

DESIGN & TECHNOLOGIES

PROJECT-BASED LEARNING

DEVELOP
PROCESS AND
PRODUCTION
SKILLS THROUGH
HANDS-ON
ACTIVITIES!



SAMPLE BOOKLET



DESIGN & TECHNOLOGIES



INTRODUCTION TO PROJECT-BASED LEARNING

What is project-based learning?

Project-based learning is an instructional approach which develops students' knowledge and skills through cross-curricular projects based on real-world tasks, issues or challenges. It encourages students to be curious, creative and critical thinkers as they explore the task, issue or challenge in an attempt to 'solve' it.

While conducting project-based learning tasks, students interact with their peers and other members of the school and local community to find out information, discuss plans and ideas, work collaboratively and present their ideas or findings.

Project-based learning in Design and Technologies

The projects included in this box are based on four broad topics—Food and cooking, Clothing and textiles, Building and construction and Technological advancements. Within these topics, students explore why and how people design and create products that meet a purpose for a particular audience, and use their knowledge and skills to develop their own products.

While conducting these projects, students will also develop their understandings of how food and fibre is produced and used, and how people use their knowledge of forces and materials to design and create products.

Project-based learning design process

The design process used in this series involves six steps—*inquire, ideate, plan, create, evaluate and share*. These steps are outlined on the back of each project card to guide students' learning.

PLANNING, TEACHING AND ASSESSING

Implementing a project

- Choose a project from one of the sections based on the sub-strand of the curriculum you wish to cover. See the overview card of each section to see what is covered and how.
- Once a project is chosen, read the back of the card in advance to familiarise yourself with the stages of the design process and how they relate to the chosen project.
- Program time in your teaching timetable for students to conduct the project and decide whether students will complete the task in pairs or small groups.
- Think about the ingredients or materials, tools and equipment students may need to complete the project and how these will be accessed by students. If possible, use recycled goods and ask for items to be donated.

Differentiation

These projects naturally allow for differentiation, as students are encouraged to use their prior knowledge and skills to design and create products. As the focus is on the development of students' knowledge and skills throughout the project design process, the level to which students complete the project task can be easily adapted to suit individual learning needs.

Assessment

Observations and anecdotal notes should be made consistently throughout projects and used to guide students' learning. Assessment should focus on students' knowledge and understanding, and processes and production skills as outlined by the Design and Technologies content descriptions in the Australian Curriculum.



BUILDING AND CONSTRUCTION

A well for Jack and Jill

1. INQUIRE

What is a well? How do people get water from it? What parts does a well have?

2. IDEATE

What recycled materials can be used? How will you make the bucket go up and down? What will each person do?

3. PLAN

Draw and label your design for a well, then draw or write the steps you will use to make it. Collect your materials, tools and equipment.

4. CREATE

Create your well. Do you need help using the tools and equipment?

5. EVALUATE

Make the bucket go up and down. Is there anything you would change?

6. SHARE

Display your well. Show how the bucket goes up and down to get water. Tell how you made it. Would you like to get water this way? Why or why not? Discuss.



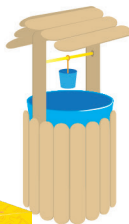
BUILDING AND CONSTRUCTION

A well for Jack and Jill

Project task:

Design and create a model of a well for Jack and Jill, with a way to lift a bucket of water from the well.

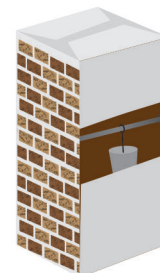
Project ideas:



stick well



aluminium can well



drink carton well





FOOD AND COOKING

Perfect potatoes

1. INQUIRE

What are potatoes? How do they grow? What do potatoes need to grow? What is the best place to grow potatoes?

2. IDEATE

What recycled materials can you use for a potato container? How big does it need to be? What materials, tools and equipment do you need? What is the best place at school to put your container?

3. PLAN

Draw and label a design for your container. Collect your materials, tools and equipment.

4. CREATE

Create your potato container. Plant your seed potatoes in it. Do you need help using the tools and equipment? Look after your container until your potatoes grow.

5. EVALUATE

Look at your potato container. Was it suitable for growing potatoes? Did your potatoes grow well? Is there anything you would change?

6. SHARE

Display your digital photos of how you made your potato pot. Tell how you made it. Show one potato you grew. As a class, find a good recipe and make some healthy potato wedges to bake in the oven.



FOOD AND COOKING

Perfect potatoes

Project task:

Design and create a container for growing potatoes, then grow some.

Project ideas:



an old grocery bag



an old tyre



an old bucket





CLOTHING AND TEXTILES

Fashion for dogs

1. INQUIRE

What fabrics and materials are warm? What shape and size does the dog coat need to be? How can it be made so that it fits the dog securely? How are fabrics joined together to make a garment?

2. IDEATE

What warm fabric will you use? What tools and equipment will you use? How will you make it? How will you ensure it's the correct size?

3. PLAN

Draw and label a design for your dog coat, then write the steps you will take to make it.

