ACORN Physics Tutorials Facilitator Guide

What are ACORN Physics TUTORIALS?
ACORN Physics Tutorials support learning environments that Attend to Conceptual Resources in Physics. Conceptual resources are potentially generative student ideas: “seeds of science” that can grow toward sophisticated understandings with support and cultivation. ACORN Physics Tutorials support students to construct their own models for physics concepts: the materials do not scaffold students toward a predetermined model.

ACORN Physics Tutorials:
- Begin with conceptual physics questions that research has shown to consistently elicit generative student ideas about specific physics topics.
- Ask students to explain physics observations or phenomena in order to articulate, connect, and refine their ideas.
- Guide students to construct and test models for a broad set of phenomena (e.g., wave propagation, dc circuit behavior, collisions) based on their own ideas.
- Are designed to be used in small groups of students (ideally 3-4) in synchronous or in-person class time in a 60-90 minute period.
- Are designed to be used with extensive instructor engagement. Near-peer facilitators (LAs or TAs) are helpful.

What materials come with ACORN Physics Tutorials?
- Worksheets for students (editable and pdf)
- Instructor guides, including common student ideas about each physics topic
- Periscope video lessons for instructor training, highlighting how ACORN Physics tutorials elicit student thinking about specific topics and illustrating instructor moves that effectively support students’ progress

What should I expect students to do during an ACORN Physics Tutorial, and how can I help?
- Students will generate many novel ideas and questions. Instructors can:
  - Notice and elevate their original ideas and questions.
  - Revoice their ideas and questions back them.
  - Ask clarifying questions to help them connect the dots.
- Students will experience vexation points, “critical moment[s] when the[y] articulate an in-consistency or gap in their understanding [that] kicks off the sensemaking frame.”* Instructors can:
  - Suggest analogies, thought experiments, and contrasting cases to support students’ sensemaking process.
  - Choose questions or observations to elicit additional conceptual resources that are fruitful for the context. (Particular ideas, representations, or experiments discussed in previous class sessions, etc.)
- Students will be motivated to answer their novel questions, but will find this challenging. Instructors can:
  - Suggest ways students can refine their question to be answerable within the scope of the knowledge and equipment they have access to.
  - Suggest experiments to test/explore students’ questions.
- Students will wonder whether their ideas are idiosyncratic or shared. Instructors can:
  - Encourage students to share ideas with each other.
  - Facilitate sharing by asking questions about how students’ ideas connect to one another.
  - Connect students’ own ideas or models with canonical models and concepts.

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