STUDENT ONLY

Alarmed! An alarm system to protect treasure

COMPUTER SCIENCE
DESIGN & TECHNOLOGY

education@samlabs.com
www.samlabs.com

01

Activity log

YOUR NAMES?

DATE

/ /

Use these pages to record your inventions and programming. When you record things, it's often useful to put down the things that didn't work, as well and those that did - it's how we learn!

1 **Can you think of some examples of alarms, and why you would use them?**

2 What sort of buildings might have an alarm system?

3 How many types of alarm can you think of?

4 What kinds of things might need protecting with an alarm?

5 How do sensors work?

6 **How can you use them to either detect intrusion or the removal of an object?**

7 **What other types of sensor could be used, and what other types of output might be good?**

8 Draw some examples of how your alarm system might look.

INPUTS	CONNECTIONS	OUTPUTS

9 Draw your ultimate alarm system using multiple inputs and outputs.

INPUTS	CONNECTIONS	OUTPUTS

10 **How might your alarm system be made better, so you can capture evidence of an attempted theft?**

02

Time to reflect

Did you enjoy the activities? Did you find anything too hard? Trace the face next to the statements below that best represents your feelings.

1. WE ENJOYED THE PROJECT

2. WE UNDERSTOOD THE TASKS SET

3. WE CAME UP WITH OUR OWN SOLUTIONS TO THE CHALLENGES

4. WE WERE ABLE TO CREATE A MULTIPLE INPUT/OUTPUT ALARM SYSTEM

5. WE SHARED THE RESULTS WITH THE CLASS

SAM LABS

STUDENT ONLY

Board Games

COMPUTER SCIENCE
DESIGN & TECHNOLOGY

education@samlabs.com
www.samlabs.com

01

Activity log

YOUR NAMES?

DATE

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PLANNING

1 **How might modern technology allow for a game to be improved?**

2 Could you create a completely new modern board game using technology?

3 Which SAM Blocks would be useful in your board game design?

4 How would you use these?

INPUTS	CONNECTIONS	OUTPUTS

5 Would they enhance the gameplay or be a fundamental feature of the game?

6 How would the SAM blocks be connected to the game?

7 Would they be embedded into the board, or separate?

8 **What would be the role of the blocks within the context of the game?**

DESIGNING AND DEVELOPING AN IDEA

9 **How might you address the limitations of bluetooth?**

10 Could you embed the SAM Blocks physically into the board?

CREATING THE GAME

11 Should you test your ideas with other people in the class?

12 Is the gameplay improved by use the SAM Blocks that you have decided on?

13 Do they make the game more fun, or do they enhance the game rules?

GETTING FEEDBACK AND IMPROVING THE PROTOTYPE

14 How does the technology enhance your game experience?

15 Could the technology be better embedded into the game design and rules?

EVALUATION

16 Can you describe the process that you have been through?

17 Can you reflect on the importance of the different stages of design, including prototyping and testing?

18 How successful do you feel that the final game is?

19 Is there anything that you would change?

20 Could you improve on the game design?

02

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SAM LABS

STUDENT ONLY

Civic Engagement

COMPUTER SCIENCE
DESIGN & TECHNOLOGY
CITIZENSHIP

education@samlabs.com
www.samlabs.com

01

Activity log

YOUR NAMES?

DATE

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Use these pages to record your inventions and programming. When you record things, it's often useful to put down the things that didn't work, as well and those that did - it's how we learn!

1 **Have you used Twitter before?**
Describe what Twitter is in 140 characters!

