Common Rock Classification: Make Your Own Key

Activity Purposes

-To introduce students to the most common and basic types of igenous, metamorphic, and sedimentary rocks, and the characteristics that are typically used to describe them.
-To faciliate observational learning through the practice of guided and freeform classifications of natural objects.
-To help students learn how to distinguish between similar types of natural objects through comparisons and contrasts of physical qualities.

Target Audiences

Kindergarten - Third Grade: These grades will ideally use the mats labeled with rock characteristics.

Fourth - Eighth Grades: These grades will ideally use the three flowcharts with rock characteristics supplied. The mats may be used in conjunction for hands-on reasoning and organizing.

Ninth - Twelfth Grades: These grades will ideally use the three flowcharts with the rock characteristics missing. The mats may be used in conjunction for hands-on reasoning and organizing.

Required Materials

-Printouts of the rock classification mats, pages 13-32 (if appli cable). These can be printed on cardboard and/or laminated for extended durabilty.

-Copies of the flowchart worksheets (if appli cable).

-Dilute HCl (NOTE: This should not be used with grades under 5. Please explain safe laboratory practises to all students).

-Several labeled sedimentary rocks, ideally:
- shale
- siltstone
- sandstone
- micrite
- fossiliferous limestone
- breccia
- conglomerate

-Hand lenses (optional, but very useful)

-Several labeled igneous rocks, ideally:
- granite
- diorite
- gabbro
- basalt
- pumice
- rhyolite
- scoria
- obsidian

-Several labeld metamorphic rocks, ideally:
- gneiss
- marble
- quartzite
- slate
- mica schist
- garnet schist

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Activity Instructions

Classifying Rocks with Descriptive Mats (K-3)

Please print out all of the mats (pages 13-32 of this handout) and lay them out on tables, keeping the sedimentary, metamorphic, and igneous mats grouped together. Please place all sedimentary rocks to be used in the activity on the mat that says “All Sedimentary Rocks Starting Mat”. Do likewise with the igneous and metamorphic rocks. Students can now separate these groups of rocks into two groups on the next mat, according to the rock characteristics written on the sections of mat. These groups of rocks will be broken down into smaller and smaller groups as they are moved to subsequent mats, until each rock has its own section on a mat.

Creating a Rock Key with Supplied Characteristics (5-8)

Please supply the students with copies of the three flowcharts with rock characteristics supplied in the shapes. Place the sedimentary, igneous, and metamorphic rocks into separate groups. The students can then examine each group of rocks and begin by listing all the rocks within the appropriate class on the flowcharts. The students will then break these groups down into successively smaller groups according to rock characteristics in the flowchart shapes, creating a rock identification key.

Creating a Rock Key from Scratch (9-12)

Please supply the students with copies of the three flowcharts with the blank characteristic sections in the shapes. Place the sedimentary, igneous, and metamorphic rocks into separate groups. The students can then examine each group of rocks and begin by listing all the rocks within the appropriate class on the flowcharts. The students will then break these groups down into successively smaller groups according to rock characteristics that they create and place within the top of the flowchart shapes, creating a rock identification key.

Using This Activity as a Practical Exam

This activity can be utilised as a lab-based, practical exam in various ways. One such way might be to provide the students with unlabeled rocks, and then allow them to use their previously completed worksheets to identify the rocks. If hand samples are not to be used on the exam, then a copy of the three worksheets without the characteristics with the groups of rocks written in may be supplied to the students. It would then be their task to write in the unifying characteristic for each group of rocks on the flowcharts. Alternatively, the students could be given copies of the three worksheets with characteristics and the list of rocks provided in the first rectangle only. In this case, the goal would be to list the correct rocks under the correct characteristics.

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Post-Activity Discussion Questions

After Any or All Activities

-Were any two or three rocks very similar to each other? How did you end up separating them?

-Would this activity have been more difficult if the rocks had not been separated into the metamorphic, sedimentary, and igneous classes? Why or why not?

-Are there any rocks that belong to different classes (igneous, sedimentary, and metamorphic) that are similar to each other? How are they similar? What might this mean about the formation and/or components of the rocks?

After Classifying Rocks with Descriptive Mats

-Could you apply this categorization technique to classifying other natural objects? What examples can you imagine?

After Creating a Rock Key with Supplied Characteristics

-Do you think the different characteristics into which the rocks were categorized reflect things such as how they are formed, what they are made of, etc.? Can you tell which rocks contain some common materials, and which rocks were formed by similar processes?

After Classifying Rocks with Descriptive Mats and/or Creating a Rock Key with Supplied Characteristics

-Can you think of any characteristics that would be better suited to categorize the rocks than the ones listed in this activity?

