

STEM Worlds: Physics

Y5/6 Teacher Resource Pack

Thank you for joining STEM Worlds: Physics!

Across these seven lessons, your students will explore what physics looks like in the real world and how STEM skills power amazing careers. Through digital lessons, a classroom game, and an optional team challenge, students will:

- learn how STEM skills appear in every career
- meet diverse people working in physics-related jobs
- see how their own interests can match different STEM roles
- dismantle stereotypes about “who does STEM”, and
- develop confidence that STEM skills belong to everyone - including them.

STEM Worlds: Physics supports students in years 5 & 6 to recognise physics concepts (heat and forces) as tools used by real professionals in exciting, creative careers.

What's inside this pack?

About us (pg 2).

Learn more about Arludo and Future You.

Introducing STEM Worlds: Physics (pg 3).

Learn about the contents of the STEM Worlds: Physics module.

Using STEM Worlds: Physics in the classroom (pg 4).

Hear about how STEM Worlds: Physics can be integrated in the classroom.

Accessing, sharing and using the digital lessons (pg 5-7).

Dive into the detail of using the Arludo Science Portal to access and share the lessons.

Running the team challenge (pg 8-10).

Dive into the detail of running the optional team challenge.

Aligning STEM Worlds: Physics to the curriculum (pg 11-12).

Explore how STEM Worlds: Physics links to V9 of the Australian national curriculum.

Playing the STEM Worlds: Physics game (pg 13).

Read more about how the game-based learning component can be used.

Top tips and tricks (pg 14).

Get started with our top tips and find out how to contact us - we're here to help.

Challenge assessment rubric (pg 15-16).

Use this rubric to assess student performance for the rocket challenge.



About us

Arludo

Arludo is an Australian company dedicated to creating innovative video games that engage and inspire students to see the value of science in their everyday lives.

By transforming traditional learning into interactive, hands-on experiences, Arludo helps students actively explore scientific concepts, making STEM education both accessible and exciting.

Arludo's mission is to ignite curiosity and improve scientific thinking for students of all genders, ages, and socioeconomic backgrounds - no matter where they are in Australia. Through a diverse range of games and resources, Arludo empowers learners to develop critical thinking and data literacy skills, build confidence in STEM, and see themselves as capable scientists of the future.

Every Arludo game:

- introduces students to real scientific thinking
- allows them to experiment in safe digital environments
- generates real science data they can explore, and
- shows that STEM skills make jobs easier, faster, safer and more creative.

Future You

Future You is a free program, hosted by UNSW, that builds student's interest and sense of belonging in science, technology, engineering, and maths (STEM).

Through curriculum-aligned resources and real-world role models, we support educators to connect classroom learning to everyday life and real-world careers.

Our resources challenge stereotypes about who belongs in STEM by showcasing diverse, relatable role models and career pathways - because the equity that we want to see in STEM is achievable. When students see diverse, relatable role models using STEM in the real world, they can better understand its social relevance, build their confidence and begin to imagine STEM in their future.

Introducing STEM Worlds: Physics

STEM Worlds: Physics acts as a hook that helps students to understand the basics of what physics is, where it appears in the real world and how it is relevant to careers.

Throughout the lessons, students begin to see that:

- STEM skills are used in a wide range of jobs
- physics concepts have real-world application, and
- there is no single “type” of person who works in STEM.

What’s included in the module?



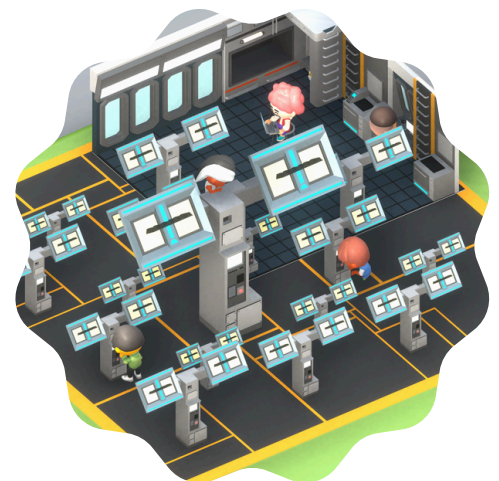
An interactive game

Students run their own Space Tourism Agency - making decisions such as hiring staff, training teams, upgrading workstations, and watching their company grow based on the decisions they make. Through the workstations, students see how the STEM concepts that they are introduced to through the digital worksheets are applied in real-world contexts.



