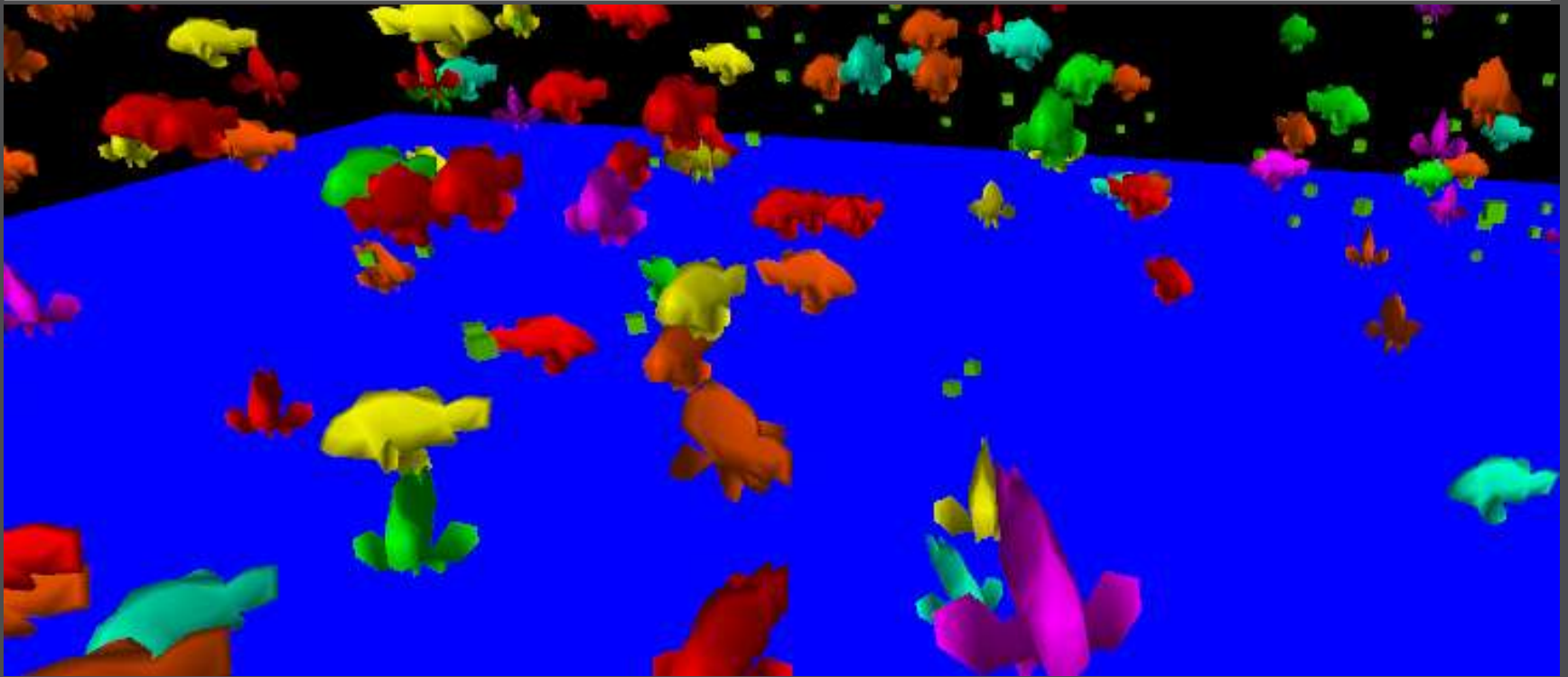


MIT **STEP/TEA**



Modeling

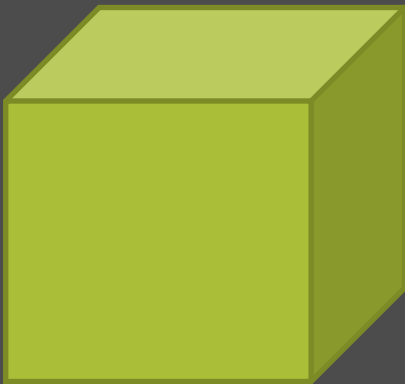
WENDY HUANG AND DANIEL WENDEL: MIT SCHELLER TEACHER EDUCATION PROGRAM (STEP)

Lesson Overview

- Lecture: Why Model?
- Video: Using Agent-based models to visualize complex systems
- Demonstration: Fish evolution computer model
- Summary
- Assignment

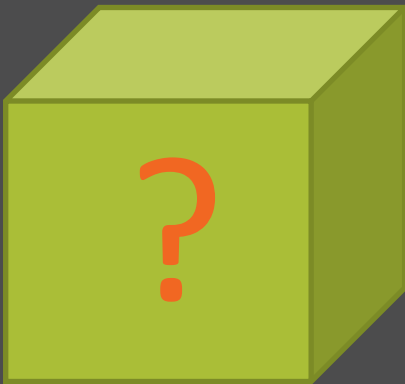
Why Model?