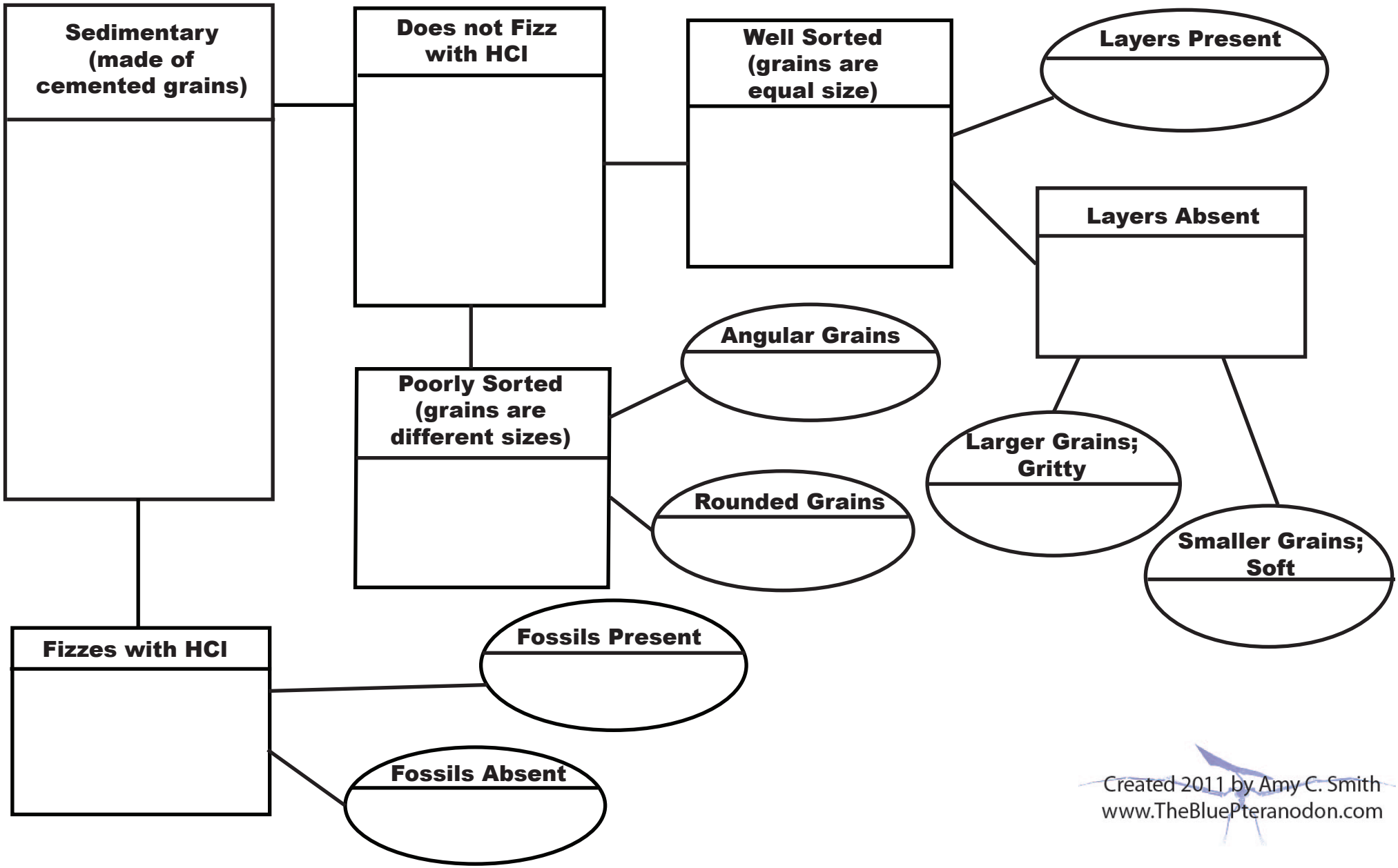
After Creating a Rock Key from Scratch

-Do your categories (created rock characteristics) differ from those created by other groups? How would your overall flowchart change if you used one characteristic created by a different group?

Common Rock Classification: Make Your Own Key

Sedimentary Rock Key

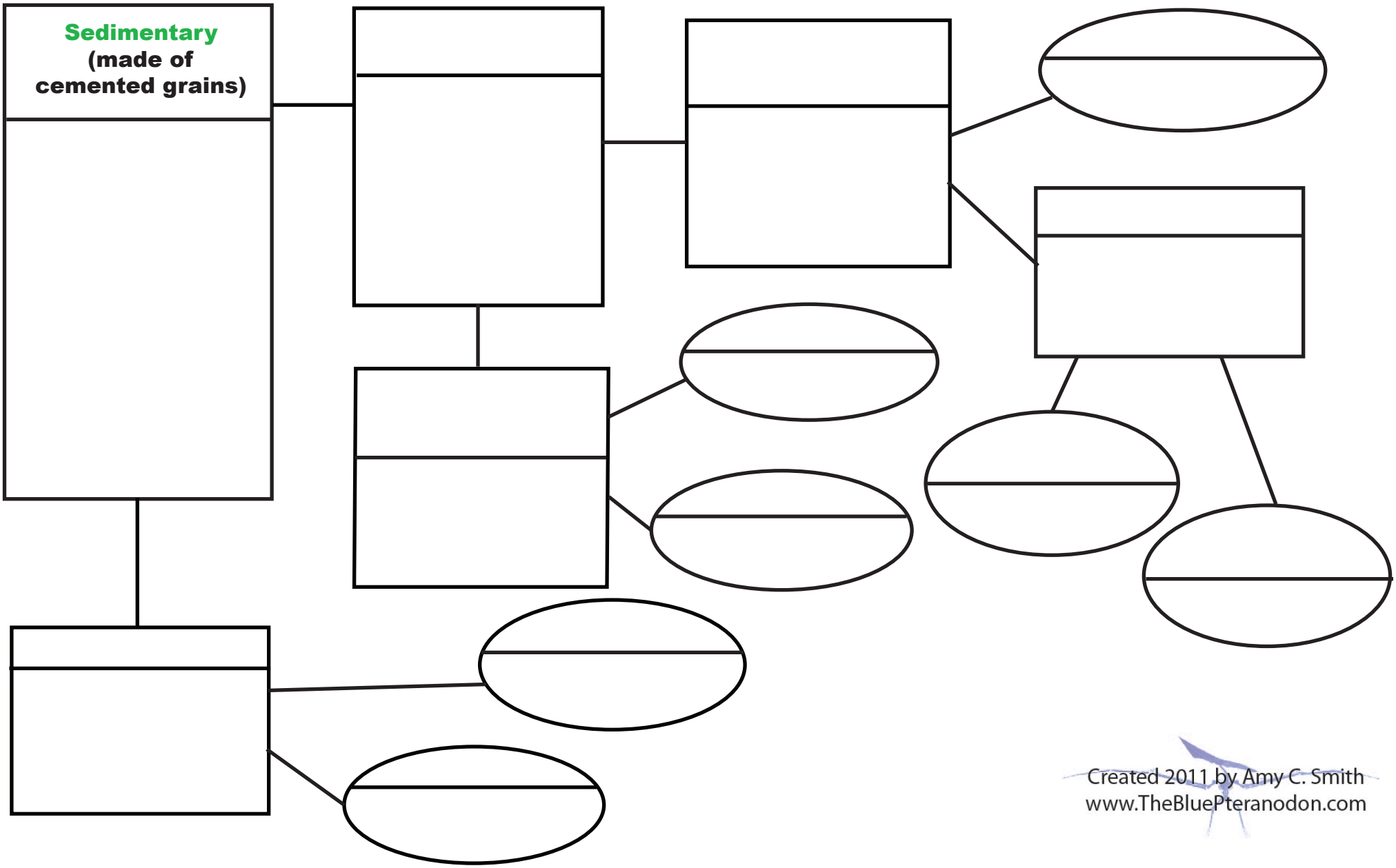
Fill in the names of the rocks that match the descriptor within each rectangle, breaking down the groups of rocks into smaller groups within following rectangles until each oval at the end of the paths contains one rock from previous lists. For example, please start by listing all of your sedimenatry rocks in the upper left rectangle, then break this group down into rocks that fizz with HCl and rocks that do not fizz with HCl.