Digital worksheets

These worksheets introduce students to the concepts of forces and heat, as well as STEM role models from Future You’s Pathfinder series. Gameplay data is presented back to students in the lesson 3 digital worksheet, to provide an opportunity for individual learning and reflection.



An optional team challenge

Students apply their learning about forces in a hands-on way, working collaboratively as part of a team to build and test balloon rockets.

Using STEM Worlds: Physics in the classroom

STEM Worlds: Physics is designed to be a flexible learning tool:

- Lessons 1-6 are digital, self-contained worksheets and ready to go. Each can be completed in approx. 30 minutes (depending on your class).
- Lessons can be run weekly, daily or clustered together into a 'special physics challenge day'.
- Lesson 7 is an optional team challenge. It is part digital and part hands on, so you can choose to run it in one session or two.

You can choose to:

- Run the full sequence of lessons,
- Use selected lessons only, or
- Complete Lesson 7 as a standalone activity.

You may also choose to use the lessons as an enrichment activity, such as with your STEM club, or in a reward session towards the end of a term.

There's no right or wrong way to use the lessons - applying your professional judgement and knowledge of your classroom will make them effective in your local context.



Accessing and sharing the digital lessons

To access the lessons, log in to the Arludo Science Portal via <https://teach.arludo.com> and create your free account.

[Click here to create your free account](#)

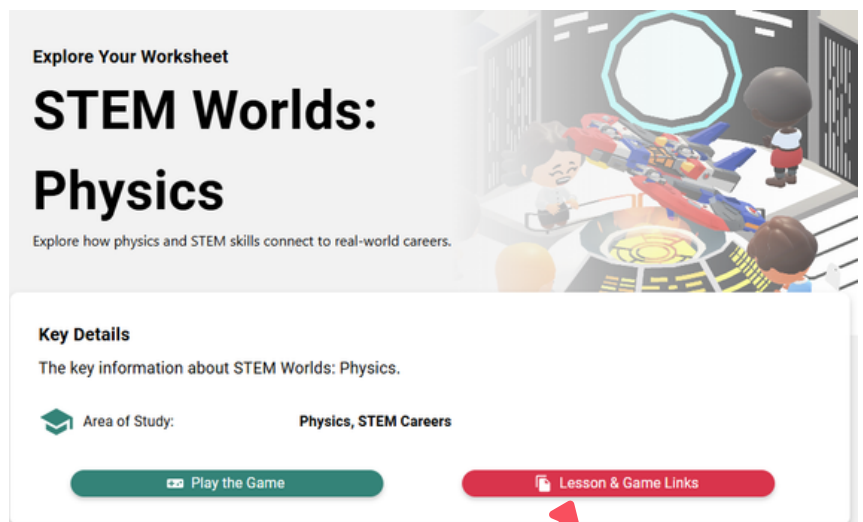
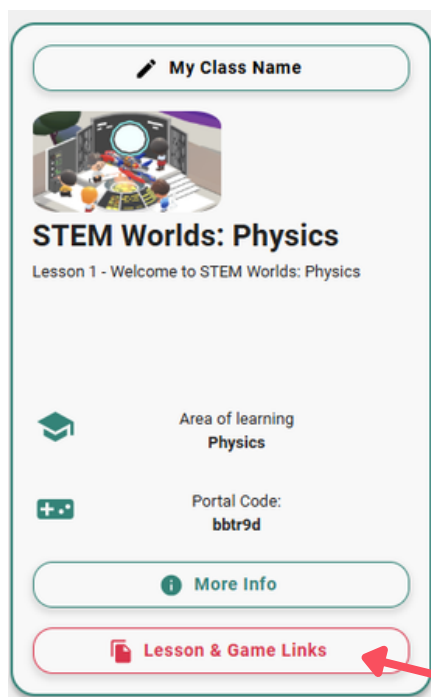
Students DO NOT need to create their own logins to access the lessons.

