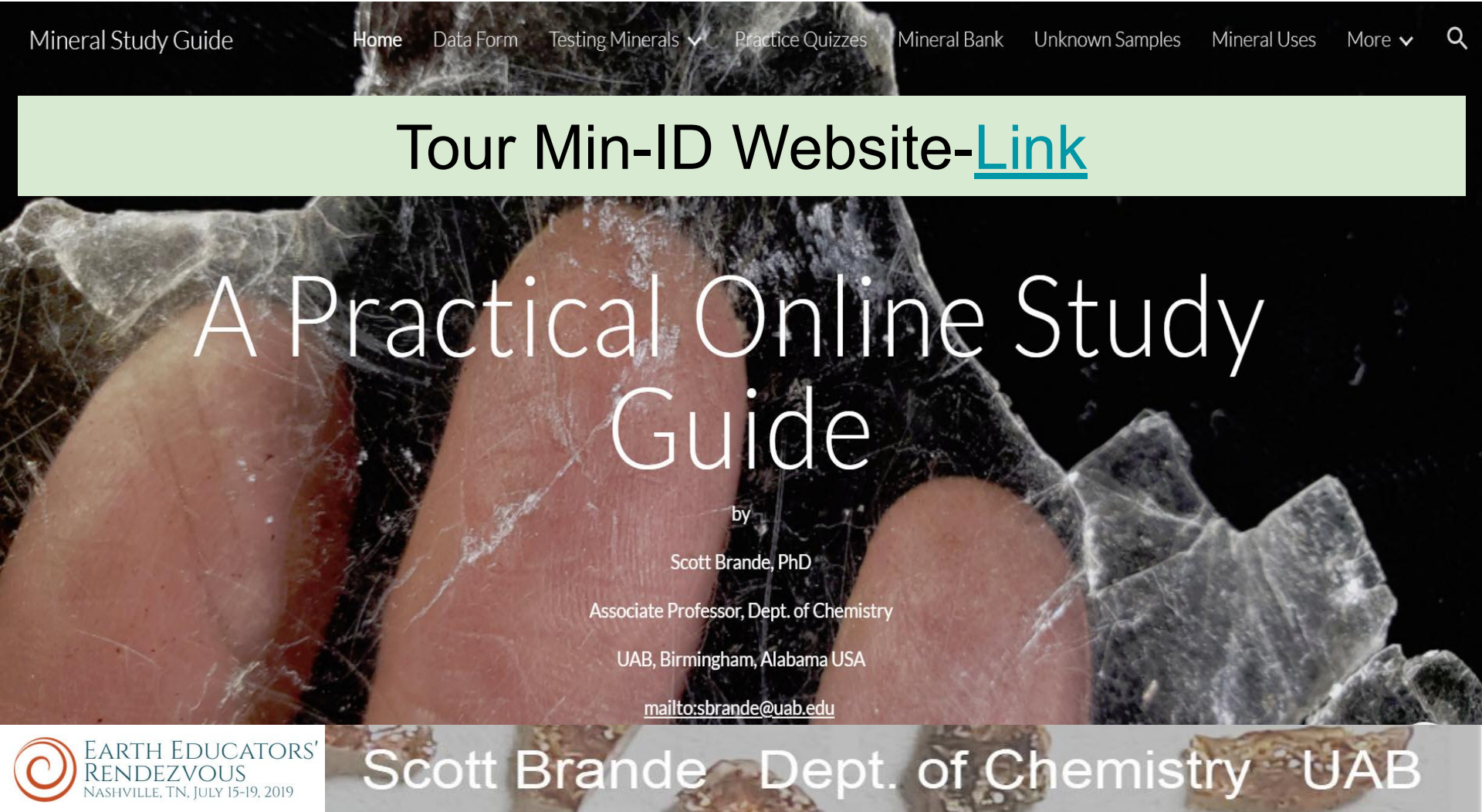
Earth Educators Rendezvous 2019

Teaching Demonstration - Mineral ID Lab Online

- experiment physical geology lab mineral ID, fall 2019
- face-to-face students, supplementary study
- maybe adaptable for online lab?
- public website: media-rich, downloadable docs, etc.
- 1st online test EER19 teaching demonstration
- website access via this PDF

