Lab Activity: Relative Dating

INTRODUCTION:

When observing a road-cut the different stratum of rocks becomes obvious. Geologic events such as deposition, erosion, volcanism and faulting are preserved in the rock and it is possible to determine the sequence of events from oldest to most recent. Sequencing events establishes a relative age of a stratum.
The process of showing that rocks or geologic events occurring at different locations are the same age is called correlation. Index fossils and similar rocks types help geologists establish correlations between distance rock outcrops.

OBJECTIVE:

Using cross sections you will infer the logical sequence of geologic events and establish relative age for a series of rock layers for one or many different locations.

VOCABULARY:

Unconformity

Principle of Superposition

Original Horizontality

Correlation

Intrusion

Index Fossil

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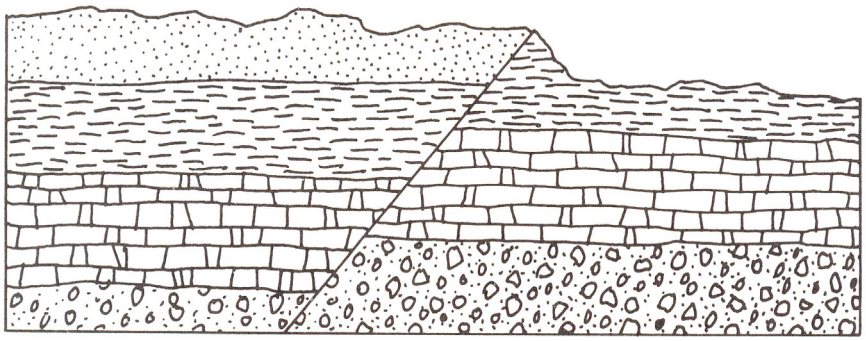
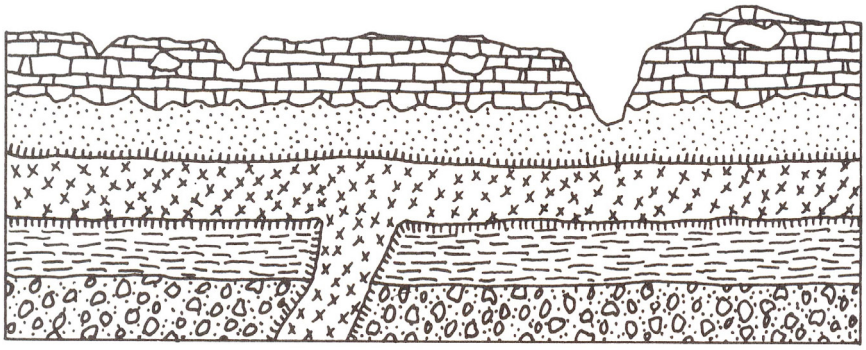
PROCEDURE A:

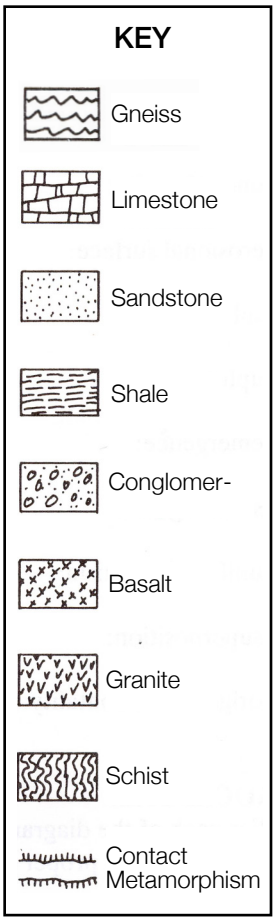
Using Cross Sections 1 and 2, determine the sequence of events and order them from oldest to most recent on the Report Sheet. In addition to determining the relative age of the different strata, you need to determine the relative age of unconformities (erosion), cross-cuttings (faults), and intrusion.

