



MODULE 05 | TEACHER GUIDE

Harbour Futures

Design a Sustainable Waterfront | English C1 | Ages 16–19 | 90 minutes

Students act as a scrutiny panel for a fictional harbour redevelopment. They test the assumptions behind competing proposals, negotiate priorities under fiscal constraints and defend a conditional recommendation. The task requires a distinction between numerical feasibility, stakeholder legitimacy and evidence of sustainability.

Learning outcomes

Students synthesise competing claims, interrogate forecasts and articulate how value judgements influence a decision. They rebut an overextended environmental claim, acknowledge uncertainty and specify proportionate approval conditions, accountability and evidence that would justify reconsideration.

Lesson sequence

Time	Activity	Outcome
0–7 min	Introduce the council brief and distinguish evidence from priorities.	Shared purpose
7–17 min	Read the appraisal brief and interrogate rules on pp. 2–3.	Rules and vocabulary
17–32 min	Compare proposals and record an initial package on p. 6.	Three-project package
32–45 min	Apply G and H; revise the package and audit the claim.	Revised plan
45–60 min	Prepare the recommendation and review conditions on p. 7.	Evidence and conditions
60–75 min	Hold paired council hearings and revise the recommendation.	Reasoned decision
75–90 min	Write the 200–250-word council memorandum.	Qualified judgement

Preparation and differentiation

Print pp. 2–7 for teams of four and retain p. 8. Print pp. 4–5 single-sided. Cut out all eight cards; keep G and H face down until the first plan is recorded. Supply pens, one A3 sheet and ten counters per team.

Assign fiscal, employment, environmental and community scrutiny leads. Each must challenge another perspective before agreeing a package. Provide the glossary if needed; require independent argumentation, precise qualification and a substantive response to a counterargument.

Final council memorandum

In minutes 75–90, write a 200–250-word memorandum on a separate sheet. Recommend one package, rebut its strongest objection fairly, expose a consequential assumption and specify approval conditions. Distinguish a reason to reject from a reason to seek further evidence.

All names, project costs, forecasts and scenarios are fictional. Costs and jobs are simplified classroom values. Space conflicts apply to this game's first development phase, not to every real harbour. No real investment or environmental approval is implied.

Ocean Literacy principle 6: people and the ocean are connected. Links to decent work, responsible resource use and marine protection. Scientific background and answers appear on p. 8.



STUDENT SHEET 1 | THE MISSION

A harbour for people and nature

Harbourhaven's council has commissioned an independent appraisal of six waterfront proposals. Their forecasts appear comparable, yet employment totals reveal little about who benefits or which losses are acceptable. Your panel must recommend three projects and disclose the assumptions and priorities on which its judgement rests.

Defining a sustainable blue economy

The blue economy links ocean-related economic activity to livelihoods and healthy marine ecosystems. Shipping, tourism and fisheries can generate income, yet their location beside the sea does not establish sustainability. The relevant question is whether the activity sustains the resources and communities on which it depends. [1]

Sustainable development integrates economic activity, social inclusion and environmental protection across generations. [2] For this appraisal, ask whether gains in one area can justify losses in another. This is a value judgement: two panels may accept the same evidence yet disagree about which burdens are tolerable. Make that judgement explicit.

Look at	Ask
Economy	Will there be useful, fairly paid work? Are the forecasts realistic?
People	Who benefits? Who pays or loses access? Can local people take part?
Environment	What happens to habitats, resources, waste and emissions?

Facts for your decision

Shore power allows compatible vessels to draw electricity from land while berthed, reducing the need to run onboard engines for electrical power. It can therefore reduce emissions at the quay. However, it does not eliminate voyage emissions; the electricity mix, vessel compatibility and remaining onboard equipment affect the overall benefit. [3]

Living shorelines use vegetation and other natural materials to provide habitat and limit erosion where conditions are suitable. Their effectiveness depends on site characteristics, including waves, tides and shoreline shape. A planted bank is consequently a site-specific intervention, not a guarantee against flooding. [4]

Sustainable coastal tourism considers economic, social and environmental effects on host communities, visitors and nature. Employment and visitor spending may be benefits, but an "eco" label does not demonstrate responsible practice. Evaluate the proposal's actual measures and the evidence needed to check them. [5]

Language for evaluating proposals

distribution = who receives benefits or bears costs • displacement = new activity replacing existing work • baseline = the starting condition for comparison • opportunity cost = the benefit of the best alternative forgone • conditional approval = acceptance subject to stated requirements

Discuss: should ecological damage ever be offset by a higher employment forecast? Distinguish an empirical question from a value judgement in your response.

STUDENT SHEET 2 | PLANNING BOARD

Four places six possibilities

 	WORKING QUAY Choose A or C One project maximum	 	OLD WAREHOUSE Project B One project maximum
 	SHELTERED BANK Choose D or E One project maximum	 	PUBLIC SQUARE Project F One project maximum

This is a planning board, not a geographical map. Q, W, N and P are zone codes.

