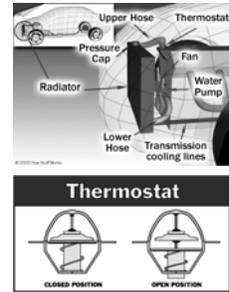


## Team-based Learning USUHS October 11, 2011

Thomas R. Viggiano M.D., M.Ed.  
Associate Dean, Mayo Medical School  
Professor of Medical Education and Medicine

## Pre-reading How Car Cooling Systems Work?

- Objectives:
- Identify components of an automobile cooling system.
- Describe how the thermostat, radiator, radiator cap, water pump, anti-freeze, and heater core function individually and in combination to cool an engine.
- Troubleshoot causes of overheating.



## i-RAT

### Readiness Assurance Questions

Which of the following sequences most accurately describes the path of water through a hot engine?

- Engine block => thermostat => water pump => engine block
  - Engine block => thermostat => radiator => water pump => engine block
  - Engine block => water pump => thermostat => radiator => engine block
  - Engine block => radiator => water pump => thermostat => engine block
2. Which of the following actions will improve the cooling ability of the water in the radiator?
- Add ethylene glycol
  - Raise the pressure
  - Reduce turbulent flow
  - Only A and B are correct
3. Which of the following components of the engine cooling system ensures that the coolant is under pressure?
- Overflow tank
  - Thermostat
  - Radiator cap
  - Water pump
4. Which of the following will lower the engine temperature after 30 minutes on a hot summer afternoon?
- Turn the heater on
  - Remove the thermostat
  - Add ethylene glycol to the overflow tank while the engine is running
  - None of the above is correct
5. Which of the following will occur if 15% of the radiator tubes are blocked?
- Engine temperature reaches a higher operating level
  - Engine temperature rises continuously
  - Radiator fluid pressure reaches a higher level
  - Radiator fluid pressure rises continuously

## g-RAT

### Readiness Assurance Questions

Which of the following sequences most accurately describes the path of water through a hot engine?

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## Post-RAT Questions and Comments

### Answers:

- B
- D
- C
- A
- A

## Group Activity

### Case: "Tom's Car Runs Hot"

One morning Tom found a small puddle of colored fluid on the floor of his garage under the car. The engine temperature gauge had never indicated a hot engine so this was a surprise. Inspection revealed a small hole in the hose leading to the car heater. He drained the radiator fluid and saved as much as possible. He replaced the faulty hose. He also bought and installed a generic-brand thermostat because he had to open the thermostat housing to replace the hose. Using the collected fluid, he refilled the radiator and topped off the level with water after running the engine for about 5 minutes.

Over the next several days as he drove around Rochester he noticed that the needle of the temperature gauge settled in the "High" zone during normal driving conditions. No leaks were apparent anywhere, but the overflow tank was always filled with more fluid immediately after driving than at startup in the morning.

### Group Activity Question

Which of the following is the most cost-effective action to take at this time? Be prepared to defend your answer.

- Buy a new radiator cap
- Do nothing
- Flush radiator and fill with new radiator fluid
- Reinstall the old thermostat
- Run the car with the heater on

## **Team-based Learning Strategy**

**Team-based Learning (TBL) is an instructional strategy based on procedures for developing high performance learning teams**



## **Team-based Learning Method**

**TBL is an instructional method that allows one instructor to conduct multiple small groups simultaneously in the same classroom, and integrate active learning in to large group format**



## **Team-based Learning Objectives**

- **Master course content**
- **Utilize content in problem solving**
- **Develop interpersonal and team skills**
- **Prepare for life-long learning**



## **Team-based Learning**

**Learning objectives changes from knowing concepts to using concepts to solve problems**



## **Team-based Learning**

**Instructor changes to a facilitator of learning rather than a teacher**



## **Team-based Learning**

**Learners have responsibility to actively engage in group problem solving rather than be passive individuals with limited responsibility**



## Team-based Learning 3 Phases

Phase 1 – Learners study independently out of class to master identified learning objectives



## Team-based Learning 3 Phases

### Phase 2

Individual learners complete a multiple choice exam to assure their readiness to apply phase 1 knowledge.

iRAT- (Individual Readiness Assurance Test)



## Team-based Learning 3 Phases

### Phase 2

Then groups can retake exam and have consensus answers scored

gRAT- Group Readiness Assurance Test

Learners can appeal wrong answers

Instructor provides feedback / mini lecture



## Team-based Learning 3 Phases

Phase 3 – Groups collaborate on in class application assignments. Groups can share answers for comparison, discuss, provide immediate feedback, and consolidate the learning.

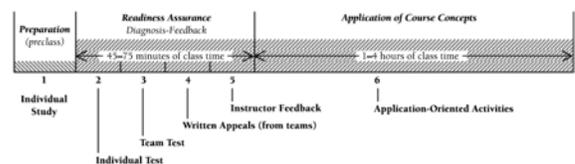


## Phase 3 Application Assignments

- Case vignette with MCQ's
- Develop a treatment plan
- Justify a diagnosis, evaluation plan



## Team-Based Instructional Activity Sequence



Note: This sequence is repeated for each major instructional unit—typically five to seven per course.



## Team-based Learning 4 Elements

- Groups
- Accountability
- Feedback
- Assignment design

## TBL 4 Elements

- Groups must be properly formed and managed
- Students must be accountable for the quality of individual and group work
- Students must receive frequent and timely feedback
- Group assignments must promote both learning and team development

## Properly Formed and Managed Groups

- Diversity – brings different perspectives to learning, problem solving, tasks
- Avoid coalitions
- Stable groups, work together over time

## Individual and Group Accountability

- Individual accountability for preparation
  - iRAT
- Group accountability for team contributions
  - gRAT
  - peer assessment
  - team performance
- Grading
  - individual preparation
  - individual contribution to team
  - team performance

## Frequent and Timely Feedback

- Feedback is essential to content learning and retention
- Immediate feedback has impact on group development

## Assignments That Promote Learning and Team Development

- Assignments that require group interaction and content related discussion
- Assignments require teams to use course concepts to solve problems

**“ The single most important idea behind TBL is that group assignments will only enhance learning if they promote give and take, content related discussions. Effective assignments require groups to produce decisions”**

**Larry Michaelson**



## Comparison of Lecture, PBL, TBL

	Lecture	Problem-Based Learning	Team-Based Learning
<b>Key points</b>	Instructor provides content for student note-taking in a hall	Student-directed learning in solving real world problems in small groups	Instructor-directed content applied to real world problems by student teams in a lecture hall
<b>Teaching Methods</b>	Lecturer didactically provides content	Facilitators give cases and students analyze facts to solve case	Students prepare content before class. In class, they apply it in teams to solve problems
<b>Outcomes</b>	Content acquisition and conceptual understanding	Problem-solving abilities, critical reasoning, content acquisition, understanding, effective communication and small group interaction	Content acquisition, understanding, content application to solve problems, critical reasoning, effective communication, collaborative team work
<b>Instructor's role</b>	Identifies learning objectives, prepares presentations and answers student questions	Facilitates small group discussions and gives students feedback and guidance as needed	Identifies learning objectives and content, prepares readiness tests, answers student questions and prepares application assignments for team work
<b>Student's role</b>	Attend lecture, study notes, prepare for exam	Identify learning issues, do independent out of class research, join group discussions	Do independent out-of-class study, join team discussions, defend team solutions to class

\*Table excerpted from Baylor College of Medicine, Team Learning in Medical Education, September 2002

**Thank you**



**Questions, Comments,  
Discussion**

