Connecting Students to Citizen Science and Curated Collections

www.CollectionsEducation.org

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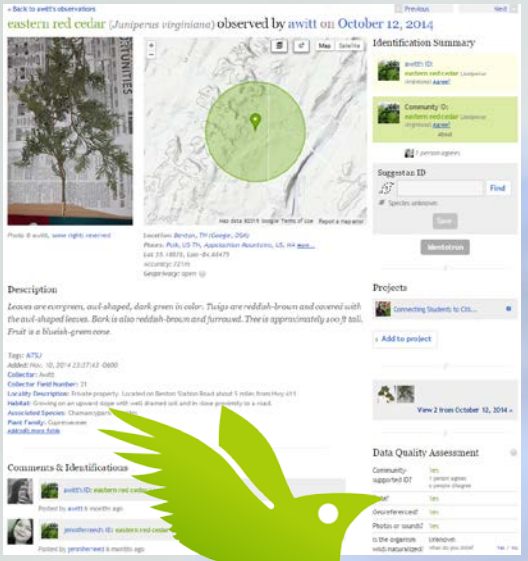
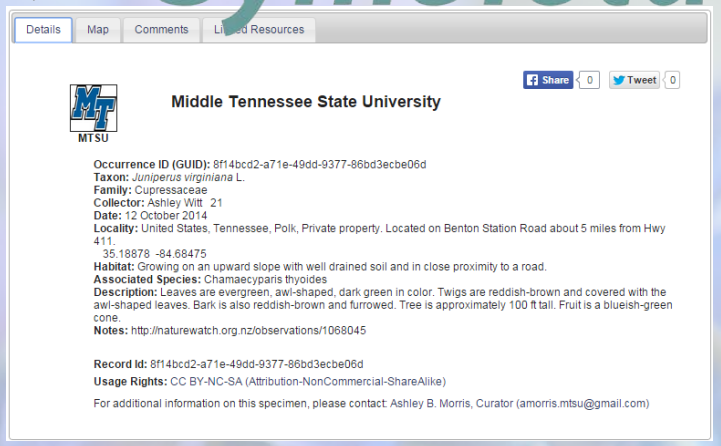
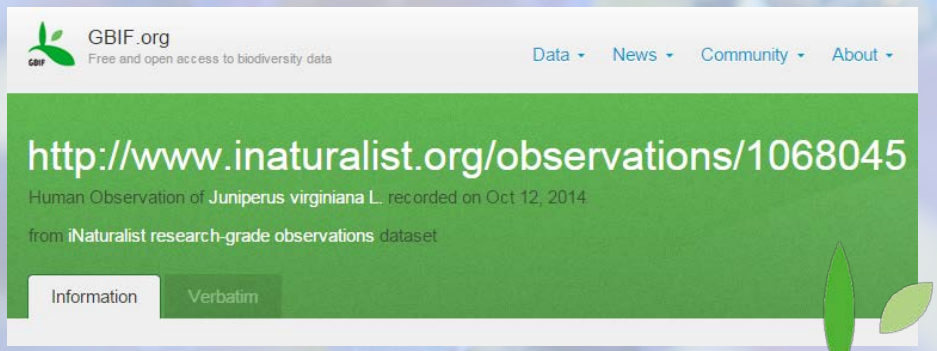
PRODUCT. Students contribute real scientific data to three outlets



iNaturalist

Symbiota





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CONTEXT. Managing an herbarium in the digital age takes extra time

