Team Based, Project-Centered Learning Workshop

Dr. Joseph Ritter

April 10, 2015

Workshop Outcomes

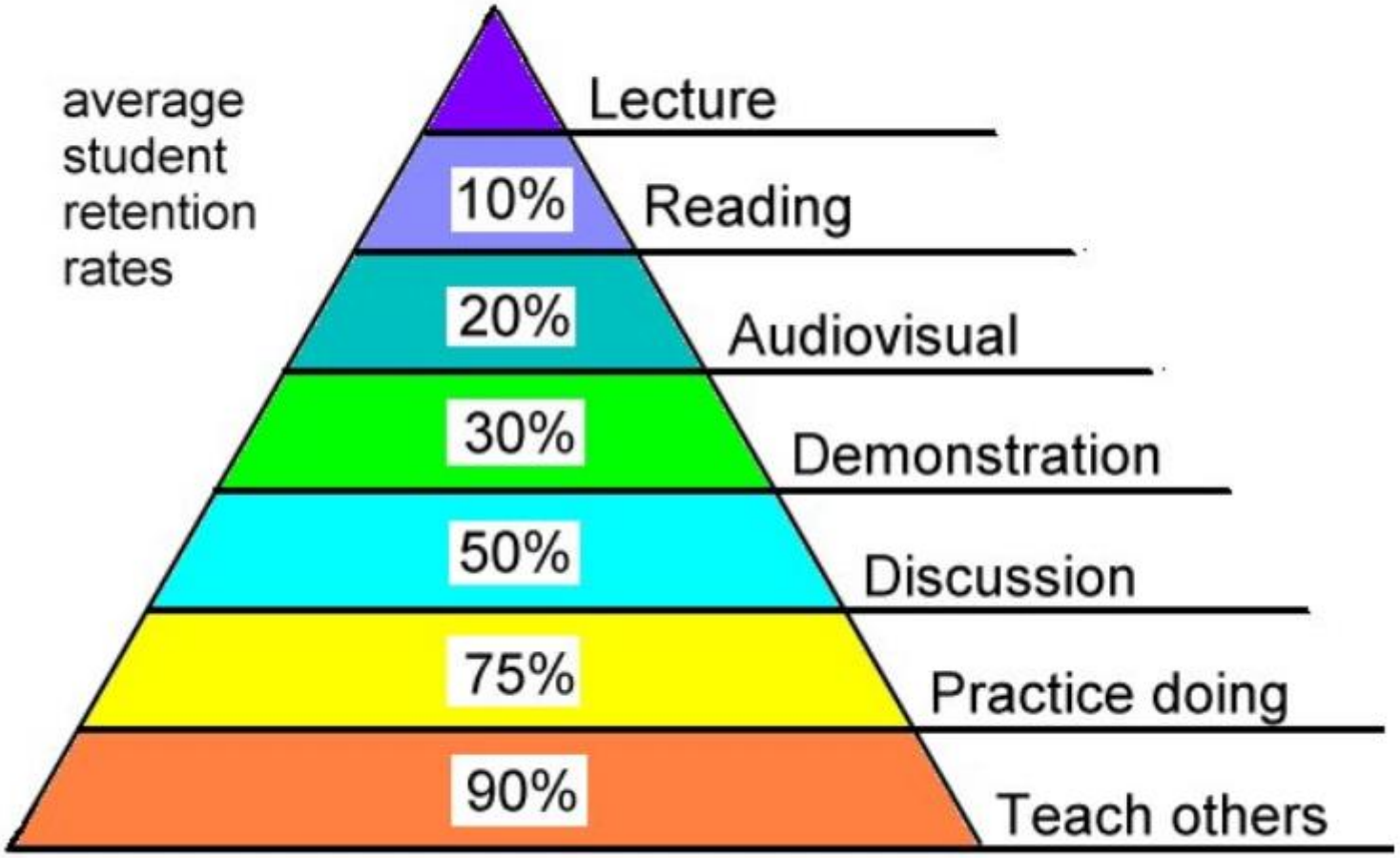
- Define and give examples of team-based, project-centered learning
- Describe methods of team-based, project-centered learning that include: development of a community of learners
- Identify principles associated with team-based, project-centered learning
- Generate ways team-based, project-centered learning can be employed in your courses

Team-based, project-centered learning challenges students:

- to think.
- to take responsibility for their learning.
- to work collaboratively.
- to participate in planning the curriculum.
- to assess the learning process together.

"Learning only occurs when the learner does something." (Herb Simon)

Learning Pyramid



Source: National Training Laboratories, Bethel, Maine

Project-Centered Learning

Involves successful completion of a complex, **team-based** project. It provides opportunities to develop teamwork, leadership, communication, problem-solving, and project management skills.

Student-centered; teacher-directed

Examples of team-based, project-centered learning

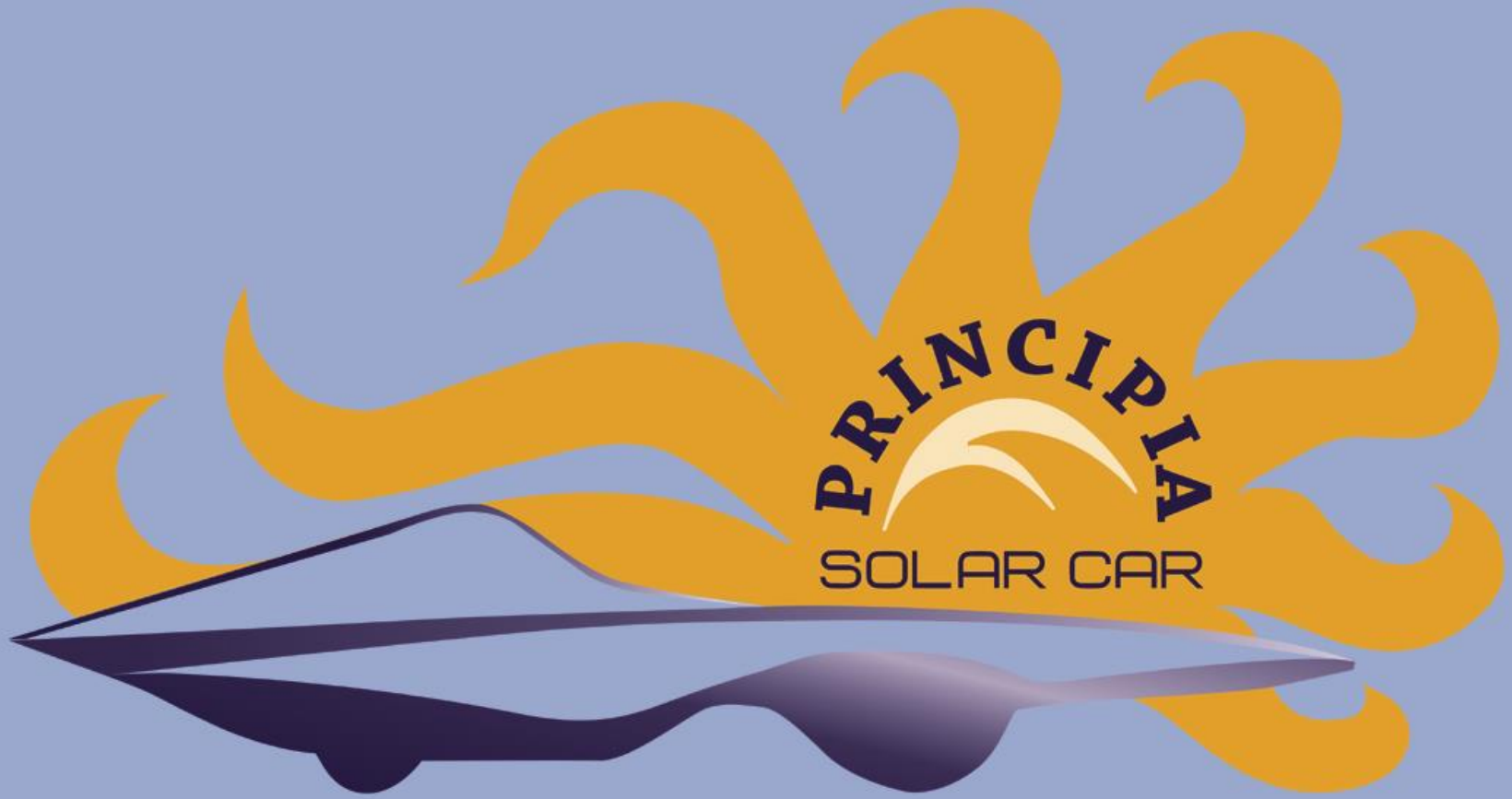
- Cardboard Canoe Race
- Sugarbush Management Class
- Biology and Education blocks
- Service Learning (Community Service)
- Solar Car Team—competitions


LEGE 32
Mary L. Blalock
Louise S. Greeley
Arthur & Faye Billings
Charles Cheeseman
Stewart & Robin Collins
Paul & Mary Hartman
Marian & Robb Broxberg
Dolores Lovejoy
Pauline Mueller
Geneva Newman
Robert & Donna Nichols
Gary Rainwater
Stephen Sheper
Linda Spier
Terry Walter
Margret Buchholz
The Chaney Foundation
Mary-Margaret Young
In Memory of Bud Hardman


SONIC
BOOM!


