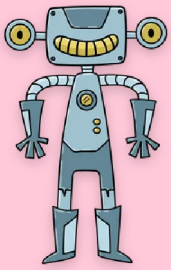
SCIENCE · ENGINEERING DESIGN · GRADES 2–4

The Engineering Design Process



Number the five steps engineers use, from ask to improve, then name a problem an engineer could solve.

Name: _____ **Date:** _____

Engineers solve problems by designing things. They follow these steps, and they go around again and again until the design works well.

1. Number the steps from 1 to 5.

- ☐ Create: build your design.
- ☐ Ask: what is the problem? What do I need?
- ☐ Improve: test it, then make it better.
- ☐ Plan: draw your best idea and list the materials.
- ☐ Imagine: think of lots of ideas.

2. Think of a problem at school. What could an engineer design to fix it?

_____

_____

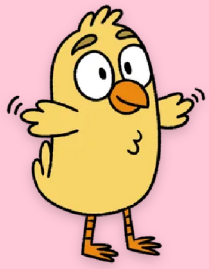
3. Draw your idea.

Art © Kevin Coulston

SCIENCE · ENGINEERING DESIGN · GRADES 3–5

Egg Drop Challenge

Plan, build and test a package that keeps an egg from breaking when it falls.



Name: _____ **Date:** _____

The challenge: build a package that keeps a raw egg from breaking when it is dropped from 2 meters. **Rules:** use only paper, straws, tape, cotton balls, rubber bands and a paper cup.

Materials I will use: ☐ paper ☐ straws ☐ tape ☐ cotton balls ☐ rubber bands ☐ paper cup

Draw your design. Label the parts.

Drop	Height	Did the egg break?	What I will change
1			
2			
3			

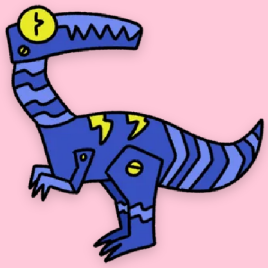
What part of your design protected the egg the most?

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SCIENCE · ENGINEERING DESIGN · GRADES 3–5

Craft Stick Catapult

Build a catapult from craft sticks and rubber bands, launch a pom-pom and measure how far it flies.



Name: _____ **Date:** _____

Build it: stack 5 craft sticks and wrap a rubber band around each end. Band 2 more sticks together at one end only. Open them gently, slide the stack between them and glue a bottle cap to the free end of the top stick. **Test it:** put a pom-pom in the cap, press down and let go.

How far I pressed down	Try 1 (cm)	Try 2 (cm)	Try 3 (cm)
A little			
Halfway			
All the way			

My longest launch _____

One change I will try next _____

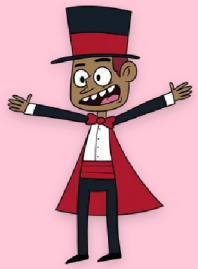
What made the pom-pom fly farther? What kind of simple machine is a catapult?

Art © Kevin Coulston

SCIENCE · ENGINEERING DESIGN · GRADES 3–5

Kinds of Engineers

Match six kinds of engineers to what they design, then tell which one you would like to be.



Name: _____ **Date:** _____

Draw a line from each engineer to what they design.

civil engineer ●	● tools that help doctors and patients
aerospace engineer ●	● circuits and power lines
mechanical engineer ●	● ways to keep water and air clean
electrical engineer ●	● airplanes and rockets
biomedical engineer ●	● bridges, roads and buildings
environmental engineer ●	● machines and engines

Which kind of engineer would you like to be? What would you design?

_____

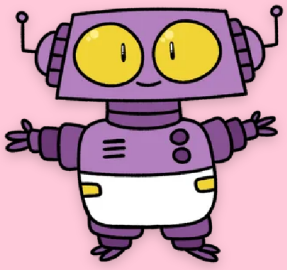
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SCIENCE · ENGINEERING DESIGN · GRADES 2–5

Paper Marble Run

Build a marble run from paper and tape that makes the marble roll as slowly as it can, then improve it.



Name: _____ **Date:** _____

The challenge: build a marble run on a wall or a cardboard box that makes a marble take as long as it can to reach the bottom. **You need:** paper, cardboard tubes, tape, scissors, a marble and a stopwatch.

Plan: draw your marble run. Add turns, ramps and drops.

Try	Time (seconds)	What I changed
1		
2		
3		

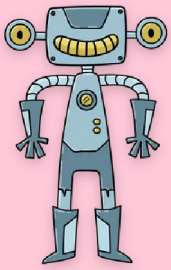
What slowed the marble down the most?

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ANSWER KEY · ENGINEERING DESIGN · GRADES 2–4

Answer Key: The Engineering Design Process

Answers for grown-ups. Some questions have more than one good answer.



