MONK, ELLIE-MAE (PGT) 4/22/2024

Green Space

1: Key Information

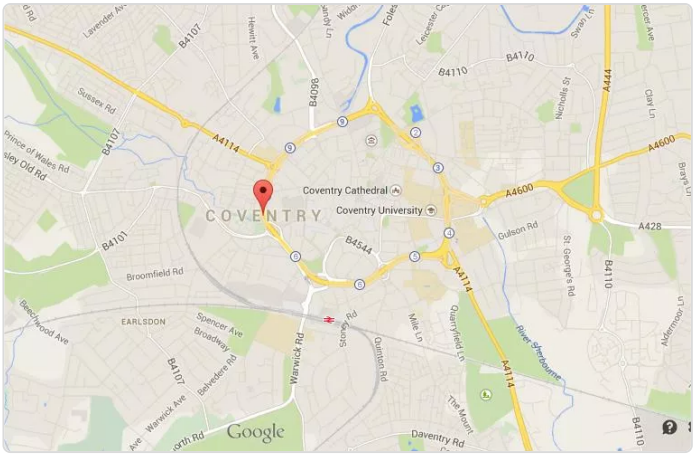
Name: Ellie-Mae Monk, Group 5
Subject: Computer Science
Focus Group: Year 7
LO: To enale students to be able to respond to climate change through developing their understanding of how their use of technology is a major impact.
Overall idea: Students will be introduced to the concept of green computing and its importance of mitigating environmental impacts. Each lesson will progressively delve deeper into various aspects of green computing, starting from understand the concept and its significance, movin on to exploring strategies for energy efficiency in computing and examine broader sustainable computing practices.
Key Inspiration: Institute of Computing for Climate Science studies and how they support the role of software engineering, computer science, AI and data science within climate science.

2: Context

A group of 30 mixed ability year 7 students within a mixed school in an inner city context. They are from mixed heritages, and the lessons will be taught as part of rotation for each group within the year group

- Teaching is most effective with the students being able to complete hands on activities that are practical.
- All students will have access to computers in the lesson.
- This will be taught during the first week of the rotation, so their computing ability may be limited. Their prior use of computers will be varied.
- They have done no prior learning at school of climate change and its effects.
- This section of learning will help to develop their understanding of climate change and how their use of technology is able to aid the cause.

Coventry - inner city school. Class of 27,
18 boys and 11 girls - 3 students with SEND



3: Learning - skills, knowledge, values

Knowledge

1. **Environmental Awareness and Understanding:**
   Students learn about environmental issues such as climate change, energy consumption, and electronic waste. They gain an understanding of the environmental impact of traditional computing practices and the importance of adopting green computing strategies.
2. **Technological Literacy:**
   Students develop literacy in computing concepts and technologies, including hardware design, power management techniques, virtualisation, and cloud computing. They learn how technology can be used to address environmental challenges and promote sustainability.
3. **Problem-Solving and Critical Thinking:**
   Students engage in problem-solving activities, such as conducting energy audits and developing green computing projects, to explore solutions to environmental problems. They apply critical thinking skills to analyse the environmental impact of computing practices and evaluate the effectiveness of green computing strategies.
4. **Ethical and Social Responsibility:**
   Students consider the ethical implications of technology use and its impact on the environment. They explore their responsibilities as a digital population to minimise their ecological footprint and promote sustainable computing practices.
5. **Collaboration and Communication:**
   Students collaborate in group activities and projects, sharing ideas and working together to explore green computing concepts and solutions. They develop communication skills through class discussions, presentations, and reflections on their learning.

Skills

1. **Critical Thinking:** Students analyze the environmental impact of computing practices, evaluate the effectiveness of green computing strategies, and consider ethical implications.
2. **Problem-Solving:** Through activities such as energy audits and green computing projects, students identify environmental challenges and explore solutions to address them.
3. **Collaboration:** Through group activities and projects, students collaborate with peers, share ideas, and work together to explore green computing concepts and solutions.
4. **Communication:** Students engage in class discussions, presentations, and reflections to communicate their understanding of green computing concepts and their ideas for promoting sustainability.
5. **Environmental Awareness:** Students gain knowledge about environmental issues such as climate change, energy consumption, and electronic waste, fostering a deeper understanding of the importance of adopting green computing practices.

