Who is *Design In The Classroom* for?

Design in the Classroom (DITC) Teacher Professional Development materials are made for pre-service teacher educators, professional-development facilitators, school administrators, and most especially, middle-school teachers interested in seeing design-based curricula in action in the classroom. The DITC videos showcase US and UK teachers using lessons and units from newly developed curricula like *Learning By Design, Challenges In Physical Science, Nuffield's Design & Technology,* and *Design Now!* These curricula contextualize and motivate students learn skills and ideas in science and technology by having them do hands-on design challenges. DITC highlights the key concepts and skills teachers need to know and use to guide students in working together to make *informed design decisions*—informed by key science and technology ideas that can be found in various state and national Standards.

How to Use the Materials

DITC CDs have been designed for use by two or more teachers working together at the same computer, at a distance, or in a facilitated professional development setting. They aim to give users a "video gestalt" of what design might look like in the classroom, and supports them in using these tasks in their classes.

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To chat on line with other DITC users, check out the latest video sequences, or provide much valued feedback on the project, visit our soon-to-be-updated website at:

www.cc.gatech.edu/projects/DITC

Hardware Requirements:
Macintosh or PC-based computer running Microsoft's Internet Explorer 5.x, OR Netscape Communicator 4.7x, AND running QuickTime Player 4.x or later.

Design in the Classroom

Teacher Professional Development Materials

For Middle-School Science and Tech Ed Teachers

Georgia Tech | College of Computing

MISSION:

Provide Standards-based professional development materials to support middle-school science and technology education teachers in learning about, discussing, implementing and managing design-related projects and curricula in their classrooms.

What is *Design In The Classroom?*

Design tasks of all sorts are appearing in different classroom around the world. You would expect to find them in colleges to train future engineers, but in the last few decades, they increasingly can be found in high- and middle-schools, and even in elementary classes. They are used in teaching technology, science, computer programming and webpage design, textile and food production, and mathematics. A number of national standards in the US, UK and elsewhere have included design as an essential element of a quality education for students.

What is design?

The famous husband-and-wife design team, Charles and Ray Eames, described design as "a plan for arranging elements in such a way as to best accomplish a particular purpose." The *National Science Education Standards* describes technological design as a set of higher-order thinking skills that include identifying the design problem, proposing solutions and products, and implementing and evaluating a proposed idea.

Design In The Classroom (DITC)

DITC uses a web-like interface to give teachers and other users access to its video library collection. Footage shows science and tech ed students and teachers doing different design activities from one of four Standards-based middle-school curricula. Classroom scenes are accompanied by interviews with teachers, students, principals, curriculum designers and experts in education, science and engineering. The materials aim to help teachers get the most student learning from design-based activities, to understand better what students think, and to see the range of students' solutions to challenges.

Get an overview of the unit by viewing the 3-minute *Getting Started* video.

Listen in on students' thoughts and design discussions.

"I like if you look at something you analyze it and... you look at it carefully. [you] focus on it. That's it, nothing else."

"The if you feel it with holes you cannot drop it without one hole on it computer."

Teaching topics and tutorials can be accessed via the Main Menu. These act as jumping-off points for discussions by groups of teachers using DITC to:

• help students work in groups and manage their time and materials
• encourage creative and analytical thinking
• links design, science and math ideas
• do formative assessment with design tasks

Design in the Classroom

Learning by Design™
Parachute Challenge
Tech Ed Class, Grade 9

Getting Started	**Parachute Task Overview**	**Classroom Videos in Sequence**
• What is Design in the Classroom? • How to use this disk	• Parachute challenge • Ed Goldman, teacher • Learning By Design™	• Teacher instruction • Student work sessions
Teaching Strategies	**Students Doing Design**	**Final Presentations**
• Introducing a design task • Time management • Coaching design teams	• Working in teams • Design strategies • Interviews with kids	• Watch the drops • Controversy: Did the winner win?
Key Parachute Concepts	**Assessment and Standards**	**Video Comparisons**
• How parachutes work • Class demos • Inquiry vs design	• Grading • Formative assessment • Links to NSES	• Science vs tech ed teachers implementing Parachute Challenge

View the unit's day-to-day evolution via the *Classroom Videos in Sequence's* Timeline.

Learn more about the science of how the devices students design work in the *Key Concepts* section.

Teacher goals for using DITC:

• *Make Connections* with one's own knowledge of subject and pedagogy
• *Dialog with Other Educators* about videos and design-oriented activities
• *Reflect* about one's own teaching
• *Elaborate* on cases and frameworks shown in DITC

Compare tech ed versus science teachers' demos, lessons and students' designs in the *Video Comparisons* section.

Parachute Design in a Tech Ed Class

Ed Goldman, a technology education teacher from Brooklyn Tech HS in New York, spending seven days with his students doing a parachute design task taken from the Learning By Design™ curriculum developed at Georgia Tech.

DAY 1. Ed reads the challenge to his students, shows them materials they could use to make a model parachute, then demonstrates three sample designs. The following video shows five 9th graders brainstorming ideas and selecting variables to investigate and test.

DAY 2-4. Discussions about design variables take up the next three teaching days. Ed's visits with teams to check on their progress, reminds them of impending deadlines, and guides them to base their decisions on data they collected.

DAY 5. Classroom scenes show highlights of the final classwide Parachute Drop.

DAY 6. Ed ran a discussion on "Looking Versus Seeing" and managed a controversy that erupted over whether the best performing parachute could be called a "winning design".

DAY 7. Ed tests his tech ed students' understanding by asking them to design and make a toy that used a parachute in its design.

Other video sequences include Ed discussing problems with homework, differences between design and inquiry, and getting students to:

• link the behavior of their products with the design decisions they made
• rely on each other rather than on him, and explore the value of working in groups
• move from trial-and-error designing to "informed designing"