



Teacher Notes

- The open-ended nature of these lessons that form this unit enable the use of the BricQ Motion Essential and/or LEGO® Education SPIKETM Essential Sets.

- The lessons follow a similar format. The books have been selected as an example only and can be changed to suit your learners and context.
- Students in groups apply their knowledge of forces, motion and interaction to develop a solution to an identified problem.
- The solution can be designed and built providing hands-on learning experiences without the need for technology **or**
- To provide opportunities for learning progression and coding, hands-on learning experiences can be developed to be more interactive by connecting the Intelligent Hub, motors, Light Matrix and colour sensor to bring models to life.







Hello! I'm,..

Stella.

I love reading, designing and making things. It looks like my STEM skills will be useful to help solve some problems in fairy tale land.







Hello! I'm,..

Newton.

I love reading and flying my drone. It seems like my STEM skills will come in very handy as we try to help some fairy tale characters.



Once Upon A Time: STEM Tales ...

Join your guides, Stella and Newton as they adventure through familiar fairy tales to help the main character solve a problem using the engineering design process and their knowledge of forces and how objects move. Can you help Rapunzel escape the tower? Or help move the Gingerbread Man faster to escape the fox? Students will test their solution and be introduced to coding to help make their solution move.





Lessons

- Go, Ginger, Go!
- Cinderella Coach Crisis
- >> Delightful Deliveries
- 🧯 Beanstalk Balance ` 👾

- Rapunzel's Rescue
- Mermaid Magic
- > Wolf Warnings





Go, Ginger, Go!

get the Gingerbread Man safely across the water?

Run, run as fast as you can ... oh crumbs! Stella and Newton want to help the Gingerbread Man avoid the fox. How can Stella and

Newton







Students will:

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- Develop a solution to solve a problem
- Follow, describe and represent a sequence of steps using directional language (unplugged activity) and/or
- Follow, describe and represent a sequence of steps (using visual code blocks)
- Participate in group work





Cinderella Coach Crisis

Ka-blam! Oh no, the Fairy God Mother's wand is broken. Instead of turning the mice and pumpkin into horses and a carriage, they have disappeared! HowcanStellaandNewtonhelpCinderellatoget to the ball?





Key Objectives

Students will:

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- Research different types of transport (air, road, rail or water)
- Develop a solution to solve a problem
- Participate in group work
- Extension: Program the designed solution to move





Delightful Deliveries

StellaandNewtonaretryingtohelpLittleRedRidingHooddelivergoodies toGrandma?

How can they help with a safer method of delivery?





Key Objectives

Students will:

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- Develop a solution to solve a problem
- Participate in group work

For use with BricQ Motion Essential Kit

Featured Lesson - Beanstalk Balance

Suggested Time: 2 - 3 lessons (approx. 3 x 30 mins) Level: Beginner Year Level: 2

Supporting Resources: 1. Engineering Design Process 2. Flashcards

3. Student Checklist for Success

4. Assessment Rubric (Teacher)





Beanstalk Balance

Fe-fi-fo-fum! Oh no, Stella and Newton need to help Jack escape the giant. How can they help Jack get up and down the beanstalk quickly and safely using a simple machine?















Key Objectives

Students will:

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- Learn about simple machines, forces and motion
- Generate, develop and record design ideas using drawings and models
- Develop a solution to solve a problem using the Engineering Design Process
- Participate in group work

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Supporting Resource 1

Australian Curriculum – Science – Year 2

Science Understanding > Physical Sciences A push or a pull affects how an object moves or changes shape (ACSSU033)

Science as a Human Endeavour > Nature and Development of Science Science involves observing, asking questions about, and describing changes in, objects and events (ACSHE034)



Australian Curriculum – Technologies (Design Technologies) – Year 2

Design and Technologies > Knowledge and Understanding Explore how technologies use forces to create movement in products (ACTDEK002)

Design and Technologies > Process and Production Skills Generate, develop and record design ideas through describing, drawing and modelling (ACTDEP006)

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Australian Curriculum – General Capabilities

Literacy

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Critical and Creative Thinking

Personal and Social Capability

Prepare:

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Introduce lesson vocabulary: force, motion, simple machine, inclined plane, wheel and axle, pulley, lever, screw and wedge.

FORCE PULLEY MOTION LEVER **SCREW SIMPLE MACHINE INCLINED PLANE** WEDGE WHEEL AND AXLE

Supporting Resource 2



(Whole Class, 5 minutes)

Read story and introduce problem of helping Jack to get up and down the Beanstalk quickly and safely.

Distribute a brick set to each group. Allow students to become familiar with the contents of the set.



Explore:

(Whole class and small groups, 20 minutes)

Provide time for students to explore simple machines using images and books (small groups).

Have students create a model of each of the simple machines using BricQ Motion Essential and/or LEGO® Education SPIKETM Essential Set (one model per groups).

Create an anchor chart (whole class).



Explain;

(Small groups, 25 minutes)

In their Science notebook or digital portfolio plaform of choice (E.g. Seesaw), have students record and reflect what they have learned about the six simple machines.

Re-introduce challenge/problem: How can we help Jack get up and down the beanstalk quickly and safely using a simple machine? (ASK/IMAGINE)



Elaborate:

(Small groups, 30 minutes)

In groups, students will discuss and generate their ideas and create a working model to share. (IMAGINE/PLAN/CREATE)



Evaluate:

(Ongoing, throughout lesson)

Ask guiding questions to encourage students to 'think aloud' and explain their idea and reasoning for their designed solution.

Test model and make improvements. (IMPROVE)

Group Self-Evaluation: Student Checklist for Success (supporting resource)



STUDENT CHECKLIST FOR SUCCESS

WE DESIGNED AND CREATED

 $\frown \frown \frown$

WE PLANNED OUR IDEAS WITH PICTURES AND/OR WORDS

WE CREATED A MODEL

WE TESTED OUF

WE IMPROVED OUR MODEL (IF NEEDED)

WE WORKED WELL

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Supporting Resource 3

Beanstalk Balance

Exploring simple machines and forces

Name: _____



	Needs Support	Independent	Expert
Demonstrates an understanding of simple machines			
Correctly answers questions about forces and motion			
Can demonstrate that an object's speed or direction can be changed with a push or a pull			
Generates, develops and records design ideas			
Tests and improves a working model			
Explains whether their group's design solution worked as intended to			
Works as an effective group member			

Supporting Resource 4



Rapunzel's Rescue

Stella and Newton are captivated by Rapunzel's beautiful hair.

How can Stella and Newton help Rapunzel to engineer an escape?







Students will:

- Learn about forces, motion, and simple machines
- Develop a solution to solve a problem
- Participate in group work





Mermaid Magic

Stella and Newton love going underwater to explore and visit the Little Mermaid, but they can't stay for too long. How can the Little Mermaid protect her special underwater treasures while visiting friends on land?







Students will:

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- Learn computational thinking skills
- Learn to break down a problem into smaller parts (decomposition)
- Develop a solution to solve a problem
- Create an interactive model (algorithms)
- Participate in group work

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Wolf Warnings

StellaandNewtonaretryingtohelpafewdifferentfairytalecharacterswith anongoingwolf problem.

Can you develop a solution to make fairy tale land safe again?





Key Objectives

Students will:

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- Develop a solution to solve a problem
- Participate in group work

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Thank you!

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Credits: Photographs: Own images Presentation Template: <u>SlidesMania</u>