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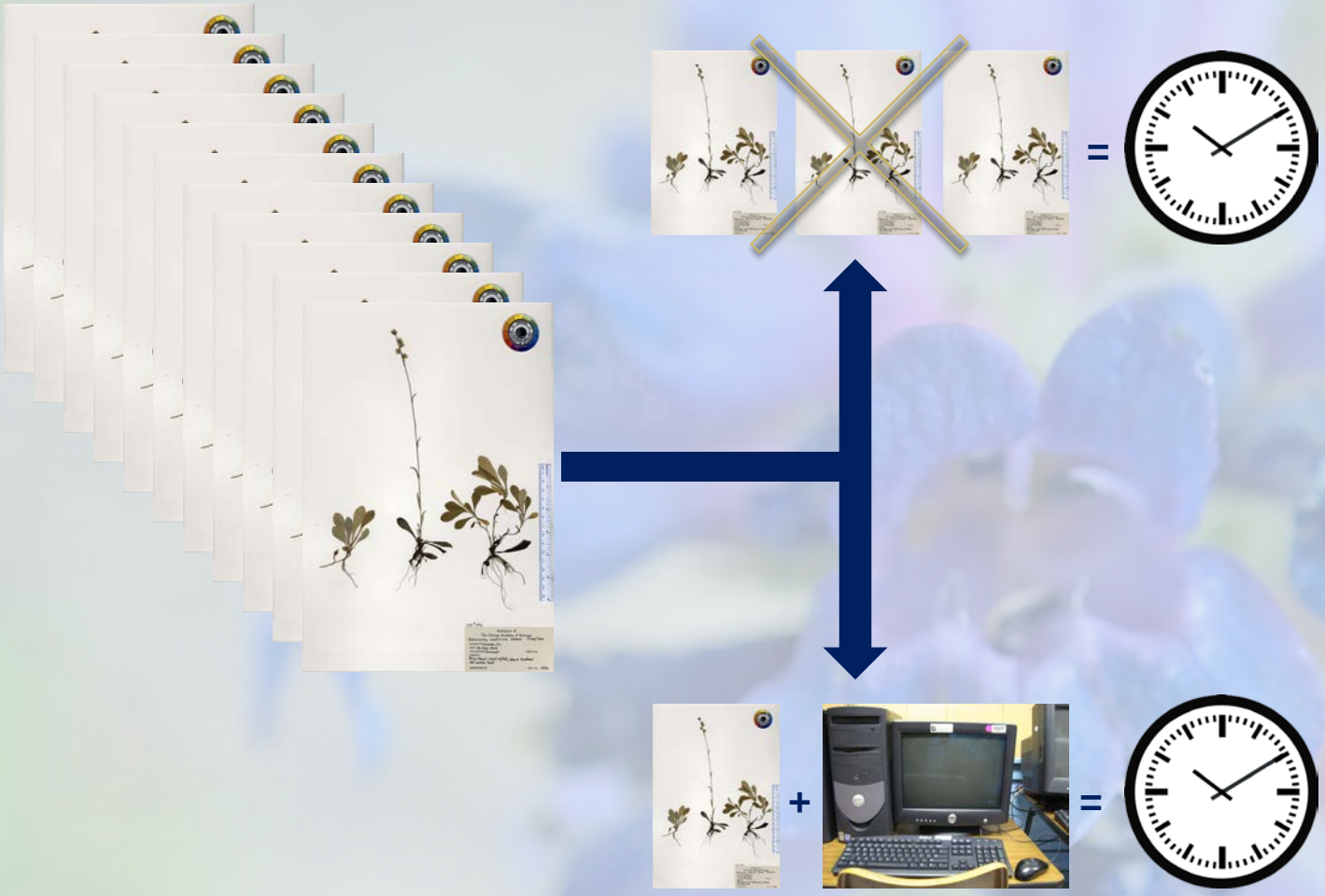
CONTEXT. Managing student contributions to said herbarium takes even more time



CONCEPT. Streamline by creating digitally native data for new specimens

Symbiota

Herbarium of the Chickering American River Reserve

Polygonaceae

Aconogonon phytolaccifolium

United States, California, Placer County, North Fork American River Headwaters Basin, 0.25 mi along trail E of The Land of the Lost. N of river.
39.253354N -120.38404W +-90 meters [WGS84]
Riparian.
Large plant, 3-5 ft tall. Locally abundant.
http://www.inaturalist.org/observations/755941

E. Krimmel
With: F. Felix

26 June 2014

iNaturalist

CONTEXT. "Vision and Change in Undergraduate Biology Education"

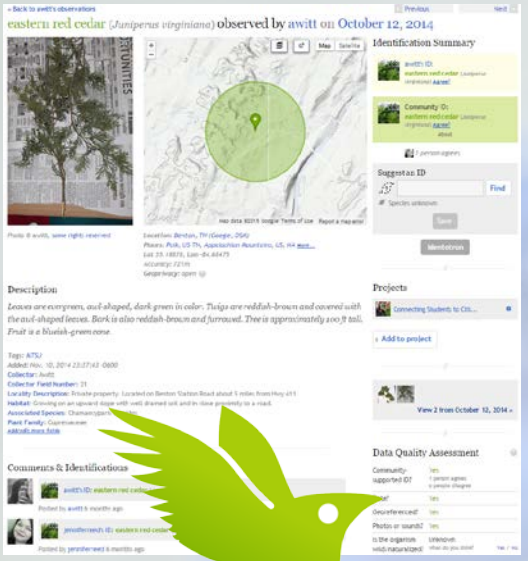
Ensure that undergraduate biology courses are active, outcome oriented, inquiry driven, and relevant.