2 If you use Twitter, who do you follow?

3 Are there any topics or feeds you follow?

4 **What other options would be useful to include in your tweets to help engage the global audience so that they respond?**

5 **How is this creation potentially dangerous?**

6 **What could be the consequence if you tweet a picture of somebody without their permission in a ridiculous posture?**

7 **What issues are relevant to young people in today?**

8 Are these local, national or global problems?

9 How could you assess the impact of the problem?

10 Could technology be used to help solve the issues?

11 How could this be communicated to people?

12 Are text-based tweets enough?

13 Would tweeting photos or videos be beneficial to help explain your ideas?

14 Could you design graphical content to help explain issues?

GAINING EMPATHY

15 Who does the issue affect?

16 What are their problems?

17 Is there anyone else involved in the issue?

DEFINING THE PROBLEM

18 Can you use the global community through Twitter to help define the problem?

IDEATE

19 What are the skills within your group?

20 **Can you use these different skills to generate different solutions and ideas for your campaign?**

21 **Will tweeting your ideas help to develop them with responses from the global community?**

PROTOTYPE

22 **Do you need to test the final outcomes, or can you test small elements of the campaign?**

TEST

23 **What was the response to your project?**

24 Was the feedback what you expected?

25 How did the feedback from the Twitter community help to guide and develop your campaign?

02

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4. WE SHARED THE RESULTS WITH THE CLASS

SAM LABS

STUDENT ONLY

Crazy Cars! Part 1

COMPUTER SCIENCE
DESIGN & TECHNOLOGY

education@samlabs.com
www.samlabs.com

01

Activity log

YOUR NAMES?

DATE

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Use these pages to record your inventions and programming. When you record things, it's often useful to put down the things that didn't work, as well and those that did - it's how we learn!

1 What is an example of a remote controlled car or vehicle?

2 How can you control the speed and the direction of this vehicle?

3 Photograph or draw the design of your buggy.

4 **Record the progress of your buggy. Please include what did and didn't work.**

5 **Which SAM Blocks should you use to control your buggy?**

6 How does it work?

7 What does the final version of your program look like?

INPUTS	CONNECTIONS	OUTPUTS

8 What went well?

9 What could have gone better?

10 How might your buggy be improved next time?

INPUTS	CONNECTIONS	OUTPUTS

02 Time to reflect

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4. WE SHARED THE RESULTS WITH THE CLASS

SAM LABS

STUDENT ONLY

Crazy Cars! Part 2

COMPUTER SCIENCE
DESIGN & TECHNOLOGY

education@samlabs.com
www.samlabs.com

01

Activity log

YOUR NAMES?

DATE

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Use these pages to record your inventions and programming. When you record things, it's often useful to put down the things that didn't work, as well and those that did - it's how we learn!

1 **What block should you add to your buggy so something happens when you run into an obstacle?**

2 What input are you going to use for your buggy?

3 What output?

4 How will you register how many times you collide with an obstacle?

5 What is your course going to look like?

6 **Why is an indicator on the finish line a good idea?**

7 **Can you think of any situations outside the classroom where this is used?**

8 What SAM Blocks are you going to use for your experiment?

INPUTS	CONNECTIONS	OUTPUTS

02

Time to reflect

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4. WE SHARED THE RESULTS WITH THE CLASS

SAM LABS

STUDENT ONLY

Hands On Buzzers!

COMPUTER SCIENCE
DESIGN & TECHNOLOGY

education@samlabs.com
www.samlabs.com

01

Activity log

YOUR NAMES?

DATE

/ /

Use these pages to record your inventions and programming. When you record things, it's often useful to put down the things that didn't work, as well and those that did - it's how we learn!

1 **What situation/s would you need to react or respond quickly to, for example, a question or other stimulus?**

2 **What situations might you find yourself in where your reactions need to be quick?**

3 **Record your work through a photograph, screenshot or drawing.**

4 Why did you settle on your program?

5 What worked well with your game?

6 What might work better?

7 What other SAM Blocks could you include to make it better, or easier to know who won?

8 **Record your work through a photograph, screenshot or drawing.**

9 **Why did you settle on your program?**

10 Did you need the toggle?

11 What happens if you do not use it?

12 **With your reaction game, what could be improved?**

13 **Who has the fastest reactions?**

02

Time to reflect

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4. WE SHARED THE RESULTS WITH THE CLASS

STUDENT ONLY

How fast?

COMPUTER SCIENCE
MATHEMATICS

education@samlabs.com
www.samlabs.com

01

Activity log

YOUR NAMES?

DATE

/ /

Use these pages to record your inventions and programming. When you record things, it's often useful to put down the things that didn't work, as well and those that did - it's how we learn!