Once you are logged in, follow these steps to access the digital lessons:

- Click the 'STEM Worlds: Physics' button in the top left corner,
- Select the 'Add STEM Worlds: Physics' button, and
- The page will then redirect back to the homepage, where you will see all seven lessons added.

To share the lessons with your students:

- While on the homepage, click the red 'lesson and game links' button on the Lesson 1 tile.
- A pop up will provide you with the link to that digital lesson. Copy this link.
- Share this link with your students via whichever LMS you use. When your students access this link, it will take them directly to the digital lesson for them to complete. Your students will not need to create a login to access any of the lessons in this physics challenge.



Click here to generate the unique link for your class to access the digital lesson.

Using the digital lessons

To navigate effectively, students should complete all questions on a page before selecting 'next page' to move forward. Students should not use the browser's arrow buttons to navigate between pages.

At the end of the lesson, it's crucial for each student to click 'Submit' to save and submit their responses. Teachers can track team progress by clicking 'Get Started' on their lesson and selecting 'Download Student Answers' to generate a .csv file with responses.



Teacher Tip: You can't save progress during a lesson, so it's best to complete each lesson in one go.

The screenshot displays the 'STEM Worlds: Physics' interface. On the left is a sidebar with a 'My Class Name' input field, a lesson preview for 'Lesson 1 - Welcome to STEM Worlds: Physics', the 'Area of learning Physics', a 'Portal Code: bbtr9d', and buttons for 'More Info' and 'Lesson & Game Links'. The main content area is titled 'Explore Your Worksheet' and 'STEM Worlds: Physics', with a subtitle 'Explore how physics and STEM skills connect to real-world careers.' Below this is the 'Key Details' section, showing 'Area of Study: Physics, STEM Careers' and buttons for 'Play the Game' and 'Lesson & Game Links'. The 'Explore Data' section states 'Everything you'll need to view and understand the data that your students are generating while playing STEM Worlds: Physics.' and includes buttons for 'View Graphs', 'Shiny Apps', 'Download Game Data', and 'Download Student Answers'. Red arrows point from a pink callout box to the 'Download Student Answers' button in the 'Explore Data' section and the 'Lesson & Game Links' button in the sidebar.

Explore Your Worksheet

STEM Worlds: Physics

Explore how physics and STEM skills connect to real-world careers.

Key Details

The key information about STEM Worlds: Physics.

Area of Study: Physics, STEM Careers

Play the Game Lesson & Game Links

Explore Data

Everything you'll need to view and understand the data that your students are generating while playing STEM Worlds: Physics.

View Graphs Shiny Apps

Download Game Data Download Student Answers

Click here to view your students answers and see the data they're generating via gameplay.

Using the digital lessons (cont.)

You don't need to download anything to use the digital worksheets or the game-based component of STEM Worlds: Physics - the game runs online, directly in a web browser and is embedded in the digital lesson worksheets, ready to play.

It's completely free to play and safe for classroom use (no ads, accounts, logins or personal data required).

When students reach the relevant pages in their digital lessons, they'll see a direct link to play the game. Students simply click the "Play Game" button to open it in a new tab or window on their device.

You can also preview STEM Worlds: Physics anytime [here](#).



Teacher Tip: Before starting, play through the game yourself so you're familiar with the content. It only takes a few minutes and will help you guide students through the lessons.

We'll be playing STEM Worlds: Physics



Play The Game

It looks like you are using a desktop or laptop computer. This means you can play in your browser.

To start playing, click the icon to the left and the game will open in a new tab.

You can navigate back to the worksheet by selecting the correct tab in your browser.

