Geology Challenge: Collecting Rocks, Minerals, and Fossils

Geology is the science that deals with the earth's physical structure and substance, its history, and the processes that act on it. Discover the types of rocks, minerals, and fossils that can be found where you live. Learn about geological formations across Kansas. In this challenge, you'll explore some basic tips for collecting rocks, minerals, and fossils, and how to display your geology collection.

Starting Out

Learn About Geology

- Explore which types of rocks, minerals, and fossils occur naturally in your area.
- Collect different specimens of rocks, minerals, and fossils.
- Learn how to clean your specimens for display.

Learning More

Learn About Your Collection

- Identify your rocks, minerals, and fossils.
- Learn how to use field guides for identifying your specimens.
- Take part in a geology field trip.

Expanding Horizons

Display Your Collection

- Learn how to properly label your collected specimens.
- Learn how to display your collected specimens for your county fair.

Inspire Kids to Do

Skill Building

- Explore the environment around you. What types of rocks, minerals and fossils are found where you live?
- Learn ways to identify the rocks, minerals, and fossils.

Goals

- Learn about and identify the rock formations of your area.
- Identify the rocks, minerals, and fossils found in those rock formations.

Project Ideas

- Learn the three different types of rocks and which are found in Kansas.
- Make a display of your collected rocks, minerals, and fossils for your county fair.
- Give a talk about your geology collection.

Self-Evaluation Before

Using the rating scale below, answer the following:

1 = not at all
2 = a little
3 = a lot

I know...

How to identify the rocks, minerals, and fossils ..... 1 - 2 - 3

The three types of rocks found in Kansas..... 1 - 2 - 3

The minerals and fossils found in my area .....1 - 2 - 3

Geology Challenge: Collecting Rocks, Minerals, and Fossils

Challenge Instructions

- Identify your collected specimens.
- Display your geology collection, page 3.
- Plan a field trip in your area and collect rocks, minerals, and fossils, page 5.

When finished, please visit: www.tinyurl.com/KS4H-Challenge to tell us what you learned. Thanks.

Helpful Tips

- Start with a place where a road cuts through a hill. If on private property, get permission from the landowner before collecting.
- Rock outcrops and road cuts along county roads are good locations to begin looking.
- Start simple. If something looks interesting, pick it up. It can be identified later.
- Use a small bucket to put your collected specimens in. Smaller items can be put in a sealable plastic bag. Carry out everything you collected.

Leadership

(Suggested for Intermediate and Advanced Levels.)

Teach someone what you have learned.

- Teach 4-H members how to collect and identify rocks, minerals, and fossils.
- Plan and invite family, friends, and neighbors to go on a geology field trip.
- Other _____

_____

_____

_____

Curriculum and Resources

To learn more about the geology project, visit the 4-H Geology project page.

Kansas 4-H Geology Project Leader Notebook, S149

National 4-H Curriculum is found at shop4-H.org

- 4-H Geology: Introduction to the Study of the Earth

Kansas Geology ID

Kansas 4-H Geology Field Trip

Life Skills Learned (check all that apply)

- ☐ Positive Self-Concept
- ☐ Inquiring Mind
- ☐ Concern for Community
- ☐ Sound Decision-Making
- ☐ Healthy Interpersonal Relationships

Share

- ☐ Read a book about rock collecting at the local library story hour.
- ☐ Present a project talk or demonstration at a club meeting telling what you learned about geology.
- ☐ Create a geology display to use in teaching others about your project.
- ☐ Other _____

Evaluate Your Experiences!

What did you learn about the geology in your area? _____

_____

What was the most unique specimen you found? Where did you find it? _____

_____

_____

What was your biggest challenge in this project challenge? _____

_____

To complete the Challenge, take a selfie while doing the activity. Upload the photo and take the survey about your Challenge experience. **www.tinyurl.com/KS4HChallenge**

Local Contact Information

Self-Evaluation After

Using the rating scale below, answer the following:

1 = not at all
2 = a little
3 = a lot

I know...