1 **What devices are used to measure how fast something is moving?**

2 **How fast did Usain Bolt run in the 100 m?**

3 **What speed did your car go? Show your working out.**

4 Is taking one reading a good thing? Why?

5 What variables are there (mistakes that could be made)?

6 **What is a sensible time to run your car for?**

7 **What was the average speed of your car? Show your working out.**

8 **Which was your favourite way of calculating speed? Why?**

9 **Does including a counter make a difference?**

12 **Is it a better solution, or do you prefer using a stopwatch?**

02 Time to reflect

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3. WE CAME UP WITH OUR OWN SOLUTIONS TO THE CHALLENGES

4. WE SHARED THE RESULTS WITH THE CLASS

SAM LABS

STUDENT ONLY

Light-chasing Robot

COMPUTER SCIENCE
DESIGN & TECHNOLOGY

education@samlabs.com
www.samlabs.com

01

Activity log

YOUR NAMES?

DATE

/ /

Use these pages to record your inventions and programming. When you record things, it's often useful to put down the things that didn't work, as well and those that did - it's how we learn!

1 **What examples can you think of that react to changes in light, or are dependent on changes in light conditions?**

2 **Why has the light affected the motors?**

3 **Why do you think your wheels might react differently to your teachers?**

4 **What will you need to do to configure the motors so that they spin in the correct direction, so they move in a straight line?**

5 **How could you improve speed and/or accuracy of your buggy?**

6 **What could you add to your buggy, that would sound an alarm if you crashed into something?**

02

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3. WE CAME UP WITH OUR OWN SOLUTIONS TO THE CHALLENGES

4. WE SHARED THE RESULTS WITH THE CLASS

SAM LABS

STUDENT ONLY

Logical Thinking

COMPUTER SCIENCE

education@samlabs.com
www.samlabs.com

01

Activity log

YOUR NAMES?

DATE

/ /

Use these pages to record your inventions and programming. When you record things, it's often useful to put down the things that didn't work, as well and those that did - it's how we learn!

1 **Why is a camera that monitors the light levels useful?**

2 What blocks might we need to use to achieve this?

3 Why do you need to use a filter block?

4 What are the best settings for the filter?

5 Why might you use an AND block?

INPUTS	CONNECTIONS	OUTPUTS

6 **Does the camera work as expected, and the RGB LED come on when you increase the ambient light allowing you to take a photograph?**

7 **Can you explain the functions of the filter block and the AND block?**

8 **How do we make it so that the photograph can only be taken when the RGB LED illuminates green?**

9 **What would be appropriate filter block settings to make the proximity sensor take a photograph when some approaches?**

10 **How close do the person have to be to the proximity sensor?**

11 **Can you fine tune the filter settings to improve the camera performance?**

12 **What do you want to do with the photographs that are being taken?**

02

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4. WE SHARED THE RESULTS WITH THE CLASS

SAM LABS

STUDENT ONLY

Morse Code Magic

COMPUTER SCIENCE
DESIGN & TECHNOLOGY
MATHEMATICS
HISTORY

education@samlabs.com
www.samlabs.com

01

Activity log

YOUR NAMES?

DATE

/ /

Use these pages to record your inventions and programming. When you record things, it's often useful to put down the things that didn't work, as well and those that did - it's how we learn!

1 How do you communicate with your friends and family?

2 Which colour works best?

3 Write the message you will send.

4 Which method do you prefer, and why?

5 What other blocks could you add? Record your final program.

INPUTS	CONNECTIONS	OUTPUTS

02

Time to reflect

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4. WE SHARED THE RESULTS WITH THE CLASS

STUDENT ONLY

Photosynthesis

COMPUTER SCIENCE
SCIENCE (BIOLOGY)

education@samlabs.com
samlabs.com/education

01

Activity log

YOUR NAMES?

DATE

/ /

Use these pages to record your inventions and programming. When you record things, it's often useful to put down the things that didn't work, as well and those that did - it's how we learn!

