# Differentiated Instruction Teaching/Learning Examples

**GRADE 10 INTRODUCTION TO COMPUTER STUDIES (ICS20): COMPUTER HARDWARE—COMPUTER STUDIES**
Four to five 75-minute periods

1. Scavenger Hunt—The Six Internal Components of a Computer
2. Graffiti Review—The Six Internal Components of a Computer (Questions, Cues and Advance Organizers)*
3. Multiple Intelligences Exit Cards (Questions, Cues and Advance Organizers)*
4. RAFT (Role, Audience, Format, Topic)** Assignment
5. RAFT Research Options (Questions, Cues and Advance Organizers)*
6. Peer Assessment (Setting Objectives and Providing Feedback)*

*Marzano's Categories of Instructional Strategies (See Resources, below.)
**Differentiated Instruction Structure

## DIFFERENTIATED INSTRUCTION DETAILS

**Knowledge of Students**
Differentiation based on student:
☐ Readiness    ☑ Interests    ☑ Preferences:
☐ Styles        ☑ Intelligences        ☐ Other (e.g., environment, gender, culture)

**DI**

**Need to Know**
• Students' interests in specific computer uses (e.g., photography, gaming, etc.) in order to design the RAFT choices
• Students' Multiple Intelligences preferences

**How to Find Out**
• Multiple Intelligences inventories, class discussion, conferencing, observation

**Differentiated Instruction Response**
☑ Topic, Entry Point (content)    ☑ Ways of learning (process)    ☑ Ways of demonstrating learning (product)    ☐ Learning environment

## CURRICULUM CONNECTIONS

**Overall Expectation: Understanding Computers**
A1. Describe the functions of different types of hardware components, and assess the hardware needs of users

**Specific Expectations: (A1) Hardware Components**
A1.1 Use correct terminology to describe computer hardware, speed measurements and size measurements
A1.2 Describe the functions of the internal components of a computer
A1.4 Assess user's computing needs and select appropriate hardware components for different situations
Note: This Teaching/Learning Example could be adapted to address expectation A2.2 (assess user computer needs and select appropriate software for different situations).

**Learning Goals:**
• Assess user needs for six hardware components based on a specific situation
• Describe the range of options available to the client for each of the six hardware components
• Make hardware recommendations based on user needs

## ASSESSMENT AND EVALUATION

**Assessment/Success Criteria**

*Knowledge and Understanding*
• Explains the function of internal computer components as a range of options available to the client
• Uses computer terminology

*Thinking*
• Assesses user needs (i.e., explains what the client wants the computer to do)
• Makes hardware recommendations
• Provides a reason for each recommendation

**Assessment Tools:**

• Anecdotal Comments
• Checklist
• Rubric

## PRIOR LEARNING

Prior to this lesson, students will have:
• Knowledge of the basic functions of the internal components of a computer and associated terminology
• Experience with some presentation methods (e.g., oral, presentation software, etc.) and products (e.g., brochures, reports)

## MATERIALS AND RESOURCES

**Materials:**
Access to internal computer components (e.g., old computers) so that students can locate components
Six pieces of chart paper or six computer stations for the Graffiti activity; coloured markers
Access to information sources (e.g., people, computer books, the Internet)
Access to presentation software (e.g., PowerPoint)

Appendix A: Computer Hardware RAFT Assignment—one per student
Appendix B: Computer Hardware RAFT Assignment Checklist—one per student
Appendix C: Computer Hardware Fishbone Research Organizer—one for each student who chooses Appendix C
Appendix D: Computer Hardware Research Note-taking Chart—one for each student who chooses Appendix D
Appendix E: Computer Hardware RAFT Assignment Rubric—one for each student

**Internet Resources:**
http://videos.howstuffworks.com/howstuffworks/23-computer-tour-video.htm
http://videos.howstuffworks.com/harvard-extension-schools-computer-science-e-1-understand/1290-dissecting-a-pc-video.htm

**Resources:**
Hume, Karen (2008). *Start Where They Are: Differentiating for Success with the Young Adolescent* (with CD-ROM). Toronto, ON: Pearson Education Canada. (Multiple Intelligences Inventory and Information, p. 72)
Marzano, Robert J., Pickering, Debra, and Pollock, Jane E. (2001). *Classroom Instruction that Works: Research-Based Strategies for Increasing Student Achievement*. Alexandria, VA: ASCD.
Ministry of Education (2008). *The Ontario Curriculum, Grades 10–12, Computer Studies.*

## Teaching/Learning Sequence: Grade 10 Introduction to Computer Studies (ICS20): Computer Hardware—Computer Studies

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| **MINDS ON**<br>• Establishing a positive learning environment<br>• Connecting to prior learning and/or experiences<br>• Setting the context for learning | **CONNECTIONS**<br>L: Literacy<br>ML: Mathematical Literacy<br>AfL, AoL: Assessment **for/of** Learning |

Explain to students that during this lesson they will be consultants who make hardware recommendations for clients who are specialized users. To prepare for this, they will need to review the function of six internal components of computers and then do some research so that they are able to give good advice to their clients. Remind them of their prior discussion and experience with Multiple Intelligences and indicate that they will have opportunities during the lesson to use a variety of intelligences. In addition, they will choose a way to demonstrate their learning on the final lesson task, based on their preferred intelligences.