CONCEPT. Add objectives to curriculum inspired by Vision & Change

Students completing this assignment will be able to:

1. Maintain a professional specimen collection notebook.
2. Collect plant specimens from the field using proper techniques and including adequate material for identification.
3. Identify unknown plant specimens using multiple forms of reliable evidence.
4. Prepare and deposit research quality herbarium specimens.
5. Explain the importance of herbaria in plant biology research.
6. Deposit species and occurrence data into national/international databases.
7. Discuss the value of large data sets for investigating large spatial- or temporal-scale phenomena. (invasive species, rare species, climate change, etc.)
8. Evaluate the importance of citizen scientists to large data sets.

PRODUCT. Students contribute real scientific data to three outlets



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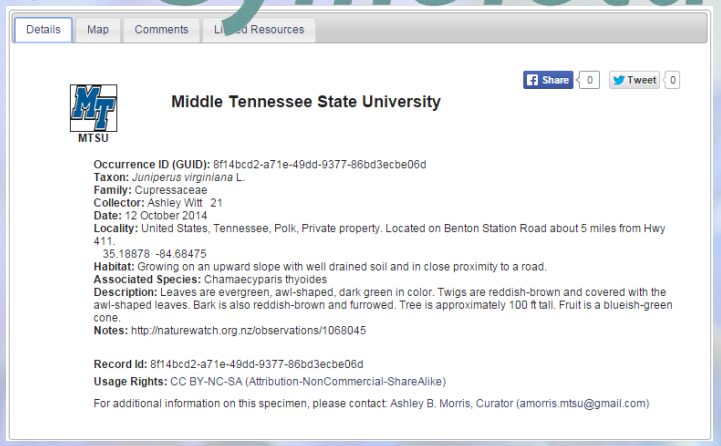
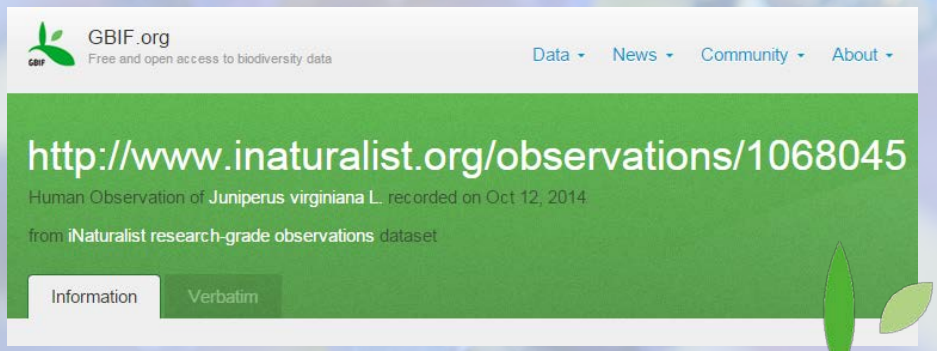
Symbiota