Common Rock Classification: Make Your Own Key

Sedimentary Rock Key

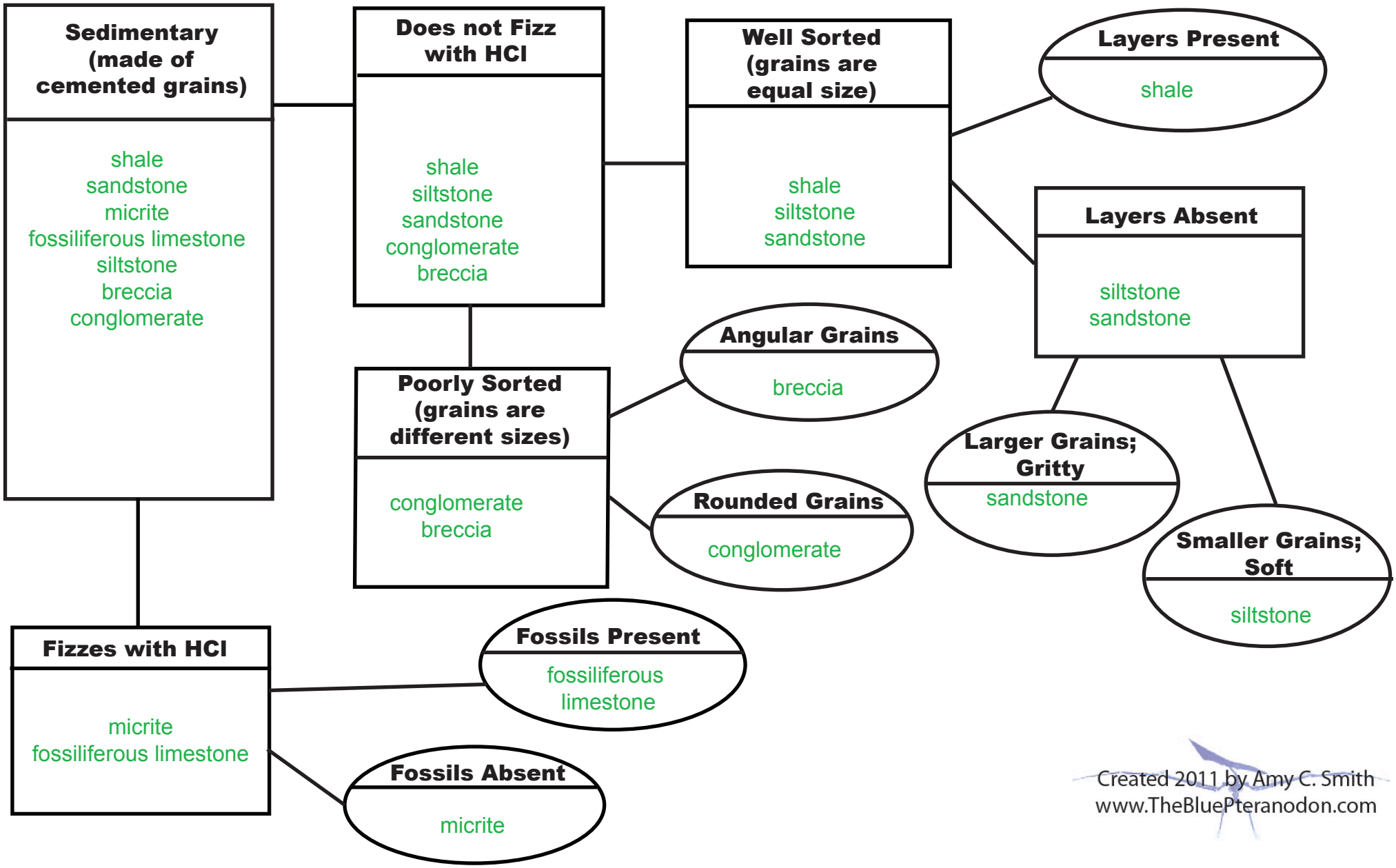
Break down all of the sedimentary rocks into successively smaller groups by placing a physical characteristic in the top of each rectangle, then list all of the rocks that possess that quality. Each oval at the end of the paths will contain one rock from previous lists. For example, please start by listing all of your igneous rocks in the upper left rectangle, then break this group down into a group of rocks that exhibit a character that you define (such as colors, textures, etc.).