How to identify the rocks, minerals, and fossils ..... 1 - 2 - 3

The three types of rocks found in Kansas..... 1 - 2 - 3

The minerals and fossils found in my area .....1 - 2 - 3

Kansas Clover Classroom

Adapted from NW 4-H Advisory Challenge created by Wally Mack, Riley County 4-H Volunteer, and Patsy Maddy, Twin Creeks District Extension Agent

K-STATE Research and Extension

Kansas State University Agricultural Experiment Station and Cooperative Extension Service

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Field Trip Preparations

Materials Needed

- Suitable clothing and sturdy shoes
- Pencil and paper
- Containers and labels (sacks, small bottles, plastic bags, etc.)
- Soft material to wrap delicate samples (rags, facial tissues, newspaper, etc.)
- Field trip guide or maps
- Identification aids (books, drawings, charts, etc.)
- Hammer and/or chisel
- Gloves and safety glasses
- Water and food
- First aid supplies, sun screen and insect repellent
- Full tank of gas and spare tire (if using cars)

Rules and Safety Tips

1. Be on time and stay with the group or you might get left behind.
2. When getting out of cars along roads, exit on the passenger side.
3. Be careful when coming out from behind parked cars.
4. Cross roads with adults and be careful at all times when near roads.
5. Stay away from open shafts, pits, mines, equipment and wire.
6. Don't swing or throw rock hammers.
7. Use some type of eye protection if you hammer on a rock. (This includes the people near you.)
8. Take extra care around steep slopes, stream banks, sink holes, quarry walls and piles of material. The footing may not be good and they all offer places for snakes and other animals to be unexpectedly found.
9. Watch out for people below you on out-crops; rocks that you dislodge may injure someone!
10. Do not throw, roll or push other material down hills, cliffs or material piles.
11. Don't try to lift BIG rocks.
12. When looking under rocks, use a hammer to lift the side away from you, and pull it toward you. This allows snakes and other critters a chance to escape.
13. Take plenty of drinking water.
14. Bring a change of clothing and an extra pair of sturdy shoes (preferably high-tops).
15. Leave wildlife alone. Let them enjoy their own freedom and space. When returning from a field trip check for ticks and other unwelcome guests.

Collecting Tips

1. Collect with purpose, don't try to bring home every rock, mineral, or fossil that you find.
2. Always label specimens promptly with the stop number and location.
3. Collect specimens that are as close as possible to the size that you will be using in your exhibit.
4. If possible, collect samples that are not connected to another rock. These may already be in good shape to exhibit without your having to try to remove the sample from the rock.
5. If it is necessary to remove a specimen from the rock, do so with care. Remember a careless blow with a hammer can ruin the best of specimens. If the rock is small enough, take it home and take your time in removing the specimen. However, if the specimen must be removed from a large rock, use a coal chisel to remove rock from a trough around the specimen (not right next to the specimen, but a little distance away), then use the chisel to undercut the specimen and pop it free. Most specimens obtained in this way will need additional trimming or removal of the excess rock to get it ready for display.
6. When specimens are collected, they should be wrapped in newspaper or other material and placed in some container to provide maximum protection. No one likes to get home and find a bunch of pieces to remind them of how hard they worked to collect the samples.
7. If you collect carbon-film fossils, consider using clear plastic spray to stabilize the fossil. This may need to be applied to the fossil before it is completely dry. However, try it on a sample that is not a prime specimen first, before spraying that one in a million find. Use several thin coats as needed instead of one thick, runny, coat.
8. If you feel that a specimen needs to be cleaned up, try brushing or washing first. This will be okay for most specimens.
9. If you feel that a specimen needs to be removed from other material, check appropriate references for the proper procedure.

Source: Chapter 7, 4-H Geology Project Leader Notebook, S149

Building a Geology Display Box

Collecting rocks is fun, and showing off rocks you've collected is also fun. When you make them into a display, it helps you organize them and learn their names. It also shows other people what interesting things can be found in our state and is more attractive and convenient to look at than a pile of rocks.

If you are not planning to show your display for competition, you could display your collection by any of a variety of methods. One way is to put each one in one section of an egg carton. Another is to get a plastic box with dividers in it (like for fishing tackle or sewing supplies). You could also glue your samples to a board or poster. Be sure you have each sample labeled with where you found it and what it is.

If you are going to be exhibiting at the state fair and most classes of the county fair, however, there are strict rules that you will need to follow to qualify. There are several variations of rules that do not meet the requirements. You might want to consider the ones you have seen used. Here is a basic guide to producing a top-notch geology display box.

Select your specimens carefully. Reread the rules in the fair book to make sure you have met the requirements. Most classes require you to have 15 new specimens collected in the current year in Kansas. Another member of your family or the group could have actually found the specimen as long as you were at that stop. You want specimens that are approximately 2 inches or less in size. If you have one or two really great larger specimens, that is OK also. If you have several small fossils, see if you can make a grouping with an odd number (three, five or seven) of them on the card (like putting seven fusulinids on one card). Make sure your identifications are correct. If you have a specimen you can't get a positive identification on, leave it out if you can.

The box used for geology is a wooden box 18 inches by 24 inches with a plexiglass top; the same as an entomology box. You can get directions for making it from your 4-H leader or the extension office, or from your geology leader. Put something in the bottom of the box, like ceiling tile or cork, that pins can penetrate; and cover it with some attractive medium-color fabric like felt that will not detract from your specimens, or show dirt. Each box can hold up to approximately 30 specimens.