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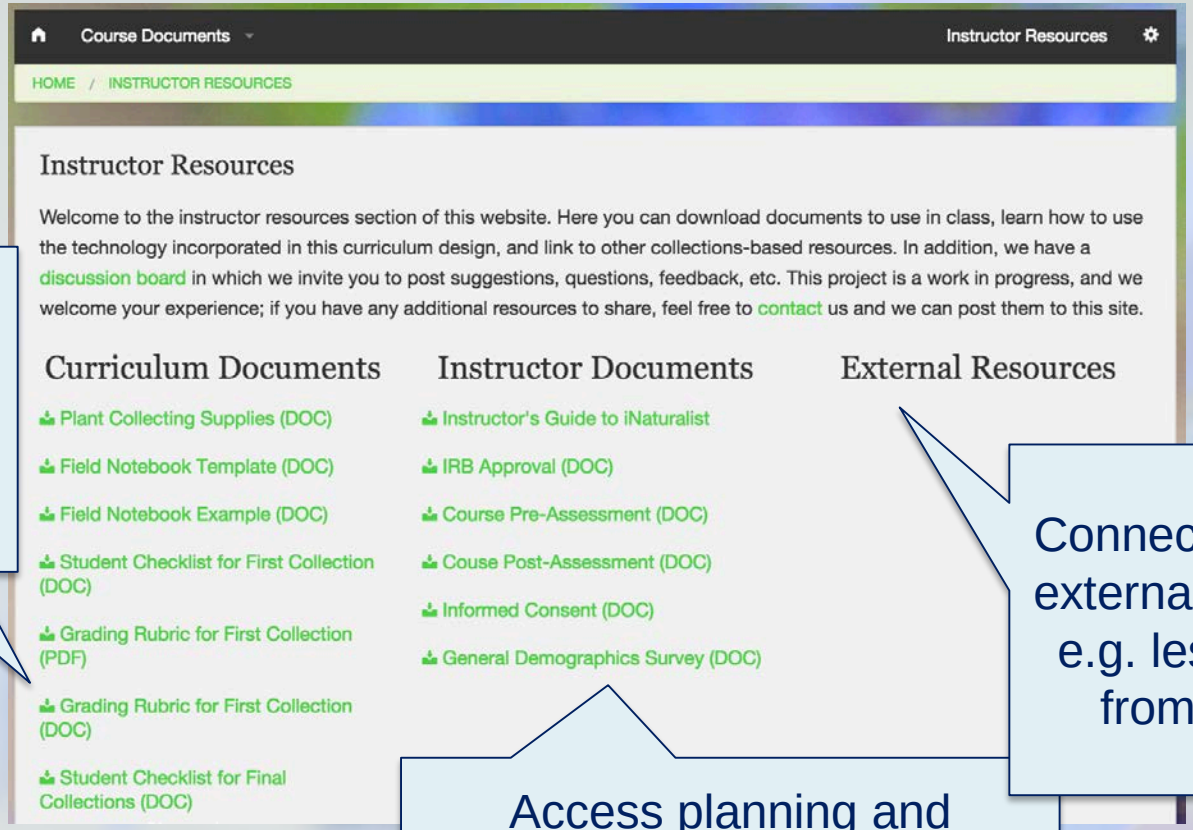
PRODUCT. Course curriculum, hosted on custom website

Students access course documents online

Website provides content management and framework for project

www.CollectionsEducation.org

PRODUCT. Instructor resources section of the website (login required)



Download editable versions of documents

Connect to existing external resources, e.g. lesson plans from AIM-UP

Access planning and research documents

www.CollectionsEducation.org

PRODUCT. Qualitative data to support research on curriculum efficacy

Pre/Post **Opinion Survey** (Likert scale) and **Knowledge Assessment** (free form) with the research goals of:

- Quantitative comparison of Likert survey values
- De-identification, coding, and analysis of free-form responses

Not at all Prepared (1)	Somewhat Prepared (2)	Well Prepared (3)	Very Well Prepared (4)	Totally Prepared (5)

Not at all important (1)	Somewhat important (2)	Important (3)	Very Important (4)	Necessary (5)