Common Rock Classification: Make Your Own Key

Sedimentary Rock Key

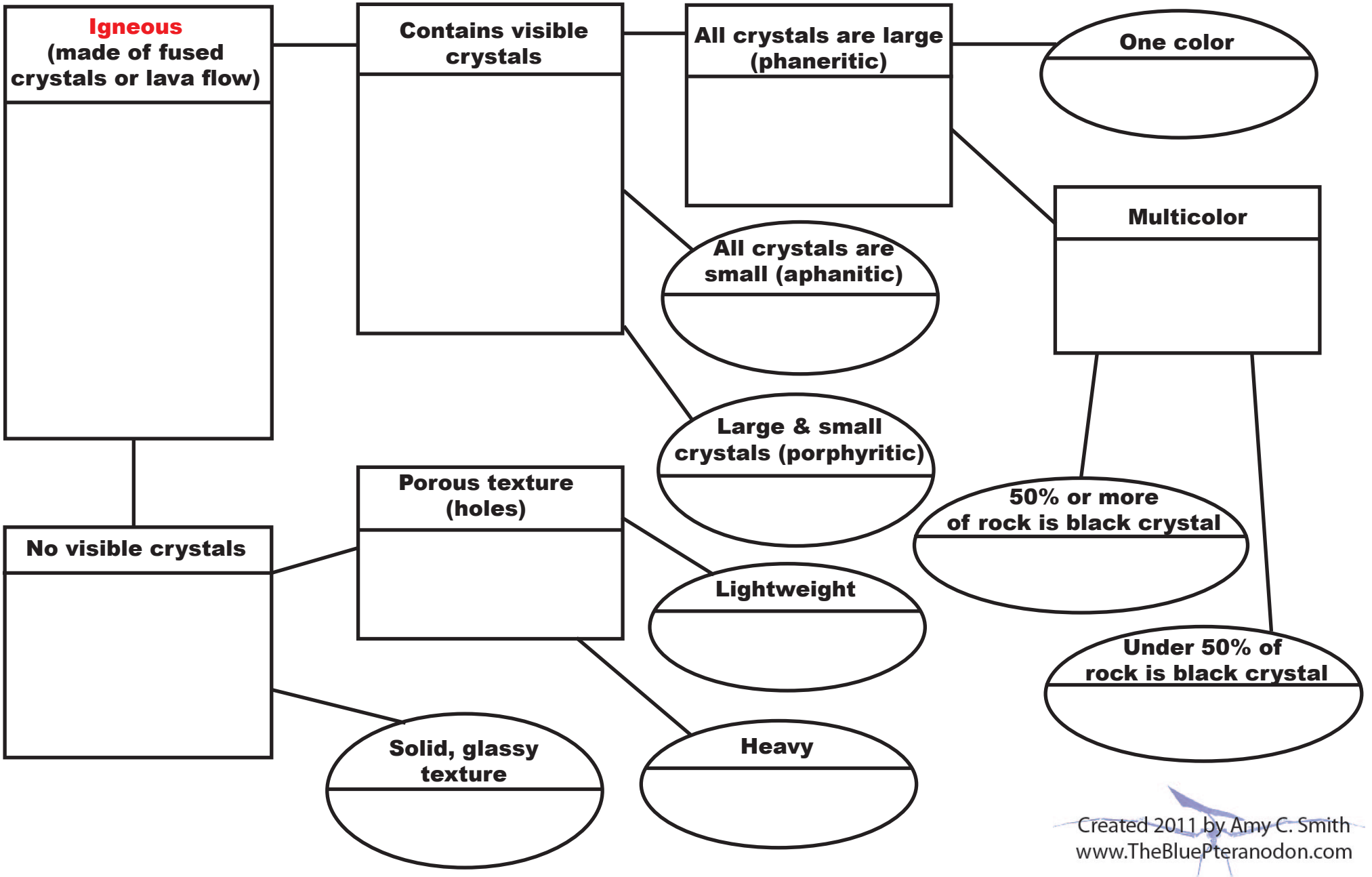
Fill in the names of the rocks that match the descriptor within each rectangle, breaking down the groups of rocks into smaller groups within following rectangles until each oval at the end of the paths contains one rock from previous lists. For example, please start by listing all of your sedimenatry rocks in the upper left rectangle, then break this group down into rocks that fizz with HCl and rocks that do not fizz with HCl.



