Collegial Conversation - SCUDEM
Student Team Members and Coaches

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A Community of Practice for teachers and students, teaching and learning the pivotal STEM Course in differential equations in a modeling first and throughout approach - mathematics in context!
Outline of Conversation
SIMIODE Challenge Using Differential Equations Modeling

▶ Overview of SCUDEM
▶ Resources Available
▶ Role of Student Team Member
▶ Role of Coach
▶ Preparation Before Challenge Period
▶ Challenge Period Efforts
▶ Results, awards, and judges’ reports
▶ Satisfaction

All SCUDEM materials are available at
https://qubeshub.org/community/groups/scudem/overview
Join us for SCUDEM VI 2021
23 October - 14 November 2021

Registration Open Now

SCUDEM — SIMIODE Challenge Using Differential Equations Modeling is a 3-student group modeling challenge that runs over multiple days culminating in a 10 minute video which is reviewed by at least 3 judges. Teams and Coaches may meet remotely. Team submissions will be judged Outstanding, Meritorious, or Successful.

Teams choose one of the Challenge Problems provided in the areas of

- physics/engineering,
- chemistry/life sciences,
- social sciences/humanities,

and develop a model using differential or difference equations and a presentation.

Watch presentations from SCUDEM V 2020 Outstanding Award recipients at SIMIODE's YouTube playlist. Read the full details about all our past events, including problem statements and results, in our wiki.

See Complete Rules for details of the challenge.

We need volunteer Coaches and Judges so please volunteer.

SCUDEM is administered by SIMIODE, a non-profit Community of Practice focused on a modeling first approach to teaching differential equations. We are in the process of migrating fully to QUBES.

Please feel free to share this News Release on SCUDEM VI 2021 with colleagues.
SIMIODE Challenge
Using Differential Equations Modeling

Three student team modeling challenge

Teams consist of 3 undergraduates or high school students, home schooling students, and a coach.

Students can register as a team with a coach or students and coaches can register independently and SIMIODE will match up team and coach.
Teams choose one Challenge Problem provided in the areas of

- physics/engineering,
- chemistry/life sciences,
- social sciences/humanities,

and develop a model using differential or difference equations and a 10 minute video presentation.
SCUDEM

- Runs over a multiple day Challenge Period (23 October - 14 November 2021)
- Culminates in production of a 10 minute video which is reviewed by at least 3 judges
- Upload video as Unlisted in YouTube for judging
- In SCUDEM V 2020 each team averaged more than 8 judges’ reports
- Teams and coaches meet remotely or in person
- Team videos judged Outstanding, Meritorious, or Successful, and awarded certificates
Resources Available

- **Guide for Coaches and Students**
- **Students - Benefits and General Comments**: Student Support Materials and Helpful Comments from Problem Author
- **Previous SCUDEM** Information, Problem Statement, and Student Submissions
- **Rules for SCUDEM VI 2021**
- SCUDEM Participants **Increase Self-Efficacy in Mathematics**
Student perspective - Anthony Stefan

- Use **Guide for Coaches and Students**
- Resources available to practice are on the **SCUDEM webpage**
- Past examples including the **SIMIODE YouTube channel** of teams who received outstanding videos.
Student perspective - Anthony Stefan - more

- **Strategy to organize** – Gather a plan with your team mates before the statement release of when it does, how you will attack it.

- **Strategy to model** – Discuss weaknesses, strengths of team members so when time comes allocation of tasks is appropriately distributed (e.g., usually there is someone who has the most intuition on a problem, pick that one).

- **Strategy to present** – If a student is good at developing visual presentation and another is skilled in the mathematics, settle this early
Role of Student Team Member

▶ Respect and be sensitive to colleagues’ contributions, expertise, feelings, cultures, emotions
▶ Be considerate to time zone issues
▶ Discuss team member individual strengths, e.g., data analysis, modeling, mathematics, programming, video, editing
▶ Read and consider three problems physics/engineering, chemistry/life sciences, and social sciences/humanities.
Role of Student Team Member - more

► Select one problem soon and stick with it
► Reasonable hours on task and meeting times
► Assign tasks and be accountable
► Gather and document source information
► Leave time for writing and video production
► Offer clear titles, labeled plots, modest text
► Practice and edit video
Coach perspective - Anthony Stefan

- Use **Guide for Coaches and Students**


- Meet students twice before and once after event (After Action Report - AAR), (1) explain and prepare for the event (communication between students), (2) practice modeling approaches, and (3) discuss the judges’ comments.
Role of Coach

- Benefits
- Information for Coaches
- Role of the Coach
- Things Coaches Can Do
- Act with integrity . . . more on this
- Post SCUDEM - talk at conference about experience, e.g., SIMIODE EXPO
Act with integrity

During challenge period, no assistance from living people other than team members can be used on the problem effort.

Coaches are free to help teams prepare before the challenge begins. During the challenge, coaches are limited to moral support — we recommend pep talks and check-ins to be sure the group is working together in a positive manner.
Preparation Before Challenge Period

- Go over previous **SCUDEM problems and student submissions**
- Refer to **Information for Coaches** for ideas
- **Team Meeting Software Platforms**
- **Useful Resources for Coaches and Students**
  - software
Results, awards, and judges’ reports

- All teams who submit video receive an award certificate: Outstanding, Meritorious, Successful

- SCUDEM V 2020 had 27 Outstanding Teams - see SIMIODE YouTube Channel

- Team judges’ reports - SCUDEM V 2020 teams received on average 8+ judges’ reports
are hereby granted the **Outstanding Award** for their submission of
**Problem # Title**

as determined by faculty and peer judges and given by
the Director, SIMIODE.
Personal Satisfaction and Professional Growth

In 2019 article, Building mathematics self-efficacy of STEM undergraduates through mathematical modelling in *International Journal of Mathematical Education in Science and Technology*, the authors found intervention, particularly through SCUDEM, "promotes students’ mathematics self-efficacy."
Discussions and Questions

Deferential equations.