

Selecting a Topic, Hypothesis, and Data Gathering

200 minutes (5 periods)

Applied Learning Tasks (ALTs)

Outcome 1.20

Outcome 1.11

Outcome 1.23

Outcome 2.1

Outcome 3.4

Outcome 3.5

Outcome 3.7

WHAT THIS LESSON DOES

In this lesson, you'll explore how to pick an engaging interdisciplinary topic, craft a testable hypothesis, and plan ethical data collection. Working in teams, you'll assign roles and create a solid project plan for your analytics artefact.

CURRICULUM OUTCOMES

Outcome	What the specification asks for
1.20	collaborate and assign roles and responsibilities within a team to tackle a computing task
1.11	discuss the complex relationship between computing technologies and society including issues of ethics
1.23	reflect and communicate on the design and development process
2.1	use abstraction to describe systems and to explain the relationship between wholes and parts
3.4	develop algorithms that can find the frequency, mean, median and mode of a data set
3.5	structure and transform raw data to prepare it for analysis
3.7	use algorithms to analyse and interpret data in a way that informs decision-making

WHAT STUDENTS SHOULD BE ABLE TO DO

- Develop the ability to select an interdisciplinary topic that aligns with personal interests and real-world issues for data analysis.
- Formulate a clear, testable hypothesis to guide focused data investigation and analysis.
- Understand and apply ethical principles in data handling to ensure responsible and lawful practices.
- Plan effective data collection strategies that support meaningful statistical analysis.
- Collaborate effectively in teams by assigning roles and responsibilities to optimise group strengths.

BEFORE THE LESSON

- This is a planning lesson: no code runs, but students need shared documents. Confirm teams can reach Google Docs or a word processor and a shared folder they all have edit access to.
- If teams may collect via survey, check that Google Forms is reachable behind the school filter before class rather than during it.
- Have the Data Protection Commission site open or the GDPR consent points to hand for the ethics discussion.

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HOW THE LESSON RUNS

Introduction

Team Role Assignment Activity

Choosing Your Project Topic

Forming a Testable Hypothesis

Understanding Data Ethics

Planning Data Collection

Developing Your Plan Document

TEACHING MOVES

- 2. Team Role Assignment Activity. Cap this at fifteen minutes and insist each role has a named owner written down. Steer whoever was strongest in the Analytics unit toward the Analyst role, but make clear every member still contributes to the plan.
- 3. Choosing Your Project Topic. Push teams away from topics too broad to test. Ask each team to state their topic as one sentence naming two things that might relate, before they commit. Reject topics with no measurable data behind them.
- 4. Forming a Testable Hypothesis. Have each team read their hypothesis aloud and name the variables in it. If you cannot see what number they would calculate to test it, it is not measurable yet. Send it back.
- 5. Understanding Data Ethics. Make consent and anonymisation concrete: if they survey classmates, what exactly will the form say about use of the data? Have each team note one real ethical risk in their project and how they will handle it.
- 6. Planning Data Collection. Get teams to tag each variable as numerical or categorical now, because that decides which calculations are possible later. Check their chosen method can actually reach enough respondents in the time they have.
- 7. Developing Your Plan Document. Give a required structure: topic, hypothesis, ethics notes, data plan. Collect the document at the end so nothing is lost between sessions. This is their roadmap, not a formality.

WHAT TO WATCH FOR

- Students write a topic or opinion statement and call it a hypothesis, with nothing measurable to test. Ask what single number or comparison would confirm or disprove it. If they cannot answer, rewrite together into a form that names measurable variables.
- Students treat ethics as a box to tick rather than something that shapes their collection method. Point at their actual survey or dataset and ask who could be identified or harmed. Make them change the plan, not just add a sentence about ethics.
- Students plan to gather data that does not match the calculation their hypothesis needs, such as free-text answers when they need numbers for a mean. Walk back from the hypothesis: name the calculation, then the data type it requires, then check the collection method produces exactly that.

DIFFERENTIATION

- Emerging: Offer two or three ready framed topic-and-hypothesis pairs from the lesson examples and let the student adapt one rather than start blank. Pair them with the Documenter role so they contribute without needing to lead the analysis planning.
- Developing: Have them justify why their chosen variable is numerical or categorical and what that lets them calculate, checking they can reason about it, not just follow the steps.
- Proficient: Ask them to identify a second, competing hypothesis their data could also test, and note why they chose one over the other, the kind of reasoning that strengthens an Applied Learning Task write-up. Have them plan how they will spot and reduce sampling bias in their chosen collection method.