Common Rock Classification: Make Your Own Key

Igneous Rock Key

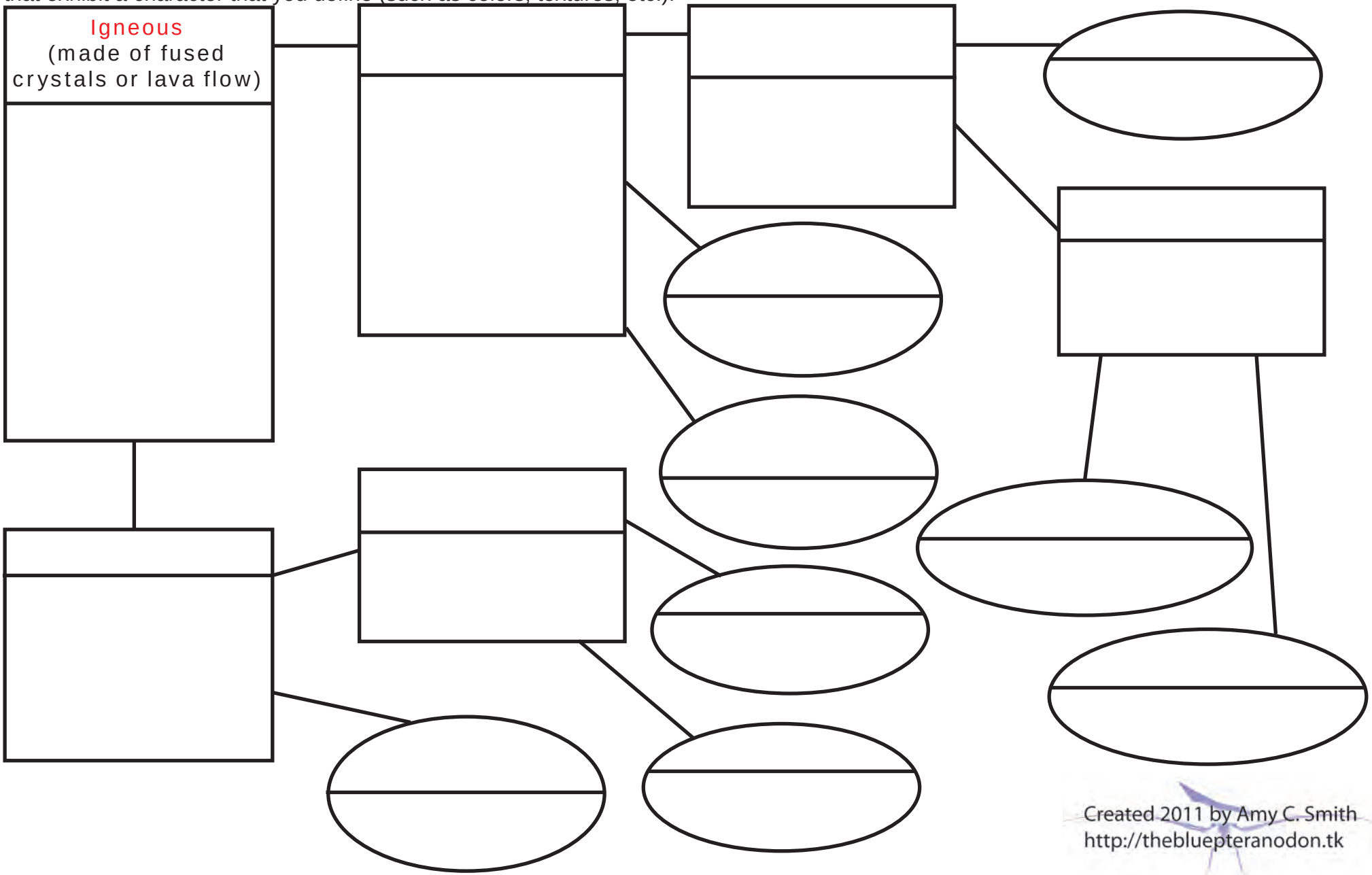
Fill in the names of the rocks that match the description within each rectangle, breaking down the groups of rocks into smaller groups within following rectangles until each oval at the end of the paths contains one rock from previous lists. For example, please start by listing all of your igneous rocks in the upper left rectangle, then break this group down into rocks with and without visible crystals.



Common Rock Classification: Make Your Own Key

Igneous Rock Key

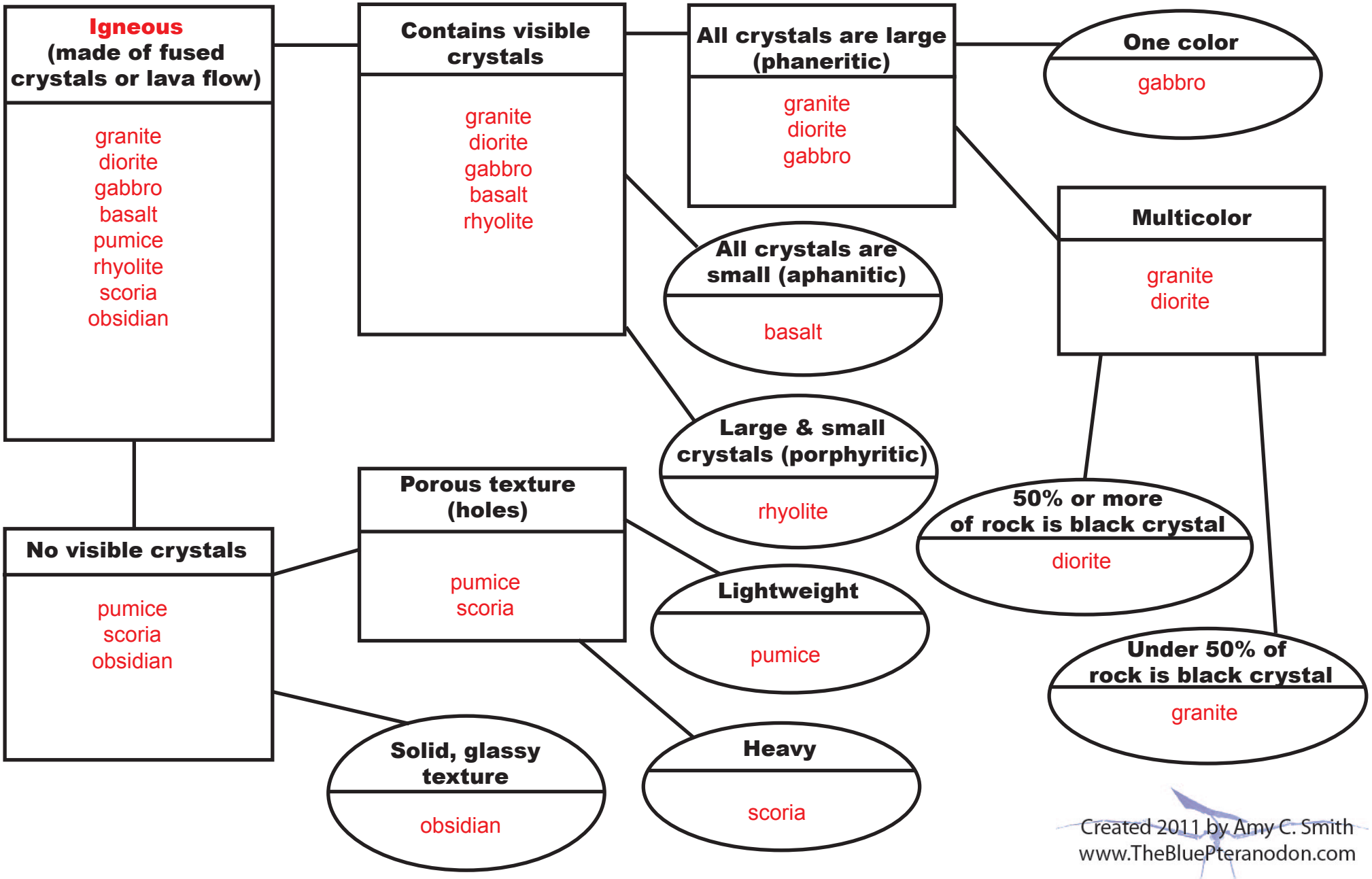
Break down all of the igneous rocks into successively smaller groups by placing a physical characteristic in the top of each rectangle, then list all of the rocks that possess that quality. Each oval at the end of the paths will contain one rock from previous lists. For example, please start by listing all of your igneous rocks in the upper left rectangle, then break this group down into a group of rocks that exhibit a character that you define (such as colors, textures, etc.).



