Trace Your Website Route!

Summary:
Students will learn how their computers use the Internet to access websites across the world. They will also be introduced to the command prompt and the trace route command (tracert). After a brief introduction to the command prompt, the trace route command will be demonstrated with a website in the US and one in a different continent. Using the Submarine Cable Map (www.submarinecablemap.com), the students will explore how underwater cables connect countries across the world with the Internet. Students will then pick a website of their choice and, after guessing how many stops their request will take, will run the trace route command to see if they guessed correctly.

Grade Band	Time Needed
☐ K-2 ☒ 6-8 ☐ 3-5 ☒ High School	● <u>30</u> minutes for main activity ● <u>20</u> minutes for extension activity ● _____ additional time for _____

Learning Outcomes – Upon completion of this lesson, students will be able to:
Describe how computers use the Internet to access websites across the world. Describe the command prompt and trace route command and explain what they do. Understand how underwater cables and the Internet connect continents together. Run a trace route command on their own under teacher supervision.

Materials List

An Internet-connected device (laptop, Chromebook, etc.)

Access to the command prompt and trace route command

Website: www.submarinecablemap.com

This lesson includes:

☒ Mapping to Educational Standards   ☒ Learning Outcomes

☒ Mapping to Computational Thinking   ☒ Assessment

☒ Mapping to Cyber Security Principles   ☐ Accommodations

Mapping to Educational Standards - ISTE 2016 student standards

1.1c - Students use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways.

1.1d - Students understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.

2.2b - Students engage in positive, safe, legal and ethical behavior when using technology, including social interactions online or when using networked devices.

3.3a - Students plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits.

5.5b - Students collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making.

Trace Your Website Route!

Mapping to Computational Thinking

☒ **Abstraction** is identifying and extracting relevant information to define main idea(s).

☐ **Algorithm Design** is creating an ordered series of instructions for solving similar problems or for doing a task.

☐ **Automation** is having computers or machines do repetitive tasks.

☒ **Data Collection** is gathering information.

☒ **Data Analysis** is making sense of data by finding patterns or developing insights.

- ☐ ***Data Representation*** is depicting and organizing data in appropriate graphs, charts, words, or images.

- ☒ ***Decomposition*** is breaking down data, processes, or problems into smaller, manageable parts.

- ☐ ***Parallelization*** is simultaneous processing of smaller tasks from a larger task to more efficiently reach a common goal.

- ☒ ***Pattern Generalization*** is creating models, rules, principles, or theories of observed patterns to test predicted outcomes.

- ☒ ***Pattern Recognition*** is observing patterns, trends, and regularities in data.

- ☒ ***Simulation*** is developing a model to imitate real-world processes.

Mapping to Cyber Security Principles

☒	Domain separation	☒	Abstraction
☐	Process isolation	☒	Data Hiding
☐	Resource Encapsulation	☐	Layering
☐	Modularity	☐	Conceptually Simple
☒	Least Privilege	☐	Minimization

Assessment:

Students will show write down their guess and then show the teacher how many stops their trace route took by copying the results and pasting them into a document they share with the teacher.

Accommodations:

Examples of accommodations could include specific instructions for:
- Closed captioning for hearing impaired students
- Accommodations for students with disabilities
- English Language Learner (ELL) assistance

Date Lesson Created: **7/21/2016**

Acknowledgements:

Submarine Cable Map (www.submarinecablemap.com)