CROSS SECTION 1



CROSS SECTION 2





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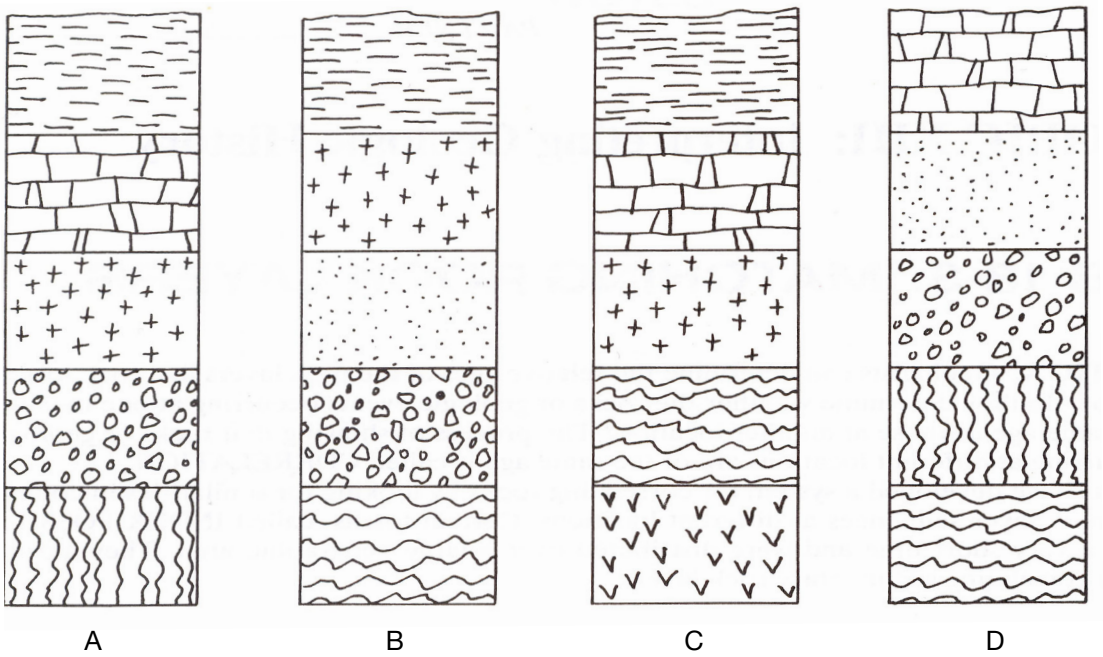
PROCEDURE B:

Cross-sections 3 is from four different locations in New York State. Reconstruct the complete sequence of events. Assume that the oldest rocks are on the bottom and the youngest are on the top. Draw in the strata in the column on the Report Sheet. Each rock type is used only once.

CROSS SECTION 3



A B C D

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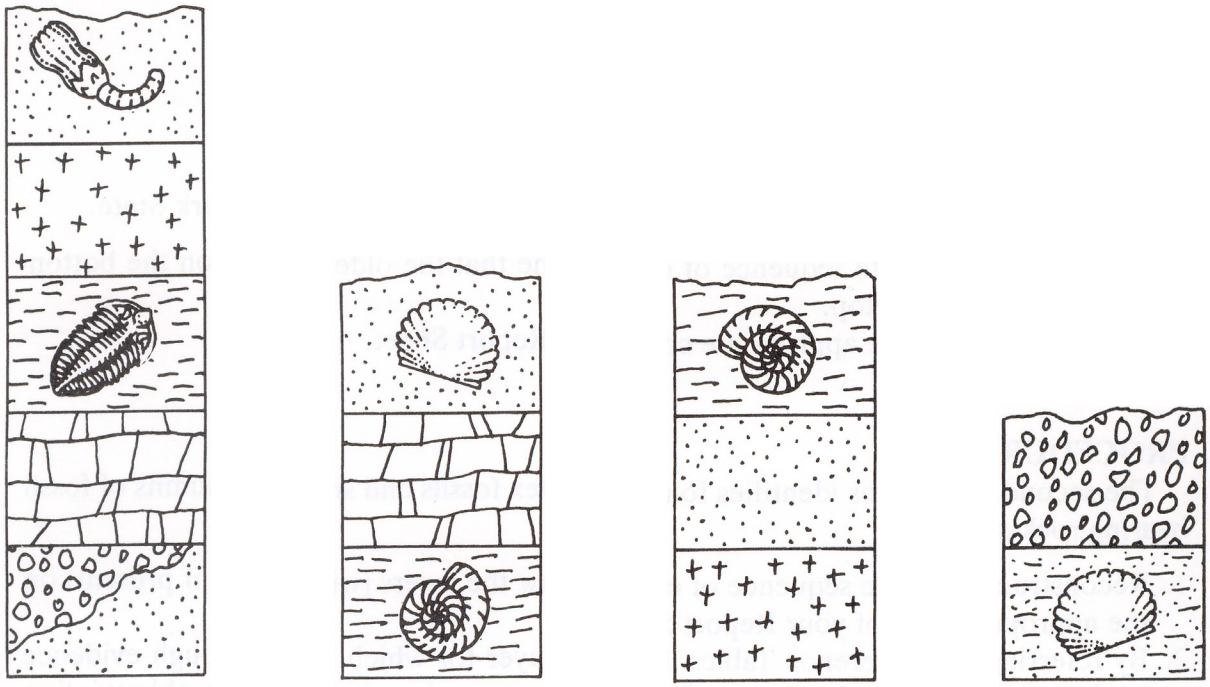
PROCEDURE C:

The sketches below are of index fossils from specific geologic time periods. Cross Section 4 is from four different locations in New York State. The Reference Table will help you determine the age of the index fossils. Record the age range of each index fossil in the Results section. Once you determine the oldest fossil it is possible to determine which location has the oldest strata. Re-construct the complete sequence of events and draw the strata in the column on the Report Sheet. Some rock types may be used more than once.

CROSS SECTION 4



A B C D

Pecten
(Paleogene Period)

Crinoid
(Mississippian Period)

Ammonite
(Cretaceous Period)

Trilobite
(Devonian Period)

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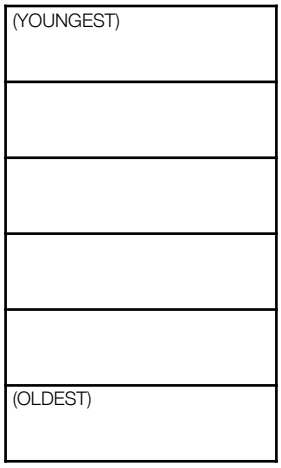
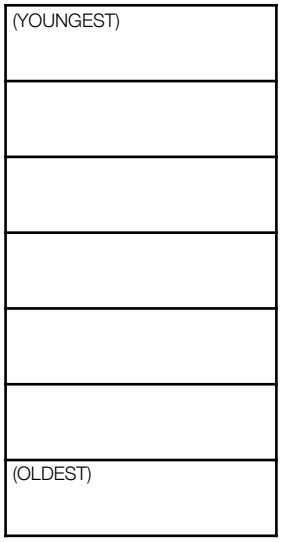
REPORT SHEET

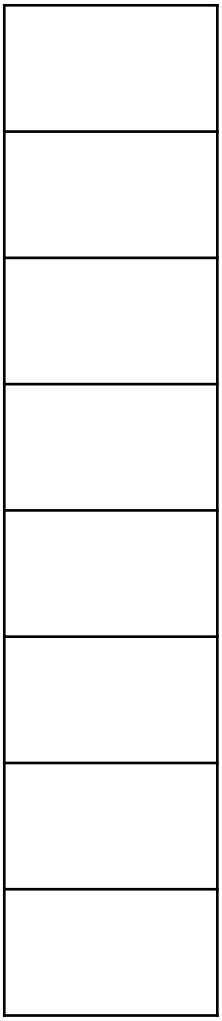
PROCEDURE A
CROSS SECTION 1



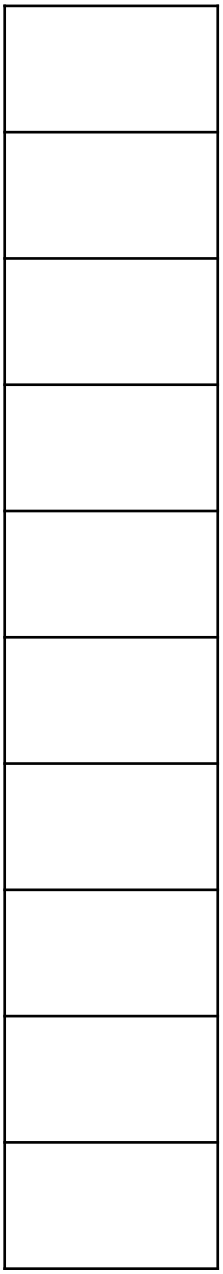
PROCEDURE A
CROSS SECTION 2



PROCEDURE B
CROSS SECTION 3



PROCEDURE C
CROSS SECTION 4



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DISCUSSION QUESTIONS:

1. How is the Law of Superposition used to determine relative age of strata?

2. Explain how an older rock layer could appear on top of a younger rock layer.

3. Why is the age of a fault younger than the rock in which it is found?

4. What is a possible explanation for why strata may be absent from some outcrops?

5. List two characteristics of a fossil that would make it a good index fossil.

6. What is the minimum age of the lowest strata in Procedure C?

CONCLUSION: What relative dating methods do we use to date rocks found in cross sections?