Common Rock Classification: Make Your Own Key

Igneous Rock Key

Fill in the names of the rocks that match the description within each rectangle, breaking down the groups of rocks into smaller groups within following rectangles until each oval at the end of the paths contains one rock from previous lists. For example, please start by listing all of your igneous rocks in the upper left rectangle, then break this group down into rocks with and without visible crystals.



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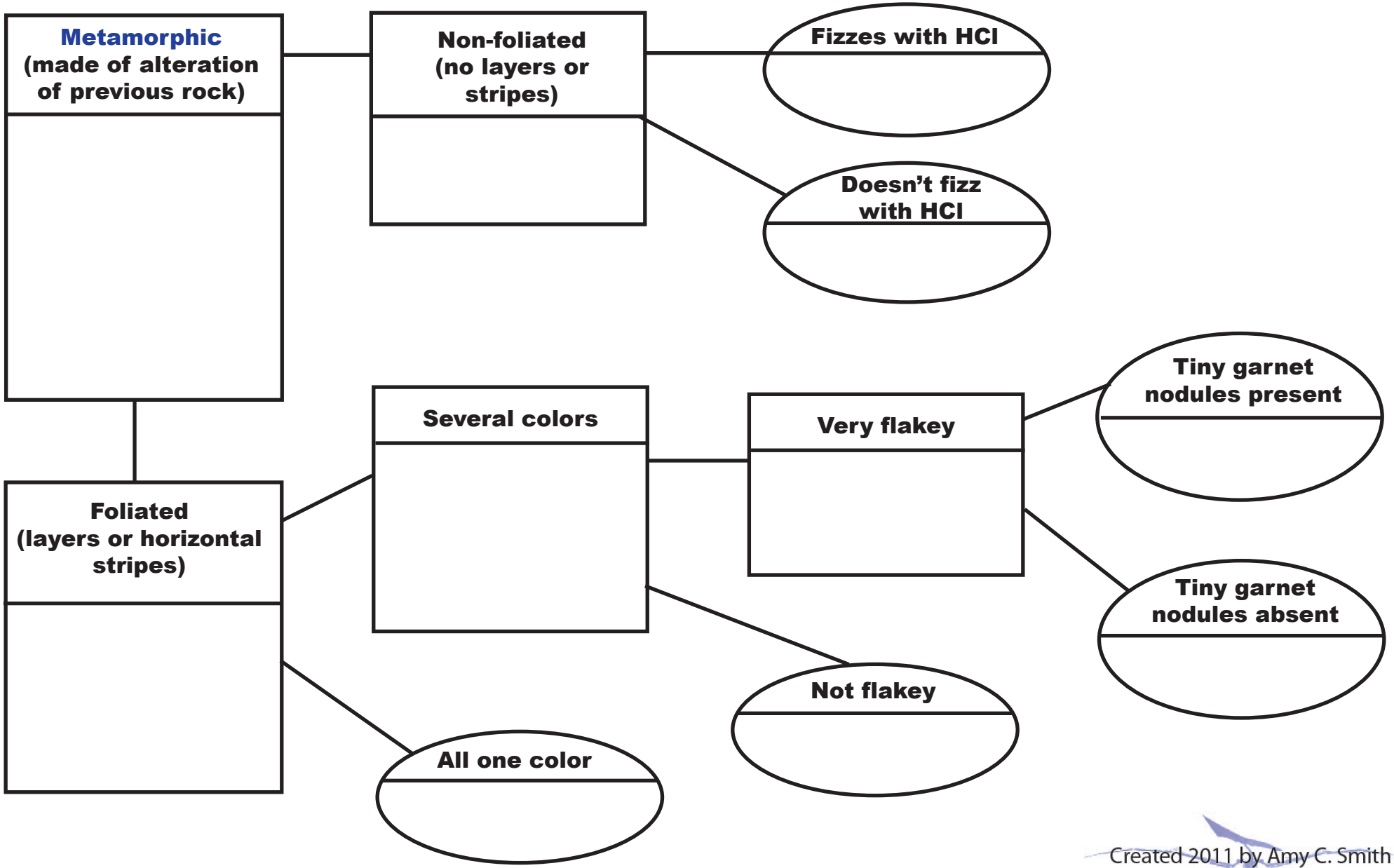
Metamorphic Rock Key

Fill in the names of the rocks that match the descriptor within each rectangle, breaking down the groups of rocks into smaller groups within following rectangles until each oval at the end of the paths contains one rock from previous lists. For example, please start by listing all of your metamorphic rocks in the upper left rectangle, then break this group down into Non-foliated and Foliated rocks.