PRIN SECOND GRA


Styrofoam



ONE MIND • ONE LIGHT • INFINITE RAYS


32


SIMPSON
RACE PRODUCTS
N2
28
32
Principia
College


32
PRINCIPIA COLLEGE

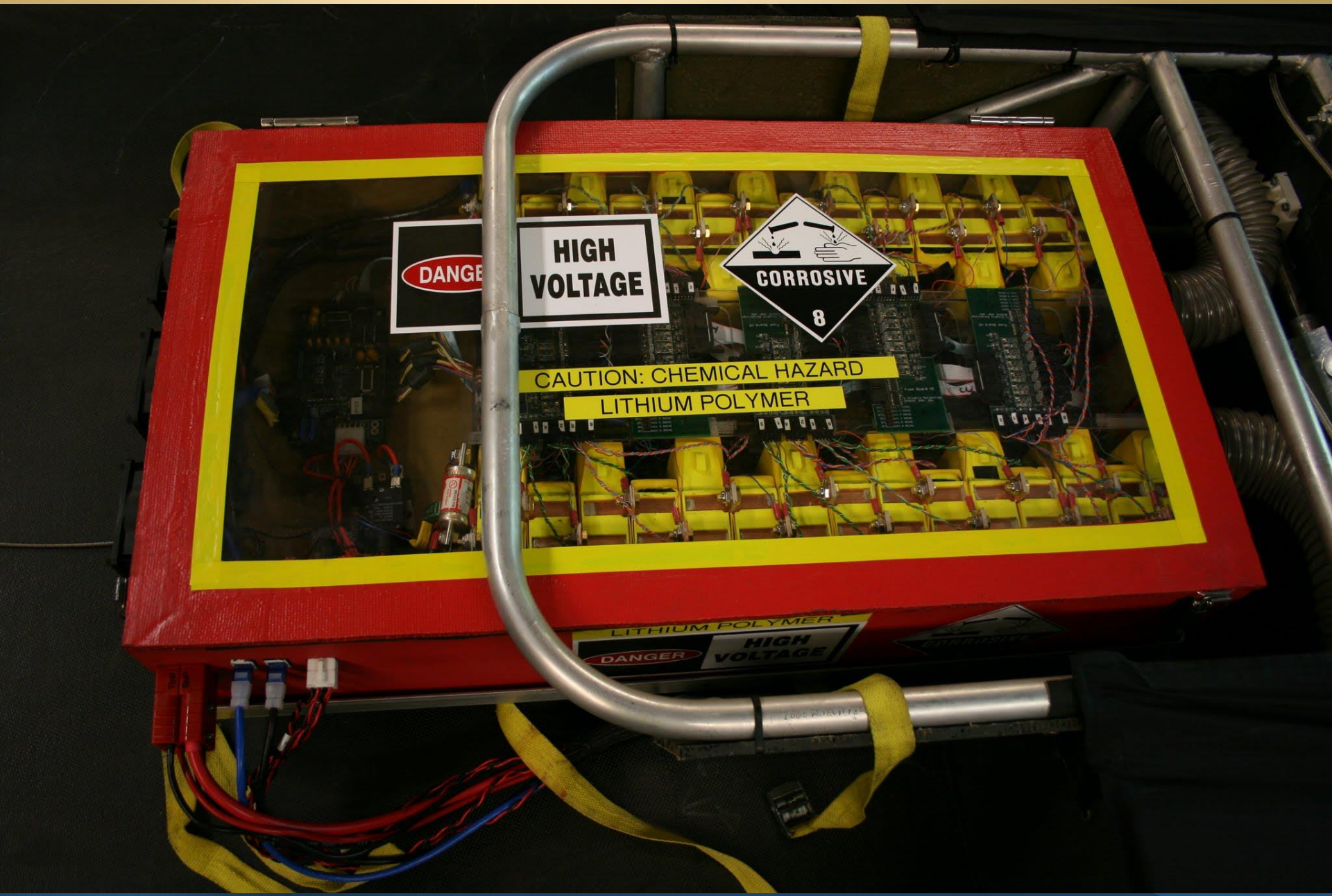

2002 中国太阳能电动车友谊赛暨巡回展（上海站活动）
2002 China Solar Challenge & Road Show，Shanghai
SAE CHINA
EDS
SAIC
Sun
Principia College


WAL★MART
53'
632049
MES
32


principia


sale
LEASE
Office
Tindo
32 PRINCIPIA


MICHELIN
32 PRINCIPIA Ra 7s


DANGE
HIGH VOLTAGE
CORROSIVE
8
CAUTION: CHEMICAL HAZARD
LITHIUM POLYMER
LITHIUM POLYMER
DANGER
HIGH VOLTAGE

Special Project

Race a solar-powered car 3000 km across the Australian Outback

Challenges

Design and Build a Solar Car

Transport Solar Car, Equipment, and Team to Australia

Pass Scrutineering and Qualifying

Race 3000 km (1800 miles) across the Australian Outback


DARWIN
KATHERINE
TENNANT CREEK
3,000km
ALICE SPRINGS
COOBER PEDY
PORT AUGUSTA
ADELAIDE

Challenges

Design and Build a Solar Car

Transport Solar Car, Equipment, and Team to Australia

Pass Scrutineering and Qualifying

Race 3000 km (1800 miles) across the Australian Outback


Internode
global green challenge
Darwin City Council
Internode
global green challenge
Internode
PRINCIPIA COLLEGE
ANSYS
ROUSH
32


10/tenths
TUDelft
NUON
NUON
KLM

Challenges

Design and Build a Solar Car

Transport Solar Car, Equipment, and Team to Australia

Pass Scrutineering and Qualifying

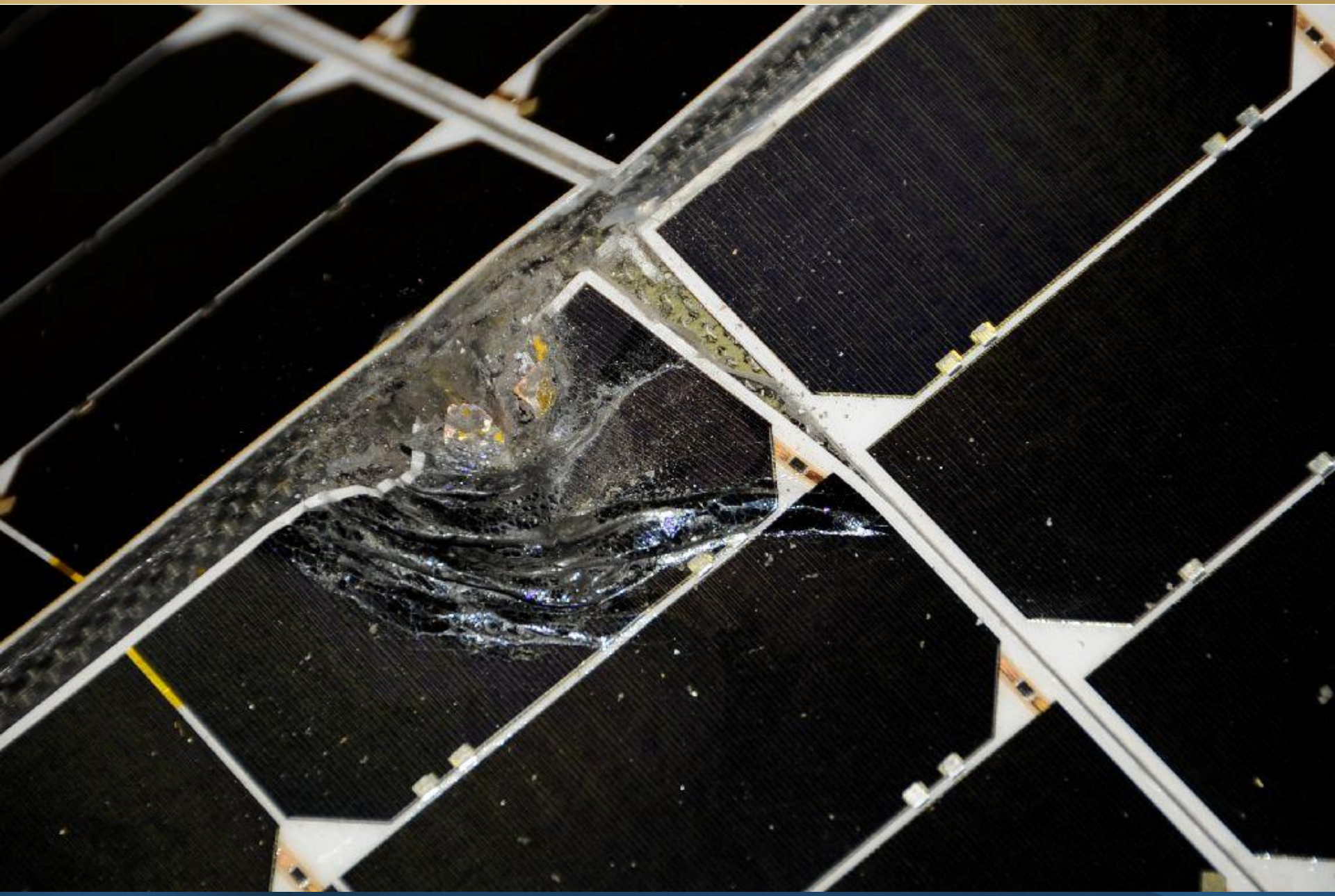
Race 3000 km (1800 miles) across the Australian Outback