Round 1 rules

- 1 Read project cards A–F. Keep update cards G and H face down.
- 2 Choose exactly three projects. Start with ten budget tokens.
- 3 Use no more than one project in each zone. You cannot combine A with C, or D with E, in this phase.
- 4 Add the costs and the job forecasts. Record your plan on p. 6.
- 5 Use all three sustainability questions from p. 2 to explain it.

Interrogate the appraisal assumptions

Costs are fictional tokens covering start-up and the first operating year. Employment figures forecast additional year-round full-time-equivalent roles in year three. They are not guarantees or real estimates. The mismatch in time horizons also prevents a full assessment of long-term affordability.

For arithmetic, assume job forecasts are independent and additive. In reality, check displacement, overlapping roles and recruitment. Additional jobs do not necessarily mean additional local employment. Neither a job total nor a cost figure establishes pay, job security, profitability or ecological performance.

Conditions matter

Propose conditions such as affordable fees or a habitat survey, but do not treat them as free or already delivered. Identify who should check their cost and feasibility before approval. Keep the printed game costs unchanged; the exercise does not supply enough information to calculate a real investment budget.

A zone without a new project keeps its existing use during this phase. Selecting fewer than three projects is outside the game rules; it may be an option in real planning.

Separate evidence from judgement

Identify one factual claim, one forecast and one value judgement in your reasoning. What evidence could challenge the first two? What principle would you use to defend the third?

STUDENT SHEET 3 | CUT-OUT PROJECT CARDS

Compare the harbour projects

A



SHORE POWER

ZONE Q / COST 4 / JOBS 2

Connect visiting ships to electricity at the quay. Ships need suitable equipment.

Can reduce engine emissions while docked. It does not remove emissions at sea. Electricity sources matter.

HARBOUR FUTURES / PROJECT

B



REPAIR WORKSHOP

ZONE W / COST 3 / JOBS 6

Reuse an old warehouse for boat and equipment repairs. Offer two paid training places within the six jobs.

Repair can extend product life. Paint, chemicals and waste still need safe handling.

HARBOUR FUTURES / PROJECT

C



CRUISE TERMINAL

ZONE Q / COST 5 / JOBS 9

Build a visitor terminal for larger passenger ships. Local shops may gain customers.

More visitors can also mean traffic and waste. Spending locally and suitable working conditions are not guaranteed.

HARBOUR FUTURES / PROJECT

D



LIVING SHORELINE

ZONE N / COST 3 / JOBS 2

Create a planted shoreline and a free public path. The plan needs a survey of tides, waves and habitat.

May provide habitat and reduce erosion at a suitable site. It needs care and cannot stop every flood.

HARBOUR FUTURES / PROJECT

Cost = planning tokens. Jobs = invented additional year-round full-time-equivalent job forecasts in year three. Cut on the dashed lines; all cards are fictional proposals.



STUDENT SHEET 4 | PROJECTS AND UPDATES

New ideas changing conditions

E



KAYAK CENTRE

ZONE N / COST 3 / JOBS 4

Create a kayak rental centre with guided trips. Sessions have a fee.

Boats have no motor during use. Busy routes may disturb wildlife; prices may exclude some residents.

HARBOUR FUTURES / PROJECT

F



WATERFRONT MARKET

ZONE P / COST 2 / JOBS 3

Open stalls for local makers and food sellers. Keep the walking route open and provide refill points.

May support local businesses. Affordable stall fees, waste collection and access need planning.

HARBOUR FUTURES / PROJECT

G

BUDGET UPDATE

10 → 8

A grant is smaller than expected. Your budget falls to eight tokens. Keep exactly three projects and follow the zone rules. Change your package if needed. Explain what you gain and what you give up.

OPEN AFTER YOUR FIRST PLAN

H

CHECK THE CLAIM

A fictional campaign says: "Shore power makes every ship climate-neutral." Check this claim using the science brief on p. 2. Rewrite it in one accurate sentence. Every team completes this task, even without Project A.

OPEN AFTER YOUR FIRST PLAN

Read E and F with the other project cards. Keep G and H face down until your first package is recorded. Both updates apply to every team.



STUDENT SHEET 5 | DECISION RECORD

Build test and revise your plan

First plan Ten tokens

Project	Zone	Cost	Job forecast
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
TOTAL	3 different zones	_____ / 10	_____

Criterion you prioritise and why: _____

Stakeholder carrying a disproportionate burden: _____

Assumption most capable of changing the decision: _____

Open update G Eight tokens

Following G, compare both feasible eight-token packages. Distinguish the numerical constraint from your substantive reason for preferring one. Explain the opportunity cost; do not treat the larger employment forecast as decisive by default.

Project	Zone	Cost	Job forecast
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
TOTAL	3 different zones	_____ / 8	_____

Conditional recommendation: _____

Strongest objection and response: _____

Evidence that would reverse our judgement: _____

Open update H Check the promise

Identify the scope error in the campaign's claim, then write a defensible replacement. Specify one missing piece of evidence and explain why a reduction in local emissions cannot alone establish whole-vessel climate neutrality.