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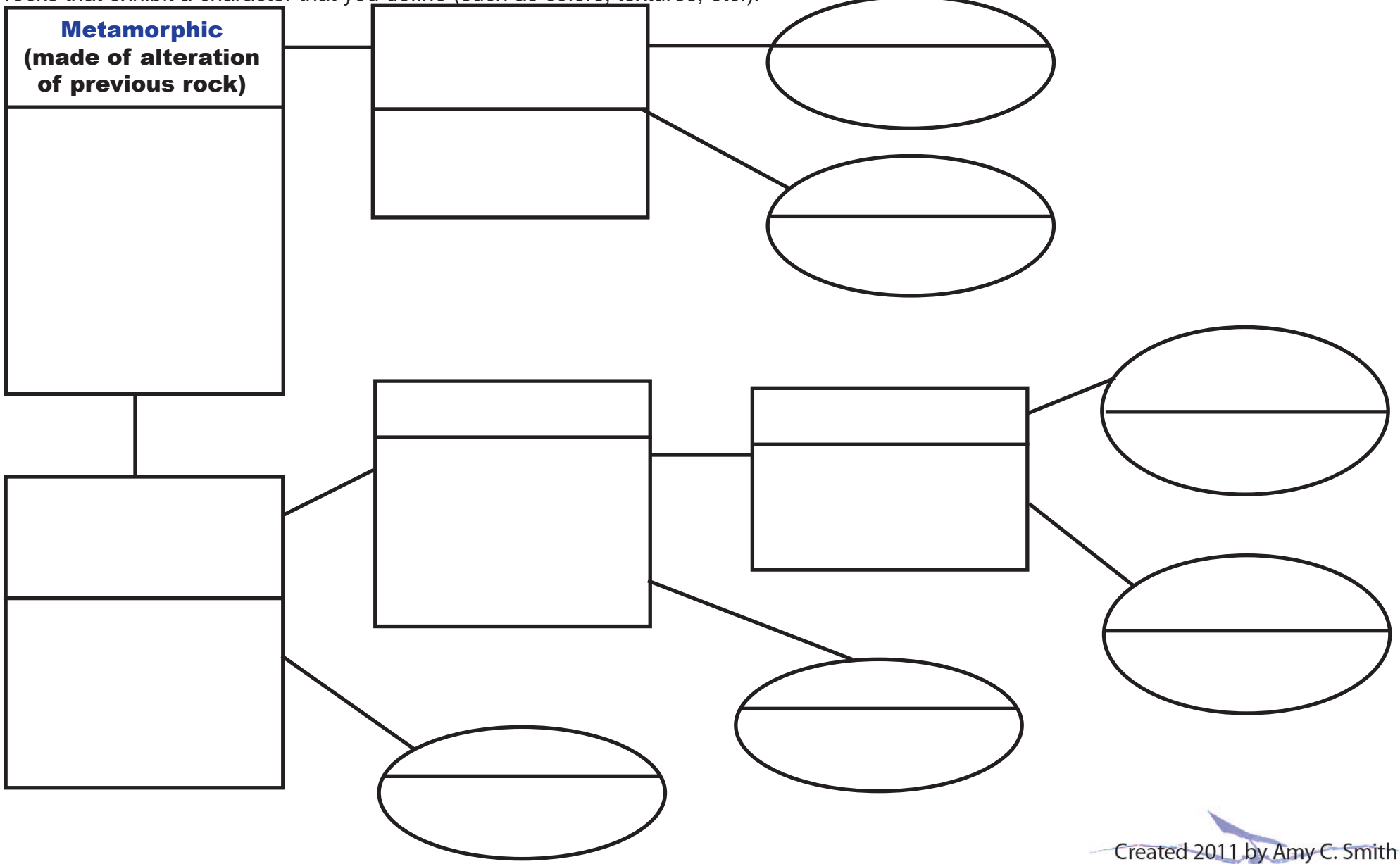
Common Rock Classification: Make Your Own Key

