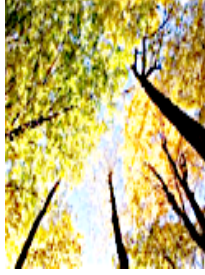


How Tall Is It?

Deeper Learning Postcard



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Highlights

Vetted Project: Students make and learn to use a clinometer to estimate heights of tall objects. Students use the clinometer in a practical way, cruising timber to estimate board feet in a sample of trees. A timber cruise involves calculating the merchantable height (part that is marketable) of a sample of trees and estimating the board feet each tree contains.

Sustainability: Working clinometer and instructions on school grounds for self-guided practice for use of the clinometer to measure heights of tall objects.

Driving Question: How can we make and use a simple device to estimate the height of tall objects?

Students Reflection: Students described the most enjoyable part of the project:
"Working with my group because they kept the project exciting and entertaining";
"I loved working hands on with clinometers and measuring heights";
"Having the option to measure whatever objects we want";
"Meeting a group of people I've never met and becoming friends with them during the project";
"I liked presenting to students and faculty as well as measuring the height of tall objects."

Students would do the following differently:

"I wish I had more time to calculate the problems and could have started earlier";
"I wish I had more time to learn about cruising timber";
"I wish I had spent more time practicing cruising timber."

When asked on what portion students did their best work, they said:

"Working together to get the right measurements when we stayed after school";
"The cruising timber";
"I think I did good on research and getting the heights of the objects we measured";
"I did my best work on explaining the components of the project and I never thought that I would have been able to do that."

When asked how the teacher could change the project to make it better, students observed:

"Have a commercial clinometer like foresters use to give us a deeper meaning to what they are used for";
"Give a little more direction on the cruising timber portion";
"Nothing. This expo project was fun!"
"I personally feel like this project was as fun/good as it could get for being a math/trig-centered project."

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Teacher Reflection: The students did a very good job demonstrating their clinometers on Expo day. They were confident in the skills that they learned and were able to verbalize to a diverse audience the components of their project and demonstrate their project smoothly.

Lessons Learned: Invite a guest speaker from forestry department with more experience with cruising timber.

Teacher Rating: Definitely would recommend.

WANTS

I. Authenticity

Demonstrating: On Expo day, students demonstrate usage of the clinometers with practical demonstrations on campus.

Producing / Revising: Once students make their clinometers, they test their reliability by estimating the height of the flagpole in front of the school building, and compare their estimates to the actual height.

Presenting: Clinometer calculations are demonstrated on Expo Day and saved in Powerpoint file.

Performing

Participate in a Rehearsal

Realistic Role

Speech or Spoken Word Performance

Producing / Revising

Model or Prototype

Test for Quality / Integrity

Presenting

Display Calculations & Trends

Utilize Visuals

II. Media Produced

Tactile: Construction of clinometer

Tactile

Building

Print Media

Signage

Artistic Composition

Journal / Diary

Technical Writing

Instruction / How to Use

III. Challenging Problems

Theme & Physical World: The field-based component is the sample cruising timber part of the project.

Of the Mind: How do we make a working clinometer, test its accuracy, and show a hands-on demonstration of a practical use of right triangle trig?

Questions

Assist Others

Express the Intangible Visually

Self Reflection & Evaluation

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Deeper Learning Postcard

Themes

Field-based Work

Topics: Physical World

Climate, Nature & Natural Resources

Topics: Of the Mind

Intelligence & Learning

IV. Achieved Literacy Skills

Information / Technology: Search for relevant web content for making clinometers and cruising timber; master use of calculator as related to right triangle trig.

Information / Technology

Distinguish Quality Web Content

Master Uses of Technology

Project / Work

Address Setbacks / Criticism

Adjust to Schedules / Contexts

Manage Time / Workload

Take Initiative for Personal Success

Leadership

Leverage Strengths of Others

NEEDS

I. Parameters & Feasibility

Project Timeframe

5-6 Weeks

Assessment Timeframe

More than a Class Period

of Project Members

Small Group

Grade Level

High School (Grades 9-12)

Authentic Audience / Evaluators

Peers

Parents

Teachers & Administrators

Community Members

II. Intended Learning Outcomes

Creativity

Brainstorm

Design / Create

Elaborate / Expand

Improve / Refine

Communication

Engage Creatively

Instruct

Technical Presentation

Collaboration

Assume Shared Responsibility

Develop Trust

Encourage Others

Exercise Flexibility

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Deeper Learning Postcard

Ignore Distractions
Incorporate Feedback
Manage People / Team
Respond to Failure
Value Contributions Made by Others
Work with Diverse Teams
Critical Thinking
Draw Analytic Conclusions
Model with Math
Negotiate
Quantify
Rational, Objective Decision-making
Reflect Critically on Learning
Solve Problems Innovatively
Instilled Citizenship Values
Lifestyle Respecting Environmental Resources
Strong Personal / Work Ethic

III. Success Skills & Depth of Knowledge

Assessment Structures: Timelines
Cognitive Demand
Identifying / Remembering
Comprehending / Understanding
Applying
Analyzing
Evaluating
Creating
Social & Emotional Skills
Self-awareness
Self-management
Group-awareness
Group-management
Learning Styles / Intelligences
Bodily / Kinesthetic
Logical / Mathematical
Verbal / Linguistic
Visual / Spatial
Assessment Structures / Resources
Journals Rubrics

IV. CTEs & Disciplines

Career & Technical
STEM Research & Applications
Engineering
Environmental Engineering
Mathematics
Algebra & Trigonometry
Sciences
Earth & Geo Sciences