Values

1. **Environmental Stewardship:** The lessons emphasise the importance of protecting the environment and reducing the ecological footprint of computing practices. By adopting green computing strategies, students learn to take responsibility for their environmental impact and contribute to the conservation of natural resources.
2. **Sustainability:** The lessons promote the idea of sustainability, encouraging students to consider the long-term consequences of their actions and adopt practices that support the well-being of future generations. By practicing sustainable computing habits, students contribute to a more sustainable and resilient society.
3. **Ethical Awareness:** The lessons highlight the ethical implications of technology use and its impact on the environment. Students learn to consider the ethical consequences of their digital behavior and make informed decisions that align with their values and principles.
4. **Social Responsibility:** By exploring their role as digital citizens, students develop a sense of social responsibility and civic engagement. They recognise their responsibility to minimise their ecological footprint, promote sustainable practices, and advocate for positive change in their communities and beyond.
5. **Innovation and Creativity:** The lessons inspire innovation and creativity by challenging students to think critically and develop innovative solutions to environmental problems. By exploring green computing concepts and technologies, students discover new ways to harness the power of technology for positive environmental impact.

6. **Respect for Diversity:** The lessons acknowledge the diversity of perspectives and experiences related to environmental issues and sustainability. Students learn to respect different viewpoints and appreciate the interconnectedness of environmental, social, and economic systems.

4: Activities

Sequence of Learning Activities

Introduction:

1. **Starter**
   Introduce the topic of green computing.
   Explain the objectives of the workshop and what students will be doing throughout the lesson.
2. **Presentation: Introduction to Green Computing:**
   Provide a brief overview of green computing concepts and its importance.
   Discuss environmental issues related to traditional computing practices.
   Highlight the significance of adopting green computing strategies.
3. **Group Discussion:**
   Facilitate a class discussion on the importance of sustainability and the role of technology in addressing environmental challenges.
   Encourage students to share their thoughts and ideas about how technology can be used to promote sustainability.

Activity 1: Green Computing Scavenger Hunt:

1. **Instructions and Group Formation:**
   Divide students into small groups and provide each group with a checklist or questionnaire for the scavenger hunt.
2. **Scavenger Hunt:**
   Instruct students to explore the school or community to find examples of green computing practices.
   Encourage them to take notes of what they find.
3. **Group Discussion and Reflection :**
   Reconvene as a class and have each group share their findings.
   Discuss the observations and reflect on the importance of the practices observed.

Activity 2: Energy Efficiency Experiment:

1. **Introduction to Power Management:**
   Explain the concept of power management and its importance for energy efficiency.
   Provide an overview of different power management settings on computers and laptops.
2. **Experiment Setup:**
   Distribute computers or laptops to students and instruct them to access the power management settings.
3. **Power Management Experiment:**
   Have students experiment with different power management settings, such as adjusting sleep and hibernate modes or enabling automatic shutdowns.

Instruct them to measure and record the energy consumption of devices under different settings.

4. **Data Analysis and Discussion:**
   Discuss the results of the experiment as a class.
   Reflect on the impact of power management settings on energy usage and the environment.

Activity 3: E-Waste Recycling Campaign:

1. **Introduction to E-Waste Recycling:**
   Explain the concept of electronic waste (e-waste) and its environmental impact.
   Discuss the importance of proper disposal and recycling of electronic devices.
2. **Campaign Planning:**
   Divide students into groups and assign each group the task of creating a public awareness campaign about e-waste recycling.
   Provide materials for creating posters, flyers, or social media posts.
3. **Campaign Creation:**
   Instruct students to work collaboratively within their groups to design their campaign materials.
4. **Campaign Presentation:**
   Have each group present their campaign materials to the class.
   Encourage students to explain the message of their campaign and why e-waste recycling is important.

Conclusion and Reflection:

- Summarise the key concepts learned during the workshop.
- Facilitate a class discussion reflecting on the importance of green computing and how students can apply these principles in their daily lives.
- Encourage students to share their reflections on the activities and what they have learned.

