_____’s Whysheet for

Your name

Why don’t playgrounds use motors?

Yeah, why? Write (or draw) your answer:

Whybricks

Giving physical science form

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Welcome to the playground

When you think of a playground, what do you imagine? What kinds of equipment is there? How does that equipment work? What is it that makes playgrounds so enjoyable?

Believe it or not, most of the equipment you find on a playground relies on physical science and **simple machines** to make it fun!

On a playground, you can find many different forces (like **gravity**, **friction**, **tension**, **potential and kinetic energy**, and **Newton's laws of motion**) at work.

You will also find examples of the six types of simple machines (**inclined plane**, **wedge**, **screw**, **lever**, **wheel and axle**, and **pulley**) being used in many of the most common playground fixtures.

Harnessing science and engineering for fun

In this challenge, you are going to design a piece of playground equipment out of Whybricks. You can look at real playgrounds for inspiration or design a brand-new piece of equipment you wish were at a playground.

You also need to create a plaque to place next to your playground equipment.

Your plaque should explain the science that's at work in your design. It can explain any simple machines you use, which physical science forces are at work, or both. Basically, it should explain what's going on that makes your equipment fun!

Design your own playground

This is an engineering design challenge. Your goal is to engineer a piece of playground equipment that demonstrates at least one physical science principle.

Step 1: Brainstorm

What are some of your favourite pieces of playground equipment? Why do you like them? What could you create and how will it work?

Write and draw your ideas.

Idea #1

Idea #2

Idea #3

Idea #4

Idea #5

Idea #6

Idea #7

Idea #8

Step 2: What is the science?

Each piece of equipment you drew above probably uses at least one physical science principle. In fact, it probably uses more than one! It might also use a simple machine.

Write or draw what it is that makes each of your brainstormed playground pieces fun. Try to note down the specific forces, principles, or simple machines you think are involved. If you aren't sure, make a note of that too.

The science of idea #1

The science of idea #2

The science of idea #3

The science of idea #4

The science of idea #5

The science of idea #6

The science of idea #7

The science of idea #8

Step 3: Design your test

How will you know whether or not your design fits the challenge? You need to design a test that you can run with each playground design you try to determine whether or not your idea fits the given challenge.

The goal is: to engineer a piece of playground equipment that demonstrates at least one physical science principle.

Things I need to know to run my test:

How I will set up and run my test (including the materials and equipment I will use and my procedure):

How I will measure the outcome:

Step 4: Build, test, learn, repeat

You are now ready to start **iterating**. Iterating is the process of taking one of your ideas and trying it out. You will try to build your idea and then test it out. Somethings will work and somethings won't. You then take what you learnt and apply it to a new iteration. That is to say, you apply the learning to a new version and try again!

For each iteration there are three steps:

1. Build. Describe and draw your build for your records.
2. Run your test and record your results.
3. Record your ideas for how to improve your next iteration.

If at any point things don't work how you thought they would, record what happened and what you did to solve the problem. You will need this for your next iteration!

Iteration #1

Describe and draw your build:

Run your test and record your results:

Record your ideas for how to improve your next iteration:

Iteration #2

Describe and draw your build:

Run your test and record your results:

Record your ideas for how to improve your next iteration:

Iteration #3

Describe and draw your build:

Run your test and record your results:

Record your ideas for how to improve your next iteration:

Iteration #4

Describe and draw your build:

Run your test and record your results:

Record your ideas for how to improve your next iteration:

Iteration #5

Describe and draw your build:

Run your test and record your results:

Record your ideas for how to improve your next iteration:

Step 5: Make your plaque

Pick the design from your iterations that you feel was the most successful.

Describe your most successful design. Draw and label your design and explain why you believe it was the most successful:

In addition to explaining your design, your plaque also needs to explain the science that makes it fun.

Write down an explanation of the science at work in your design. You may need to do some research to help you understand and explain the science your design uses.

Explain the science that makes your design fun:

When you are happy with both your explanation of your design and the science at work, you can write up your plaque.

Create your plaque. Describe your playground equipment. Draw and label your design and explain the science at work:

So... why don't playgrounds use motors?

Now that you've completed this investigation, what do you think about your original answer? Can you add any new information to your original explanation?

And... what are you wondering about now?

Now I wonder...

Now that you have completed the investigation, what new questions do you have?