Assumption audit on separate paper: challenge job additionality, the time horizon or the first-phase space rule. Explain which conclusion the challenge affects without inventing alternative figures.



STUDENT SHEET 6 | COUNCIL MEETING

Defend a plan that can be checked

Deliver a two-minute recommendation to a partner panel. The panel cross-examines it for three minutes; allow one minute to revise. Swap roles. Each member must contribute either a reasoned claim or a substantive response.

Structure the case for conditional approval

- 1 Establish numerical feasibility and the priority guiding your judgement.
- 2 Compare the strongest alternative and acknowledge its genuine advantage.
- 3 Explain an unequal burden and a consequential evidential limitation.
- 4 State approval conditions, responsibility and a trigger for reconsideration.

Council perspectives

Role	Ask about
Young job-seeker	What supports the claim that these are additional local jobs, with suitable pay and training?
Local resident	Who retains access, and who might bear higher prices, noise or disruption?
Nature adviser	What evidence of site suitability is required, and what would count as an unacceptable impact?
Small business owner	How dependent is this proposal on visitor demand and affordable operating costs?

Design a proportionate review

Specify two indicators with baselines, a responsible actor and review dates. Include one environmental measure. Explain what each indicator can and cannot establish, and state a result that would prompt investigation or redesign. Do not confuse correlation with evidence that the project caused the change.

Indicator and limitation 1: _____

Indicator and limitation 2: _____

Language for scrutiny and rebuttal

“The case rests on the assumption that ...”

“While this objection is valid insofar as ..., it does not establish ...”

“Approval would be defensible only if ...”

“This indicator would reveal ..., but would not by itself demonstrate ...”

Record the panel's judgement

Revise your recommendation in response to the strongest challenge. State whether the objection changes the package, adds a condition or leaves the decision intact. Explain why.

Council memorandum: write 200–250 words using the brief on p. 1. Clearly distinguish approval in principle from permission to begin work.



TEACHER SHEET | ANSWERS AND SOURCES

Decisions and suggested responses

Budget and space checks

Initial valid three-project packages within ten tokens: ABD 10/10 jobs; ABE 10/12; ABF 9/11; ADF 9/7; AEF 9/9; BCF 10/18; BDF 8/11; BEF 8/13; CDF 10/14; CEF 10/16. Each pair is cost / job forecast. Reject A+C and D+E because of the first-phase zone rules.

After G, only BDF and BEF meet all rules. Both cost eight tokens. BDF forecasts eleven jobs; BEF forecasts thirteen. BDF prioritises the planted shoreline and free access; BEF adds paid recreation with possible wildlife disturbance and access barriers. The forecasts alone cannot decide sustainability. If a team already chose a valid eight-token package, it may retain it with reasons.

Claim check and environmental reasoning

A defensible correction is: "Shore power can reduce emissions from compatible ships' onboard power generation at berth; it does not eliminate voyage emissions, and its wider benefit depends partly on the electricity source." The campaign confuses a limited operational benefit with whole-vessel climate neutrality. Grid and vessel data would be needed. [3]

Accept either final package if its priorities are explicit. C1 responses distinguish evidence gaps from fatal objections. For example, an untested shoreline design warrants a suitability study; evidence of unacceptable habitat loss could justify rejection. Do not accept invented costs or assume conditions remove every adverse effect.

Model recommendation and scrutiny

"BDF is numerically feasible at eight tokens and eleven forecast jobs. We prefer its potential habitat and access benefits to BEF's two additional forecast roles. This is a stated priority, not a result proved by the arithmetic. Approval in principle should depend on a site survey and funded maintenance, verified by the harbour authority. A habitat baseline and twelve-month review could identify deterioration, though they would not alone establish causation. If site evidence showed unacceptable ecological damage, we would reconsider D. Employment should be reviewed against the year-three forecast, with displaced work accounted for."

Assessment and analytical guidance

Award 0–2 each for numerical accuracy, synthesis and explicit priorities, scrutiny of assumptions and counterarguments, proportionate conditions and monitoring, and precise C1 argumentation. Reward justified qualification rather than complexity alone. Distinguish an evidence gap, an unacceptable impact and a disagreement over values.

Audit examples: overlapping jobs weaken the additive total; missing later operating costs prevent an affordability verdict; relaxing the zone rule could change the feasible set. Keep the game calculations intact. For attribution, compare pre-project conditions and plausible external influences before claiming that the project caused a measured change.

Sources

[1] World Bank. PROBLUE. <https://www.worldbank.org/en/programs/problue>

[2] United Nations. Sustainable Development Goals. <https://www.un.org/sustainabledevelopment/development-goals/>

[3] US EPA. Shore Power Technology Assessment. <https://www.epa.gov/ports-initiative/shore-power-technology-assessment-us-ports>

[4] NOAA Fisheries. Understanding Living Shorelines. <https://www.fisheries.noaa.gov/insight/understanding-living-shorelines>

[5] United Nations. Sustainable tourism. <https://sdgs.un.org/topics/sustainable-tourism>

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