32
32
HYSTER
COSCO


32
32


T6020
32
principia
32


T6020
DO NOT
OVERTAKE
TURNING VEHICLE
XLK 702




PRINCIPIA COLLEGE


PRINCIPIA COLLEGE
ROUSH

Challenges

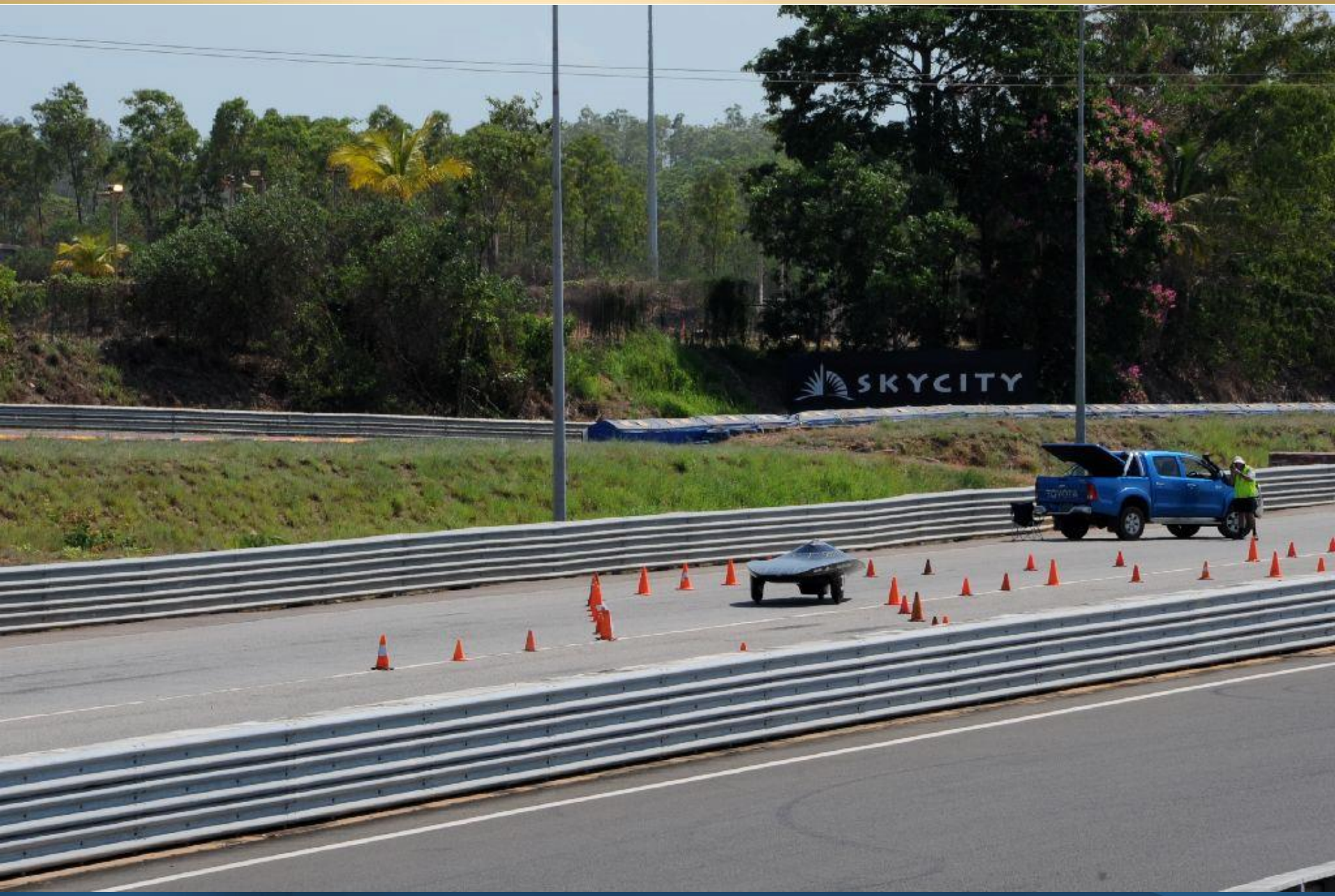
Design and Build a Solar Car

Transport Solar Car, Equipment, and Team to Australia

Pass Scrutineering and Qualifying

Race 3000 km (1800 miles) across the Australian Outback


PRINCIPIA COLLEGE
32
ANSYS
ROUSH


SKYCITY

Challenges

Design and Build a Solar Car

Transport Solar Car, Equipment, and Team to Australia

Pass Scrutineering and Qualifying

Race 3000 km (1800 miles) across the Australian Outback


MACK
ROAD
795 JEB
TRAIN


NTFS 781
4FG1
ROAD TRAIN

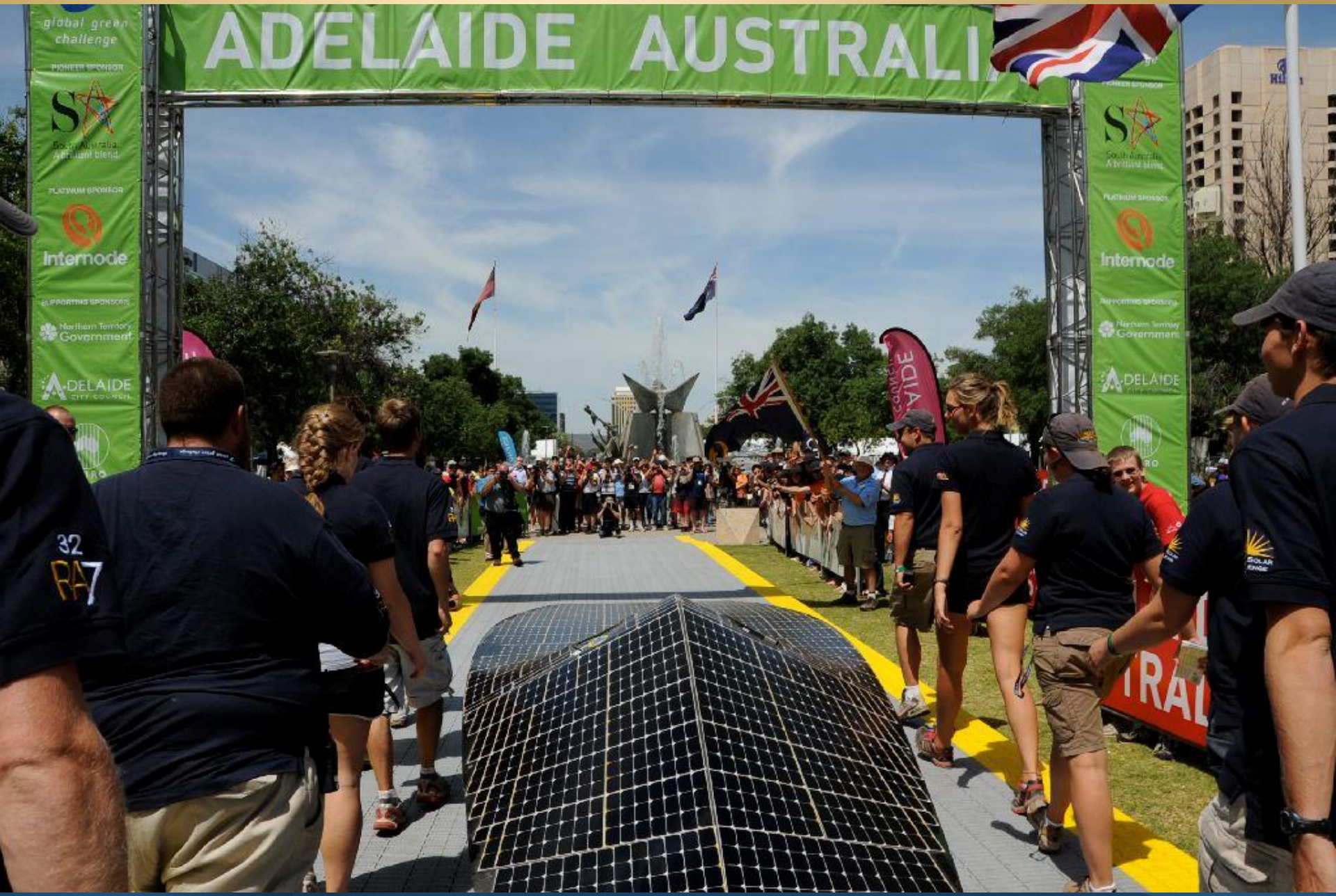

EAGLE BOY
PIZZA
ROUSH

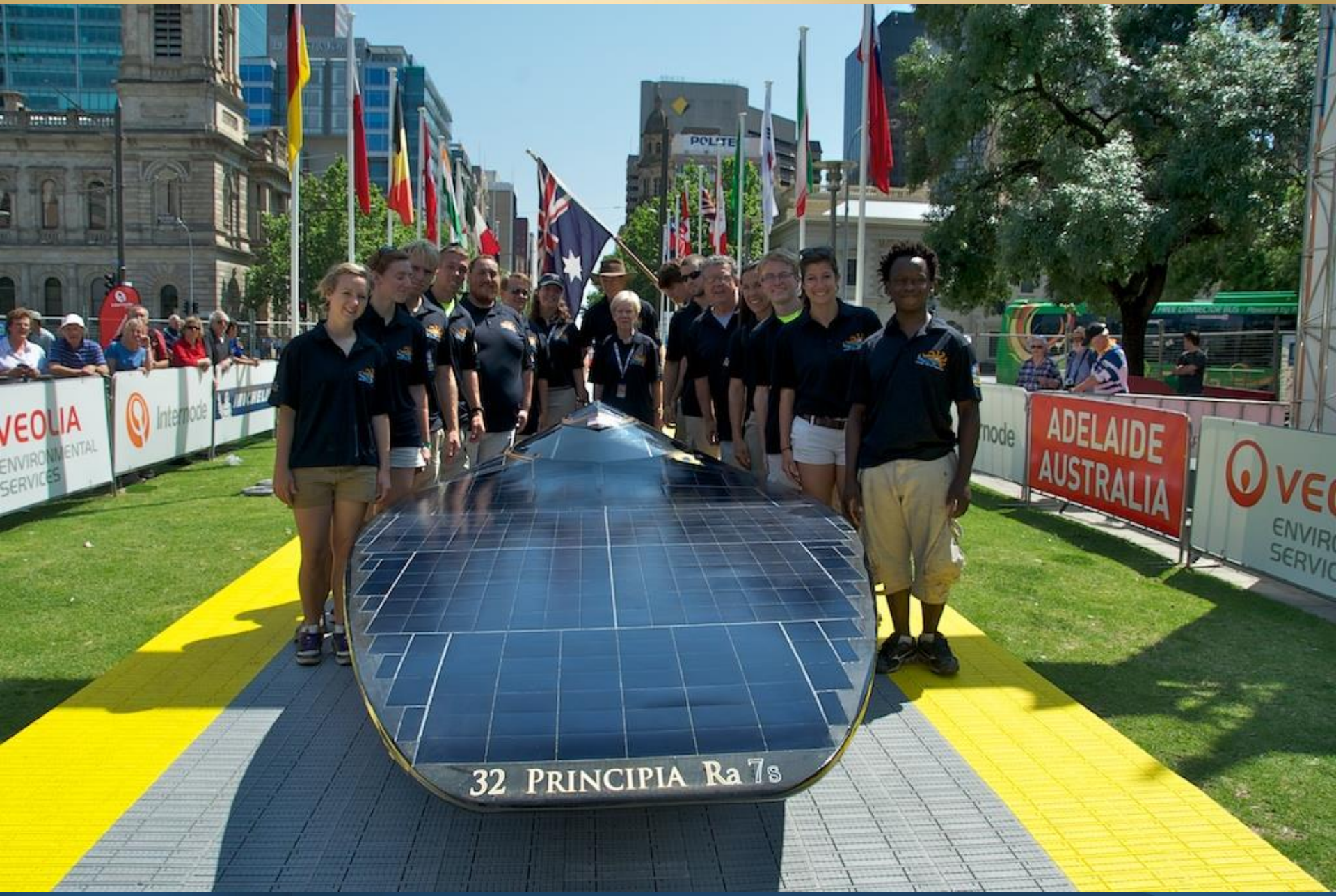

principia
32


32
PRINCIPIA


32


32


global green challenge
ADELAIDE AUSTRALI
Internode
Northern Territory Government
ADELAIDE
32
RA7


VEOLIA
ENVIRONMENTAL
SERVICES
Intermode
ADELAIDE
AUSTRALIA
32 PRINCIPIA Ra 7s


principia
principia solar
principia solarcar
SCIENCE AND HEALTH
MARY BAKER EDDY
participant

Reflection

- What just happened?
- How does this connect with team-based, project-centered learning?
- Share your ideas with your group
- How did this activity help reach the desired outcomes of this workshop?

Workshop Outcomes

- Define and give examples of team-based, project-centered learning
- Describe methods of team-based, project-centered learning that include: development of a community of learners
- Identify principles associated with team-based, project-centered learning
- Generate ways team-based, project-centered learning can be employed in your courses

Specifying groups

Form groups—What are different ways we can form groups?

Assigning Groups

- Ideal Group size is between 5 and 7
- Process is fair
- Allow for greatest possible diversity

Marshmallow Challenge

Designed by Peter Skillman,
while Vice President of Design at Palm

Instructions

Supplies


20 sticks of spaghetti
+
one yard tape
+
one yard string
+
one marshmallow

Build the Tallest Freestanding Structure:

The winning Team is the one that has the tallest structure measured from the table top surface to the top of the marshmallow. That means the structure cannot be suspended from a higher structure, like a chair, ceiling or chandelier.

The Entire Marshmallow Must be on Top:

The entire marshmallow needs to be on the top of the structure. Cutting or eating part of the marshmallow disqualifies the team.

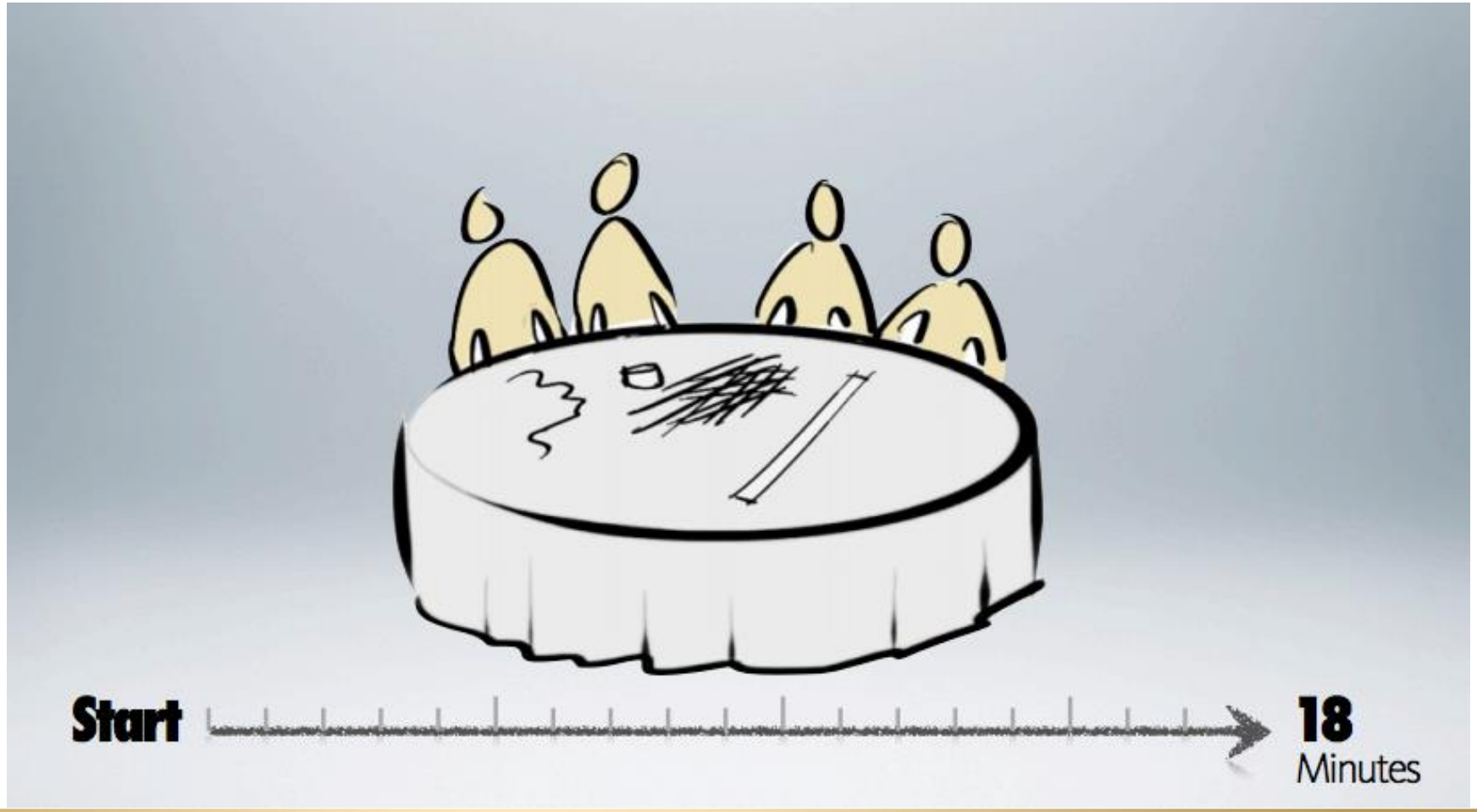
Use as much or as Little of the Kit:

Teams are free to break the spaghetti, cut up the tape and string to create new structures.

No replacements, though!

The Challenge Lasts 18 minutes:

Teams cannot hold on to the structure when the time runs out. Those touching or supporting the structure at the end of the exercise will be disqualified.


Start
18
Minutes


Time Remaining
00:18:00
Hours
Minutes
Seconds


Time Remaining
00:18:[illegible]
Hours
Minutes
Seconds


Time Remaining
00:16:[illegible]
Hours
Minutes
Seconds


Time Remaining
00:16:[illegible]
Hours
Minutes
Seconds


Time Remaining
00:15:00
Hours
Minutes
Seconds


Time Remaining
0 0 - 1 3 - [illegible]
Hours
Minutes
Seconds

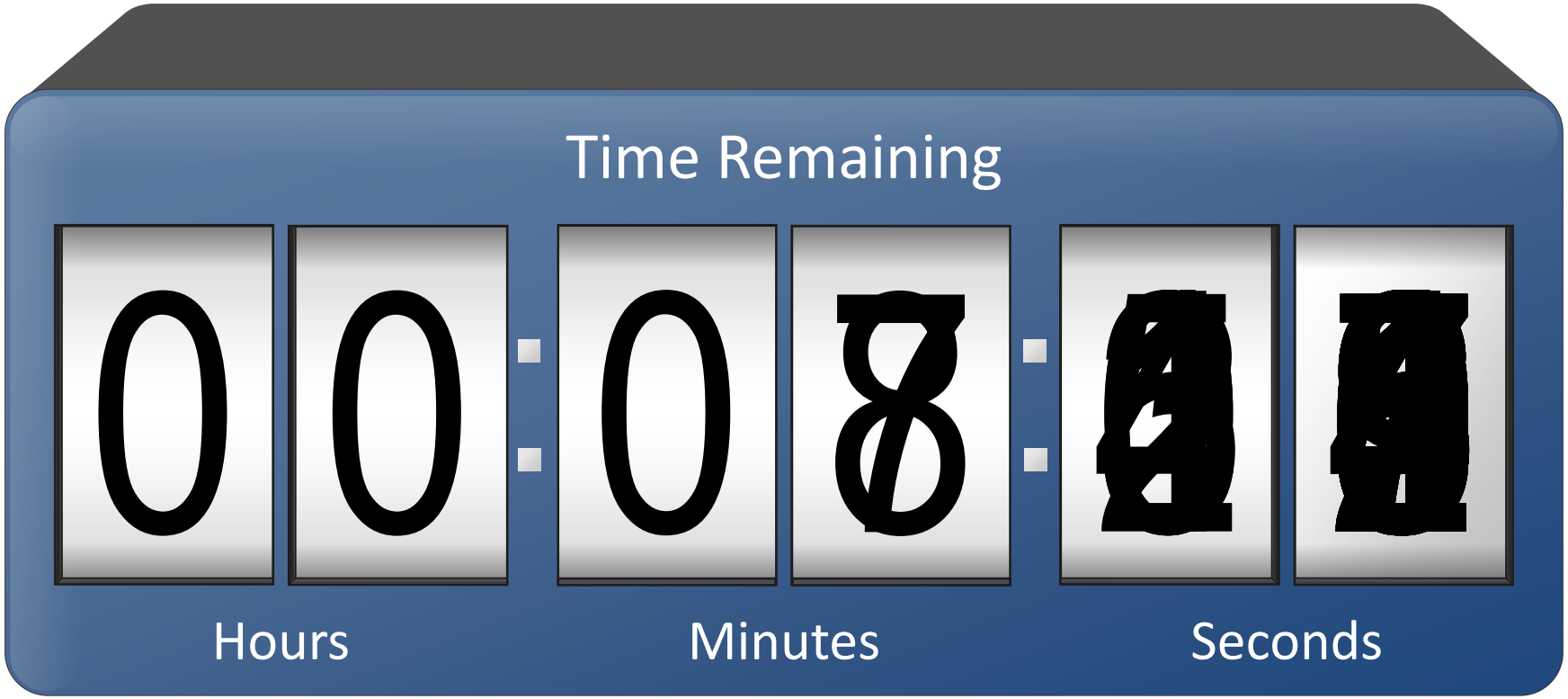

Time Remaining
00:13:[illegible]
Hours
Minutes
Seconds

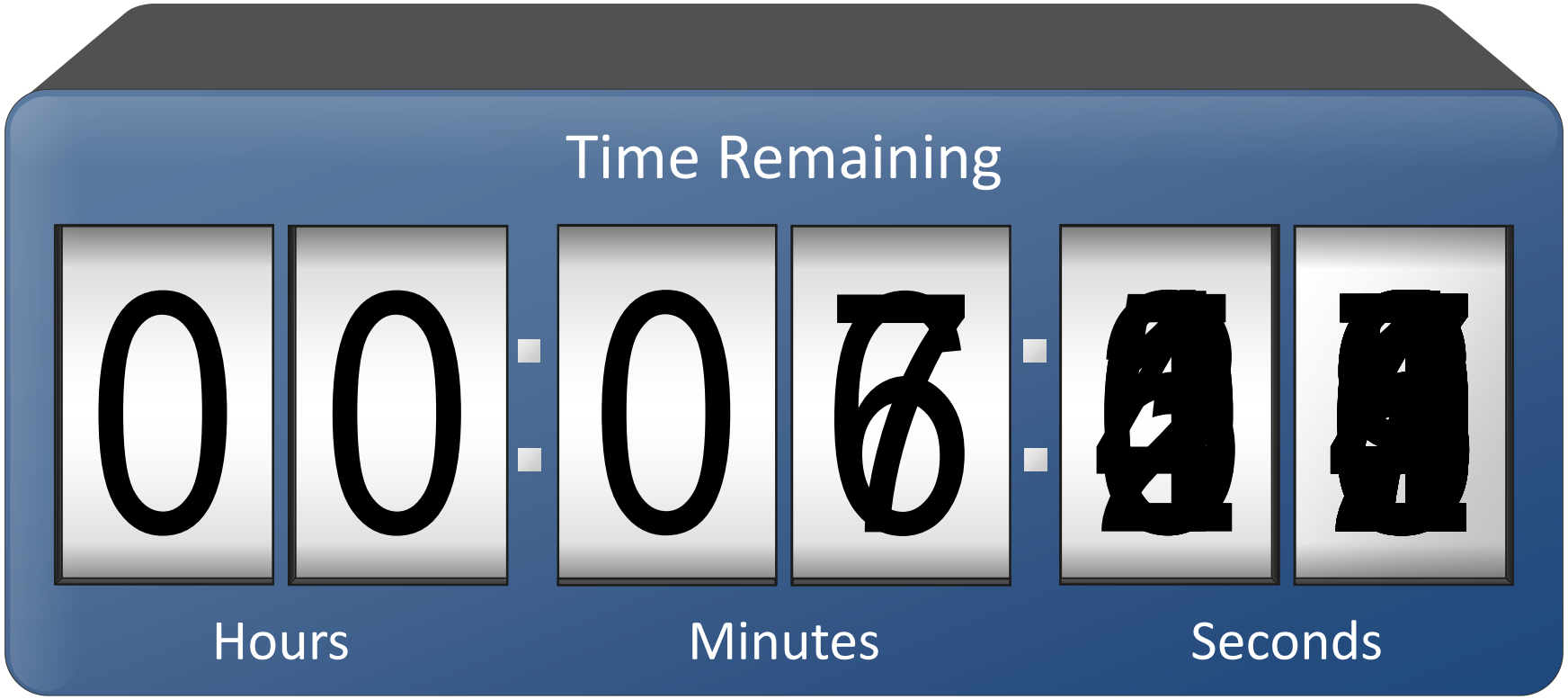

Time Remaining
00:12:[illegible]
Hours
Minutes
Seconds

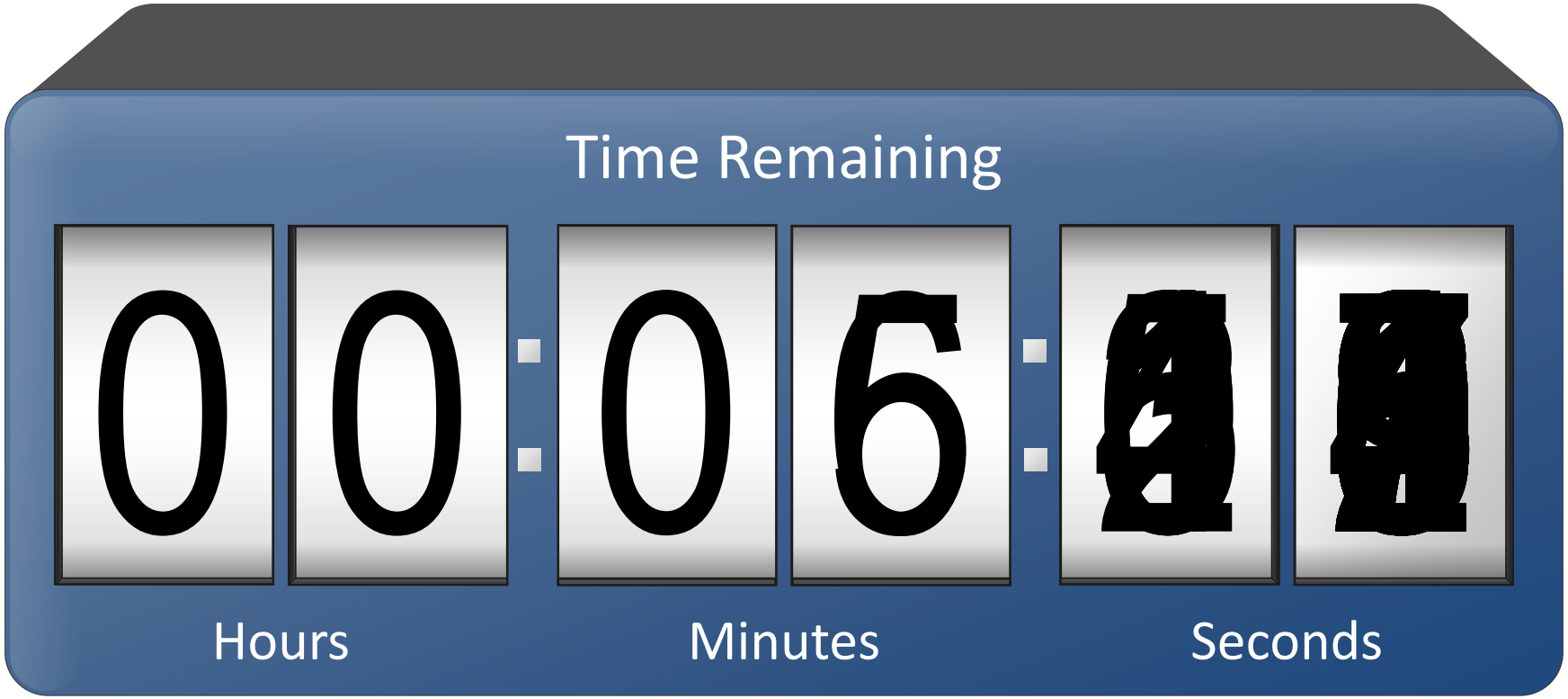

Time Remaining
00-10-
Hours
Minutes
Seconds

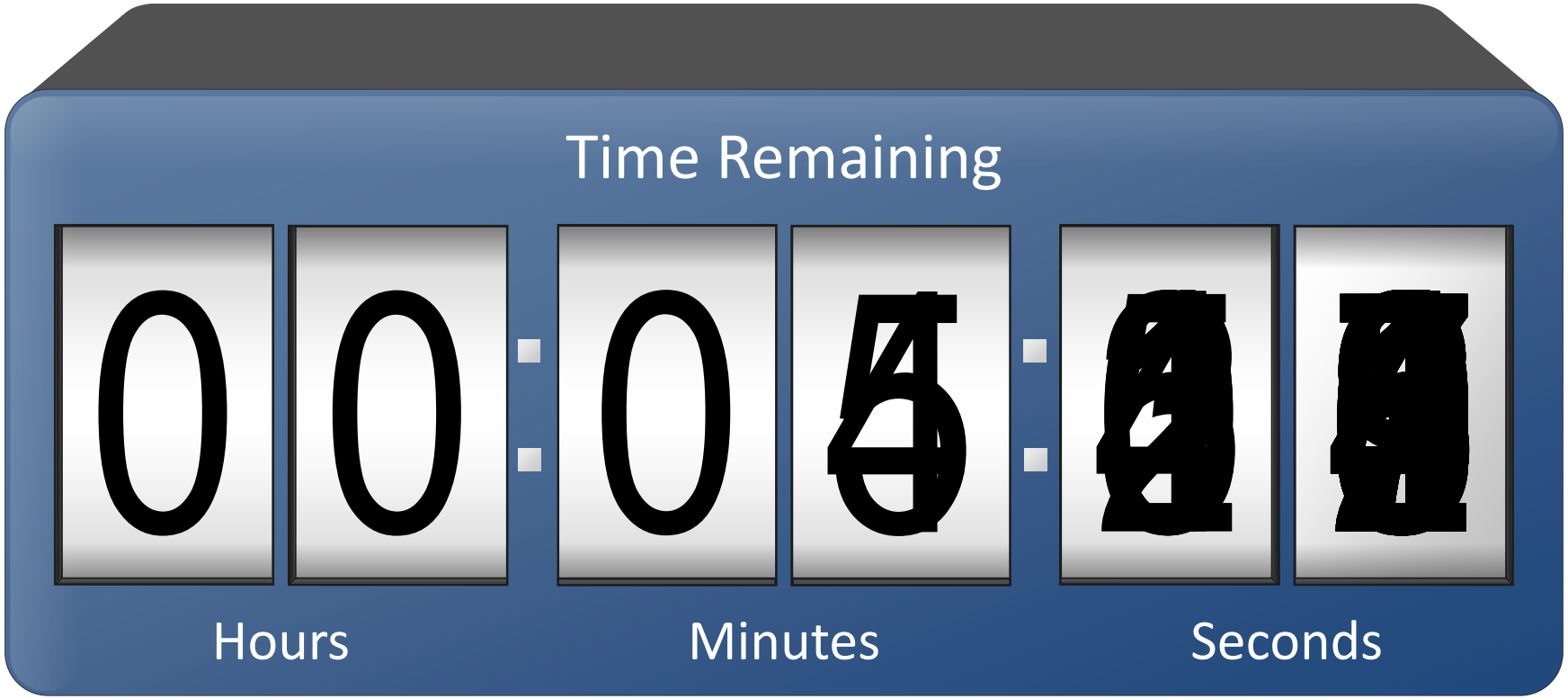

Time Remaining
00:09:
Hours
Minutes
Seconds

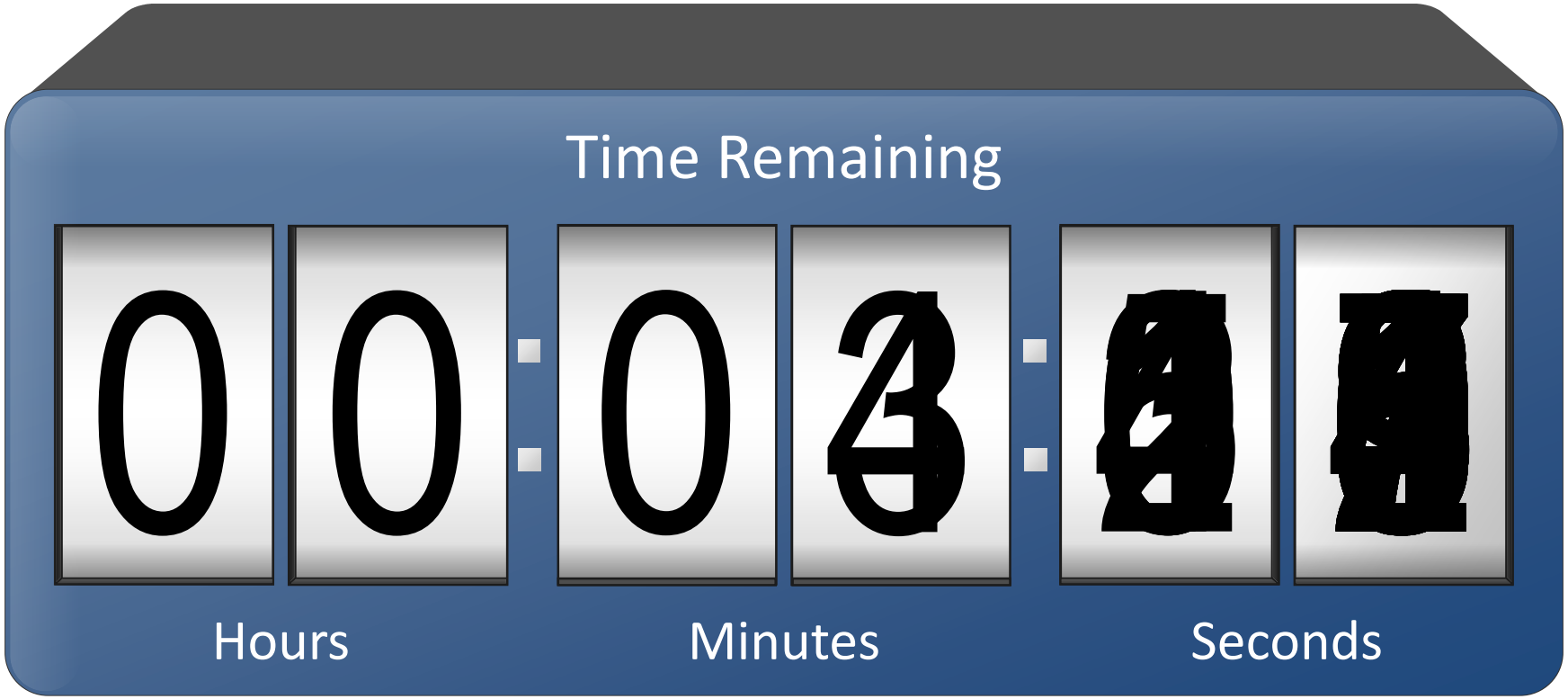

