Science and technology

VOCABULARY PRACTICE

ADVANCED | C1

Name: _____ **Date:** _____

1 Match each advanced science-policy concept with its meaning.

1 epistemic uncertainty	____	a controlled setting for testing innovation under oversight
2 external validity	____	b systematic non-publication of less striking findings
3 publication bias	____	c planning for possible futures before effects become fixed
4 dual-use research	____	d limits in what is known or knowable
5 technological lock-in	____	e research usable for beneficial or harmful purposes
6 regulatory sandbox	____	f ability to apply findings beyond the original setting
7 responsible innovation	____	g established system becoming difficult to replace
8 precautionary principle	____	h honesty, transparency and accountability in research
9 research integrity	____	i innovation aligned with social values through reflection and participation
10 anticipatory governance	____	j protective action despite incomplete evidence of serious risk

2 Complete the governance collocations.

bias | **governance** | **innovation** | **integrity** | **lock-in** | **principle** | **sandbox** | **validity**

1 detect publication _____

2 assess external _____

3 avoid technological _____

4 establish a regulatory _____

5 promote responsible _____

6 apply the precautionary _____

7 protect research _____

8 develop anticipatory _____

3 Choose the concept that best captures the distinction.

1 Findings may not transfer to other populations: *external validity / integrity*.

2 Negative studies remain unpublished: *publication bias / uncertainty*.

3 A discovery can support therapy or weapons: *dual-use research / diffusion*.

4 Existing infrastructure blocks alternatives: *technological lock-in / sandbox*.

5 A supervised environment permits limited testing: *regulatory sandbox / peer review*.

6 Serious risk prompts action before certainty: *precautionary principle / causation*.

7 Stakeholders shape innovation goals early: *responsible innovation / lock-in*.

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4 Complete the science-governance review with terms from the box.

anticipatory governance | dual-use research | epistemic uncertainty | external validity | precautionary principle | publication bias | regulatory sandbox | research integrity | responsible innovation | technological lock-in

The review states the level of **1** _____ and tests **2** _____ across settings. Evidence synthesis checks for **3** _____, while open methods support **4** _____. Because the work may be **5** _____, access requires safeguards. Early trials occur in a **6** _____. The programme uses **7** _____ and stakeholder participation to promote **8** _____. It also applies the **9** _____ where harms could be severe and avoids **10** _____.

5 Read the text and answer the questions concisely.

Governing an uncertain technology

A technology can be promising before its benefits, risks and social effects are well characterised. Waiting for complete certainty may freeze beneficial development, while rapid deployment can create infrastructure and expectations that are difficult to reverse. Proportionate governance therefore links oversight to evidence and potential harm. It supports limited, monitored trials, specifies stopping rules and revises requirements as knowledge changes. Public participation is not a substitute for technical evidence, but it reveals contested values and helps define acceptable trade-offs.

1 Why may early assessment be difficult? _____

2 What risk follows waiting for certainty? _____

3 What risk follows rapid deployment? _____

4 What does proportionate governance link? _____

5 Name three practical governance measures. _____

6 What does public participation contribute? _____

6 Paraphrase using the expression in capitals.

1 Knowledge about the risk remains incomplete. **EPISTEMIC** _____

2 The existing system is difficult to replace. **LOCK-IN** _____

3 The trial occurs under controlled regulatory oversight. **SANDBOX** ___

4 Future effects are considered before deployment. **ANTICIPATORY** ___

OVER TO YOU

Write a **160-190 word** governance proposal for an emerging technology. Address uncertainty, evidence, external validity, dual use, participation, safeguards and revision rules.

[ ] Use at least ten target terms or collocations. [ ] Calibrate oversight to evidence and harm. [ ] Define monitoring and stopping rules.

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ANSWER KEY

1 Advanced science-policy concepts

1 **d** 2 **f** 3 **b** 4 **e** 5 **g** 6 **a** 7 **i** 8 **j** 9 **h** 10 **c**

2 Governance collocations

1 **bias** 2 **validity** 3 **lock-in** 4 **sandbox** 5 **innovation** 6 **principle** 7 **integrity** 8 **governance**

3 Conceptual distinctions

1 **external validity** 2 **publication bias** 3 **dual-use research** 4 **technological lock-in**
5 **regulatory sandbox** 6 **precautionary principle** 7 **responsible innovation**

4 Science-governance review

1 **epistemic uncertainty** 2 **external validity** 3 **publication bias** 4 **research integrity** 5 **dual-use research** 6 **regulatory sandbox** 7 **anticipatory governance** 8 **responsible innovation** 9 **precautionary principle** 10 **technological lock-in**

5 Reading - suggested answers

1 Benefits, risks and social effects are uncertain. 2 Beneficial development may be frozen. 3 Hard-to-reverse systems and expectations may form.
4 Oversight, evidence and potential harm. 5 Trials, monitoring, stopping rules or revision. 6 It reveals values and acceptable trade-offs.

6 Paraphrasing - possible answers

1 There is **epistemic uncertainty**. 2 The system shows technological **lock-in**. 3 It is a regulatory **sandbox**. 4 This is **anticipatory governance**.

Over to you: Answers will vary. Check uncertainty, evidence, participation, safeguards and adaptive governance.