A quick reminder:

When playing on a PC, your portal code and name should be automatically entered so your science data is collected for your class. If it's not, here are your details:

Portal Code: bbtr9d

Student click on the 'play the game' button to launch the game - their class code will be automatically populated.

Running the team challenge

In lesson 7, students step into the shoes of real engineers in an optional hands on team challenge inspired by the in game workstations.

This team challenge:

- Consolidates the physics content from lesson 4 & 5.
- Allows students to practice teamwork and STEM skills.
- Shows how physics knowledge supports real engineering work.
- Highlights STEM as practical, creative and collaborative.

The hands-on challenge focuses on light (aligned to Year 5 ACARA V9.0 curriculum content). It builds on the rocket systems explored in the game and provides a fun, practical way for students to apply their learning. It also introduces elements of the engineering design process, giving students the opportunity to plan, test and improve a real-world solution.

At the end of this pack, there is an assessment rubric that can be used as a formal (or informal) assessment opportunity for your students.

Resources needed to run the challenge

All materials are low-cost and easy to source:

- Balloons (minimum 1 per team, plus spares)
- Paper straws (minimum 1 per team)
- Tape
- Two string options (per team):
 - Twine (length determined by your fixed points)
 - Fishing line (length determined by your fixed points)
- Chairs, desks or fixed points to attach string
- Stopwatch (or device timer)
- Measuring tape or ruler
- Marker or tape to mark distances

Optional:

- Clipboards or paper for recording results



Running the team challenge

(cont.)

How to run the team challenge

Lesson 7 is a combination of a guided digital lesson and a hands-on classroom activity.

The digital lesson will walk students through:

- forming teams and assigning roles,
- understanding the challenge,
- step-by-step build and test instructions, and
- suggested reflection questions.

Your role is to support the hands-on setup, materials, and facilitation while students follow along.

Step 1: form teams

Students will form teams and assign roles within the digital lesson. You may:

- pre-assign groups, or
- allow students to choose their own teams.

Step 2: introduce the challenge

The digital lesson introduces the challenge, but you may wish to reinforce:

- the goal: build a rocket that travels far and straight, and
- the key forces that will act on the rocket that they create: thrust, gravity, friction.

Step 3: build the rockets

Students follow the step-by-step instructions in the digital lesson to:

- set up their string track,
- attach the balloon and straw, and
- prepare for testing.

Your role at this stage is to:

- distribute materials,
- help with setup (tying string, taping balloons, etc.), and
- ensure safe use of materials.



Running the team challenge

(cont.)

Step 4: test and collect data

Students run multiple tests with different rocket designs and record what happens. Encourage them to:

- observe carefully,
- discuss results as a team, and
- change one thing at a time (e.g. air amount or string type) to refine their rocket.

Step 5: improve and re-test

Students adjust their design based on what they observed and test again. This is the most important part of the challenge: testing ideas, learning from results, and improving as a result.

Step 6: reflect

Students can use the suggested reflection questions on the last page of the digital lesson to encourage reflection and discussion

Using the team challenge in the classroom

The challenge is designed to be flexible, so that you can use it in a way that is appropriate to your context.

Option (1 lesson): Complete one design and one round of testing per team

Extended option (2 lessons):

- Lesson 1: Plan and build
- Lesson 2: Test, improve and reflect

Standalone activity: Can be used independently of the full module as a light-based STEM challenge.

Rotation model: Run as a small group activity while other students complete different tasks.

Demonstration option: If materials are limited, run as a teacher-led build and test with class input.

Aligning STEM Worlds: Physics to the ACARA curriculum

While STEM Worlds: Physics focuses on physics concepts, it also embeds science inquiry skills and the engineering design process through hands-on investigation, testing, and reflection.

Year 5 - Science - Light (AC9S5U03)

Students learn that light comes from different sources, travels in straight lines, and can be reflected or refracted. They also explore how shadows are formed when light is blocked.

