

# Pennsylvania Grade 3 to Grade 4 Engineering Design Summer Bridge

*Engineering Design: Review and Readiness*

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# Welcome to Engineering Design Summer Bridge



## A Grade 3 to Grade 4 engineering design path: review, preview, and grow.

This bridge book reviews Grade 3 design thinking and gently previews the next step. Students revisit familiar ideas first, then move toward clearer problem statements, stronger comparisons, and more careful testing habits for Grade 4.

### Grade 3 review

- define a simple design problem
- list criteria and constraints
- compare more than one solution
- plan fair tests for designs
- use failure points to improve

### Grade 4 readiness

- make problem statements more exact
- connect research to new ideas
- use decision tables with evidence
- test like an engineer
- explain the next improvement step

#### A growth path, one step at a time

The first weeks strengthen Grade 3 skills. Later weeks add gentle Grade 4 previews. The goal is not to rush ahead; it is to help students see how the same design process becomes more careful and more evidence-based.

# How to Use Engineering Design Summer Bridge



Use the bridge pages as a guided move from review to readiness.

This book begins with Grade 3 design ideas and then previews how students will use those ideas with more independence. Students should expect review pages first and gentle Grade 4 readiness pages later.

- Review days** Read the short reminder and answer the questions. These pages rebuild the design words students need: problem, criteria, constraints, solution, test, and improvement.
- Readiness days** Slow down and look for the new step. The page may ask students to make a problem more exact, compare with a table, or explain a fix from evidence.
- Best pace** Plan for about 15–20 minutes. One careful page is enough for a summer day.
- After checking** Treat missed answers as clues. Ask, “Was I defining, comparing, testing, or improving?” Then correct the work.

## Review

Remember the Grade 3 design idea and the words that go with it.

## Step Up

Try the readiness step, such as making a clearer statement or using stronger evidence.

## Reflect

Ask what changed from Grade 3 review to Grade 4 readiness. Name the next design habit.

## For students

When a page says Grade 4 preview, do not worry if it feels new. Use the same design steps you already know and add one careful detail.

## For parents and teachers

Point out the growth step: clearer problem, better comparison, fairer test, or evidence-based fix. Keep support brief so the student still does the thinking.



# My Science Bridge Progress

Check off Grade 3 review days, Grade 4 readiness days, and Friday quizzes.

5 review weeks

3 readiness weeks

8 Friday quizzes

This grade 3 to grade 4 science summer bridge belongs to:

Week	Focus	Mon	Tue	Wed	Thu	Friday Quiz
1	Defining Design Problems and Comparing Solutions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/> / 10
2	Comparing Solutions and Testing and Improving Mix	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/> / 10
3	Defining Design Problems and Comparing Solutions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/> / 10
4	Testing and Improving and Defining Design Problems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/> / 10
5	Defining Design Problems and Comparing Solutions Mix	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/> / 10
6	Grade 3 Review and Grade 4 Preview	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/> / 10
7	Grade 4 Preview: Generating and Comparing Solutions and Fair Tests and Failure Points	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/> / 10
8	Grade 4 Preview: Defining Design Problems and Generating and Comparing Solutions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/> / 10

 **Reflection Notes**

A design idea that feels strong: \_\_\_\_\_

A design idea to practice again: \_\_\_\_\_



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*Let's learn and have fun!*



WEEK

1

## Defining Design Problems and Comparing Solutions

*Practice this week's science ideas.*

### *This Week's Days*

- Day 1*      *Problems, Needs, and Wants*
- Day 2*      *Criteria and Constraints*
- Day 3*      *Define Your Own Problem*
- Day 4*      *More Than One Way*
- Day 5*      *Week 1 Quiz*

# Answer Key & Explanations

Check the answer first, then read the explanation to see the evidence or reasoning.

