the Metropolitan Museum of Art is the 86th Street Station which is serviced by the 4 (local), 5 and 6 (express) trains. Walk three blocks west (past Park and Madison avenues) to Fifth Avenue, and 4 blocks south on Fifth Avenue to the main entrance of the museum across from 82nd Street (see photo below). You can obtain further directions from the Metropolitan Museum of Art’s website (www.metmuseum.org), door-to-door subway directions from www.hopstop.com, or door-to-door driving directions from www.mapquest.com. The official address is 1000 Fifth Avenue, NY, NY.

Bags will be checked by security at the front door. A coat check is available in the Great Hall, to either side of the main entrance doors. As a non-profit organization in a building owned by the City of New York, the Metropolitan Museum of Art is a “pay-what-you can” institution. The suggested admission is $10 for students. However, you are
free to pay a lesser amount; just tell the cashier at the ticket booth what you can afford. Be sure to take a copy of the “Museum Plan” from the ticket agent or information desk to help you navigate through the museum’s exhibits.

Unless your instructor has made other arrangements with you, please meet at the Temple of Dendur, in the Sackler Wing at the far end of the galleries of Egyptian Art (see the generalized map below). This open and quiet gallery is an ideal meeting place away from the crowds and bustle of the Great Hall at the museum’s main entrance.
Temple of Dendur

The Temple of Dendur was commissioned by Emperor Augustus of Rome. Built in 15 BC, it stood on the left bank of the Nile River (approximately 77 kilometers south of Aswan) until it was removed in 1963 to save it from being submerged below the waters of Lake Nasser that rose after the construction of the Aswan High Dam. The Egyptian government gave the temple to the United States in 1965 in recognition of American assistance in saving other monuments that had been threatened by flooding associated with the dam. The 642 blocks of the temple, weighing a total of 800 tons, were dismantled and transported to America by freighter.

Sunken relief carvings of papyrus and lotus plants line the base of the temple. Images of the sun disk flanked by the outspread wings of the sky god Horus were carved above the gate and temple entrances. On the outer walls between earth and sky are carved scenes of the Emperor Caesar Augustus in regalia of the pharaoh making offerings to Egyptian deities. The red, blue, green, yellow and black paints that adorned the carvings were washed away after the first, smaller Aswan dam was built.

The Temple of Dendur was constructed from pale, yellow-brown (buff) sandstone which contains well-developed cross bedding. This sedimentary structure develops in environments where a flowing medium (water or wind) transports and deposits sediment to form ripples or dunes. The ancient water flow direction can be determined based on the slope direction of the cross beds (see image below.

Examine the walls of the Temple of Dendur, and find examples of cross bedding. Determine the water flow direction wherever you find examples of crossbeds.

Cross beds in a sandstone block from the Temple of Dendur

Examine the walls of the Temple of Dendur and search for evidence to indicate whether the rock from which the temple was carved is hard or soft. Document your evidence.

The sandstone is:  Hard  Soft  (Circle One)

The evidence that supports my conclusion is:  ___________________________________________________
___________________________________________________________________________________________
___________________________________________________________________________________________
Data Collection at the Museum

Your instructor will divide you into up to 6 groups of up to 5 students, and each group will be assigned to investigate a specific gallery of art and artifacts from an ancient culture:

- **Egyptian** – This collection is extensive. Students should limit themselves to investigating the artifacts from three periods, the Old Kingdom (2650-2150 BC), the Middle Kingdom (2010-1640 BC), and the New Kingdom (1550-1295 BC).

- **Chinese**

- **Greek** – Note that Greek artifacts share a gallery with those from the younger Roman culture. Be sure to confirm that the artifacts that you document are Greek in origin.

- **Middle American** – This collection is relatively small. However, the labeling of materials in this hall is not as detailed as those found in the other halls. Some interpretation on the part of students will be needed to categorize some of the earth materials in this gallery. This hall should not be assigned if your class has not completed a rock-related lab (e.g., Geologist as Detective, Geology of the New York City Metropolitan Area).

- **Near Eastern**

- **Roman** – Note that Roman artifacts share a gallery with those from the earlier Greek culture. Be sure to confirm that the artifacts that you document are Roman in origin.

You will be asked to determine the most common materials used for a given purpose (statuary, jewelry, pottery, paints), and provide specific examples of artifacts. To document your examples you need to note both the Collection Number (set of three numbers with two decimals, e.g., 66.196.40) in the blanks on the worksheet, and the location of the artifact on the map of the gallery that is provided in this lab; on the map, note the position of the artifact with a circle and label it with the Collection Number. When you document paints colors, you will be required to provide three adjectives to further describe the color (e.g., Blue: dark, navy, shiny; Green: pale, olive, drab)

**Group Members:** ___________________________________________________________________

**Assigned Hall:** __________________________________________

**Which types of stone are most commonly used to make large sculptures?**

Most Common: ____________ Examples: _________ _________ _________ _________

Describe the appearance of the surface:
_________________________________________________________________________________
_________________________________________________________________________________
_________________________________________________________________________________

2nd Most Common: ____________ Examples: _________ _________

Describe the appearance of the surface:
_________________________________________________________________________________
_________________________________________________________________________________
_________________________________________________________________________________

3rd Most Common: ____________ Examples: _________ _________

Describe the appearance of the surface:
_________________________________________________________________________________
_________________________________________________________________________________
_________________________________________________________________________________
Which metals are used most commonly, and for what purpose?

Most Common Metal: ___________________       Most Common Use:  ____________________
Examples: _________  _________  __________

2nd Most Common Metal: ___________________       Most Common Use:  __________________
Examples: _________  _________  __________

3rd Most Common Metal: ___________________       Most Common Use:  __________________
Examples: _________  _________  __________

Other metals: ____________________ ____________________ ____________________

Which gemstones are most commonly used to make jewelry?

Most Common: ________________ Examples: _________  _________  __________  _________

2nd Most Common: ________________ Examples: _________  _________

3rd Most Common: ________________ Examples: _________  _________

Which color pigments are most commonly used to decorate pottery?

Most Common: ________________ Examples: _________  _________  __________  _________
Adjectives to Further Describe Color: ____________ ____________ ____________

2nd Most Common: ________________ Examples: _________  _________
Adjectives to Further Describe Color: ____________ ____________ ____________

3rd Most Common: ________________ Examples: _________  _________
Adjectives to Further Describe Color: ____________ ____________ ____________

Other colors: ____________________ ____________________ ____________________

Which color pigments are most commonly used to paint walls or statues?

Most Common: ________________ Examples: _________  _________  __________  _________
Adjectives to Further Describe Color: ____________ ____________ ____________

2nd Most Common: ________________ Examples: _________  _________
Adjectives to Further Describe Color: ____________ ____________ ____________

3rd Most Common: ________________ Examples: _________  _________
Adjectives to Further Describe Color: ____________ ____________ ____________

Other colors: ____________________ ____________________ ____________________
Greek and Roman Art Floorplan

Egyptian Art Floorplan

To Arts of Africa, Oceania and the Americas
To the Great Hall
To The American Wing

To the Grace Rainey Rogers Auditorium
To the Great Hall

Old Kingdom
New Kingdom
Middle Kingdom

Temple of Dendur
Cypriot Art

Ancient Near Eastern Art

Chinese Art

Art of the Americas

To 19th Century European Paintings and Sculpture

To Great Hall Balcony

To South and Southeast Asian Art

To South and Southeast Asian Art

To Japanese Art

To Modern Art

To European Sculpture