Time Remaining
00:09:[illegible]
Hours
Minutes
Seconds

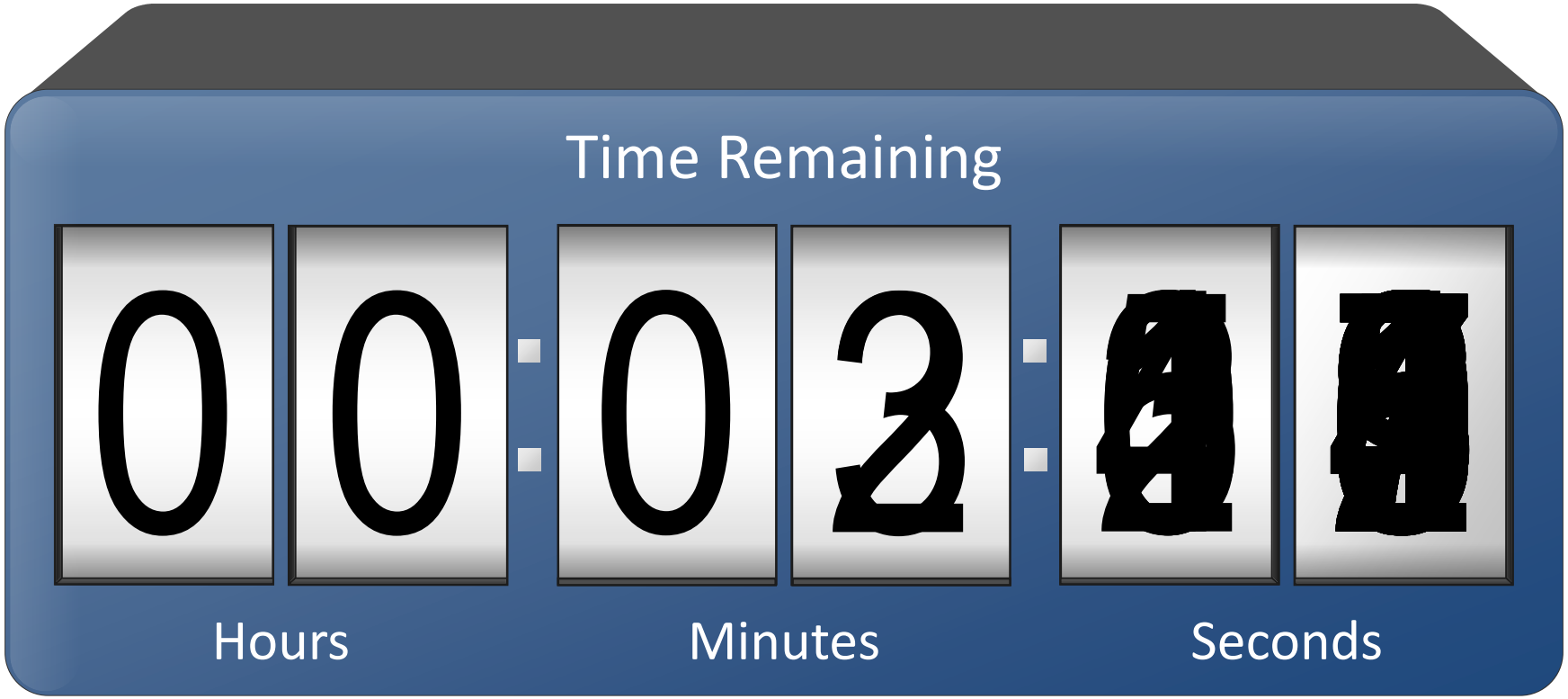

Time Remaining
00:08:[illegible]
Hours
Minutes
Seconds

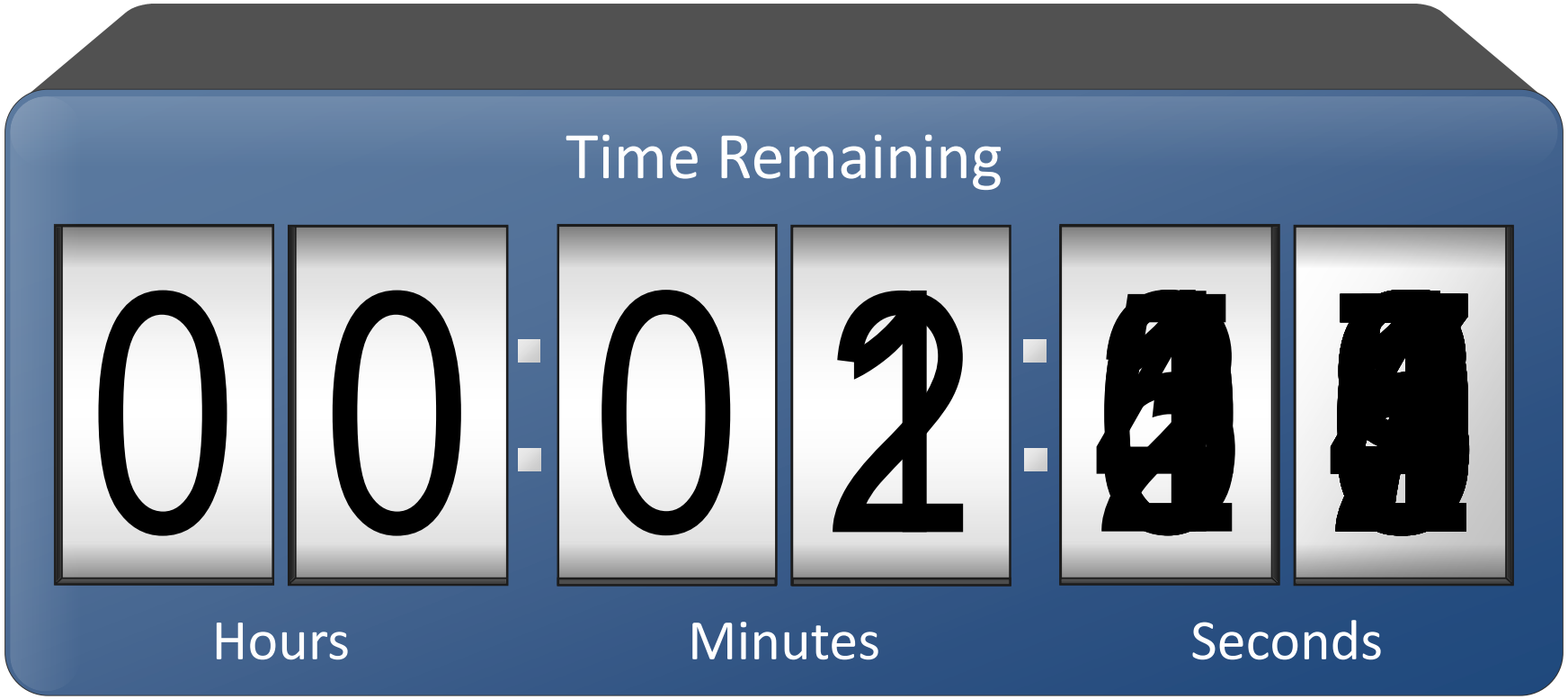

Time Remaining
00:07:[illegible]
Hours
Minutes
Seconds

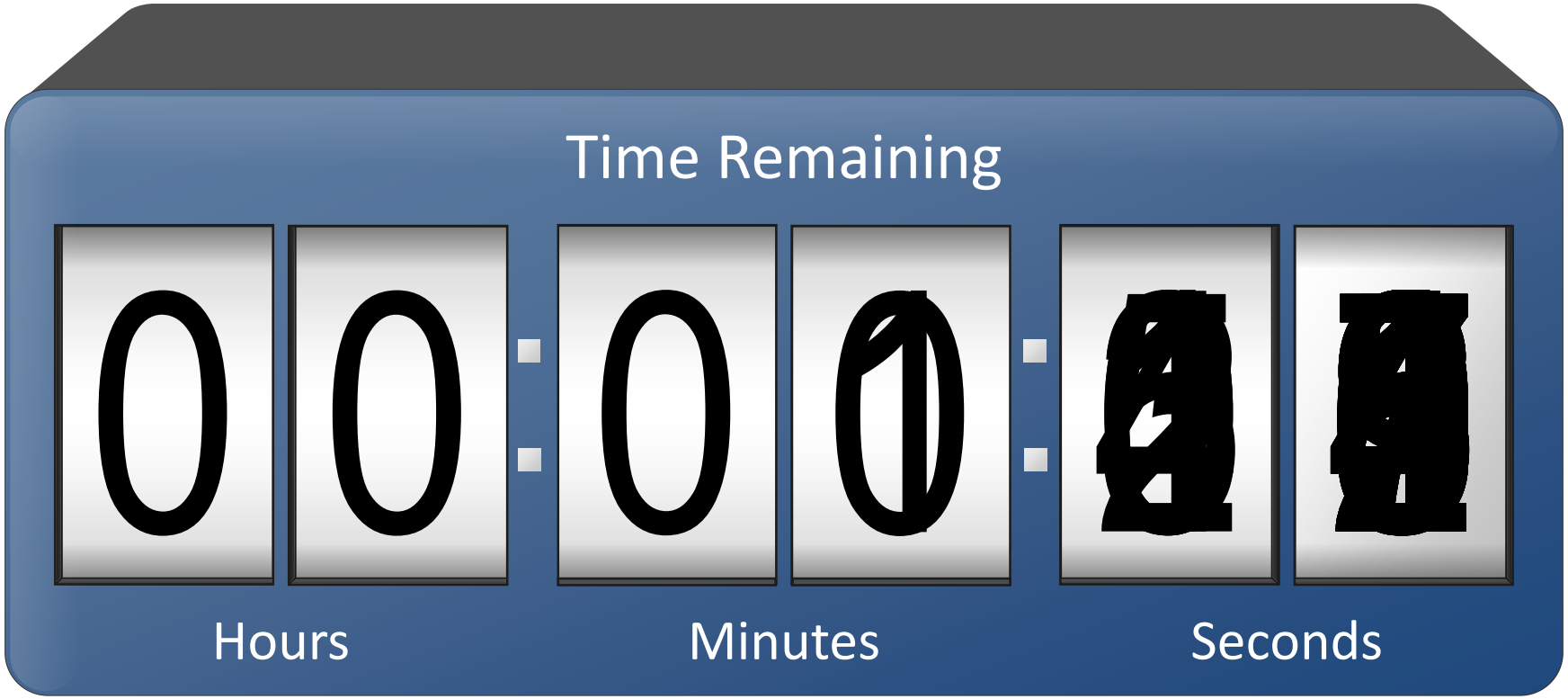

Time Remaining
00:06:[illegible]
Hours
Minutes
Seconds


Time Remaining
00:05:[illegible]
Hours
Minutes
Seconds


Time Remaining
00:03:
Hours
Minutes
Seconds


Time Remaining
00:03:
Hours
Minutes
Seconds


Time Remaining
00:02:
Hours
Minutes
Seconds


Time Remaining
00:00:[illegible]
Hours
Minutes
Seconds

Times Up!

Marshmallow Challenge

www.marshmallowchallenge.com

REFLECTIVE WRITING

What does it mean to work as a team?

What makes for an effective or ineffective team?

Share your experience and how it has enhanced your students' learning experiences.

TED Talk Video

- http://www.ted.com/talks/tom_wujec_build_a_tower.html

Building a Community of Learners

Stages of Group Development

Five Stages of Group Dynamics

Forming

Storming

Norming

Performing

