

A framework for recognizing debugging during students’ computational model building

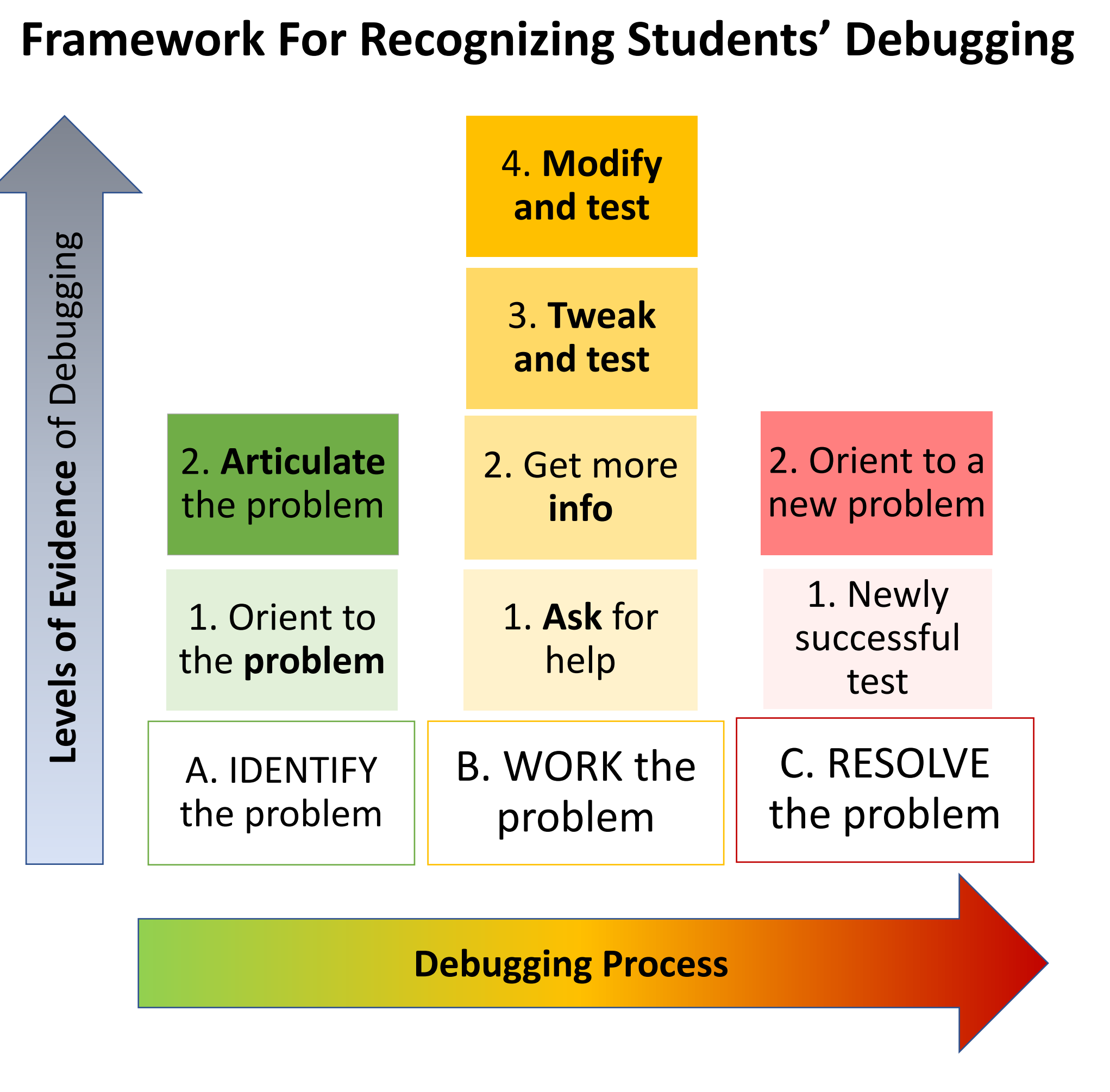
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INTRO