IRB Approved

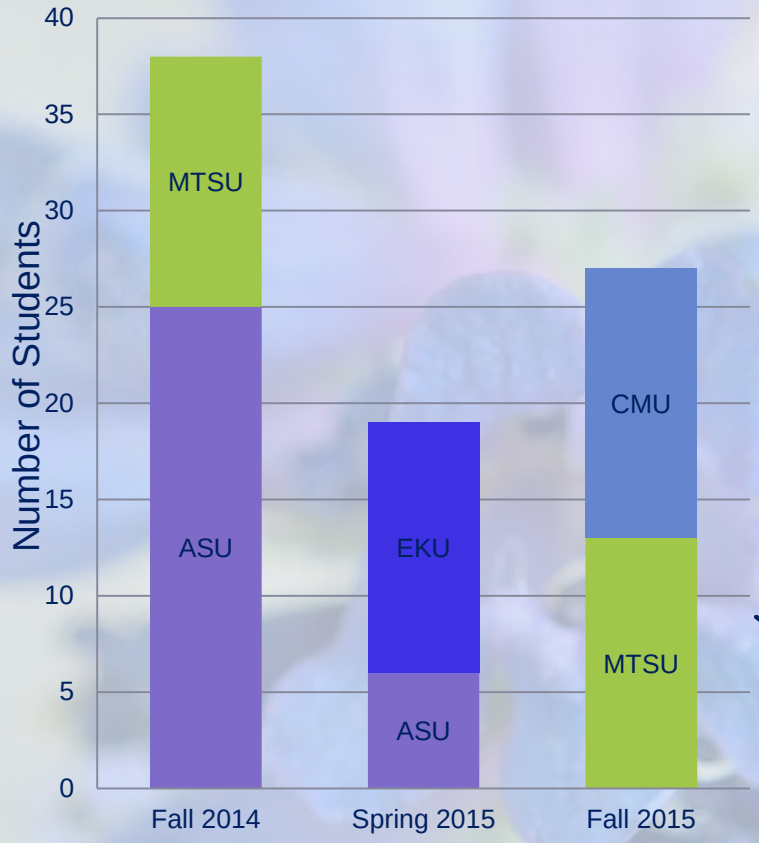
OUTCOME. Herbarium staff workload for menial tasks is reduced

Digitally native data + Shared resources (curriculum, student resources, technical support) =

OUTCOME. Students enjoy the course experience

"Experienced the need for citizen scientists, and how my contribution will benefit others and myself for years to come"

"The project is really good for getting students interested in biological collecting and identifying things"



"Creating a collection inspired me to learn more about the plant diversity"

"Great learning experience!"

"Although not my best subject, by far my most favorite class"

Quotes from Fall 2014 student survey.

OUTCOME. Students feel well-prepared leaving the course

How well has the specimen and data collection project prepared you to…			
Maintain a professional specimen collection notebook?	very well (4.0)	Explain the importance of herbaria in plant biology research?	very well (3.9)
Collect plant specimens from the field using proper techniques and including adequate material for identification?	very well (4.4)	Deposit species observations and occurrence data into national/ international databases?	very well (4.2)
Identify unknown plant specimens using multiple forms of reliable evidence?	very well (4.3)	Discuss the value of large datasets for investigating large spatial- or temporal-scale phenomena?	well (3.2)
Make and deposit research-quality herbarium specimens?	very well (4.2)	Evaluate the importance of citizen scientists' contributions to large data sets?	very well (3.7)

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Data from Fall 2014 student survey.