PDF direct links http://bit.ly/2NSfSXK - Link

Scott Brande Dept. of Chemistry UAB


Mineral Study Guide
Home
Data Form
Testing Minerals
Practice Quizzes
Mineral Bank
Unknown Samples
Mineral Uses
More
Tour Min-ID Website-Link
A Practical Online Study Guide
by
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Earth Educators' Rendezvous
Nashville, TN, July 15-19, 2019
Scott Brande Dept. of Chemistry UAB

Mineral ID Data Form - Handout/Downloadable

Link

Learning Mineral Identification with the Mineral Identification Online Study Guide by Scott Brande
https://sites.google.com/view/mineral-study-guide/home
Instructions: Make observations, record data, consult resources to identify mineral by name.
A limited online mineral bank is here: http://bit.ly/2XKUGGK

	luster	***hardness***	***streak (w-g-b)***	***streak (colored)***	***magnetism***	***HCl reaction***	***conducts electricity***	***other properties*** (cleavage, fracture, crystal form, etc.)	***mineral name***	***formula (if assigned)***
	***M**etallic or **N**on-metallic (**M**, **NM**)*	*> glass or < glass*	*white, gray, or black*	***R**ed, **O**ra, **Y**el, **G**re, **B**lu, **P**ur*	***M**agnetic, or **N**ot magnetic*	***S**trong, or **W**eak to **N**one*	***C**onducts, or **D**oesn't **C**onduct*			
A01										

Compare Unknowns w/Limited Mineral Bank (n=24)

Online Mineral Bank-Link

Mineral Bank	Properties							
Name (alphabetical order) (links, *text* and *images*)	*Luster? (NM=non-metallic; M=metallic).* ***Note 1.***	*Hardness - scratches glass plate?* ***Note 2.***	*Streak color?* ***Note 3.***	*"Typical" bulk color?* ***Note 4.***	*Magnetic?*	*Reacts with HCl?*	*Conducts electricity?*	*Other Distinctive Properties (e.g., cleavage, fracture, crystal form, etc.)*
bauxite	NM	no 1<H<3	white (stained)	variable, tan, orange, reddish, etc.	no	no	no	typically fine-grained, pisolitic texture (pea-like rounded shape)
biotite	NM	no 2.5<H<3	white to gray	very dark green, to brownish- black	no	no	no	perfect single cleavage produces thin sheets of irregular outline
calcite	NM	no H=3	white	clear, or varies, white, green, blue, tan, orange, reddish, etc.	no	yes	no	commonly broken into rhombs w/ 3 cleavages, angles not = 90 degrees

Data Form Workbook - Downloadable

Link

Name (alphabetical order) (links, *text* and *images*)	**Mineral Unknown**	*Luster? (NM=non-metallic; M=metallic).* ***Note 1.***	*Hardness - scratches glas*	*Streak color?*	*"Typical" bulk color?*	*Magnetic?*	*Reacts with HCl?*	***Conducts electricity?***	*Other Distinctive Properties (e.g., cleavage, fracture, crystal form, etc.)*
galena		**metallic**			(not	no	no	**YES**	commonly broken into cubic forms
garnet		NM			rown,	no	no	no	commonly forms dodecahedral crystals; exhibits conchoidal fracture
graphite		**metallic**			ck	no	no	**YES**	very soft; typically microcrystalline aggregates; can scratch w/ fingernail
gypsum		NM	no H=2	white	transparent, or varies, white, gray	no	no	no	very soft, can scratch w/ fingernail; commonly breaks into rhombohedral form

