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.

Post-RAT Questions and Comments

Answers:
1. B
2. D
3. C
4. A
5. 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 heater core. 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 the weather warmed up, 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 then 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.

- A. Buy a new radiator cap.
- B. Do nothing.
- C. Flush radiator and fill with new radiator fluid.
- D. Reinstall the old thermostat.
- E. 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 into 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 change 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

Phase 2

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

iRAT- (Individual Readiness Assurance Test)

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

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

Application Assignments

• Case vignette with MCQ’s
• Develop a treatment plan
• Justify a diagnosis, evaluation plan

Team-Based Instructional Activity Sequence
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

<table>
<thead>
<tr>
<th>Key points</th>
<th>Lecture</th>
<th>Problem-Based Learning</th>
<th>Team-Based Learning</th>
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</thead>
<tbody>
<tr>
<td>Methods</td>
<td>Instructor provides content for student note-taking in a hall</td>
<td>Students-directed learning in solving real world problems in small groups</td>
<td>Instructor-directed content applied to real world problems by student teams in a lecture hall</td>
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<td>Outcomes</td>
<td>Content acquisition and conceptual understanding</td>
<td>Problem-solving skills, critical reasoning, content acquisition, understanding, effective communication and small group interaction</td>
<td>Content acquisition, understanding, content application to solve problems, critical reasoning, effective communication, collaborative team work</td>
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<td>Instructor’s role</td>
<td>Identifies learning objectives, prepares presentations and answers student questions</td>
<td>Facilitates small group discussions and gives students feedback and guidance as needed</td>
<td>Identifies learning objectives and content, prepares readiness tests, answers student questions and prepares application assignments for team work</td>
</tr>
<tr>
<td>Student’s role</td>
<td>Attend lecture, study notes, prepare for exam</td>
<td>Identify learning issues, do independent out of class research, join group discussions</td>
<td>Do independent out-of-class study, join team discussions, define team solutions to class</td>
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Table excerpted from Baylor College of Medicine, Team Learning in Medical Education, September 2002

Questions, Comments, Discussion

Thank you