Lesson Module: Team-Based Challenge

Module Duration: 3-6 weeks (divided into 3 modules)

Recommended Group Size: 4-6 students per team (maximum of 5 teams in a class of 30)

Module Overview:
This team-based challenge is designed to engage students in a real-world problem-solving experience while developing essential teamwork and workplace skills. Over the course of 3 modules, students will tackle an industry-related problem, identify the necessary concepts to address it, and learn how to plan and strategize solutions. They will also gain exposure to project management and mentorship, ensuring a holistic learning experience.

Module Timeline Overview
Module 1 - Problem Introduction (1-2 weeks)
Weeks 1-2: ● Video introduction to the challenge and overview of problem statements. ● Form teams and assign group roles (see ***Team-based Challenge Group Roles*** doc) ● Brainstorming session within teams to discuss potential solutions and identify key concepts needed.
Module 2 - Skill Development (1-2 weeks)
Weeks 3-4: ● Teams identify and study concepts, technologies, or skills required to address the problem. ● Project management concepts are introduced. ● Teams meet with industry mentors via email or Zoom to clarify their understanding and gather insights. ● Teams schedule and check-in with a designated "boss" (teacher or external expert) for guidance.
Module 3 - Solution Planning (1-2 weeks)
Weeks 5-6: ● Teams strategize and plan how to address the problem, even if they do not implement the solution. ● Teams prepare a presentation outlining their solution plan. ● Assessment of Project

Firia Labs Prompts for Team-based Challenge

Each Team will choose 1 problem to solve:

1. Create a new curriculum module to teach a programming topic using the CodeX or CodeBot. This will include brainstorming of the topic, researching the programming skills needed to complete the mission, writing the content for the interactive textbook, writing the coding steps for CodeTrek, troubleshooting device issues, etc. Here are a few ideas for topics:
    - Maze solving CodeBot
    - Pick a cross-curricular subject area of interest and solve a problem using CodeX.
2. Write code to test a specific problem on a Firia Labs software project based on project specifications.

Group Roles

1. Project Manager: Oversees project planning and execution.
2. Communication Expert: Manages team communication and external interactions.
3. Coding Coach: Guides the technical aspects of the solution.
4. Documentation Specialist: Create and maintain records of progress.
5. Creative Designer: Design graphics, presentations, user interfaces, or any other visual elements required.
6. Add other group roles as needed (see ***Team-based Challenge Group Roles***).

Assessment

- ☐ Presentation
- ☐ Employability Rubric
- ☐ Self-reflection
- ☐ Team: Peer Rubric
- ☐ Teacher Presentation Rubric

Module 1: Lesson 1 - Introducing the Problem

Grade Level: 6th-12th grade

Duration: 1-2 weeks (multiple class periods, adjust based on schedule)

Objectives:

- Students will use teamwork & collaboration to solve a problem
- Students will use critical thinking skills to apply to real-world situations
- Students will learn to appreciate the diverse perspectives of team members
- Students will reflect on their team experience and identify areas for improvement

Materials:

- Computer and projector for presentations
- Whiteboard and markers
- Handouts
- Internet access for research
- CodeX or other microcontroller

Day 1: Introduction

1. Begin with establishing the number of teams for your class.
2. Either allow students to choose teams, or the teacher can select teams.
3. Watch the **Firia Labs Team-Based Challenge Introduction video**
4. Discuss the Team-based Challenge Prompts and allow teams to discuss in their groups.
5. Review the ***Guidelines for Group Work during a Team-based Challenge.***
6. Make sure the team tracks all ideas and discussion topics with a graphic organizer.

Day 2: Research & Brainstorm

1. Teams will meet and assign Group Roles for each team member (see ***Team-based Challenge Group Roles***).
2. Begin to research the Problem & Solution possibilities.
3. Teams will delegate specific tasks to each team member.
4. Each team member will research their task and bring a solution to the team.

Days 3-5: Teamwork & Planning

1. Goal: By the end of Week 1, teams should have established their problem focus.
2. Teams will continue gathering ideas and insights.
3. Teams will Identify potential approaches to the problem.
4. Teams will analyze the problem and define the Problem Statement.