1 **How much do you already know about photosynthesis, what is it?**

2 How might we be able to measure the rate that a plant photosynthesises?

3 What could impact on the rate oh photosynthesis in plants?

4 How can we use these bubbles to record the rate of photosynthesis?

5 What SAM Blocks would you need to create this system?

6 How would you connect them together?

INPUTS	CONNECTIONS	OUTPUTS

7 Why is it important to let the plant acclimatise to the lighting conditions?

8 **How many bubbles were released by the plant in a 1 minute time period?**

9 **Can you create a table to record this?**

10 What do the results tell you?

11 Were these what you expected?

12 **Were therE any discrepancies in the results, can you account for these?**

13 **Was there anything you could have improved in the test or the set up?**

14 Are there any other conditions that could be changed?

02

Time to reflect

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4. WE SHARED THE RESULTS WITH THE CLASS

SAM LABS

STUDENT ONLY

Pi, what is it good for?

COMPUTER SCIENCE
DESIGN & TECHNOLOGY
MATHEMATICS

education@samlabs.com
samlabs.com/education

01

Activity log

YOUR NAMES?

DATE

/ /

Use these pages to record your inventions and programming. When you record things, it's often useful to put down the things that didn't work, as well and those that did - it's how we learn!

1 **Using the SAM blocks and additional LEGO pieces, what options do you have to design your buggy?**

2 Is the design flexible so you can change the wheel size?

3 Is the construction solid?

4 **Is their space for the DC Motors?**

5 **How might the different wheel sizes impact on the speed of the buggy, or the distance it travels?**

6 **Were the results from each test consistent?**

7 **Does your programming of the SAM blocks work, or is there anything you can improve?**

8 Is a 5 second run time long enough?

9 Were your calculations accurate?

10 **Does a run time of 5 seconds provide enough time to accurately measure and calculate the results?**

11 **What happens if you increase this time by altering the delay block (remembering to re do your calculations)?**

12 **Can you build wheels from other materials and attach them to the buggy?**

13 **Does changing the front wheels make any difference too, or is it just the drive wheels that matter?**

14 What areas of manufacture is this knowledge important?

15 Are there any other applications for using this knowledge?

02

Time to reflect

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3. WE CAME UP WITH OUR OWN SOLUTIONS TO THE CHALLENGES

4. WE SHARED THE RESULTS WITH THE CLASS

SAM LABS

STUDENT ONLY

Probability

COMPUTER SCIENCE
DESIGN & TECHNOLOGY
MATHEMATICS

education@samlabs.com
samlabs.com/education

01

Activity log

YOUR NAMES?

DATE

/ /

Use these pages to record your inventions and programming. When you record things, it's often useful to put down the things that didn't work, as well and those that did - it's how we learn!

1 **What do you expect to happen each time we rotate a spinner?**

2 Will it always land on the same colour?

3 What happens if there are two spinners?

4 **Can we predict how likely it will be that they land on the same colour?**

5 **How many times did each spinner land on each colour?**

6 **How many times did they land on the same colour?**

7 **Which colour was selected the most?**

8 **Which colour combination between both spinners was the most common?**

9 **How do the theoretical probability results compare to your experimental probability results?**

10 Can you account for this in any way?

11 What do the results mean?

12 Can we accurately predict the outcomes?

13 Did each group get the same results?

14 **Did you find any problems during this experiment?**

15 **Can you present your results using tables, graphs or Venn diagrams?**

02

Time to reflect

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4. WE SHARED THE RESULTS WITH THE CLASS

STUDENT ONLY

Quiz Champion

COMPUTER SCIENCE
DESIGN & TECHNOLOGY
TEACHER CHOICE
(can be used in any curriculum area)

education@samlabs.com
samlabs.com/education

01

Activity log

YOUR NAMES?

DATE

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Use these pages to record your inventions and programming. When you record things, it's often useful to put down the things that didn't work, as well and those that did - it's how we learn!

