



Secret Agent Engineering- Curriculum Exchange

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TOP SECRET

Secret Agent Engineering
Investigating Characteristics of Wave Information Transfer
Curriculum Exchange

Grade Level 4-5

Standards: NGSS 4-PS3-2, 4-PS4-3, ETS1.C

Secret Agent Engineering provides a context for students to apply understanding of wave behavior and patterns while designing a code and device to transmit location information to rescue their classmates from “disaster”. Elementary students, in the role as Secret Agents, engage in NGSS wave transfer thinking while applying knowledge of light and/or sound waves. Designed codes and devices are presented to promote and demonstrate understanding of science and engineering.

Context: Students are introduced to this design challenge after science exploration and investigations with the behavior and characteristics of light and sound. These explorations introduce the concepts of reflection, refraction, and also develop a model to represent wave characteristics using Slinkys and ropes. Students are placed into teams of four for the challenge.

Differentiation of requirements and materials by teachers facilitates scaffolding to meet varied population needs. Materials used during two forty five minute classes dedicated to this challenge range from flashlights, colored paddles, rubber bands, straws and shoe boxes.

Scaffolding includes guiding the teams with explicit prompts to consider the following points. A Secret Agent packet facilitates “seeing student thinking” and promotes team processing of each component of the process:

1. Determine what the code should be
2. Determine how the information can be transmitted.
3. Utilize the *Engineering Design Process* to elaborate the following points:
 - State the problem
 - Generate ideas
 - Select a solution
 - Build the device
 - Test and evaluate the device
 - Present/share your device
4. Reflection

For resources that include the lesson plans with instructor notes and student secret agent packets contact:

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