**Small Groups → Scavenger Hunt—The Six Internal Components of a Computer**
Post a list of six main components (CPU, RAM, hard drive, motherboard, video card, and optical drive) of a computer. Provide as many old computers as possible to accommodate several small groups.
Students, in groups:
• Open an unplugged computer and work together to locate the six main components
• Ensure that all group members can name and locate each component
Debrief by asking students what Multiple Intelligences were required the most for this activity (e.g., bodily-kinesthetic, visual-spatial, interpersonal).

*L: Using subject-specific vocabulary/Scavenger Hunt*

**Small Groups → Graffiti Review—The Six Internal Components of a Computer**
On six pieces of chart paper (one for each component), write the name of the component in the centre. Post the chart papers at six different stations (or use word processing at six computer workstations throughout the room). Students form groups of four or five, one group per station, with each group using a different coloured marker (or font).

*L: Summarizing/Graffiti Review*

Students:
• Select a recorder/typist
• Record what they know about their station's internal component on the chart paper
• As a group, rotate through each station, adding to the lists created by other groups
• When they return to their home station, examine the information added by other groups, consult an information source (e.g., Internet, computer magazine, textbook, class notes) to verify and/or add to the list so that the points describe the function of the component and how it relates to some of the other components
• Summarize the information on the chart/screen (e.g., delete trivial or repeated information, replace lists with a single word or phrase)

Guide a class discussion as Graffiti station groups share their summary with the class. Clarify any misunderstandings about terminology or functions of computer hardware. Post the summaries as Anchor Charts/references for each component. If word processing summaries were created, combine, print and distribute to all students. Based on the readiness of the class, consider showing a video from How Stuff Works (see Internet Resources in Materials and Resources on the reverse of this folder) to consolidate information on the six components.

*AfL: Graffiti Review/Anecdotal Comments*

**Individuals → Multiple Intelligences Exit Cards**
Debrief by asking students what Multiple Intelligences were the most required for the Graffiti activity and the How Stuff Works video (e.g., bodily-kinesthetic, verbal-linguistic, visual-spatial, interpersonal). Have students hand in a sticky note or index card indicating their top two intelligences. This information will inform their choice in the Format section of their RAFT as well as how they collect and record their information.

*AfL: Self-assessment (intelligence preferences)/Exit Card*

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| **ACTION**<br>• Introducing new learning or extending/reinforcing prior learning<br>• Providing opportunities for practice and application of learning (guided → independent) | |

**Whole Class/Small Groups → RAFT (Role, Audience, Format, Topic) Assignment**
Provide students with a copy of the Computer Hardware RAFT Assignment (Appendix A) in which students select a consultant role and gather information in order to make hardware recommendations for a chosen client. Explain that the RAFT differentiates according to student interests (Role and Topic) and intelligence preferences (Format). Modify the RAFT options in response to students' interests, their intelligence preferences as indicated on the Exit Card, and their experiences with different presentation formats.

**DI** INTERESTS, PREFERENCES— INTELLIGENCES

Remind the class that, regardless of their choices, each student is required to demonstrate the same learning goals. Establish the criteria for the product together. Review the Computer Hardware RAFT Assignment Checklist (Appendix B) and the Computer Hardware RAFT Assignment Rubric (Appendix E) so that students see that the assessment criteria are the same no matter which Role, Audience, Format, or Topic they choose.

Invite a guest (e.g., teaching colleague, graphic artist) to the class or select a specialized user (e.g., musician) who is not on the RAFT and have students practice clarifying user needs, finding out how and where to access information about hardware components, describing the hardware options available to the client, and making recommendations for each hardware component.

Students select their Role, Audience, Format, and Topic from the Computer Hardware RAFT Assignment (Appendix A) and join with others who have selected the same Audience and Topic to:
• Brainstorm what their clients (Audience) would want their computers to do
• Generate a list of questions that need to be answered in order to make recommendations about the six components
• Brainstorm where they might find the information

*L: Considering audience and purpose/RAFT*

**Individuals → RAFT Research Options**
To research and record information required for the RAFT Assignment, students:
• Decide, based on their intelligence preferences and interests, the sources of information they would like to use, such as the Internet, face-to-face or telephone interviews, computer or special interest magazines (e.g., photography), videos, or books
• Select one of the note-taking organizers provided—Computer Hardware Fishbone Research Organizer (Appendix C) or Computer Hardware Research Note-taking Chart (Appendix D)—or a method of their own design (e.g., cards, hand-held recording device, Mind Map) and complete with the information researched

**DI** PREFERENCES— INTELLIGENCES

*L: Selecting Information/ Note-taking*

Circulate and provide feedback as required. Provide guidance and support as needed on summarizing information in a text and/or video (e.g., photocopy text material, have students read and then highlight what they perceive to be the important information). Conference to review and provide feedback on information highlighted.

*AfL: Observation/Anecdotal Comments*

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| **CONSOLIDATION AND CONNECTION**<br>• Helping students demonstrate what they have learned<br>• Providing opportunities for consolidation and reflection | |

**Pairs/Small Groups → Peer Assessment**
Students:
• Share their RAFT products with a partner or small group of peers
• Using their Computer Hardware RAFT Assignment Checklist (Appendix B) offer feedback based on the criteria and make suggestions for improvement
• Refine their product and hand it in to the teacher for evaluation using the Computer Hardware RAFT Assignment Rubric (Appendix E)

*AfL: Peer Assessment/Checklist*

*AoL: Raft/Rubric*