

# **Collecting Rocks, Minerals & Fossils**

## **Unit I: Beginning Geology**



### **Requirements and Project Record Book**

Member's Name \_\_\_\_\_

Age \_\_\_\_\_ County \_\_\_\_\_

Years in 4-H \_\_\_\_ Club \_\_\_\_\_

Name of Local Leader \_\_\_\_\_

Prepared by

Harold E. Jones, Extension Specialist, Soil and Water Conservation

## *To Parents and Leaders*

Too much regimentation can take the fun out of life. However, recreation and learning, like work, can be more enjoyable if we have some goals in mind. With a project book like this one it is easy to be too strict or too permissive. Some of these problems became apparent when project members attempted to follow the requirements outlined in the first edition of Beginning Geology.

One of the mistakes was the emphasis on age limits for the project members. Youth don't all start geology at the same age. Some may be 9 years old when they start and others 13 or 14 years old. So in this revised Beginning Geology, age limits are removed.

Instead, the purpose of Beginning Geology is to be emphasized. The purpose is simple: learning how to locate, identify and exhibit rocks, minerals and fossils. For even the best minds, memory is a fleeting thing. Specimens that are not properly identified, described and labeled are just a box of rocks, minerals and fossils—not a collection.

In geology, perhaps even more than for some other 4-H projects, records must be kept beginning with the first field trip and the first sample collected. The time to prepare for this record keeping is before the collecting trip is started. These are the reasons for the detailed forms for record keeping in the project book. We recommend project members take a field notebook on collecting trips and transferring the information to the project book after they return and have verified the names of the specimens. This will help keep the record book clean and neat.

No matter what age the youth is when first enrolling in the geology project, he or she must start with Beginning Geology. It is up to the industriousness of each youth and the judgment of

the leader as to when sufficient knowledge has been accumulated to warrant moving to intermediate geology, "Classifying Rocks, Minerals and Fossils." It may take an industrious, older youth only a single season to master Beginning Geology. Other 4-H'ers, especially if they are younger may need 3 or 4 years. *This is a judgment the leader must make.*

Once the 4-H'er learns that certain rocks, minerals and fossils can be found only in certain geological formations and can identify these formations, then he or she is ready for Intermediate Geology.

Beginning Geology has been changed in another and more important way. Each Beginning Geology member must complete a "*basic phase*" and a given number of "*optional exercises*" each year. There are several levels of difficulty in the basic phase. The leader should start the 4-H'er at the basic phase level and in the optional exercises that are compatible with the youngster's capability and willingness to work. For example, the leader may decide that the 4-H'er should be able to collect 30 or more rocks, minerals and fossils during his or her first year in the Geology project. This becomes the youngster's basic phase goal.

In addition to acquiring considerable knowledge and enjoyment, boys and girls, through this geology project, can form useful work and play habits that will help them all of their lives. As a parent or a leader, it is *your responsibility* to see that your Beginning Geology members completes the tasks outlined in this project book. Be sure your 4-H'ers *start only what they can finish and finish what they start.*

# Requirements for Beginning Geology

The first part of the process of studying geology is learning how to locate, identify and exhibit rocks, minerals and fossils. Beginning Geology is designed to introduce you first to some of the more common geological materials in your home community.

Field trips are necessary if you are to collect samples and learn about them in their natural settings. *Any specimens obviously collected from places other than their natural settings will not be allowed as part of your collection.* You should take several field trips. Some collecting sites may be close enough to your home so you can walk to them but usually your parents or leader will have to furnish you transportation to the collecting site. It is hoped that at least one trip can be in another county far enough from your home community so you find considerably different specimens and geological formations.

The minimum requirements for participation in Beginning Geology are listed below:

## Basic Phase

Collect, clean, identify, label, and mount one of the following collections:

- At least 15 different rocks, minerals and fossils in one 18" x 24" glass covered box.
- At least 30 rocks, minerals and fossils in one 18" x 24" glass covered box. At least five of the specimens shall be rocks, five minerals, and five fossils.
- At least 45 rocks, minerals and fossils in no more than two 18" x 24" glass covered boxes. At least five of the specimens shall be rocks, five minerals and five fossils. More than one of the same kind of rock, mineral or fossil can be exhibited if they illustrate definite differences in rock formations represented or differences in color, crystalline structure, etc. For example: selenite, anhydrite, rock gypsum and satin spar are all gypsum minerals but have distinctly different physical forms. Another example is Niobrara chalk and Fort Hays limestone are both limestones but they differ considerably in color and hardness.
- Share what you have done by giving a talk, demonstration, or exhibiting if possible.