Each specimen must be labeled with the following correctly spelled information: date collected, name of specimen and location (county) where it was found. The label also calls for a specimen number. When you return from a field trip, each specimen should be given a number. For example, one of the specimens you collected on the first stop of your first field trips would be No. 1. The next year, you start numbering where you left off. You should also show whether it is a rock, mineral, or fossil by putting a capitol R, M, or F in the upper right-hand corner of your label. For fossils, genus and species names should be underlined, or typed in italics, if you are using any of those designations. If possible, have your labels typed. If someone else types the labels, you should be the one to write out the information and check the spellings. Then they just need to type them. Labels may be obtained from your local

Specimen Card and Label

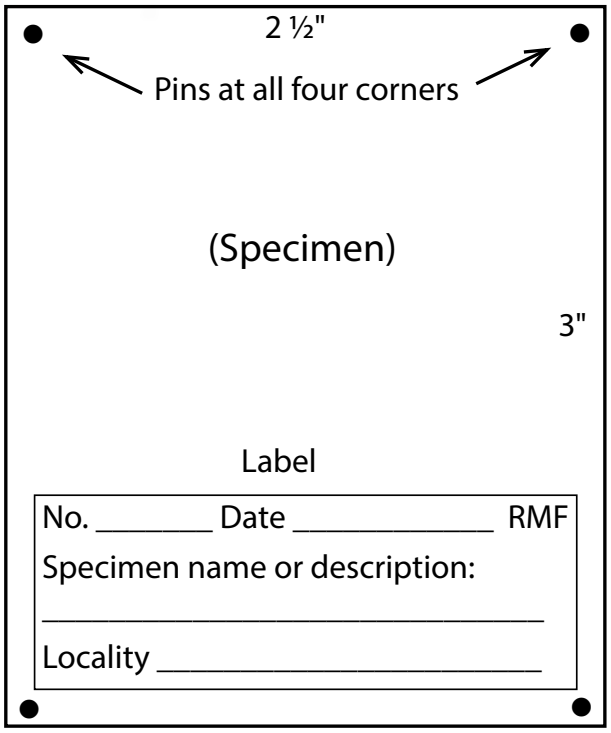
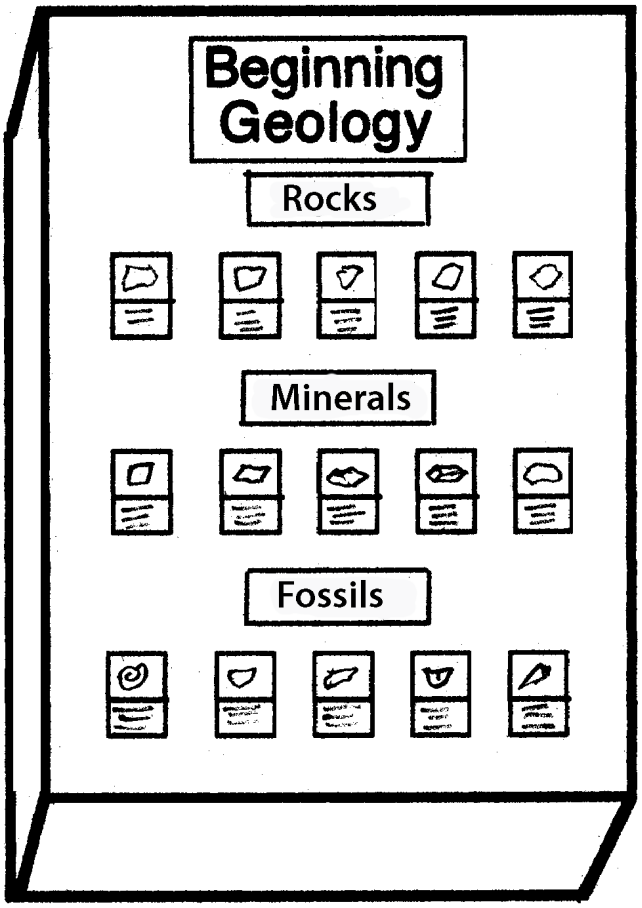


Fig. 1: Example of completed display box.



K-State Research and Extension office, or you could format your own on the computer, etc. It is a handy idea to print them off on gummed labels.