Fill in Unknown Sample # here

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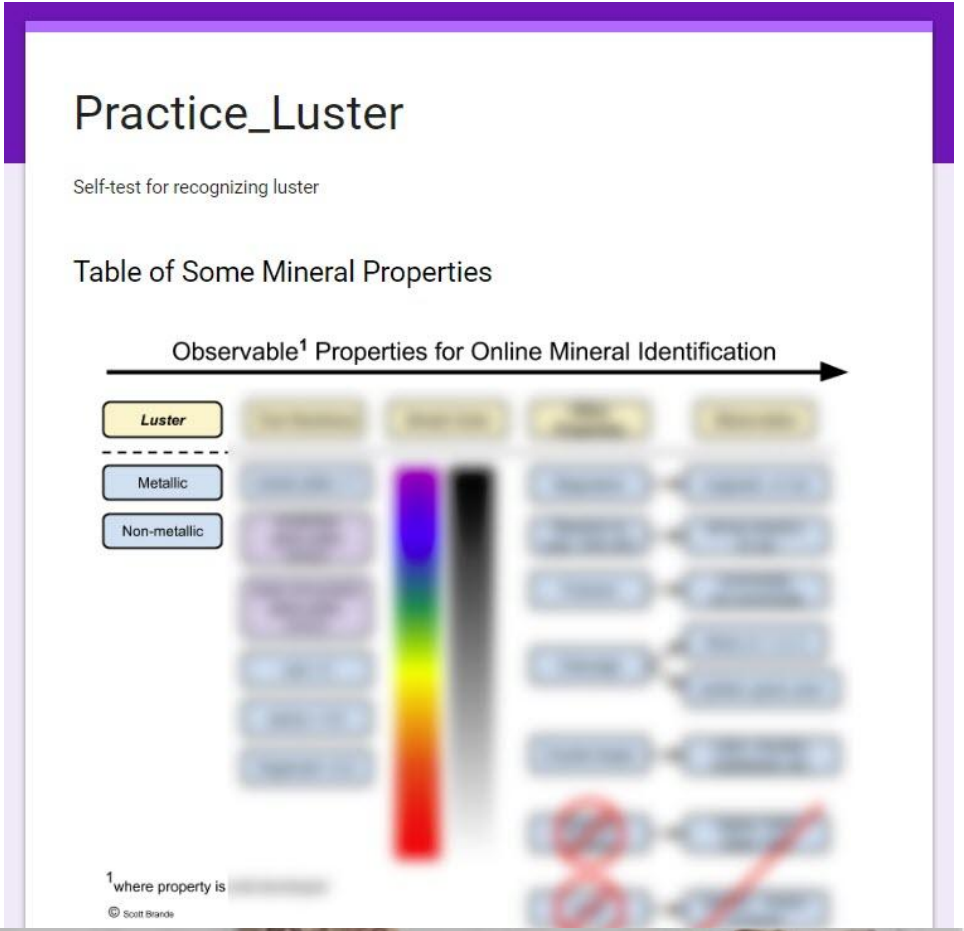
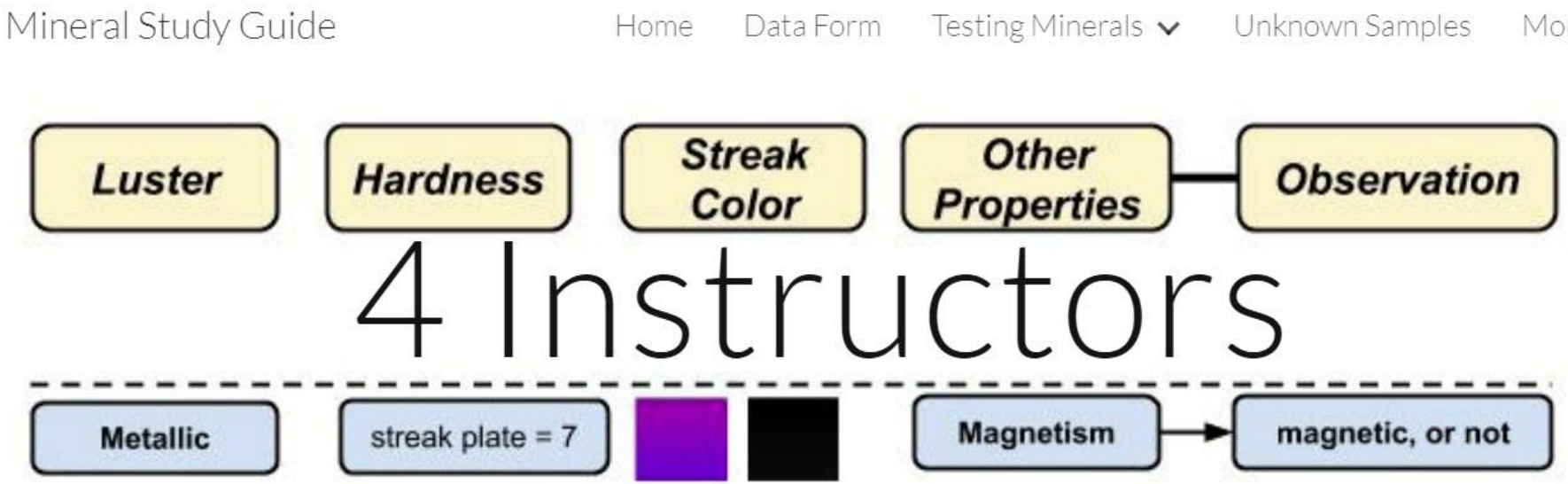
Practice Quiz Online -Link