- Implicit models



Why Model?

- What kind of model are we making?



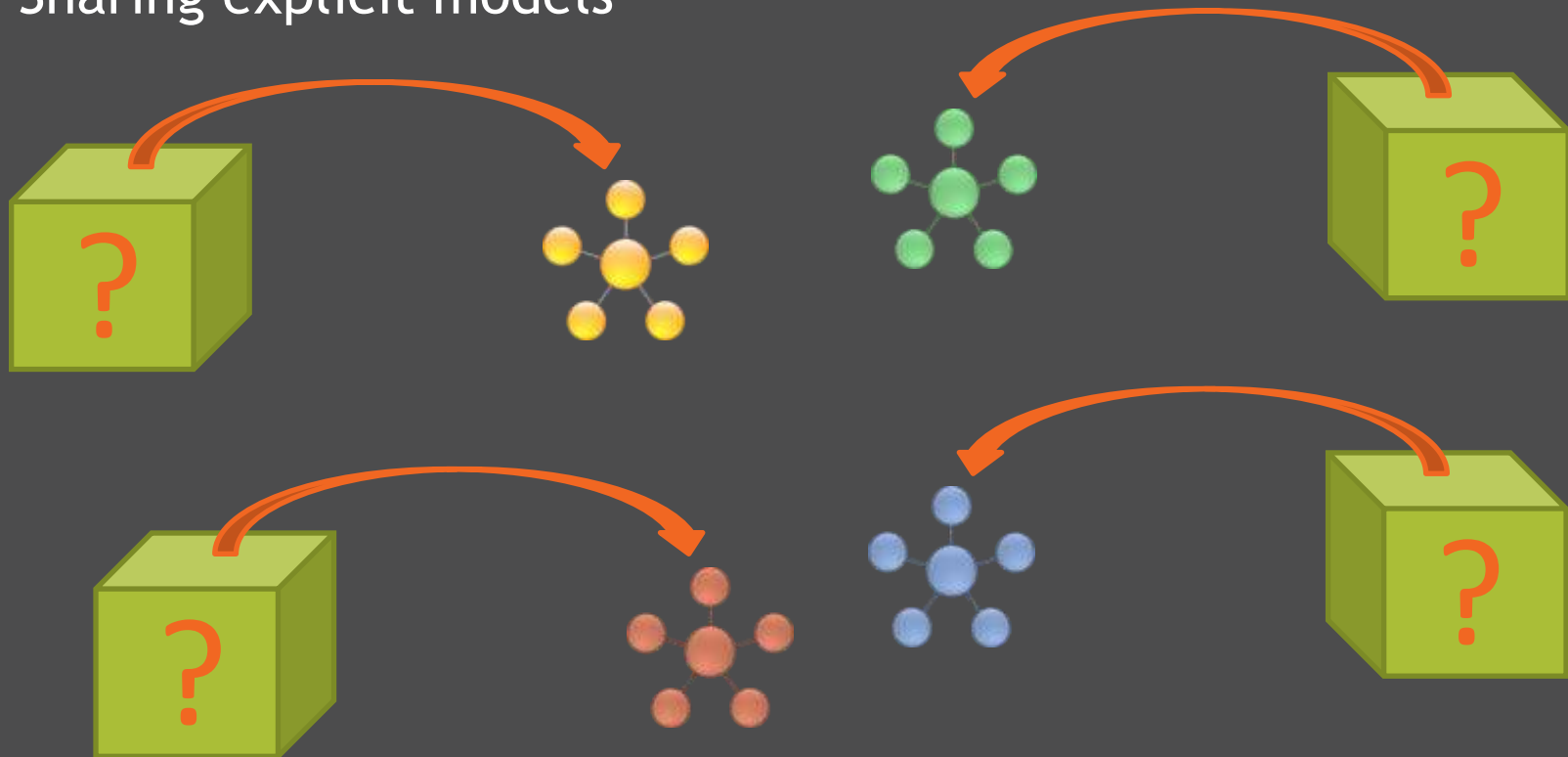
Why Model?

- Making explicit models



Why Model?