Mourning

Stage I: Forming—A stage of orientation

Issues: Identity. Inclusion. Dependency. Commitment.

Stage II: Storming—A stage of where team members are trying to find their role/place in the team

Issues: Power. Authority. Control. Inclusion

Stage III: Norming--A stage of challenge and conflict

Issues: Norm setting. Member roles.

Stage IV: Performing—A stage of cohesiveness and work

Issues: Trust. Task responsibility. Interdependence.

Stage V: Closing/Mourning—A stage of separation.

Issues: Separation. Independence

Group Formation

The formation of groups is critical in team-based learning. Which of the following characteristics should be present:

1. **Groups should be permanent, have between 5 and 7 members, and be formed by the professor.**

2. **Groups should be permanent, have a minimum of 8 members, and allow students to self-select into groups.**

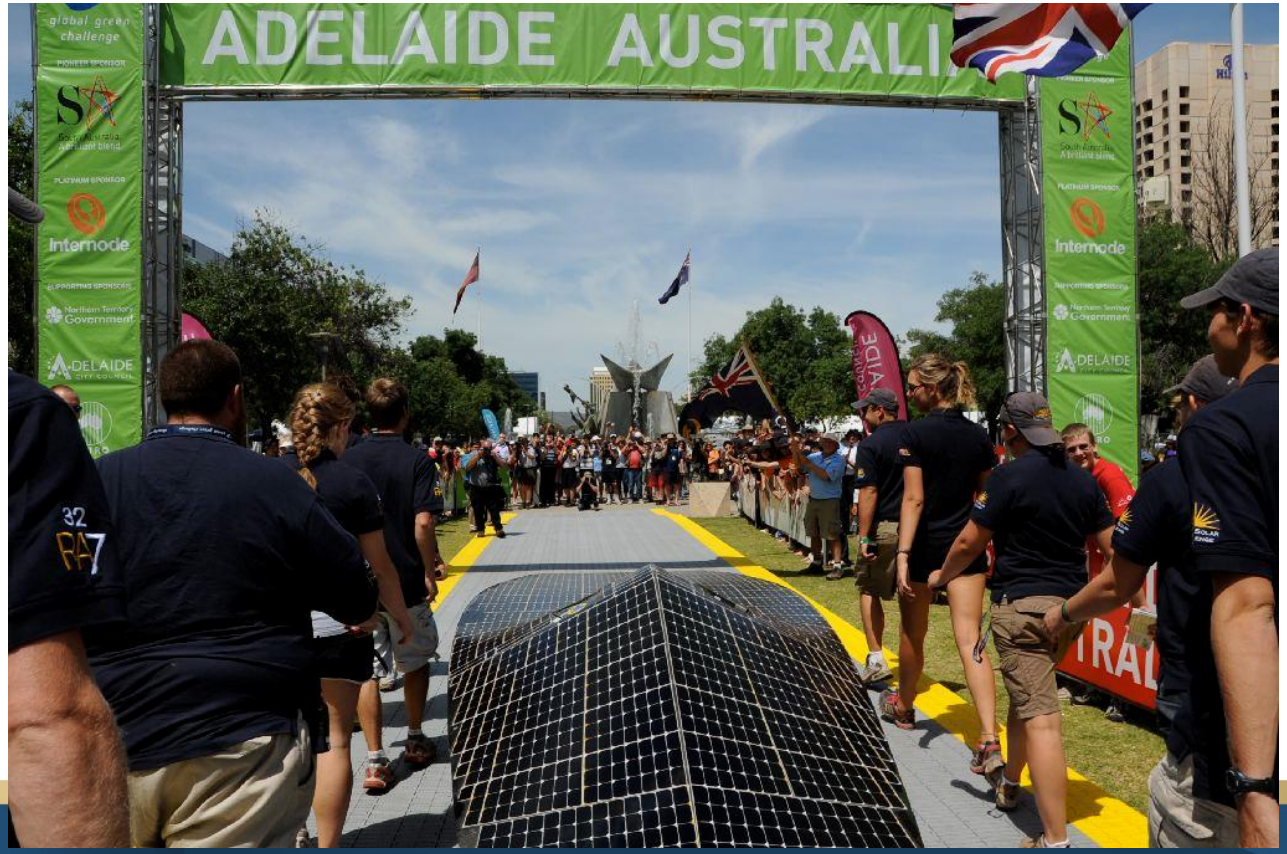
3. **Groups should switch at least once during the term, have between 5 and 7 members, and have the students self-select the second half of the team.**