## Week 1 Day 1: Problems, Needs, and Wants

### Answers

- 1 Important ideas include engineering as solving problems by designing objects, tools, processes, or systems.
- 2 Accept two accurate review details, such as one fact about problem and one example, model, or evidence source from the lesson.
- 3 problem
- 4 Use a picture, table, graph, model, observation, or source fact from the lesson.
- 5 It helps explain Defining Design Problems.
- 6 a fact, observation, data point, or model from the lesson

### Explanations

- 1 Start with the lesson's core idea. The review explains that Important ideas include engineering as solving problems by designing objects, tools, processes, or systems.
- 2 Good details come straight from the review bullets, not from a guess. Use two facts that help explain the lesson idea.
- 3 The word problem names one of the important science ideas in this lesson. Use it when you explain your answer.
- 4 Evidence can be an observation, a table, a graph, a model, or a source fact. It must connect directly to the claim.
- 5 The topic is one part of the larger chapter idea, Defining Design Problems. Connecting the day to the chapter helps you see the pattern across lessons.
- 6 Science answers are stronger when they name the evidence. The evidence shows why the claim should be trusted.

## Week 1 Day 2: Criteria and Constraints

### Answers

- 1 The two lists every defined problem needs.
- 2 Accept two accurate review details, such as one fact about problem and one example, model, or evidence source from the lesson.
- 3 problem
- 4 Use a picture, table, graph, model, observation, or source fact from the lesson.



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5 It helps explain Defining Design Problems.

6 a fact, observation, data point, or model from the lesson

**Explanations**

1 Start with the lesson's core idea. The review explains that The two lists every defined problem needs.

2 Good details come straight from the review bullets, not from a guess. Use two facts that help explain the lesson idea.

3 The word problem names one of the important science ideas in this lesson. Use it when you explain your answer.

4 Evidence can be an observation, a table, a graph, a model, or a source fact. It must connect directly to the claim.

5 The topic is one part of the larger chapter idea, Defining Design Problems. Connecting the day to the chapter helps you see the pattern across lessons.

6 Science answers are stronger when they name the evidence. The evidence shows why the claim should be trusted.

**Week 1 Day 3: Define Your Own Problem**

**Answers**

1 Define a simple design problem with criteria and constraints.

2 Accept two accurate review details, such as one fact about problem and one example, model, or evidence source from the lesson.

3 problem

4 Use a picture, table, graph, model, observation, or source fact from the lesson.

5 It helps explain Defining Design Problems.

6 a fact, observation, data point, or model from the lesson

**Explanations**

1 Start with the lesson's core idea. The review explains that Define a simple design problem with criteria and constraints.

2 Good details come straight from the review bullets, not from a guess. Use two facts that help explain the lesson idea.



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- 3 The word problem names one of the important science ideas in this lesson. Use it when you explain your answer.
- 4 Evidence can be an observation, a table, a graph, a model, or a source fact. It must connect directly to the claim.
- 5 The topic is one part of the larger chapter idea, Defining Design Problems. Connecting the day to the chapter helps you see the pattern across lessons.
- 6 Science answers are stronger when they name the evidence. The evidence shows why the claim should be trusted.

### Week 1 Day 4: More Than One Way

#### Answers

- 1 Good designers never stop at one idea.
- 2 Accept two accurate review details, such as one fact about problem, model, or evidence source from the lesson.
- 3 problem
- 4 Use a picture, table, graph, model, observation, or source fact from the lesson.
- 5 It helps explain Comparing Solutions.
- 6 a fact, observation, data point, or model from the lesson

#### Explanations

- 1 Start with the lesson's core idea. The review explains that Good designers never stop at one idea.
- 2 Good details come straight from the review bullets, not from a guess. Use two facts that help explain the lesson idea.
- 3 The word problem names one of the important science ideas in this lesson. Use it when you explain your answer.
- 4 Evidence can be an observation, a table, a graph, a model, or a source fact. It must connect directly to the claim.
- 5 The topic is one part of the larger chapter idea, Comparing Solutions. Connecting the day to the chapter helps you see the pattern across lessons.
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