- Computational modeling is a key aspect of doing physics and thus learning physics.
- More and more high school classrooms integrate computational modeling with doing physics
- A focus on computation can at times distract students from the physics, and vice versa.
- As researchers and instructors, we want to know:

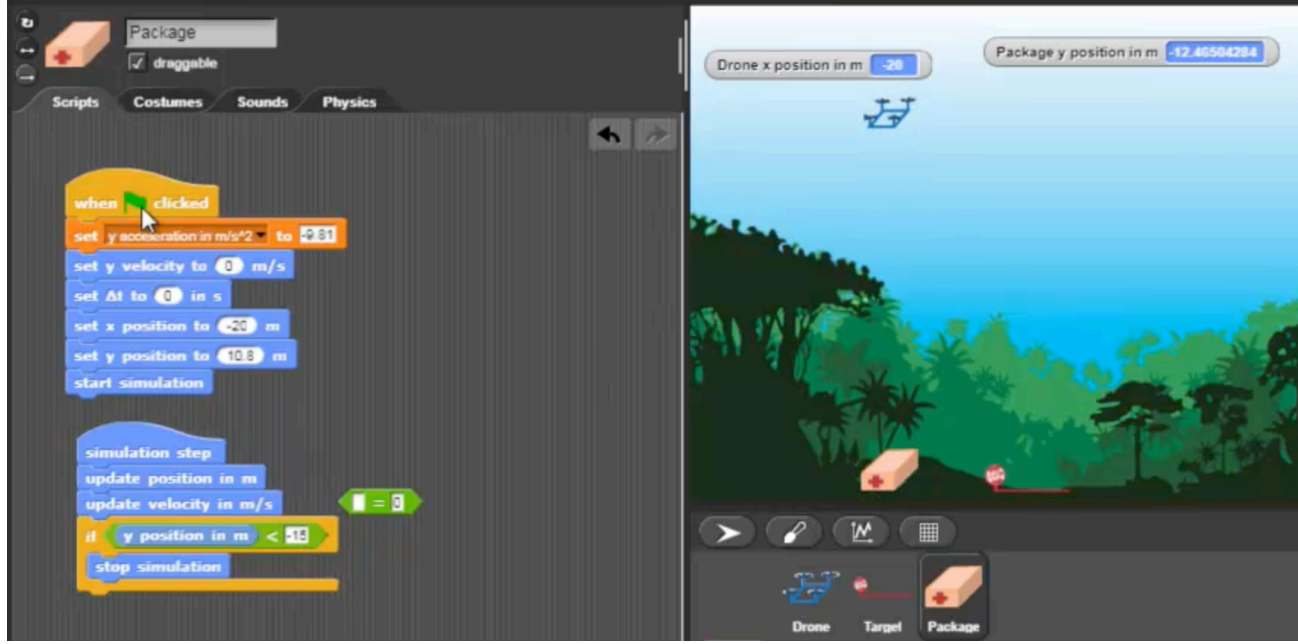
When are students are learning physics and computation in mutually reinforcing ways?

- Previous research suggests that when students are debugging, they are often engaged in disciplinary practices that are common to both computational modeling and physics.
- This poster presents a **framework for recognizing when students are debugging**, based on screen capture data of high school students' computational model building.



C2STEM data

- C2STEM is a block-based physics simulation environment and problem-based curriculum



- We examine video of screen captures from a study in high school physics classrooms (n~100) and summer camps (n~60)

Debugging is a way for students to learn physics and coding at the same time.

How can we tell when students are debugging?

Recognizing Debugging: A case study

Task: Drop a package onto a target from a height of 10m. Find the impact velocity.

1. Orient to the problem

Problem: Package does not stop when hitting the ground.

3. Tweak and Test

Student makes an “IF” block to stop the package and iteratively tests and tweaks stopping value of y position

2. Get More Info

Student opens a data table to see when condition “y position = 0” is fulfilled. It never is.

4. Modify and Test

Student replaces “IF y position = 0” block with “IF y position > 0” block.

1. Newly successful test

They test it and it works! The package stops.

After tweaking the stopping y position, they move on to a new problem: finding the right stopping x position.