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RIT THROUGH SUBJECTS MOTIVATION FOCUS OPTIM

COMPUTER SCIENCE

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Overview	
Curriculum Area	Computer Science
Subject Focus	These lessons fit into the new Computer Science curriculum area of problem solving. All the skills used for the translator are directly linked to Year 9 problem solving. In addition, as no specific software has been referred to in these lessons, the project can be applied to whichever software the school is using. This could be a specific programming software such as Python or non-specific such as spreadsheet software.
Identified Key Character Qualities	Neighbourliness (Civic) Tolerance (Moral)
Character Focus	Acquiring: learners are acquiring knowledge and understanding initially through watching a video of a student who has English as additional language and will be asked to think about how the child feels. They will then interview an EAL student in school to get first-hand information about the isolation and anxieties that EAL students have. There will be task sheets, class discussion and paired work to support this process. Developing: learners will have their understanding developed by a series of video clip case studies introducing new technology that changes peoples' lives. This will help develop the learners understanding of tolerance and neighbourliness by seeing those traits in different situations. There will be task sheets, class discussion and paired work to support this process. Consolidation: Pupils will also be asked to consolidate their knowledge and understanding in their homework where they are asked to think about neighbourliness and tolerance outside of school. In lesson five, learners will be asked to reflect on their learning of character and virtue. This will further consolidate what they have learnt. There will be task sheets, class discussion and paired work to support this process. Applying: as part of the process, learners will be asked to set themselves two targets. One target for each virtue. The targets will need to be SMART and the learners will be asked to justify why the target they have chosen is a good target that will make them behave in a more tolerant and neighbourly way.
Differentiation	Each lesson has at least one activity that has been differentiated for difference abilities. For example lesson 1 has three activities that are differentiated (resources for differentiated are provided): *Lesson 1:*

	1. *Differentiation: A prompt sheet should be given to the less able learners to help them empathise or think of words to describe the student's feelings.*
	2. *Differentiation: Provide lower ability learners with example questions or a prompt sheet*
	3. *Differentiation: The lower ability learner can list with short explanations each of their solutions. The more able learner needs to explain how their various solutions can help the new EAL student when they start at the school and identify any drawbacks of their solutions.*
Adaptability	This set of resources can be adapted quite easily. The skills needed for Computer Science can easily be made more difficult by using different software to program the solution. For example: KS3 could use spreadsheet software and KS4 Computer Science option class could use a programming language. If there is more/less lesson time available, this too can be accommodated. The teacher can provide more or less of the solution depending on time. I would not recommend reducing the explicit character elements but the Computer Science focus could be adjusted.
Affect on School Priorities	This is difficult to measure after only five lessons. The pupils did respond very well to the character focus and were very keen to contribute to the discussion. Longer term – with more of a whole school focus, I'm sure this would have impact.
Things That Worked Well	Pupils really enjoyed talking about character and virtues. They appreciated and responded well to being given the opportunity to reflect on character. **Subject Specific:** It was really valuable to see computer science in a broader context. Focusing on being responsible programmers and making a difference through technology and computer science was a useful focus. **Character Education:** Asking pupils to think about others and the impact they could have on improving the lives of others is a really valuable for character development. Bringing character development into computer science is not necessarily a natural association and helps get pupils to see that character should be a part of everything they do. The videos helped develop this link.
Things That Might Be Improved	**Subject Specific:** These sets of lessons were designed to get pupils to program a translator in a language such as Python. This was very hard for Yr9 pupils and we ended up switching to spreadsheet software and making the translator using spreadsheet software. This worked as well as the computer science aim was to use software to solve problems. All the problem solving elements were still as valuable in the process it was just creating the

	program that was impacted.
	Character Education: Five lessons is not a lot of time to embed the values and would probably benefit for being revised at a later stage to remind the pupils of the values.

Lessons	
Subject Focus	**Lesson One:** Objectives Computer Science: Identifying how to solve a problem using computer programming Outcomes Computer Science: All: Will be able to identify the problem and present simple solutions Most: Will be able to identify and understand the problem and present a variety of solutions that might work Some: Will be able to describe and understand the problem and present a variety of solutions that can be explained. **Lesson Two:** Objectives Computer Science: • Identifying how to solve a problem using computer programming • Designs a solution for a high-level textual language Outcomes Computer Science: All: Will be able to design a basic solution to the problem using a simple algorithm Most: Will be able to design a basic solution to the problem using pseudo code Some: Will be able to design a more complex, efficient solution to the problem using pseudocode. **Lesson Three:** Objectives Computer Science: • Identifying how to solve a problem using computer programming • Implements a solution in a high-level textual language Outcomes Computer Science: All: Will be able to implement a basic solution to the problem using a high-level textual language. Most: Will be able to implement a basic solution to the problem using a high-level textual language. Some: Will be able to implement a more complex, efficient solution to the problem. **Lesson Four:** Objectives Computer Science: • Identifying how to solve a problem using computer programming • Implements a solution in a high-level textual language and identifying errors. Outcomes Computer Science: All: Will be able to implement a basic solution to the problem