4. **Groups should switch at least once during the term, have at least 8 members, and be formed by the professor.**

Heterogeneous grouping of learners…

1. has little effect on a group's ability to gather and analyze information.
2. will have a prolonged negative effect on group cohesiveness.
3. is typically more effective for student learning than homogeneous grouping after 20 -40 hours of group work.
4. should not be done if the group has less than 10 hours to work together.

6 Weeks to build a community—
40 hrs to begin working effectively

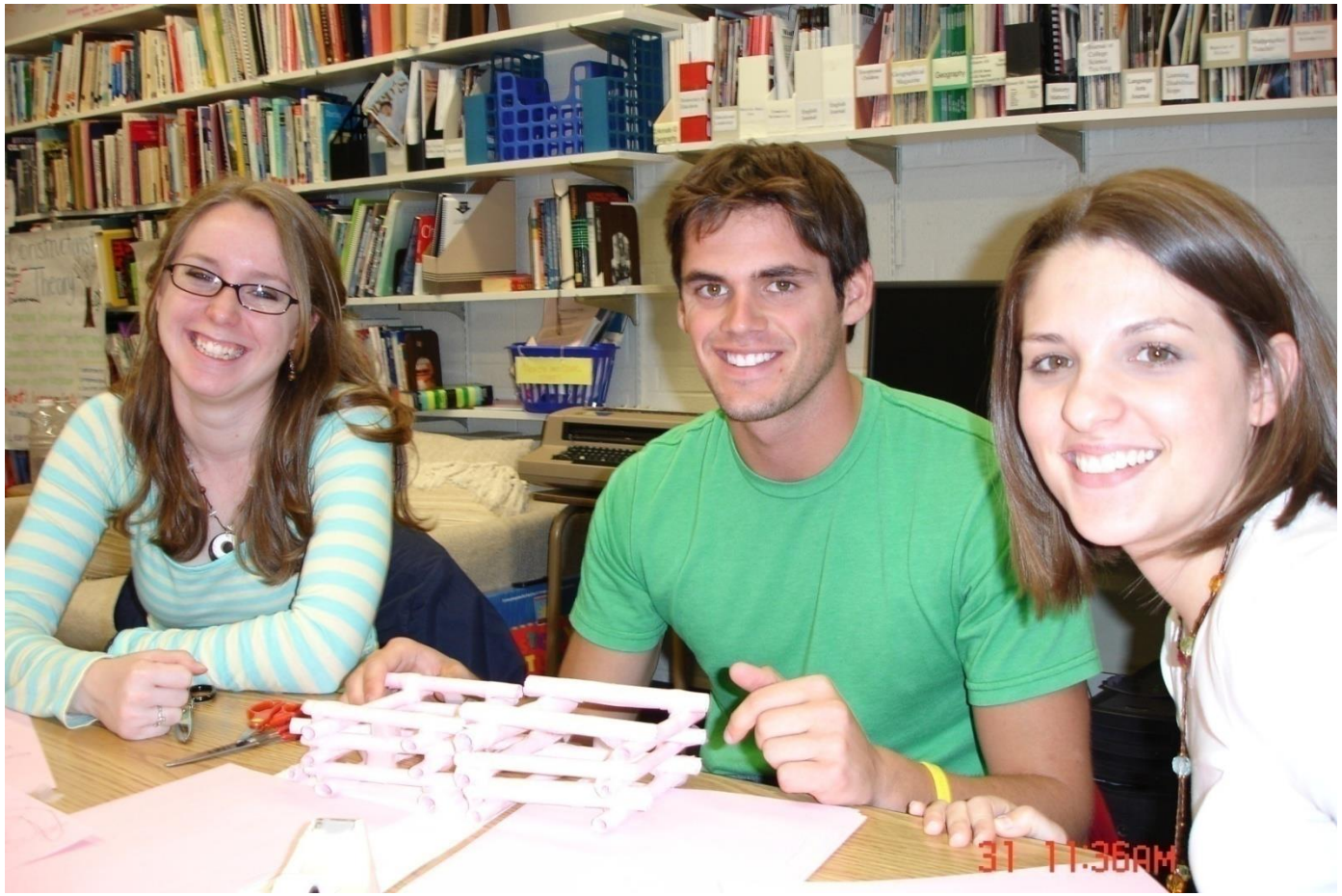


Teams need to work together on problems/ assignments that are complex and that require the group to work together.

The ability for a team to make strong decisions is most dependent on the groups ability to be:

1. **willing to disagree**
2. **willing to agree**
3. **willing to voice own ideas**
4. **willing to conform to majority vote**

Group Assignments



Effective assignments are those that:

1. allow teams to divide the work into parts and then merge them together prior to presenting in class.
2. promote teams to arrive at the same answer even though they may have different ways of explaining the reasons for their answers.
3. allow teams to have a substantial written component that justifies their process and conclusion.
4. require groups to work together and are complex enough that require members to discuss and draw on each other to solve the problem/create the product.

The most common problems that occur during team-based learning can be traced back to:

1. **poorly constructed group assignments.**
2. **ineffective communication skills among team members.**
3. **too much teacher intervention.**
4. **too much in-class time on assignments.**

Directions

As a group, discuss possible team-based, project-centered assignments that you can use in your class to improve student learning.

Possible types of assignments to support team-based, project-centered learning

Examples

- **Case studies**
- **Exploration of ‘big questions”**
- **Bulletin boards**
- **Creation of learning centers**
- **Design and construction of something**
- **iMovies**
- **Problem-based learning episodes**

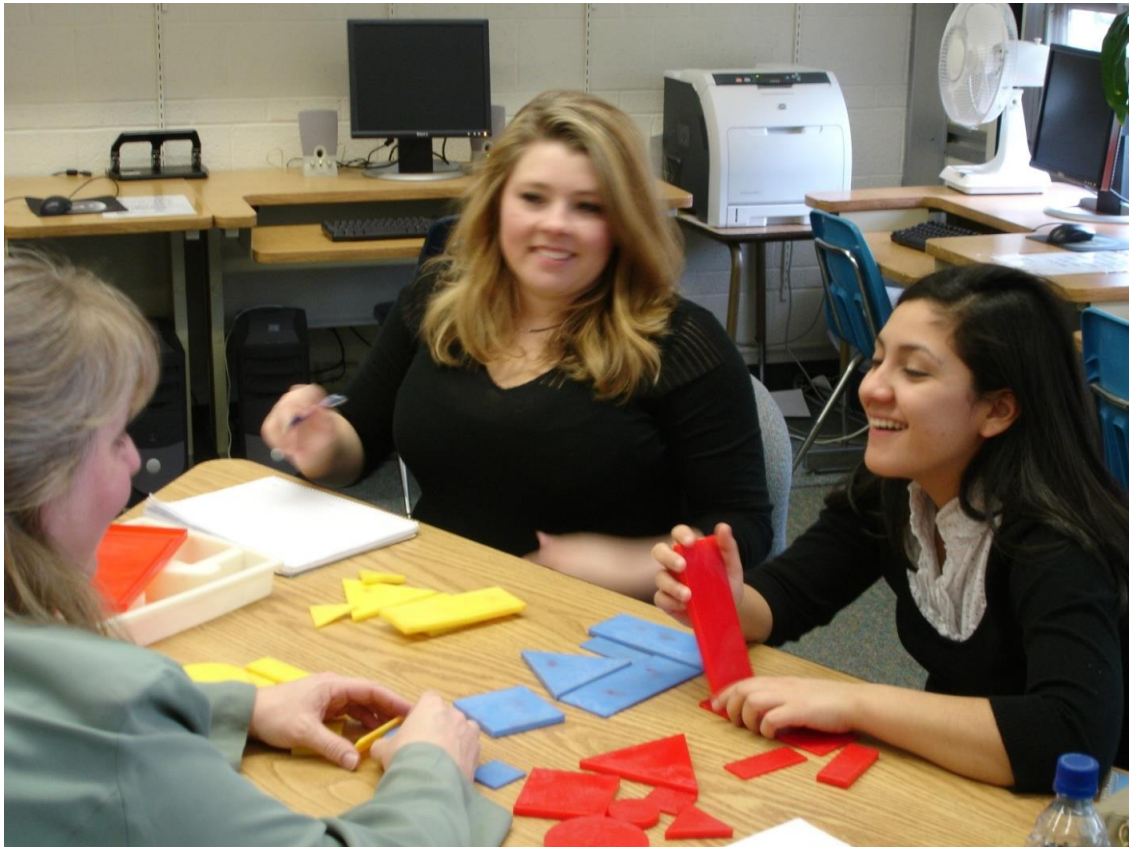
So why use team-based, project-centered learning?

Feedback helps the group to see how they are working together. It gives immediate feedback as to whether they are listening to one another and utilizing the strengths of the group.

Prompt, immediate feedback on individual and group performance helps individual team members and groups be

accountable to each other.

Learning occurs when LEARNERS see new relationships.



It is in the process of doing and reflecting on that experience that one learns!

It is in the reflecting on an experience where one has significant learning

Findings:

Team-based, project-centered learning can improve student performance and learning.

90% of Principia College education students who participated in an intensive experiential block that incorporated team-based project-centered learning during their sophomore year increased their overall GPA between +0.30 and +0.72 for their remaining semesters.