1 What examples of quizzes do you know about?

2 **Have you seen any quiz shows on television? How did the players signal that they wanted to answer a question? How did they keep score? How did you know who was the winner?**

3 **What features could your system have?**

4 How might you record the number of correct answers?

5 How might your system announce a ‘winner’?

6 **How might the questioner be able to tell which contestant wants to answer?**

7 **Are there other ways of creating a system like this using different SAM Blocks?**

8 **What might you use to keep count of the scores?**

9 **Will the contestants, or someone else, be responsible for recording correct answers?**

10 **Will you put a limit on the amount of correct answers, so that there is a 'winner'?**

11 **How might your program show this?**

02 Time to reflect

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4. WE SHARED THE RESULTS WITH THE CLASS

STUDENT ONLY

Super Home for the Hearing Impaired

COMPUTER SCIENCE
DESIGN & TECHNOLOGY
SCIENCE

education@samlabs.com
samlabs.com/education

01

Activity log

YOUR NAMES?

DATE

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1 **How do we usually know if a visitor is at the front door, and how may this be a problem for hearing impaired people?**

2 What solutions could you offer?

3 How do you want the buzzer to respond, should it make one long sound, how long for, several short sounds?

4 What about the RGB LED, should it flash?

5 Does it work?

6 What were your difficulties in designing this system?

7 What does changing the parameters do, does it make the system more effective or user friendly?

8 Is there anything you can change to the system?

02

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STUDENT ONLY

Super Light Logging

COMPUTER SCIENCE
DESIGN & TECHNOLOGY
SCIENCE

education@samlabs.com
www.samlabs.com

01

Activity log

YOUR NAMES?

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Use these pages to record your inventions and programming. When you record things, it's often useful to put down the things that didn't work, as well and those that did - it's how we learn!

1 **Why is it important to have an automated controlled environment to measure the data?**

2 **How might this be useful when exploring different conditions or environments?**

3 **What type of things could vary the brightness of a light?**

4 **Does the data match what you expected, the light sensor increased its value as the RGB LED got brighter?**

5 **How can you present this data in a way that is easy to read?**

6 **What happened to the light levels as the distances between the blocks increased?**

7 **Can you suggest any explanations for these changes?**

8 **What part might ambient light play in the experiment?**

9 **How could you control the environment further to ensure that the test results are comparable?**

8 **Could you provide the same conditions every time, irrespective of ambient light in the room?**

9 **What could you have done to develop the environment for your experiment further? How might this have helped with the results?**

02 Time to reflect

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STUDENT ONLY

Super Selfie. A light activated selfie camera

COMPUTER SCIENCE
DESIGN & TECHNOLOGY

education@samlabs.com
www.samlabs.com

01

Activity log

YOUR NAMES?

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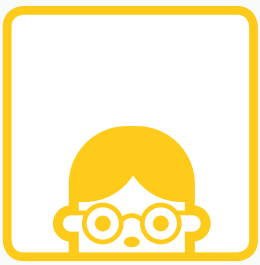
Use these pages to record your inventions and programming. When you record things, it's often useful to put down the things that didn't work, as well and those that did - it's how we learn!

1 What factors help make a good photo?

FRAMING: **Which of these examples do you think works best? Give your reasons.**



DISTANCE: A selfie is usually a portrait of you! Think about how close, or how far away you should be from the camera. What might happen if you are too close, or too far away? How might you make sure the subject is a good distance from the camera?

LIGHTING: In photography lighting is everything. It has often been described as 'painting with light'. What might happen to a photograph if there is:
a) Too much light
b) Not enough light? How might these conditions affect your photograph?

2 USING THE KEYBOARD AS A REMOTE SHUTTER

Open SAM Space on your computer. Create a program that takes a selfie when you press a key on the keyboard.

Things to consider:
- **Think about what makes a good photo - Framing, distance, lighting!**
- **Remember to double click on the camera block so you can see yourself!**
- **Which key do you want to trigger the shutter?**

Record your work below: Draw your program, and describe what you have done.

INPUTS	CONNECTIONS	OUTPUTS

3 How can we use the light level measurement to make sure we get the right level for the photo?

We can take some of the guesswork out by using a light sensor to measure the ambient light to see if the conditions are good for taking a picture.

Use SAM Space. Drag the Light Sensor block and the Filter block onto the programming area. The filter is adjustable at both ends, low and high.