For Instructors -Link



Contact: mailto:soskarb@gmail.com

Instructional Mineral Identification Practical Study Guide Online

- 16 Unknown Minerals - media-rich resources
- 24 Identified Minerals - online bank with web links
- Online practice “quiz”
- Downloadable documents (data form, activities, resources)
- Creative Commons licensed 4.0

Lab Handout - Link

Online Study

Lab: Mineral Identification Online Instructions

(under development)

Your lab this week is on minerals, the building blocks of rocks (which we will study in detail later). Minerals are also essential material components of our modern civilization. A knowledge of minerals broadens our understanding of the sources for many of our everyday items, like cellphones and highways. Some minerals are very abundant in earth's crust, while others are quite uncommon or even rare.

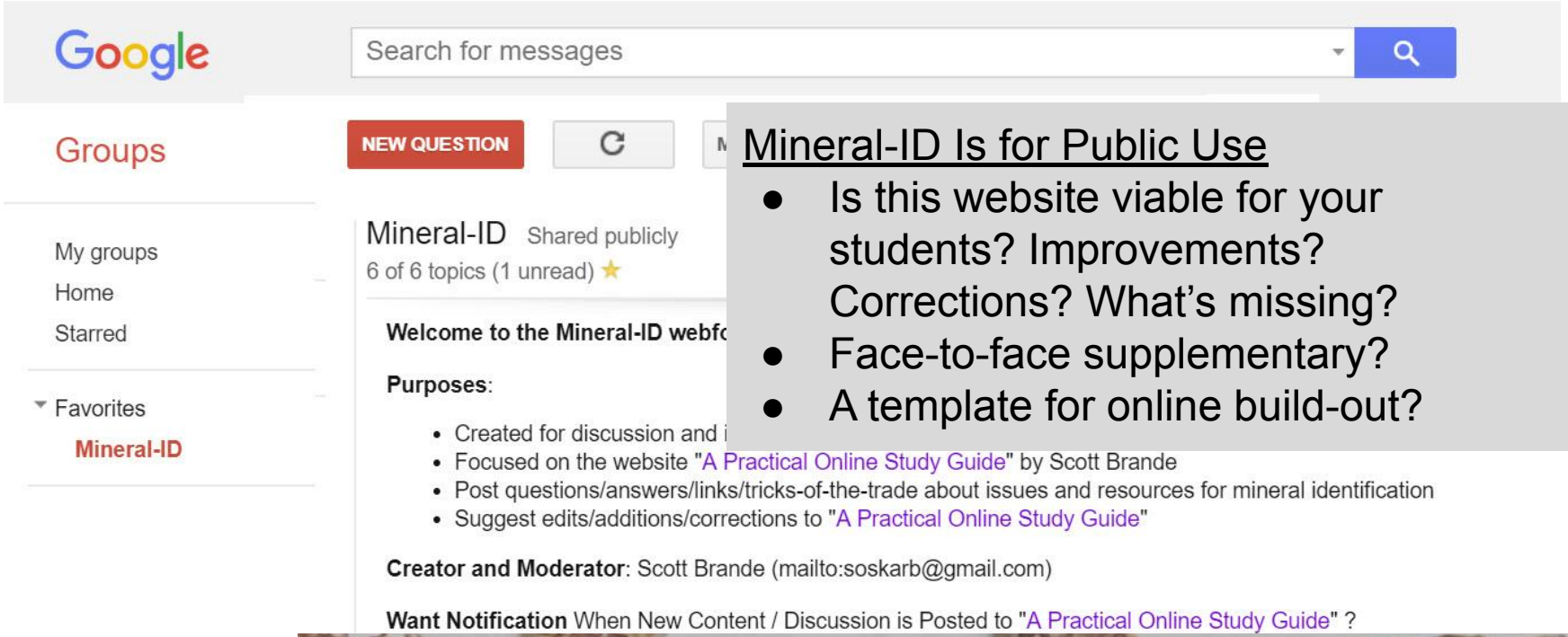
Your overall learning objectives include the following:

- learn the properties of minerals and how to recognize them in samples
- learn how to use mineral properties to identify them by name
- learn some uses for minerals

New Google Groups

Tour/Join-Link

- search: Google groups Mineral-ID
- join to read, post/share, get notifications



Mineral-ID Is for Public Use

- Is this website viable for your students? Improvements? Corrections? What's missing?
- Face-to-face supplementary?
- A template for online build-out?

2018 EER Poster on 3D Rock Models for Teaching

Join 3D Rock Project:
www.bit.ly/2m13B2j

3D Rock Model Archive:
www.sketchfab.com/rockdoc

Online Learning with 3D Virtual Rocks? Pedagogy & Technology

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Engagement & Learning

You: "You can't learn exactly the same from a 3D model as from a rock in your hand because you can't pick up a 3D model."
Me: "Correct, but only about 5% right."
You: "How can that be?"
Me: "Pick up that rock on the table. Examine it. Then on your cellphone retrieve the model (instructions on handout on table). Follow activities."

How *Do* Students Learn in Geology Lab?

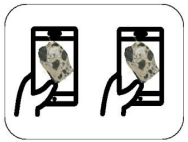
Work in teams; communicate among members
Make, record, and analyze observations
Test rocks for relevant physical properties
Consult resources, evaluate alternatives, propose ideas
Make conclusions (identification of rock by name)

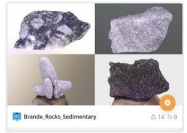
How to *Adapt* Activities for Online Use

Extend observations and experiments to online by linking to online resources (high-res images, video snips, data, etc.). Accessible by click on hyperlink markers on model that load via click to URL or QRcode app

video 1 video 2

Face-to-Face vs Online Lab Learning





- physical rocks
- limited set
- campus access only

- 3D virtual rocks
- unlimited set
- access anytime, anywhere

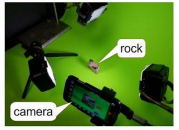
"Online Lab" Pedagogy

- ***Guided instructions*** for observations
- ***Make model interactive*** (not just for looking)
- ***Hotspots*** with clickable links to resources
- ***Channels*** for ***interactive communication***
- ***Questions*** that ***require*** observations, interpretations, discussion and ***responses***

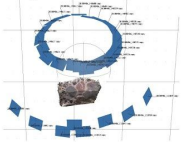
(Answer: https://goo.gl/FjWeG7)

Into The Tech Weeds

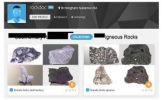
1. Photograph w/cellphone



2. Build 3D model w/Photoscan[1]



3. Upload to Sketchfab server[2]



4. Sketchfab server to browser in student devices

Online archive[2]: www.sketchfab/rockdoc

Teaching Innovation Grant Awarded[3]

Create client-server system with

- user interface for interaction with 3D models
- serve diverse devices (laptops, cellphones) & operating systems (Windows, iOS, Android)
- text chat channel connects students in teams
- collect data analytics of student interactions

References
1. http://www.agisoft.com/
2. www.sketchfab.com/rockdoc
3. http://www.uab.edu/reporter/work-resources/learning-development/item/8043-10-grants-to-promote-innovative-teaching

EARTH EDUCATORS' RENDEZVOUS
LAWRENCE, KS, JULY 16-20, 2018

Project 3D Virtual Rocks