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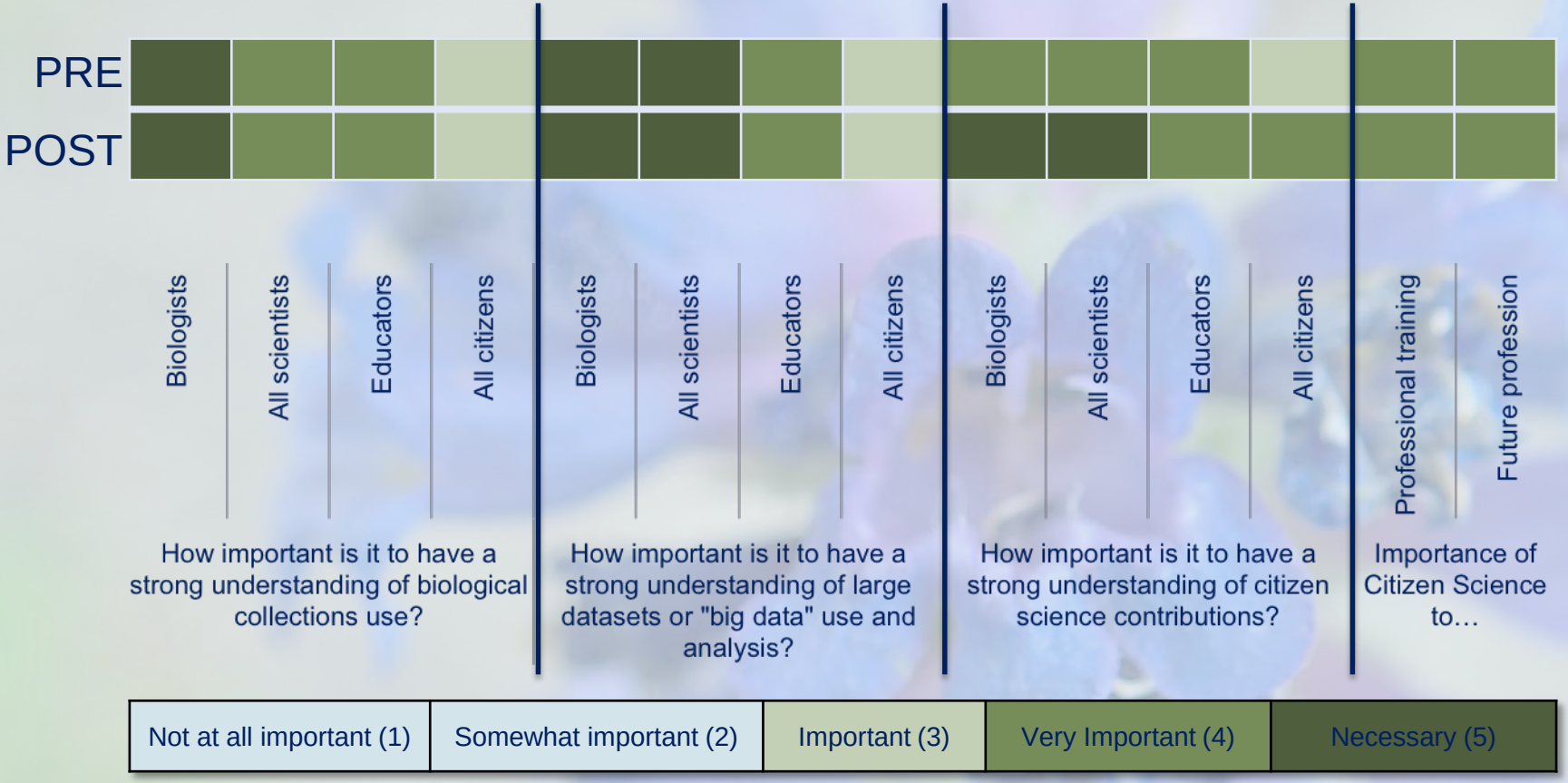
OUTCOME. Students gain an appreciation for the value of citizen science