	using a high-level textual language. Most: Will be able to implement a basic solution to the problem using a high-level textual language and being able to identify some errors. Some: Will be able to implement a more complex, efficient solution to the problem and able to identify and correct errors. **Lesson Five:** Objectives Computer Science: Evaluating the appropriateness of a program to achieve a given goal. Outcomes Computer Science: All: Will be able to provide an evaluation that identifies the elements did/did not work as planned. Most: Will be able to provide an evaluation that explains the elements did/did not work as planned and errors that were corrected. Some: Will be able to provide an evaluation that explains the elements did/did not work as planned with errors that were corrected and ways that the solution could be further improved.
Character Focus	**Lesson One:** Objectives Values: To raise an awareness of the values of neighbourliness and tolerance in relation to new EAL students in school Outcomes Values: All: Will be able identify the need to offer neighbourliness to a new EAL student Most: Will understand the need to offer neighbourliness and the importance of tolerance in respect of a new EAL student Some: Will be able to understand the need for neighbourliness and tolerance in society and begin to recognise the role they need to play in finding solutions to complex social problems. **Lesson Two:** Objectives Values: To raise an awareness of the values of neighbourliness and tolerance in relation to new EAL students in school and to children with disabilities. Outcomes Values: All: Will be able identify the need to be neighbourly a new EAL student and to a child with a disability Most: Will understand the need to be neighbourly and the importance of tolerance in respect of a new EAL student and to a child with a disability Some: Will be able to understand the need to be neighbourly and tolerant in society and begin to recognise the role they need to play in finding solutions to complex social problems. **Lesson Three:** Objectives Values: To raise an awareness of the values of neighbourliness and tolerance in relation to new EAL students in school and for

	nearly blind people. Outcomes Values: All: Will be able identify the need to be neighbourly a new EAL student and to a nearly blind person. Most: Will understand the need to be neighbourly and the importance of tolerance in respect of a new EAL student and to a nearly blind person. Some: Will be able to understand the need to be neighbourly and tolerant in society and begin to recognise the role they need to play in finding solutions to complex social problems. **Lesson Four:** Objectives Values: To raise an awareness of the values of neighbourliness and tolerance in their lives. Outcomes Values: All: Will be able identify the need to be neighbourly in their life. Most: Will understand the need to be neighbourly and the importance of tolerance in respect people around them. Some: Will be able to understand the need to be neighbourly and tolerant in society and begin to recognise the role they need to play in finding solutions to complex social problems. **Lesson Five:** Objectives Values: To reflect on how much the learner has understood about the importance and impact of character/values with particular focus on neighbourliness and tolerance. Outcomes Values: All: Will be able identify, using examples, the need to be neighbourly in their life. Most: Will explain the need to be neighbourly and the importance of tolerance in respect people around them. Some: Will be able to explain the need to be neighbourly and tolerant in society and begin to recognise the role they need to play in finding solutions to complex social problems.
Lesson Activities	**Lesson One:** 1. **Starter: Introduction to character and values and how they could be central to the motivation of a computer scientist: 10mins** Impact: explicitly introduce character and values to highlight the importance of them. 2. **Starter: Video of an EAL student in school: 10mins** Impact: Getting pupils to have a sense of how someone would actually feel in an attempt to develop empathy. Assessment: The teacher can observe the vocabulary that the learners have used to describe the student to see whether the learner has an understanding of issues. 3. **Class activity: Generating a set of questions to interview an EAL student: 10mins** Impact: Pupils asked to reflect on the problem presented and identify questions that can find out more about it in greater depth; therefore taking their learning and understanding to a greater depth. Assessment: The

teacher can identify whether the learner has understood the anxieties of the EAL students by looking at the questions they are writing down.

4. **Whole class activity: Interview EAL student: 10mins**
Impact: Getting pupils to have a sense of how someone would actually feel to futher to develop empathy and understanding.

5. **Group activity: The solution 10mins** Impact: Developing their problem solving skills. Assessment: The teacher should be assessing the quality and creativity of the variety solutions. The teacher should question the learners to challenge them to think through their offered solutions and to make a judgement about the likelihood of success.

6. **Whole class: The project and success criteria10mins**
Impact: Identifying goals for the project success to draw out the impact/benefits of the project.

7. **Set homework:**

Lesson Two:

1. **Starter: Video of Jerry the Bear: 10mins** Impact: This is not related to the translator project but is directly related to the theme of character and technology innovators having a responsibility to use their talents for the 'greater good'. It is included in these lessons to provide learners with another example of character demonstration for them to empathise with. Assessment: The teacher can observe the vocabulary and the ideas that the learners have used to describe the student to see whether the learner has an understanding of issues.

2. **Paired activity: Approaches to creating the translator: 15mins** Impact: Teamwork/co-operation to develop the best solutions and developing understanding of the problem in more depth.
Assessment: The teacher can identify the quality and effectiveness of the solution as it is being discussed in the pairs.