Experiment with the Light Sensor and the Filter block in SAM Space. Find the setting that works for you.
Record your work below.

INPUTS	CONNECTIONS	OUTPUTS

4 CHALLENGE

Create and program a selfie-taking camera system that uses a remote shutter, but will only take pictures when the light conditions are good enough.
Work together to come up with a solution to this challenge. Try different programs out and see what the results are.

What values did you use for the filter?

Record the programming and how you solved the challenge below.

INPUTS	CONNECTIONS	OUTPUTS

5 **Ready for another challenge? Remember when the LED light block was used to respond to changes in light?**

You have built and programmed a system that responds to the ideal conditions for taking a selfie, it ensures the light level is correct before the space bar can be pressed to take the picture.

Would it would be useful to have some sort of indicator so that you knew when to press the keyboard?

Could you use the LED Block and the AND command? To turn on the LED when the light levels are ideal, and indicate when to press the 'shutter'?

You have seen an idea of how this might be done. Now try your own solution! What else could be used to indicate when to press the keyboard shutter?

Record your work below.

INPUTS	CONNECTIONS	OUTPUTS

02

Time to reflect

Did you enjoy the activities? Did you find anything too hard? Trace the face next to the statements below that best represents your feelings.

1. WE ENJOYED THE PROJECT

2. WE UNDERSTOOD THE TASKS SET

3. WE WERE ABLE TO GET A GOOD SELFIE

4. WE CAME UP WITH OUR OWN SOLUTIONS TO THE CHALLENGES

5. WE SHARED THE RESULTS WITH THE CLASS

6. PRINT OUT YOUR SELFIE AND STICK IT IN THE BOX BELOW

SAM LABS

STUDENT ONLY

Twitter Battle

COMPUTER SCIENCE

education@samlabs.com
www.samlabs.com

01

Activity log

YOUR NAMES?

DATE

/ /

Use these pages to record your inventions and programming. When you record things, it's often useful to put down the things that didn't work, as well and those that did - it's how we learn!

1 **Have you used twitter before?**
Describe what twitter is in 140 characters!

2 **If you use twitter, who do you follow?**

3 **Are there any topics or feeds you follow?**

4 From monitoring your specific topic/user, what are your observations?

5 How could you improve your program?

6 What did you use for your indicator, and why?

7 Did you try anything else?

8 **How does this help you track the twitter activity?**

02

Time to reflect

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3. WE CAME UP WITH OUR OWN SOLUTIONS TO THE CHALLENGES

4. WE SHARED THE RESULTS WITH THE CLASS

SAM LABS

STUDENT ONLY

What Happens in the Dark?

COMPUTER SCIENCE
DESIGN & TECHNOLOGY

education@samlabs.com
samlabs.com/education

01

Activity log

YOUR NAMES?

DATE

/ /

Use these pages to record your inventions and programming. When you record things, it's often useful to put down the things that didn't work, as well and those that did - it's how we learn!

1 **What do you think happens to the temperature over night?**

2 **Can you think of anything that might cause unexpected bright periods?**

3 **Why do we need to build a system that automates recording the temperature?**

4 What external factors could influence the results collected by the sensors?

5 How often should you set the sensors to take a reading?

6 **How much data will this create if you left it running overnight?**

7 **Is this manageable?**

8 **Is there enough data?**

9 **Based on the time intervals for logging your data, what values do you need to set the parameters so the data is logged throughout the night?**

10 **Is there a correlation between the data recorded from the light sensor and the times recorded in the log file?**

11 **Is this what you expected, or different?**

12 **Are there other ways you could present the data?**

13 **How could you show the data from the light sensor and the heat sensor side by side, over time to make it easy to spot the correlations?**

02

Time to reflect

Did you enjoy the activities? Did you find anything too hard? Trace the face next to the statements below that best represents your feelings.

1. WE ENJOYED THE PROJECT

2. WE UNDERSTOOD THE TASKS SET

3. WE CAME UP WITH OUR OWN SOLUTIONS TO THE CHALLENGES

4. WE SHARED THE RESULTS WITH THE CLASS