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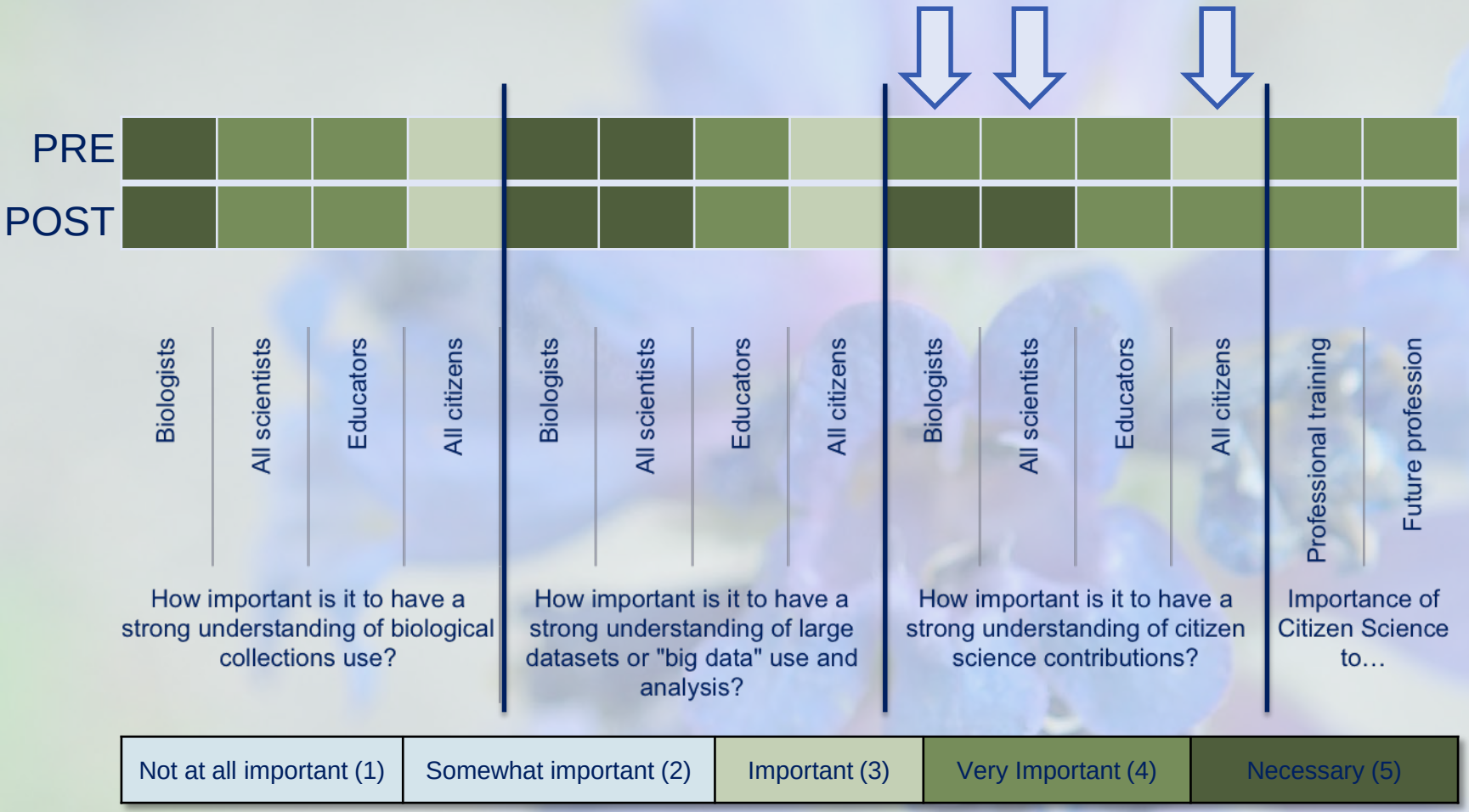
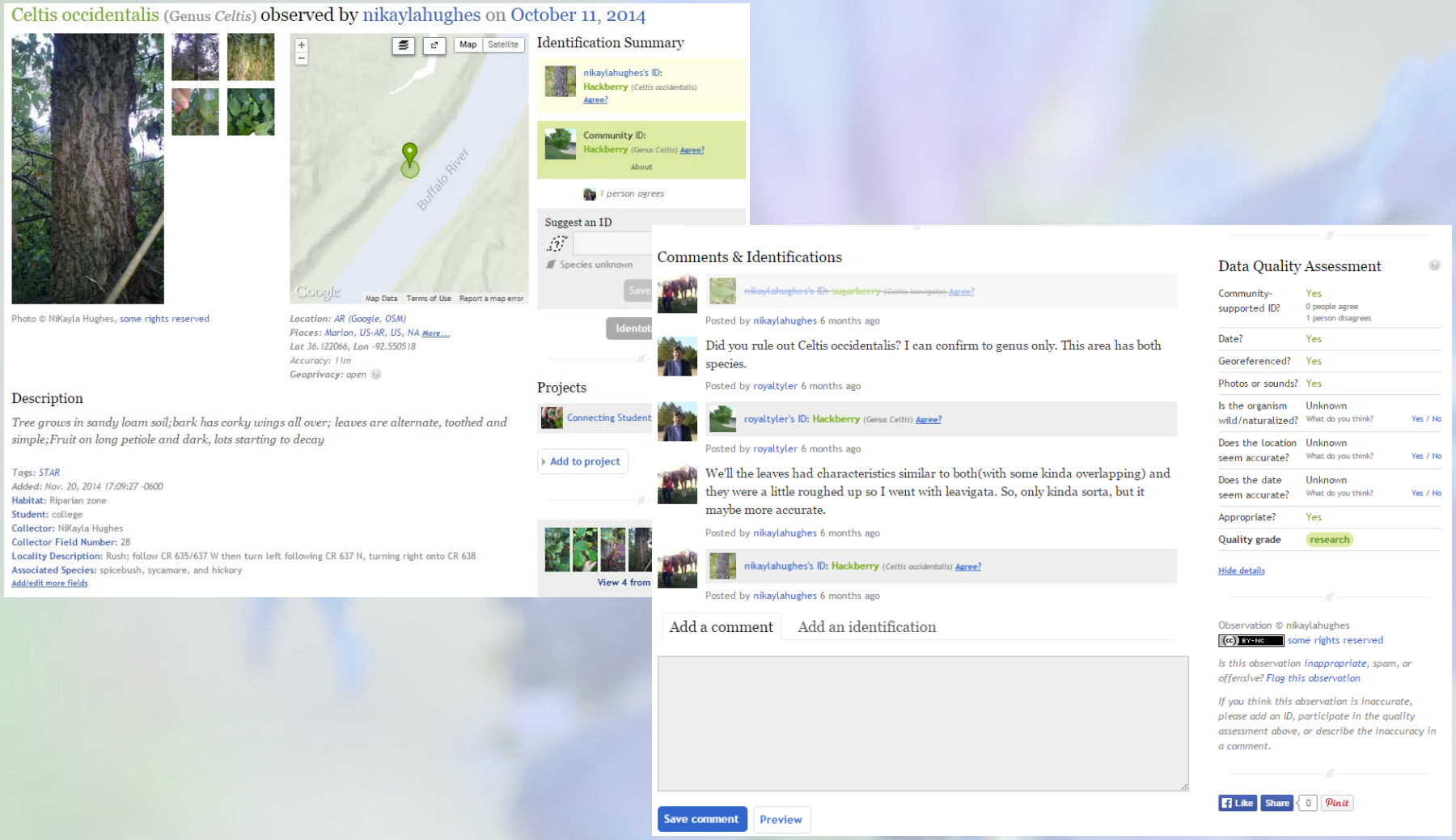