Instead of mounting your specimens directly in the box, you may want to mount them on a small piece of cardboard so that it is easy to remove them and take them out. Half of an unlined 3-by-5-inch recipe card is a good size for most specimens. The regular label also fits across the 2-inch dimension of it with only minor trimming. Glue your specimen firmly to it about one-third of the way down the card, leaving room for the label, without extra glue showing. A glue gun is handy for larger specimens. Elmer's glue types also work but be sure to allow it to fully dry in a flat position, or your specimens may slide from position. Glue the proofread label on the bottom third of the card. You may need to neatly trim the label to match the card.

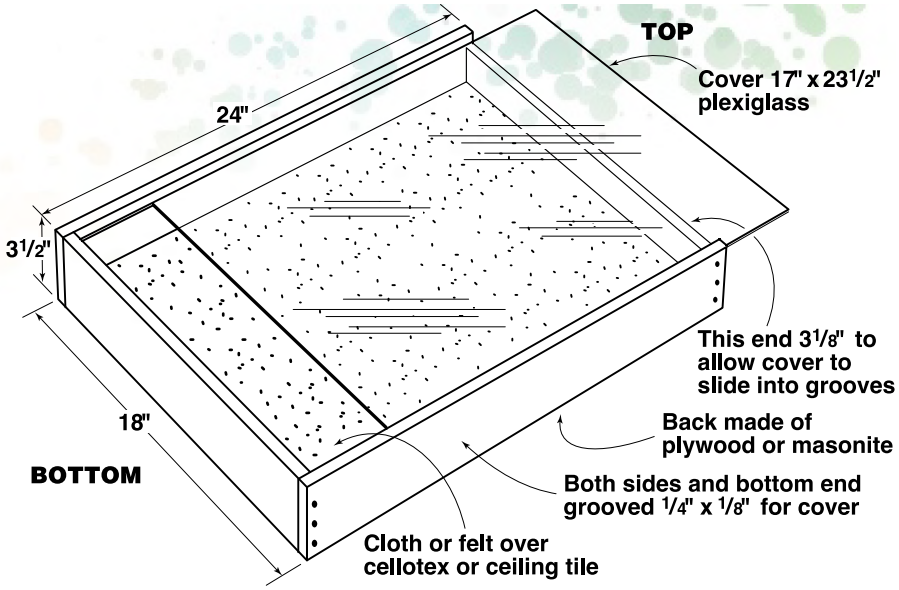
Your box needs a title that tells in what phase of geology you are enrolled (Example: BEGINNING GEOLOGY). Make smaller labels for the categories. You will need labels for rocks, minerals and fossils, and maybe more for later years. Arrange your box neatly and logically, grouping the cards with specimens under each category. As you do this, look at each category and see if you can tell how they are alike. Put larger, heavier specimens toward the bottom of the box. Straighten the rows, using a ruler or straight edge for a guide. Then pin the cards and labels down, pushing the pins in all the way. Sequin pins, available at some fabric or hobby stores, are good to use as they are not as long as regular pins. It usually takes a pin in each corner to hold the card flat.

Now your box is finished. Look at it carefully, pretending you are the judge. Did you follow all the requirements? Is your box neat and attractive? Are your identifications correct? Use a checklist, if you have one. It is a good plan to review it also. Correct any errors that are found. Then pack it carefully and enter it in the fair. No matter what award you get, you will know you have done a good job and have completed a project you can be proud of.

At the State Fair the top of the box should be the short end (18") from which the cover is to be removed for inspection. Otherwise there is a chance that the cover will fall out when the boxes are placed upright in the display racks. Any lettering or labeling in the exhibit should be right side up for reading with the cover removal end up.

For exhibiting at the State Fair, the specimens must be displayed in cases 3½" x 18" x 24" in size, similar to the case shown above left. It is not necessary to have the cover inserted in grooves as shown in the diagram, but the cover must be removable. The reasons for asking for display cases of this size and construction are simple. The covers allow the judges to examine the specimens. The display racks hold the cases with the long side (24") up and down, and cases too long or too short may not fit in the racks.

Directions adapted from the 1975 Exploring The World Through Geology Leaders Notes.



Geology Display Case

18 X 24 inches

Materials List:

1. Bottom ¼" x 18" x 24" plywood or ⅛" x 24" tempered masonite
2. Two side pieces of pine ¾" x 3 ½" x 24" groove to accept cover ¼" x ⅛"
3. One end piece of pine ¾" x 3½" x 16½" groove to accept cover ¼" x ⅛"
4. One end piece of pine ¾" x 3⅛" x 16½"
5. One cellotex or ceiling tile ½" x 16 ½" x 22½". Cover bottom so pins will stick.
6. One piece of cloth or felt to wrap around bottom, about 20" x 26"
7. One plexiglass for cover ⅛" or more x 17" x 23½"

Source: Chapter 7, 4-H Geology Project Leader Notebook, S149

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