Engineers solve problems by designing things. They follow these steps, and they go around again and again until the design works well.

1. Number the steps from 1 to 5.

4 Create: build your design.

1 Ask: what is the problem? What do I need?

5 Improve: test it, then make it better.

3 Plan: draw your best idea and list the materials.

2 Imagine: think of lots of ideas.

2. Think of a problem at school. What could an engineer design to fix it?

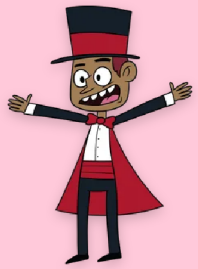
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Art © Kevin Coulston

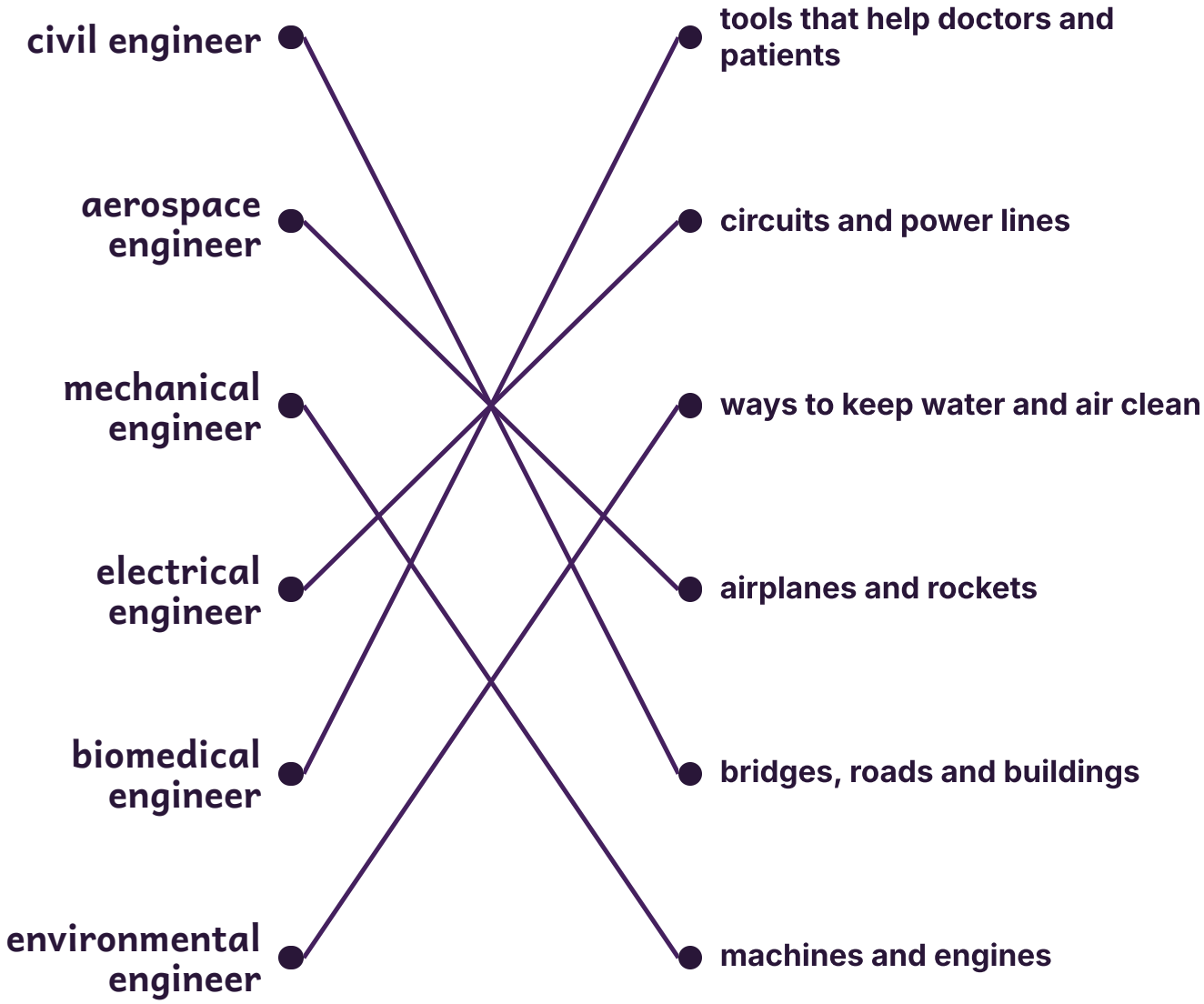
ANSWER KEY · ENGINEERING DESIGN · GRADES 3–5

Answer Key: Kinds of Engineers

Answers for grown-ups. Some questions have more than one good answer.



Draw a line from each engineer to what they design.



Which kind of engineer would you like to be? What would you design?

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