Team-based, project-centered learning challenges students:

- **to think.**
- **to take responsibility for their learning.**
- **to work collaboratively.**
- **to participate in planning the curriculum.**
- **to assess the learning process together.**

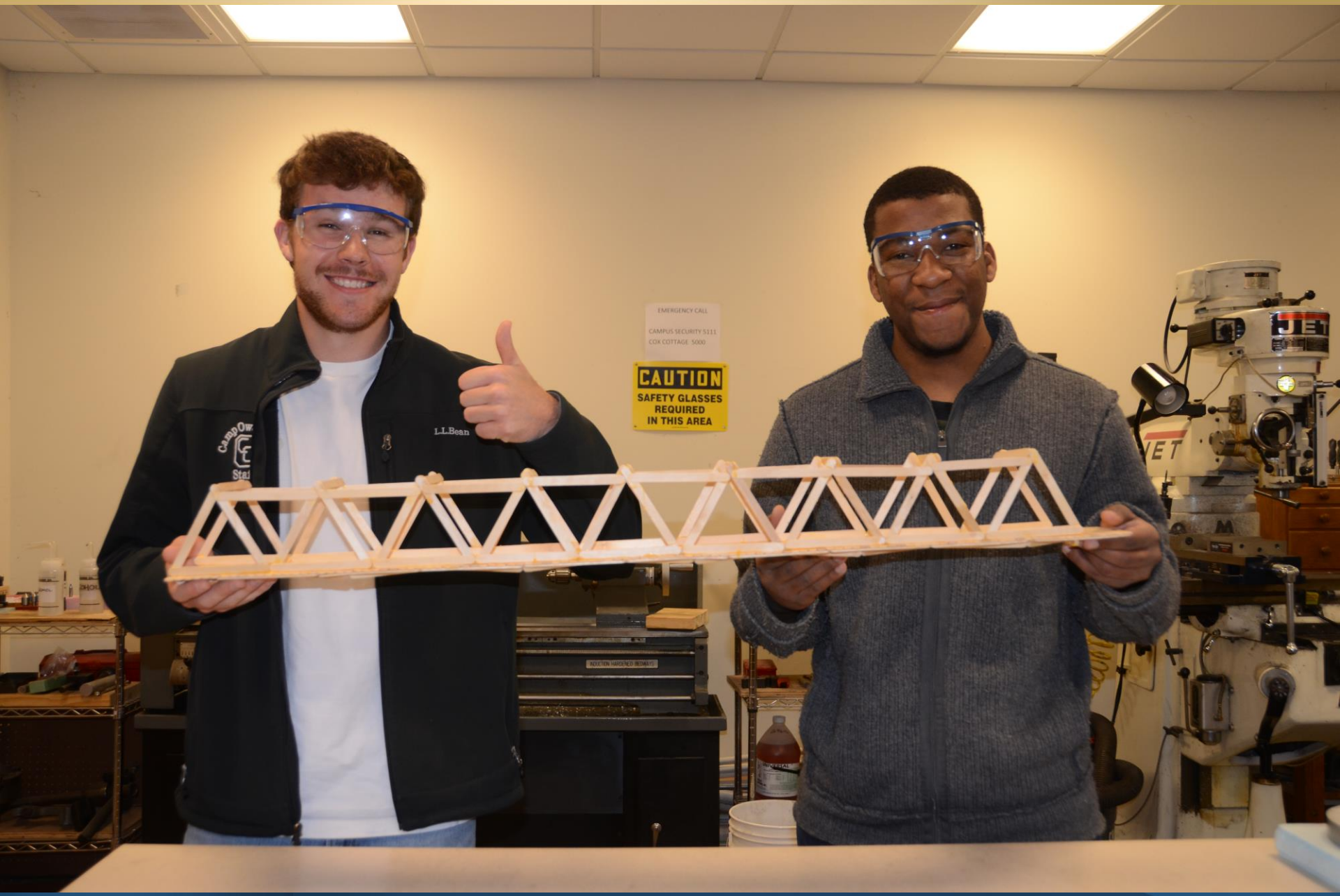
"Learning only occurs when the learner does something." (Herb Simon)

Project-Centered Learning Outcomes

- Allows students to:
  - "learn to learn"
  - Seek solutions to real world problems by working cooperatively in groups
  - Engage their curiosity and initiate subject matter learning
  - Think critically and analytically
  - Find and use appropriate learning resources
  - Generate real life products

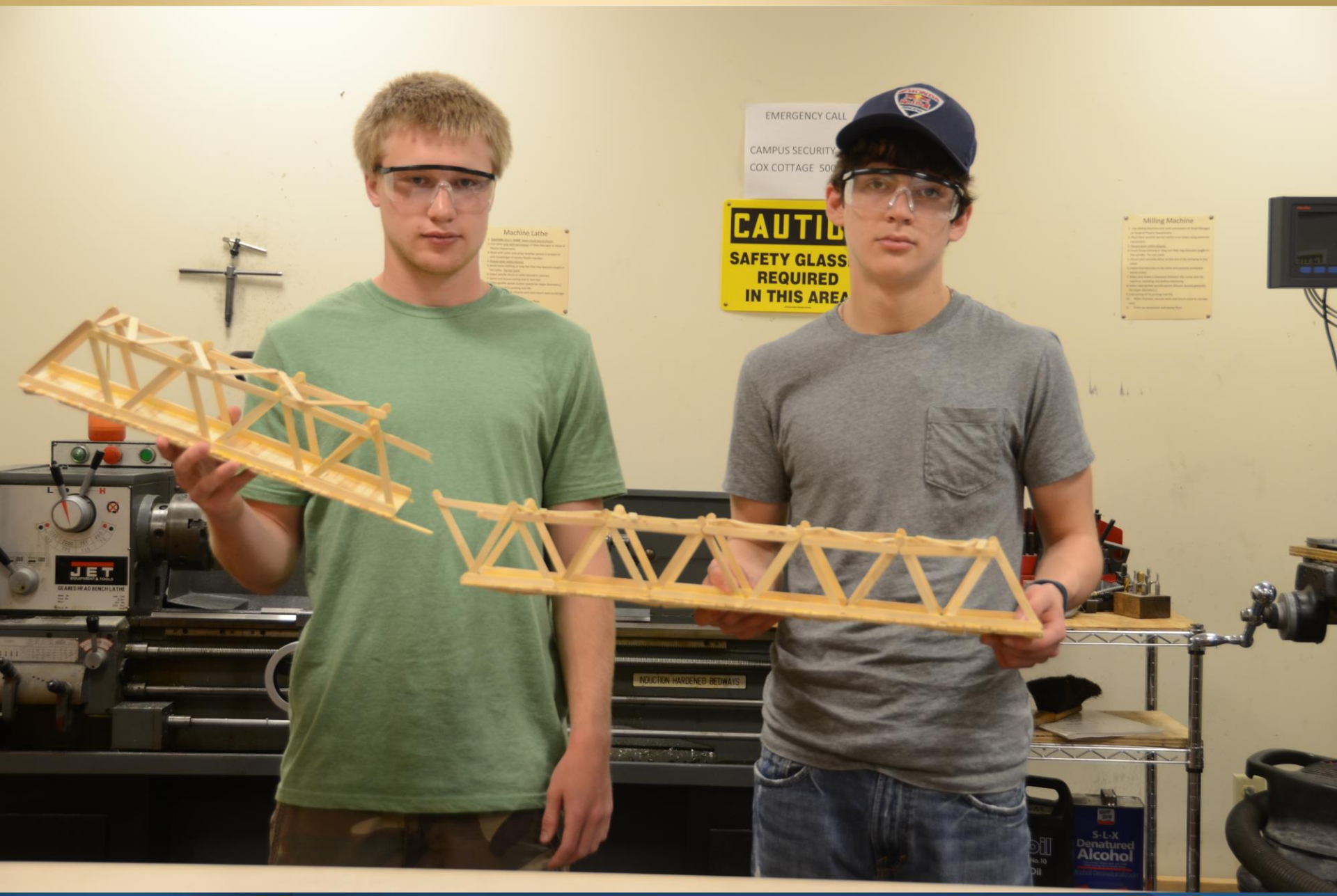
Based on an article by Barbara Duch, University of Delaware, 1995

PCL
in action at
Principia College
(More examples)


EMERGENCY CALL
CAMPUS SECURITY 5111
COX COTTAGE 5000
CAUTION
SAFETY GLASSES
REQUIRED
IN THIS AREA
L.L.Bean


CAUTION
SAFETY GLASSES
REQUIRED
IN THIS AREA
JET
P


HONDA
Red Bull
RACING


EMERGENCY CALL
CAMPUS SECURITY
COX COTTAGE
SAFETY GLASS
REQUIRED
IN THIS AREA
Machine Lathe
Milling Machine
JET
GEARED HEAD BENCH LATHE
INDUCTION HARDENED BEDWAYS
S-L-X
Denatured
Alcohol

Five Phases of (PCL) Project Development

Phase One: Identification and Design of Project

- Identify information and resources that are critical at the start of the process.

Example: BUAD 255—Integrated Principles

Project: Develop a business—

"The Principia Press"

Transferable Skills

- Critical Thinking
- Problem-solving
- Communication Skills
- Time-management
- Working on multiple tasks
- Teamwork
- Leadership
- Customer service skills

Phase Two: Role and Sequence of Learning Resources

Structure learning activities (lectures, group work, other experiences) to help the students make connections between concepts as well as learn what they need to know and do to successfully accomplish the task.

Identify people within and outside the organization who can contribute to the project.

Faculty role:

- Shift role from Lecturer to Facilitator
- Identify what you will introduce as the project unfolds.
  - Key concepts, foundational knowledge, application of key concepts.

Phase Three: Create Framework and Develop Plan

- Student-directed: research, plan development, design, and implementation.

Faculty Role:

- Manage groups
  - Teams set weekly team goals
  - Individuals set weekly individual goals
  - Assess goals through reflection and feedback
- Support self-directed learning
  - Aware of their need for guidance

Phase Four: Implementation

- Project is developed and implemented.

Faculty Role:

- Supporting Self-Directed Learning
  - Assessing need for guidance and acting accordingly.

Phase Five: Evaluate and Feedback

- Class level
- Team level
- Individual level

Faculty Role:

- Facilitating “deep” learning through reflection and connections.
- Support students with continual use of assessment throughout the process

Even more PCL activities


Styrofoam
TONGUE AND GROOVE


NO
YARD
WASTE


TRUE TEMPER


Habitat
for Humanity
Saint Louis
House #19
4853 Leahy

There will be setbacks!


CIRCUIT
AMERIC
SIEMENS
RA9
32


32


DANGER
HIGH
VOLTAGE


AUSTIN ENERGY
5:07
LAP 54
1 RA9
2 UMN
3 QIAU
4 MICH
5 IAST
6 S&T
7 OSU
8 ETS
9 POLY
10 ISU
TIME
PIRELLI


CIRCUIT of the AMERICAS


Glorify


49
32


DANGER
HIGH
VOLTAGE
LITHIUM POLYMER
DANGER
HIGH
VOLTAGE
ITHIUM POLYMER
DANGER
Electrical
Hazard.
CORROSIVE


RA9
32


PRINCIPIA
SIEMENS
MITSUBA
32
ELITE
COMPOSITES
STRUT
ACCU-Wright
FIBERGLASS
HAAS
cordstrap


Powered by the sun
SOLAR CAR:
THE SECRETS
OF RA7
QUIET ACHIEVER AWARD

How can you integrate PCL in **your** current curriculum?

Exercise:
Handout

Phase One: Identification and Design of Project

- Identify information and resources that are critical to the process.

• Phase Two: Role and Sequence of Resources

- Structure activities to help the students make connections as well as learn what they need to know and do to successfully complete the task.
- Identify people within and outside the organization who can contribute to the project.

Faculty role:

- Shift role from Lecturer to Facilitator
- Identify what you will introduce as the project unfolds.
  - Key concepts, foundational knowledge, application of key concepts.

Workshop Outcomes

- Define and give examples of team-based, project-centered learning
- Describe methods of team-based, project-centered learning that include: development of a community of learners
- Identify principles associated with team-based, project-centered learning
- Generate ways team-based, project-centered learning can be employed in your courses

Reflection