In all three levels of the Basic Phase only Kansas rocks, minerals and fossils will be counted in determining the minimum number of specimens required. The only exception is for those counties which border other states. In this case the specimens collected in the bordering county in the other state can be considered Kansas specimens.

You may have some especially attractive rocks, minerals or fossils from other states which you wish to display. These may be included but must be exhibited in a special section of your display box and clearly marked as out-of-state specimens. They will not count in the number of specimens needed to meet the minimum requirements. Also, Indian artifacts or polished rocks and minerals will not count in meeting the minimum number of specimens required.

## Optional Exercises

Optional Exercises is a term we are using to designate special problems you may work out on some phase of Beginning Geology or some activity you perform relating to geology.

To qualify as having completed a year of Beginning Geology you must *perform three* of these problems or activities. Your project leader must approve these optional activities before you perform them and you must report what you did or the experience you had in the section of this project book included for that purpose. You must include at least two new problems or experiences each year.

The following are examples of Optional Exercises which you may choose to do. You may think of others which can be done with your leader's approval.

1. Give a project talk on what geology is and why studying about it is important.

2. Write a short account of the equipment needed for a geology field trip.

3. Give a demonstration at your 4-H club meeting on how to clean and label geology specimens.

4. Give a demonstration at your 4-H club meeting on how to mount and display geology specimens.

5. Write an account of your first geology field trip and the specimens you collected.

6. Give an illustrated talk at your 4-H club meeting explaining the legal government land description system.

7. Prepare a road log of one of your collecting trips in your county.

8. Give an illustrated talk at your 4-H club meeting on ways to safely store geology specimens.

9. Prepare a map of the sites in your county where you have collected specimens and name the specimens you collected at each site.

10. If your family takes a vacation out of state, list some of the rocks, minerals and fossils you saw that are not present in your area.

11. Give a safety talk at your club meeting using geology as your safety topic.

12. Visit a rock shop if there is one in your area. Make a list of rocks and minerals found in the shop and where they came from.

13. Make a hardness kit to help in identifying minerals.

14. Give a demonstration at your club meeting on the use of the streak test for identifying minerals.

15. Visit a rock quarry. Write a short account about the rocks being quarried and the uses that are being made of the rocks.

16. If there is someone in your community who polishes rock, make arrangements to visit his shop. Write a short account of the equipment he has and what he does.

17. Visit a gravel pit if there is one in your area and name the rocks, minerals and fossils found there that are not found in other parts of your county.

18. If you take an out-of-county field trip, make a road log of the sites you visited and the specimens you collected.

19. Demonstrate how carbonate rocks and minerals can be identified by using the hydrochloric acid test.

20. Make a list of as many iron minerals as you can and indicate which ones occur in your county.

21. Write a short story about geodes; including what they are, how they were formed and where you are most likely to find them.

22. Make a list of as many different silica minerals as you can and name the ones found in your county.

23. Make an exhibit using different minerals to illustrate the differences between metallic and non-metallic luster.

24. Make a display of the different shales found in your county and the fossils found in each of the shales.

25. Name all the rocks and minerals you can that contain calcium carbonate and indicate which ones can be found in your county.

26. Without using your geology manual or any other reference, list at least 100 geology terms and names you have learned in 4-H geology.

27. Make a display showing all the different colored sandstones you have collected during your field trips. Indicate which ones were found in your county.

28. Give a talk at your 4-H club explaining what fossils are and in what kind of rocks they may be found.



# Mineral Specimens Collected and Identified

Number and list all of the specimens you have collected this year. Be sure to fill in all the spaces. Use more sheets if needed.

Sample No.	Date Collected	Name of Mineral	Where Found	Description (color, luster cleavage, fracture. etc.)
(EXAMPLE) 7	3-24-70	Ghert	Intersection I-70 and K-177, Riley County.	Conchoidal fracture, dull gray color, opaque, sharp edges, quite hard.

## Fossil Specimens Collected and Identified

Number and list all of the specimens you have collected this year. Be sure to fill in all the spaces. Use more sheets if needed.

Sample No.	Date Collected	Name of Fossil	Where Found	Description (condition, form, matrix, etc.)
<i>(EXAMPLE)</i> 11	4-10-70	<i>Brachiopod Shells</i>	<i>Emergency spillway Tuttle Creek Dam</i>	<i>Embedded in grayish-green shale.</i>

# Optional Exercises

Use this page to record the *three* optional exercises that are required in Beginning Geology. Add additional pages if necessary. If the exercise calls for a story about something relating to geology, an account of some experience you have had, or a listing of some, write about it as briefly but as concisely as possible. If the exercise is a project talk, demonstration, exhibit or display you need only to tell what it was, a brief account of its purpose and content, and where you used it. Any maps you make may be folded into the report or attached to it. Use extra sheets if necessary.

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