Data from Fall 2014 student survey.

OUTCOME. Students engage with each others' collections



OPPORTUNITY. Engage students in data use exercise

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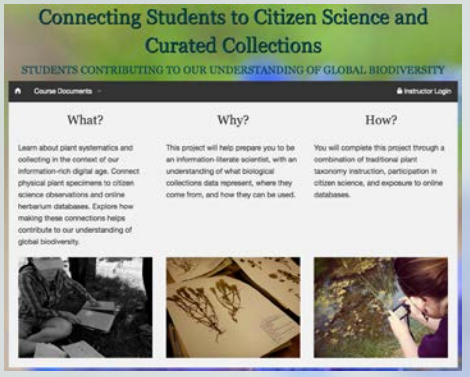
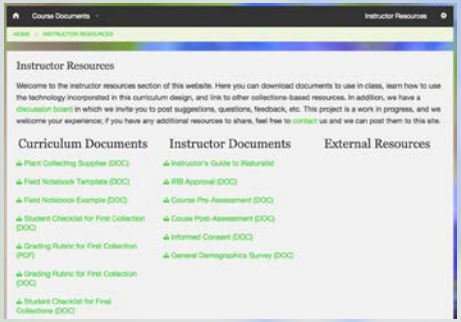
OPPORTUNITY. Engage instructors at other institutions



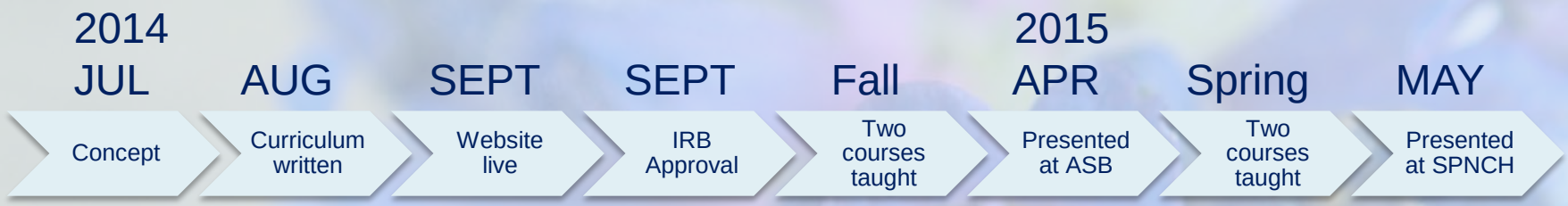
Check out **www.CollectionsEducation.org**



Use our instructor resources…
Trial username: guest_instructor
Trial password: guest

Drop us a line: info@collectionseducation.org

CONCLUSION. Small collections working together get things done



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And of course, all of the student participants!