Addressed in: Lesson 4 + Lesson 7 (Team Challenge)

Year 6 - Science - Electricity (AC9S6U03)

Students investigate how electrical energy moves through circuits and how it can be transferred and transformed. They explore the role of circuit components, as well as how conductors and insulators affect the flow of electricity.

Addressed in: Lesson 5

Design & Technologies - Engineering Design Process

Students follow the engineering design process by planning, building, testing, evaluating and refining solutions that apply physics ideas.

Addressed in: Lesson 7

Science inquiry

Throughout STEM Worlds: Physics, students also build essential Science inquiry skills:

- predicting,
- analysing data,
- observing changes,
- testing ideas,
- evaluating results,
- working collaboratively,
- representing data in tables and graphs, and
- identifying patterns and relationships.

Science as a human endeavour

Across the digital worksheets, students meet role models who are using STEM in their everyday work to make new discoveries and make the world a better place.

Aligning STEM Worlds: Physics to the ACARA curriculum (cont.)

Curriculum code (ACARA V9.0)	Content description	Where it is addressed in STEM Worlds: Physics
Science inquiry AC9S5I04 & AC9S6I04	Construct and use appropriate representations, including tables, graphs and visual or physical models, to organise and process data and information and describe patterns, trends and relationships.	Lesson 3: Students interpret gameplay data presented as graphs, identify patterns (e.g. training vs productivity), and draw conclusions about how different decisions impact outcomes.
Science understanding AC9S5U03	Identify sources of light, recognise that light travels in a straight path and describe how shadows are formed and light can be reflected and refracted.	Lesson 4: Students learn how light travels, reflects and refracts, and how these properties are used in space technologies such as visors and sensors. Lesson 7 (Team Challenge): Students design and test a visor that blocks, reflects or filters light to protect astronauts while maintaining visibility.
Science understanding AC9S6U03	Investigate the transfer and transformation of energy in electrical circuits, including the role of circuit components, insulators and conductors.	Lesson 5: Students explore how electrical energy flows through circuits, and how conductors, insulators and components are used to power spacecraft systems safely
Design and Technologies AC9TDE6P01	Investigate needs or opportunities for designing and test materials, components, tools, equipment and processes needed to create designed solutions.	Lesson 7: Students investigate a real design problem (protecting astronauts from light), explore materials, and test how different properties affect performance.
Design and Technologies AC9TDE6P02	Generate and communicate design ideas and decisions using technical terms and graphical representation techniques, including digital tools.	Lesson 7: Students plan and sketch their visor design, explain material choices, and use physics vocabulary (light, reflection, blocking) to communicate ideas.
Design and Technologies AC9TDE6P03	Select and use suitable materials, components, tools, equipment and techniques to safely make designed solutions.	Lesson 7: Students select appropriate materials (e.g. reflective, opaque, transparent) and construct their visor safely.

Aligning STEM Worlds: Physics to the ACARA curriculum (cont.)

Curriculum code (ACARA V9.0)	Content description	Where it is addressed in STEM Worlds: Physics
Design and Technologies AC9TDE6P04	Negotiate design criteria including sustainability to evaluate design ideas, processes and solutions.	Lesson 7: Students test their designs, evaluate effectiveness (blocking light while allowing visibility), and suggest improvements.
Design and Technologies AC9TDE6P05	Develop project plans that include consideration of resources to individually and collaboratively make designed solutions.	Lesson 7: Students work in teams, assign roles, plan tasks, build and test solutions, and reflect collaboratively.

Playing the STEM Worlds: Physics game

The game-based component of STEM Worlds: Physics is not an extra activity - it's a core part of the learning and is referenced throughout Lesson 2-6 to support discussion, reflection and confidence building.

In the game students run a space tourism company that is building rockets for space customers. Their goal is to build a successful business by hiring and managing a diverse team.

As they play students will:

- add different workstations that build rocket components
- review and hire employees based on their resume and skill match
- train and improve their team, and
- upgrade their workstations.

The game will begin with a short tutorial that will guide students through the main features and tasks that they will need to complete to progress.