Module 2: Lesson 2 - Skill Development

Grade Level: 6th-12th grade

Duration: 1-2 weeks (multiple class periods, adjust based on schedule)

Objectives:

- Students will use teamwork & collaboration to solve a problem
- Students will use critical thinking skills to apply to real-world situations
- Students will learn to appreciate the diverse perspectives of team members
- Students will research and create a presentation of their team solution
- Students will reflect on their team experience and identify areas for improvement

Materials:

- Computer and projector for presentations
- Whiteboard and markers
- Handouts
- Internet access for research
- CodeX or other microcontroller

Week 1: Write the Action Plan

1. Teams will create an Action Plan to guide their work over the next few class periods. Use the ***Action Planning Guide***.
2. Goal Setting is important at this stage. Teams need to write down and track all progress.
    - Determining the Team's Objectives
    - Establishing Clear and Measurable Goals
3. Teams will write a project timeline to keep track of progress.
    - Creating a Project Timeline
    - Allocating Tasks and Milestones
4. At this stage, Teams will need to focus on teamwork and collaboration.
    - Establishing Communication Channels
    - Regular Team Meetings
    - Meeting with Mentor
5. Team Role Fulfillment is essential to meeting deadlines.
    - Ensuring Team Members Carry Out Their Assigned Roles
    - Encouraging Collaboration and Sharing of Ideas
6. Conflict Resolution - Teams will need a plan for addressing issues.
    - Identifying and Addressing Conflicts Constructively

- Seeking Mediation if Necessary

Week 2: Implementation Phase

1. Prototyping and Testing - Teams will begin testing the solution.
    - Develop a Prototype of the Solution
    - Conduct Tests and Gather Feedback
2. Iterative Refinement - Teams will make revisions and adjustments as needed.
    - Incorporating Feedback into the Solution
    - Making Necessary Improvements
3. Documentation- The Documentation Specialist will manage all record keeping of this process.
    - Keeping Records of the Development Process
    - Documenting Changes and Decisions
4. Begin planning and outlining the Final Presentation. Presentations will be delivered by the end of the next week.

Module 3: Lesson 3 - Solution & Presentation

Grade Level: 6th-12th grade

Duration: 1-2 weeks (multiple class periods, adjust based on schedule)

Objectives:

- Students will use teamwork & collaboration to solve a problem
- Students will use critical thinking skills to apply to real-world situations
- Students will learn to appreciate the diverse perspectives of team members
- Students will present their solutions to an audience for assessment and feedback
- Students will reflect on their team experience and identify areas for improvement

Materials:

- Computer and projector for presentations
- Whiteboard and markers
- Handouts
- Internet access for research
- CodeX or other microcontroller

Presentation and Evaluation

A. Final Solution Presentation

1. Students will begin preparing for the Final Presentation. They will present for judges or peers.
2. Remind students about the need to demonstrate the Solution's Effectiveness.
3. Provide a ***Presentation Rubric*** and checklist for Teams to review before the presentation.

B. Peer Review and Feedback

1. Provide students with the Peer Evaluation Form to review other Team Presentations.
2. Allow students to reflect on receiving Feedback and Constructive Criticism from Team members and other Teams.

C. Self-Evaluation

1. Students will reflect on their **Team's Performance** using the ***Peer Rubric.***
2. Students will use the ***Self-Reflection Form*** to identify and reflect on their own Strengths and Areas for Improvement.

Post-Challenge Follow-Up

A. Celebration and Recognition

1. Make sure to Acknowledge Team Achievements.
2. Make sure to Recognize Outstanding Contributions.

B. Knowledge Sharing

1. Discuss as a large group and share the Insights and Lessons Learned.
2. Teachers will evaluate students using 2 Rubrics:
    - ***Technical Competencies Rubric***
    - ***Employability Rubric*** (students can use this for self-assessment, too)

C. Future Planning

1. Discussing Opportunities for Future Collaborations
2. Setting New Goals and Challenges