4. CREATE

Create your dog coat. Do you need help with the tools and equipment?

5. EVALUATE

Place your coat on the dog (or a model of one) and see how it fits. Does it fit securely? Is it warm? Is there anything you would change?

6. SHARE

Display your dog coat and explain how you made it. Compare it to a classmate's. Take photos of your dog wearing it and show everyone how much he/she likes it.



CLOTHING AND TEXTILES

Fashion for dogs

Project task:

Design and create a warm winter coat for a pet dog. The coat must fit the dog comfortably and securely.



Project ideas:

- woollen blanket coat with ties
- fleecy, hooded coat with holes for legs and head
- knitted coat with snaps or Velcro™
- a coat with two layers for extra warmth





TECHNOLOGICAL ADVANCEMENTS

Garbage truck

1. INQUIRE

How do garbage trucks pick up and tip out rubbish? What recycled materials could you use to create your truck?

2. IDEATE

How can you make your truck move? How can you make it tip out rubbish? What sort of logo could you put on it?

3. PLAN

Draw and label a design for your truck, then write the steps you will follow to create it. Collect your materials, tools and equipment.

4. CREATE

Create your garbage truck. Do you need help using the tools and equipment?

5. EVALUATE

Push your truck along to see if it moves. Place some 'rubbish' in the back to show how it tips. Is there anything you would change?

6. SHARE

Display your truck and explain how it works. Discuss how items could be reused to reduce rubbish so that garbage trucks would have very little to collect.



TECHNOLOGICAL ADVANCEMENTS

Garbage truck

Project task:

Design and create a garbage truck that moves and tips out rubbish. Your garbage truck must have an eye-catching logo.

Project ideas:

- milk carton truck
- plastic milk bottle truck
- ice cream container truck
- tissue box truck





FOOD AND COOKING

Jelly cups

1. INQUIRE

Which jelly flavours do your classmates like? How do people make layers of jelly? Which ingredients are usually added to jelly cups?

2. IDEATE

Which colours/flavours of jelly will you use? How will you make different layers of jelly? Which other ingredients will you add?

3. PLAN

Draw a diagram of your jelly cups. Label the colours/flavours of each layer and the additional ingredients. Learn how to make jelly.

4. CREATE

Collect the ingredients, tools and equipment you need. Make your layered jelly cups and add the fruit/lollies according to your plan.

5. EVALUATE

Evaluate the success of your jelly cups. Did the layers of jelly set and look the same as your diagram? Did your jelly cups taste nice?

6. SHARE

Record a short explanation of how to create layered jelly cups with added pieces of fruit/lollies so your family can make them too.



FOOD AND COOKING

Jelly cups

By understanding the properties of jelly, people have learnt to make layered jelly cups. They do this by cooling each layer of jelly in the fridge, before adding the next layer. It's tricky business. If each layer does not set properly before the next one is added, they may mix together instead.

Project task:

Design and create jelly cups with layers of different coloured/ flavoured jelly and added pieces of fruit or lollies, to share with others at a party.





BUILDING AND CONSTRUCTION

3D town map

1. INQUIRE

Which natural and built features might you see in a town? Why? How are towns designed to meet people's needs and wants?

2. IDEATE

What natural and built features will you include? Where will these features be located? How will people access each feature?

3. PLAN

Draw a bird's-eye-view map of your town and label the natural and built features. Plan how each feature will be made and attached.

4. CREATE

Collect the materials, tools and equipment you need. Construct each feature and assemble them to make your map.

5. EVALUATE

Evaluate the design of your map. Did it include a range of natural and built features? Could people access places easily?

6. SHARE

Record a short radio advertisement encouraging people to move to your new town by highlighting its design and key features.



BUILDING AND CONSTRUCTION

3D town map

Urban planners decide where buildings, parks, roads and other features should be located in a city based on the needs of the people who live there. They create maps of their design so others can visualise their ideas. Various construction workers then use these maps to build the city.

Project task:

Design and create a three-dimensional map of a town which shows the location of a range of natural and built features.





CLOTHING AND TEXTILES

Bow ties

1. INQUIRE

What is a bow tie? How do people make bow ties? Which bow tie designs are the most popular for wearing to formal events?

2. IDEATE

What type and design of fabric will you use to make your bow tie? How will it be fastened around the neck?

3. PLAN

Draw a diagram of your bow tie. Label the materials you will use for each part, then record instructions for how to make your bow tie.

4. CREATE

Collect the materials, tools and equipment you need. Use your diagram and instructions to safely make your bow tie.

5. EVALUATE

Evaluate the success of your bow tie. Did it stay fastened around your neck? Would you wear your bow tie to a formal event?

6. SHARE

Give an oral presentation explaining your design decisions and how you made your bow tie, then demonstrate how it is worn.



CLOTHING AND TEXTILES

Bow ties

A bow tie is a type of neck tie that is commonly worn by men, as a fashion accessory to a suit. Bow ties come in a range of styles and are made from coloured or patterned fabric—usually silk or polyester. They have been a popular fashion item since the mid-1880s.