- If students are ever in doubt of what they should do next, all they need to do is click the notepad icon in the top right hand corner where a task list is available.
- If they need to speed up production of components (and the generation of money for new workstations or staff) they can click the spring character at the rear of the map next to the rocket pad.
- If they need to get more customers through the gate to get more resumes, they can click the spring character at the front of the map next to the gate.

It is important to note that there is no formal 'end' to this game and if it was allowed to run in a browser it technically would run forever. The amount of time that your students are allowed to play is totally dependent on your class time.

After playing, students will be able to see gameplay data visualised as graphs that will show them how their choices within the game impacted the success of their space tourism company. One of these graphs is included in lesson 3 to encourage data analysis and critical thinking skills.

Top tips and tricks

1 Familiarise yourself with the Arludo Science Portal

Add the lessons and plan for how you will share the lesson links. Bookmark the portal URL (<https://teach.arludo.com>) for easy access.

[Click here to create your free Arludo account](#)

2 Preview the digital lessons

Once you have added the lessons to your portal you can preview the lessons in full. On your portal homepage, simply click the tile of the lesson you'd like to preview and under 'Lesson Details' click the preview button. Previewing the lessons will give you an idea of how the lesson will look for your students and whether there are any points that they made need extra assistance with.

3 Organise device availability

The digital lessons can be accessed on any device with an internet connection. We recommend a device with a larger screen, such as a tablet, laptop or computer.

4 Set-up teams and prepare materials for the team challenge

Decide whether you will set student teams up or if you will allow students to create their own teams, and prep the materials that they'll need.

Contact us

We're here to help!

Email: info@arludo.com

Live Chat: Available inside the teacher portal

Community: Join the Arludo Learning Community on Facebook

Follow Arludo for updates and resources:

[Facebook](#) • [Instagram](#) • [LinkedIn](#) • [YouTube](#)

Follow Future You for updates and resources:

[Facebook](#) • [Instagram](#) • [LinkedIn](#) • [YouTube](#)



Challenge assessment rubrics

This rubric can be used to assess student performance for the STEM Worlds Rocket Challenge. If you use this rubric, please print a copy for each group or upload to your school's LMS.

Give the rubric to students before commencing the challenge so they know what is being assessed and what is expected of them.

Optional activities (such as data collection and report writing) have been included for teachers who wish to extend the learning. Please ensure you confirm whether the optional activities need to be completed.

The challenge also lends itself to cross-curricular extensions:

- Mathematics (students can calculate the average speed of the rocket)
- Design & Technologies (give students a fictional budget to use for building and testing)

Rocket Challenge Assessment for Yr5-6

Criteria	Needs support	Getting there	On track	Rocketing-it!
Understanding the physics	Explanations are a bit mixed up. Doesn't quite grasp how physics works here.	Explains the movement but can't link it to physics.	Explains that forward movement occurs as a result of an opposite response.	Nailed it! Uses balanced/unbalanced forces, mass, and pressure to explain motion.
Testing variables (i.e. size of the balloon)	Didn't change the design, even if the rocket didn't work.	Made random changes to the rocket without really using test clues.	Modified the rocket design logically based on how the first tests went.	Used test data to smartly adjust the design (like cutting drag or reducing mass).
Working as a team	Group cannot work together. No modifications are attempted. Conflict is unresolved.	One person dominates work. Group resists making design changes. Poor communication.	Most members contribute. Group modifies design once. Good communication.	All members contribute equally. Group improves design based on failures. Excellent communication.
Collecting the findings (optional)	No data is recorded.	Wrote down some data, but they aren't connected to the explanation.	Included clear data to support final thoughts.	Thoughtfully integrated precise data tables and average measurements into the text.
The report (optional - can be oral or written)	Lacks structure. Doesn't explain how the rocket works.	The writing jumps around a bit and needs a smoother flow.	Wrote a logical report with an introduction, science explanation, and conclusion.	Brilliant report with appropriate technical terms, scientific explanation, and strong conclusion.