3. **Paired activity: Designing the program: 25mins** Impact: Teamwork/co-operation to develop the best solutions and developing understanding of the problem in more depth.
Assessment: The teacher can identify the quality and effectiveness of the solution as it is being designed in their pairs. Assessment of the individual annotated design after/during the lesson should also be done.

4. **Whole class: Lesson review 10mins** Impact: Identification of pupils own understanding of how to solve the problem.

5. **Set homework:**

Lesson Three:

1. **Starter: Smart Glasses video: 10mins** Impact: The video should allow the learners to gain an understanding of the potential impact of these glasses. Learners need to write down at least two benefits to the user of having these 'Smart Glasses'. Assessment: The teacher should be able to see whether the learner has an understanding of the potential impact the glasses could have.
2. **Paired activity: Programming the translator: 40mins** Impact: Pupils developing their computer programming skills to implement the solution. Assessment: The teacher can identify the quality and effectiveness of the solution as it is being written.
3. **In groups: Lesson review 10mins** Impact: Sharing homework ideas should further develop their understanding of neighbourliness and tolerance.
4. **Set homework:**

Lesson Four:

1. **Starter: Share their homework: 15mins** Impact: Sharing homework ideas should further develop their understanding of neighbourliness and tolerance. Assessment: The teacher should be able to see whether the learner has an understanding of the potential impact they might have on others by reading the explanation in their homework.
2. **Paired activity: Programming and testing the translator: 40mins** Impact: Pupils developing their computer programming skills to implement the solution. Assessment: The teacher can identify the quality and effectiveness of the solution as it is being written.
   Assessment: The teacher can identify the quality and effectiveness of the solution as it is being written. A record of the tests carried out will evidence the learner's ability to amend errors themselves.
3. **Whole class discussion: Lesson review 5mins** Impact: Sharing the summary of the project should further develop their understanding of neighbourliness , tolerance, their programming skills and the impact that a socially minded programmer could have.
4. **Set homework:** To complete the translator

	Lesson Five: 1. **Section 1: Translator evaluation 30mins** Impact and assessment: The evaluations can be used to assess progress and understanding of the project. This should be used in conjunction with the final solutions. 2. **Section 2: Character/Values reflection 10mins** Impact and assessment: This should be used in conjunction with the evaluation task and notes made on character and contributions to discuss over the 5 lessons. 3. **Section 2 continued: Character/Values reflection 20mins** Impact and assessment: The evaluations can be used to assess progress and understanding of character/values over the 5 lessons. This should be used in conjunction with notes made on character and contributions to discuss over the 5 lessons.
Notes on Differentiation and Adaptability	Differentiated resources are provided for the following: **Lesson One:** **Starter:** Video of an EAL student in school: 10mins Differentiation: A prompt sheet should be given to the less able learners to help them empathise or think of words to describe the student's feelings. **Class activity:** Generating a set of questions to interview an EAL student: 10mins Differentiation: Provide lower ability learners with example questions or a prompt sheet **Group activity:** The solution 10mins Differentiation: The lower ability learner can list with short explanations each of their solutions. The more able learner needs to explain how their various solutions can help the new EAL student when they start at the school and identify any drawbacks of their solutions. **Lesson Two:** **Starter:** Video of Jerry the Bear: 10mins Differentiation: A differentiated handout should be given to the less able learners to help them empathise or think of words to describe the child's feelings. A differentiated handout should be given to the higher ability learners to stretch their understanding of the impact of Jerry the Bear. **Paired activity:** Approaches to creating the translator: 15mins Differentiation: Learners will choose different solutions dependent on their ability. A support handout should be given to help the lower ability learners structure their thinking. **Paired activity:** Designing the program: 25mins Differentiation: Lower ability learners would be expected to produce a simple set of instructional bullet points and higher ability learners would be expected to write in pseudo code. **Lesson Three:** **Starter:** Smart Glasses video: 10mins Differentiation: More able learners should also include some benefits to society of people being able to use the 'Smart

| | Glasses'.
Paired activity: Programming the translator: 40mins
Differentiation: Learners will choose different solutions dependent on their ability.

Lesson Four:
Paired activity: Programming and testing the translator: 40mins
Differentiation: Learners will choose different solutions dependent on their ability. Lower ability learners will be able to detect errors but not necessarily correct the error themselves. Higher ability learners should be encouraged to work problems through themselves.

Lesson Five:
Section 1: Translator evaluation 30mins
Differentiation: Three different writing frames will be used so that learners are appropriately challenged and supported in producing their evaluations.
Section 2: Character/Values reflection 10mins
Differentiation: The negative character traits will have people with angry/unfriendly faces and a couple of examples to help the lower ability learners. Higher attainers will be asked to add a brief explanation of their choice.
Section 2 continued: Character/Values reflection 20mins
Differentiation: Three different questionnaires will be used so that learners are appropriately challenged and supported in reflecting on character/values. |
| **Other Points Worth Noting** | This set of lesson plans is designed to be used to support the Computer Science Yr9 curriculum. It was aimed at getting the learners to write a solution using a programming code such as Python. However, the solution can be written using a spreadsheet. This will not undermine the Computer Science element because learners will still be applying computational thinking skills and problem solving. |