- Sharing explicit models





“Essentially all
models are wrong,
but some are useful”

- George Box, statistician

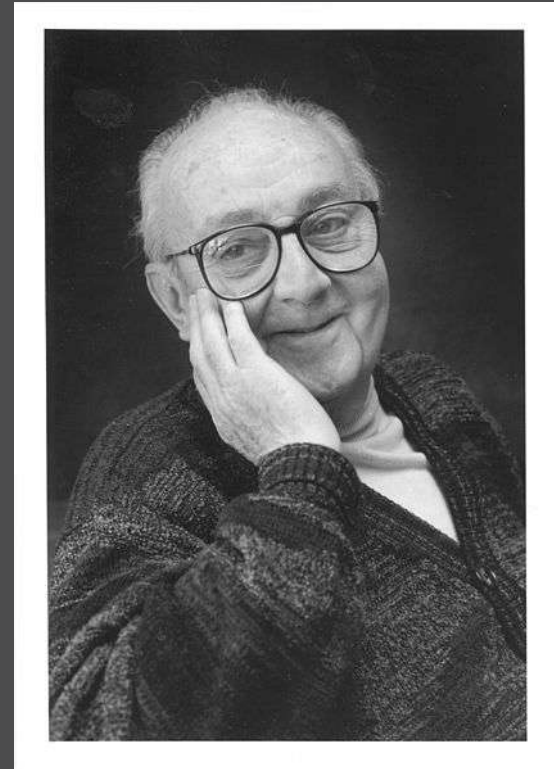
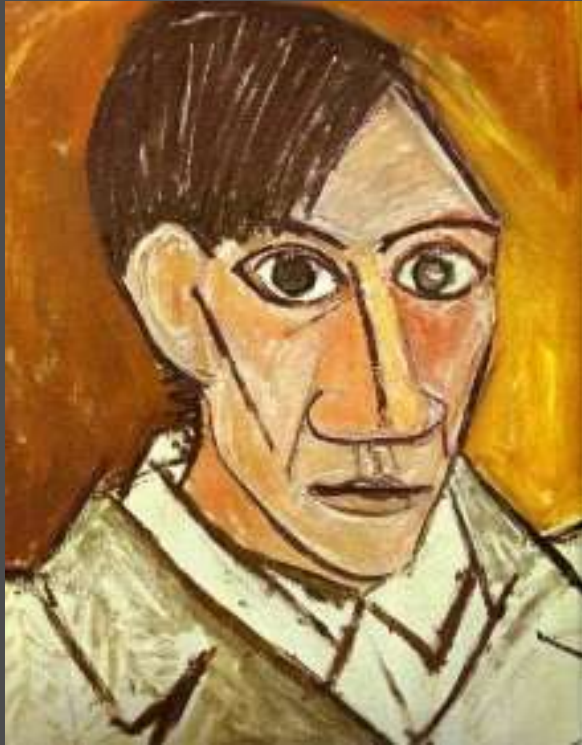


Image by DavidMCEddy/Wikimedia



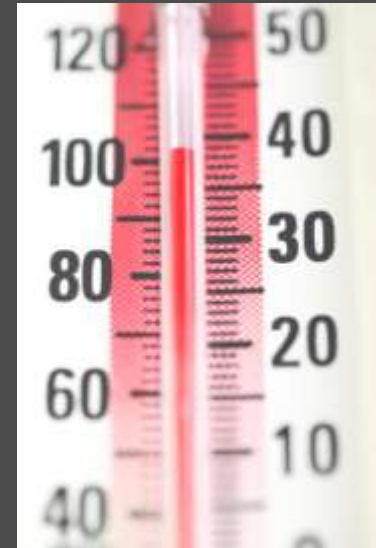
<http://www.pablocicasso.org/self-portrait.jsp>

“Art is a lie that helps us see the truth.”

- Picasso, artist

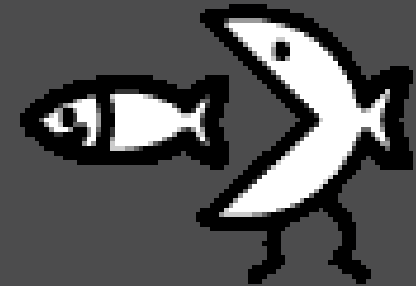
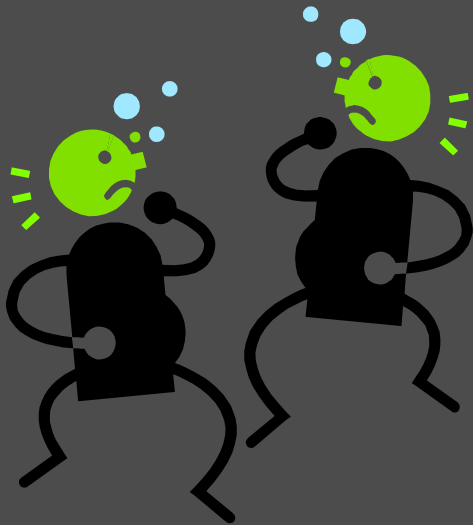
Uses of Models

