Investigate Stage – Student Guidance

1. Researching the Brief

Your Task: Your research should illustrate:

- an understanding of one **function of forests**
- an example of an environmental **risk** that affects forests
- a consequence of **changing conditions** over time
- a reason **why modelling** is a suitable way to explore forest risk
- use of 2–3 relevant **research sources** to support your understanding

Note: Your response should be general and linked to the brief, **not** to a **specific project idea**.

Marker Check {Replace with Tick ONLY if Completed} ☑

☐ Mentions **function of forests**
☐ Mentions an environmental **risk** that affects forests
☐ Describes a consequence of **changing conditions** over
☐ Explains why **modelling** is suitable to explore **forest risk**
☐ Uses 2–3 relevant research sources (see bibliography)

2. Existing Solutions

Your Task Your research should describe **3** existing systems. Each system should clearly describe:

- the **purpose** of the system
- the type of **data** it uses
- **what the system is modelling** (e.g. fire risk, fire spread, forest stress)
- one **limitation** of the system or its modelling approach

Note: Your response should clearly describe how modelling is used, **not** just sensing or data collection.

Marker Check {Replace with Tick ONLY if Completed} ☑

☐ **Purpose** is clearly described
☐ **Data** used is identified
☐ **what** the system is **modelling** (e.g. fire risk, fire spread, forest stress)
☐ One **modelling-related limitation** is explained
☐ Three systems included in total

3. How Research Informed My Project

Your Task Your should explain how your **research influenced** your project **decisions**.

- **why** you **chose** this environmental risk
- **why** you **chose** these **data types** or **variables**
- **why** you chose a **simple rules-based** model

Note: Use clear **link** between **research** and **decisions**, e.g. "Because my research showed…, I decided to…'.

Marker Check (tick / cross) ☑

☐ Explains **why** this risk was **chosen**
☐ Explains **why** these **variables/data** were chosen
☐ Explains **why** this **modelling approach** was chosen
- Uses modelling language (model / simulate / risk)

4. Final Idea

Your Task Write one **concise** paragraph outlining your final project idea. Nothing technical required.

- the environmental **risk being modelled**
- the **type** of **data** gathered/analyzed
- **what** is **simulated** over **time**
- the **role** of **Python** in the system {in model/simulation}
- one **limitation** of your approach

Note: Do not include technical build detail {included in Plan}

Marker Check (tick / cross) ☑

☐ **Environmental risk** is clearly stated
☐ **Data type**(s) you will **gather / analyze**
☐ Ongoing process **simulated** over **time** is described
☐ **Role** of **Python** modelling explained {in model/simulation}
☐ One clear **limitation** included

Plan & Design Stage – Student Guidance

1. Purpose of the system

Your Task: Your purpose should clearly explain:

- the environmental issue or **risk it addresses**
- **why** the system is **useful**

Note: Do not include technical details – save for next section.

Marker Check {Replace with Tick ONLY if Completed} ☑

☐ **Purpose** of the system is clearly stated
☐ Environmental **risk** or issue is **identified**
☐ Purpose explains why the **system** is **useful**

2. Design Objectives

Your Task: You should write clear **Design Objectives** for your system. Your objectives should:

- be written as '**I will…' or 'The system will…**' statements
- describe **specific** actions your system will perform
- be **specific** to **your own risk model**

Note: **Generic** objectives will not be accepted.
Note: Your objectives are **guided by brief**.

Marker Check {Replace with Tick ONLY if Completed} ☑

☐ Objectives are written as '**I will…' or 'The system will…**' statements
☐ Objectives describe **clear system actions**
☐ Objectives are **project-specific** actions your system will perform

3. Project Options

Your Task: Describe **at least two different** ways of building your chosen project.

Your options must relate to **the same project**, but may differ in one or more of the following ways:

- **data collection approach** (e.g. single sensor vs multiple sensors)
- **data logging method** (e.g. continuous logging vs threshold-based/event logging)
- **modelling approach** (e.g. rules-based model vs decision-tree style logic)
- **risk scoring method** (e.g. points-based scoring vs weighted scoring)
- **feedback / output method** (e.g. digital vs analogue output)
- **where data is processed** (on the embedded device vs in Python)

For **each option**, explain:

- how the option would work (project-specific)
- one advantage
- one limitation

Note: Options must describe **different build approaches**, not different project topics.

Marker Check {Replace with Tick ONLY if Completed} ☑

☐ **Two project-specific build options** are described
☐ Each option explains **how it** would **work**
☐ Each option includes one **advantage**
☐ Each option includes one **limitation**

4. Justification of Design Choice

Your Task: State **which project option you chose** and clearly justify your decision. Your justification must explain:

- project **option** clearly **stated**
- why the chosen option **better meets the Design Objectives**
- why it **improves modelling or simulation over time**
- one **practical benefit** of the chosen option (e.g. clarity, reliability, manageable data)

Note: Your justification must be based on **your own project**, not general statements.

Marker Check {Replace with Tick ONLY if Completed} ☑

☐ **Chosen** project **option** is clearly stated
☐ Choice is **justified using** the **Design Objectives**
☐ **Improvement** to **modelling** or **simulation** over time is explained
☐ One **practical benefit** of the chosen option is identified

5. Stakeholders and End Users

Your Task: Identify the stakeholders and end users of your system.You should explain:

- **who** the **stakeholders** are
- **what** stakeholders need and why
- **who** the **end user** is
- what the **end user** needs from the system

Note: Stakeholders benefit indirectly. End users directly operate the system.

Marker Check {Replace with Tick ONLY if Completed} ☑

- ☐ **Stakeholders** are **identified**
- ☐ **Stakeholder** needs are **explained**
- ☐ **End user** is **identified**
- ☐ **End-user** needs are **explained**

6. Technologies That Will Be Used

Your Task: Describe the technologies used in your system. You should include:

- **embedded system** technologies
- **software** technologies
- **data** storage method
- **modelling** approach

Note: You must explain **why** each technology is suitable.

Marker Check {Replace with Tick ONLY if Completed} ☑

☐ **Embedded** system technologies are identified
☐ **Software** technologies are identified
☐ **Data** storage method is described
☐ **Modelling** approach is identified
☐ Suitability of **key** technologies explained in a brief sentence

7. System Architecture

Your Task: For AFTER Build