Metamorphic Rock Key

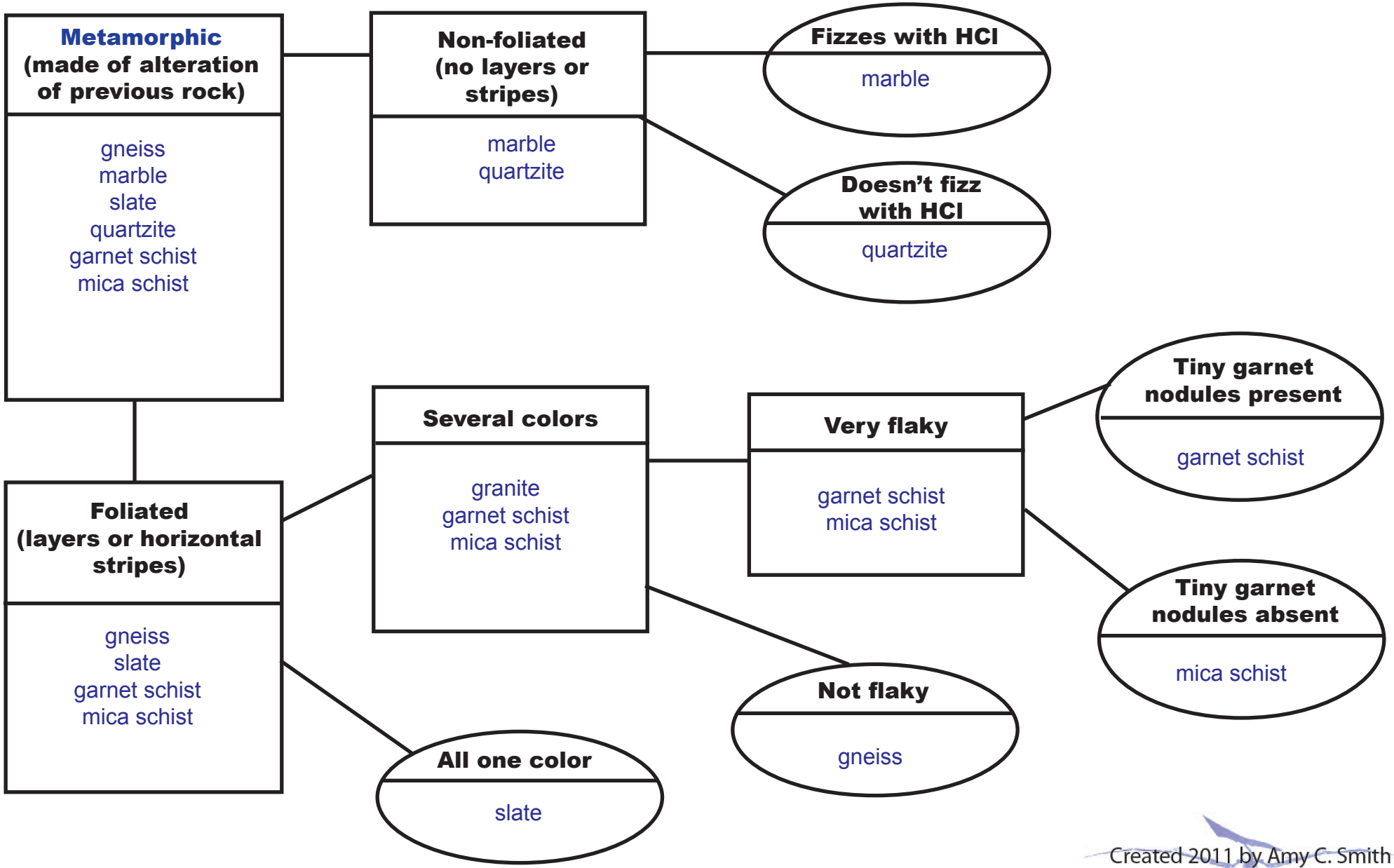
Break down all of the metamorphic rocks into successively smaller groups by placing a physical characteristic in the top of each rectangle, then list all of the rocks that possess that quality. Each oval at the end of the paths will contain one rock from previous lists. For example, please start by listing all of your metamorphic rocks in the upper left rectangle, then break this group down into a group of rocks that exhibit a character that you define (such as colors, textures, etc.).



Common Rock Classification: Make Your Own Key

Metamorphic Rock Key

Fill in the names of the rocks that match the description within each rectangle, breaking down the groups of rocks into smaller groups within following rectangles until each oval at the end of the paths contains one rock from previous lists. For example, please start by listing all of your metamorphic rocks in the upper left rectangle, then break this group down into Non-foliated and Foliated rocks.



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All Sedimentary Rocks Starting Mat

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Common Rock Classification: Make Your Own Key

Fizz with HCl

All Sedimentary Rocks

Don't Fizz with HCl

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Common Rock Classification: Make Your Own Key

Fossils present

Sedimentary Rocks That Fizz with HCl

Fossils absent

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Common Rock Classification: Make Your Own Key

Well Sorted
(grains are equal size)

Sedimentary Rocks That Don't Fizz with HCl

Poorly Sorted
(grains are different sizes)

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Common Rock Classification: Make Your Own Key

Angular Grains
(grains within the rock have corners)

Sedimentary Rocks That Don't Fizz with HCl and are Poorly Sorted

Rounded Grains
(grains within the rock are smooth and oval)

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Common Rock Classification: Make Your Own Key

Layers Present within Rock

Sedimentary Rocks That Don't Fizz with HCl and are Well Sorted

Layers Absent

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Common Rock Classification: Make Your Own Key

Larger Grains; Feels Gritty

Sedimentary Rocks That Don't Fizz with HCl, are Well Sorted, and Lack Layers

Smaller Grains; Feels Soft

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Common Rock Classification: Make Your Own Key

All Igneous Rocks Starting Mat

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Common Rock Classification: Make Your Own Key

All Igneous Rocks

Contains Visible Crystals

No Visible Crystals

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Porous Texture (holes)

Igneous Rocks without Visible Crystals

Solid, Glassy Texture

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Common Rock Classification: Make Your Own Key

Lightweight

Igneous Rocks without Visible Crystals, with Porous Texture

Heavy

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Common Rock Classification: Make Your Own Key

All Crystals Are Small

Igneous Rocks with Visible Crystals

All Crystals Are Large

Both Small and Large Crystals

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Common Rock Classification: Make Your Own Key

Rock is One Color

Igneous Rocks with Large Visible Crystals

Rock Is Multicolored

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Common Rock Classification: Make Your Own Key

50% or More of Rock is Black Crystal

Igneous Rocks with Large Visible Crystals of Different Colors

Under 50% of Rock is Black Crystal

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All Metamorphic Rocks Starting Mat

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All Metamorphic Rocks

Foliated (bands or layers)

Non-foliated (no bands or layers)

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Common Rock Classification: Make Your Own Key

Fizzes with HCl
Softer Than Glass

Non-Foliated Metamorphic Rocks

Doesn't Fizz with HCl
As Hard or Harder Than Glass

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Common Rock Classification: Make Your Own Key

Rocks with Several Colors

Foliated Metamorphic Rocks

Rocks with One Color

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Flaky Texture

Multicolored, Foliated Metamorphic Rocks

Not Flaky

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Common Rock Classification: Make Your Own Key

Tiny Garnet Nodules Present

Foliated, Multicolored, Flakey Metamorphic Rocks

No Garnet Nodules Present

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