- Do more than predict



Uses of Models

- Explain phenomena



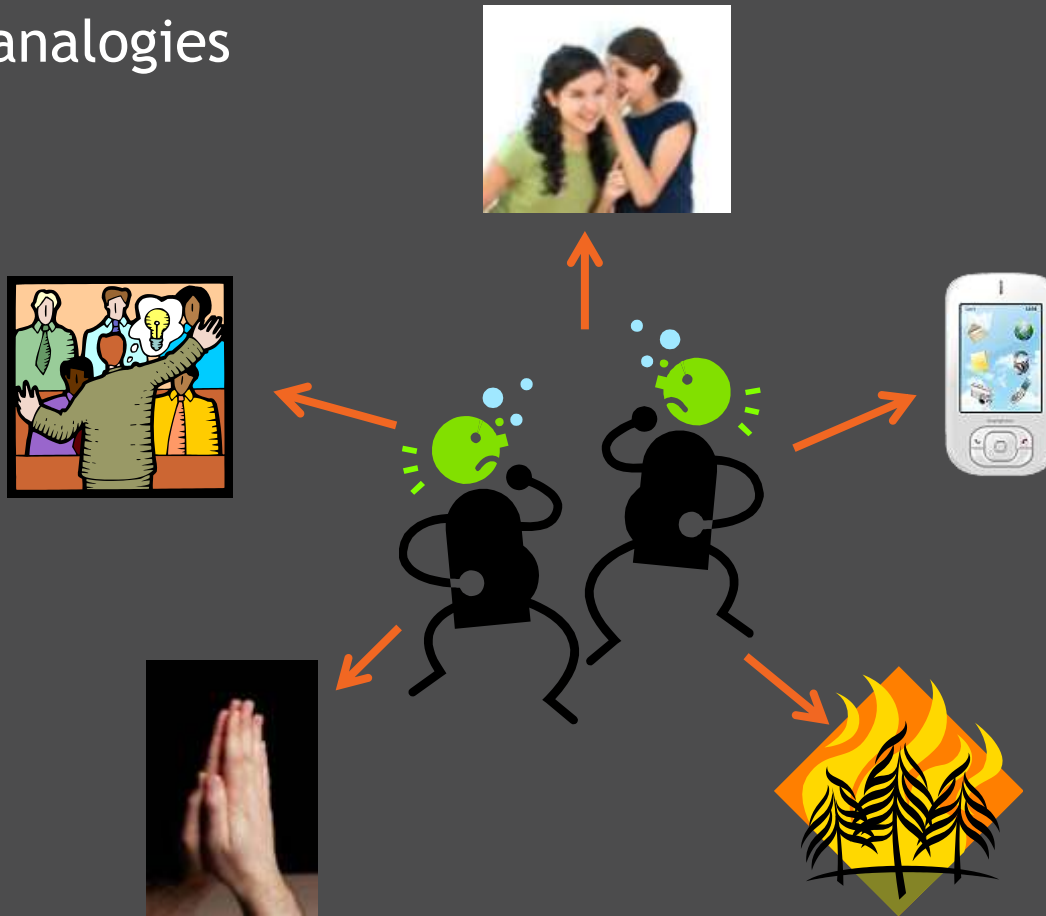
Uses of Models

- Guide data collection



Uses of Models

- Suggest analogies



Uses of Models

- Raise new questions



Modeling in Education

- Enforces a scientific habit of mind



Agent-based Modeling

- One type of modeling is agent-based modeling.
- The next 7 minutes will introduce you to the basics of agent-based modeling and how it's used to model complex systems.

Models in Classroom Practice

Use

Students are given pre-built, model:
Adjust parameters, make observations, collect data, infer “rules” of the model

Modify

Students are given pre-built model:
Tinker with rules of the model, add new rules to the model

Create

Students build new model from scratch:
Decide what are the important elements to model and what are the rules.

Easier/Less powerful

Harder/More powerful

Assignment Demonstration

- You will use Toolblox - an online agent-based modeling program.
- Assignment is to **USE** a model, following worksheet directions to guide your exploration of the model

Use

Modify

Create

- Demonstration of Toolblox and EvoFish model



Summary

- Models = illuminating abstractions
- Agent-based modeling is used to model complex systems
- Toolbox = a computer programming tool that can be used to build agent-based models
- **Use** - Modify - Create progression

Assignment

- Read essay: “Why Model?”
 - In Moodle forum, answer question: How would you convince a teacher to try modeling in his or her classroom? How would you advise him or her to start?
- Use Toolblox to investigate EvoFish model
 - Follow directions on EvoFish activity sheet
 - Answer questions on activity sheet
 - Submit completed activity sheet as an attachment to your reflection about the activity in the appropriate Moodle forum

Thanks!

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