5: Pedagogy

Teaching through a wide variety of pedagogies

1. **Constructivism:** The lesson plan is designed to facilitate active construction of knowledge by students. Through activities like the scavenger hunt, energy efficiency experiment, and campaign creation, students engage in authentic experiences that allow them to explore, question, and construct their understanding of green computing concepts.
2. **Inquiry-Based Learning:** The activities in the lesson plan encourage students to ask questions, investigate real-world issues, and seek solutions to problems related to green computing. By engaging in inquiry-based activities, students take ownership of their learning process and develop critical thinking skills as they explore the complexities of environmental issues and sustainable practices.
3. **Hands-On Learning:** The lesson plan incorporates hands-on, experiential learning activities that actively involve students in the learning process. Activities such as the scavenger hunt, energy efficiency experiment, and campaign

creation provide opportunities for students to apply theoretical concepts in practical contexts, fostering deeper understanding and retention of knowledge.

4. **Collaborative Learning:** The lesson plan promotes collaboration among students through group activities and discussions. By working collaboratively in small groups, students share ideas, solve problems together, and learn from each other's perspectives. Collaborative learning enhances communication skills, teamwork, and interpersonal relationships among students.
5. **Authentic Assessment:** Assessment in the lesson plan focuses on authentic, performance-based tasks that assess students' understanding and application of green computing concepts. Through activities like the scavenger hunt, energy efficiency experiment, and campaign creation, students demonstrate their knowledge, skills, and abilities in real-world contexts, providing meaningful evidence of their learning.
6. **Reflection and Metacognition:** The lesson plan includes opportunities for reflection and metacognition, where students think critically about their learning process and make connections between their experiences and concepts learned. Reflection encourages students to articulate their thoughts, assess their understanding, and identify areas for further exploration or improvement.

6: Resources

Key classroom resources

1. **Presentation Slides or Whiteboard:** To facilitate discussions and provide visual aids, this includes videos.
2. **Computers or Laptops:** Optional but useful for conducting the energy efficiency experiment and accessing online resources.
3. **Checklist or Questionnaire for Green Computing Scavenger Hunt:** Printed or digital copies for each group.
4. **Energy Meter:** To measure and monitor the energy consumption of devices during the experiment.
5. **Materials for Creating Posters or Flyers:** Such as markers, paper, and other art supplies for the e-waste recycling campaign activity if doing on paper, or students can complete on computer.
6. **Internet Access:** Optional but helpful for conducting research, accessing online resources, and gathering information for activities.
7. **Timer or Clock:** To keep track of time and ensure activities stay on schedule.
8. **Space for Group Activities:** Classroom or designated areas for group work and discussions.
9. **Writing Materials:** Such as pens, pencils, and notebooks for students to take notes and record observations during activities.
10. **Printed Handouts or Worksheets:** For providing instructions, guidelines, and

information about green computing concepts.

11. **Presentation Equipment:** If using presentation slides, ensure access to projectors or screens for displaying visuals.
12. **Environmental Awareness Resources:** Such as posters, infographics, or educational materials about environmental issues and sustainability to supplement discussions and activities.
13. **Safety Precautions:** Ensure proper safety measures are in place, especially if conducting experiments involving electrical devices or handling materials.

7: Learning Outcomes

What are the learning outcomes? What are pupils going to create, make, write to demostrate their learning? How will this be captured?

1. **Posters or Flyers for the E-Waste Recycling Campaign:** Students will create visually appealing posters or flyers to raise awareness about electronic waste (e-waste) recycling. These posters may include information about the environmental impact of e-waste, the importance of recycling old electronics, and guidelines for proper disposal. The posters will serve as educational tools that can be displayed in school hallways, classrooms, or common areas to inform and inspire others to take action.
2. **Energy Audit Data and Analysis:** Students will record data from the energy audit conducted during the workshop, including information about the types of devices assessed, their power management settings, and energy consumption measurements. They may present their findings in the form of charts, graphs, or tables to visually illustrate patterns and trends in energy usage. The energy audit data and analysis will provide valuable insights into the energy efficiency of computing devices and opportunities for improvement.
3. **Documentation of Power Management Experiment:** Students will document their experiment with different power management settings, noting observations, measurements, and conclusions. They may create reports or presentations summarizing their findings and reflecting on the effectiveness of different power management strategies. The documentation will serve as a record of students' learning experiences and experimentation with energy-saving techniques.
4. **Reflections and Written Responses:** Students may write reflections or responses reflecting on their learning experiences during the workshop, including insights gained, challenges encountered, and actions they plan to take.

These reflections may be compiled into a written document or shared orally during class discussions, providing opportunities for students to articulate their thoughts and insights.