Project task:

Design and create a bow tie that can be worn as a suit accessory at formal ceremonies and occasions.





TECHNOLOGICAL ADVANCEMENTS

iPad®/Tablet stand

1. INQUIRE

Why do people purchase stands to hold their iPad®/tablet up? What features do stands have? How are they made?

2. IDEATE

How will you design your stand? What materials will you use to make it? How will users adjust the angle of the stand?

3. PLAN

Draw and label a diagram of your stand. Record the materials you will use and a step-by-step process for creating it.

4. CREATE

Collect the materials, tools and equipment you need. Safely create your stand and check that it is user-friendly.

5. EVALUATE

Evaluate the success of your stand. Was it strong enough to hold an iPad®/tablet? Could the angle of it be adjusted?

6. SHARE

Take a photograph of your stand, then create a how-to guide to help others make a stand just like yours.



TECHNOLOGICAL ADVANCEMENTS

iPad®/Tablet stand

iPad®/Tablet stands are designed to allow people to use their device without holding it (hands-free). Making your own iPad®/tablet stand from scrap materials, that is personalised to suit your needs and personal preferences, is a great way of recycling materials.

Project task:

Design and create a stand that holds an iPad® or tablet in landscape or portrait positions and allows the angle at which it stands to be adjusted.





BUILDING AND CONSTRUCTION

Marble roller-coaster

1. INQUIRE

What is a roller-coaster? How does a real roller-coaster work? How will a roller-coaster for a marble work?

2. IDEATE

Which materials will you use to construct your roller-coaster? How will you make sure it can travel through at least one loop? How long will your roller-coaster be? What theme will you choose?

3. PLAN

Draw a diagram of your roller-coaster. Label the main parts and the materials you will use. Record instructions for making your roller-coaster.

4. CREATE

Collect the materials, tools and equipment you need. Safely create your roller-coaster, then test how well the marble travels through it.

5. EVALUATE

Evaluate the success of your roller-coaster. Did the marble stay on the roller-coaster? Did it make it through at least one loop? Did the materials used to make your roller-coaster work well? Was there a clear theme?

6. SHARE

Demonstrate to the class how your roller-coaster works. Give an oral presentation about the theme you chose, how you made it and how you made sure the marble would complete a loop.



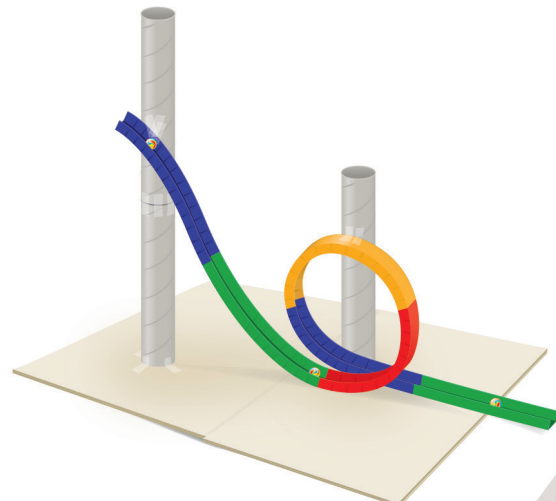
BUILDING AND CONSTRUCTION

Marble roller-coaster

As engineering advances, the design of roller-coasters gets scarier and more daring! A 'gold rush'-themed roller-coaster called Yukon Striker in Canada is the world's longest, tallest and fastest dive roller-coaster. It has a straight drop that goes into an underwater tunnel and its top speed is 129 km/h as it does four inversions and one 360° loop!

Project task:

Design and create a model of a themed roller-coaster, with at least one loop, that successfully rolls a marble on it.





FOOD AND COOKING

Sushi

1. INQUIRE

What is sushi? How is it traditionally made and what tools are used?

2. IDEATE

What ingredients will you use to make your sushi rolls? How will you design it to cater for all tastes, allergies and a younger age group?

3. PLAN

Draw a diagram of a sushi roll. List the ingredients you will use and what shape and size your rolls will be. Decide what tools will help you roll your sushi the best.

4. CREATE

Collect the ingredients, tools and equipment you need. Safely create your sushi rolls, then taste them to see if the ingredients are successful and if the size and shape is easy to eat.

5. EVALUATE

Evaluate the success of your sushi rolls. Do other people enjoy the taste of your creations? Is there a better flavour combination you can use? Is the size acceptable or are smaller/bigger rolls easier to eat?

6. SHARE

Create a sushi menu board and present it to the class. Explain how you made your sushi rolls and why you chose the flavour combinations.



FOOD AND COOKING

Sushi

Sushi started in areas of Laos, Thailand and Vietnam, as a way to preserve fish using rice and vinegar. The rice wasn't even eaten, just thrown away, and the fermented fish was kept! Then a Japanese man developed a quick and easy modern version of sushi that the busy people of Tokyo could eat on the go. Today, sushi is eaten all over the world. In the 1960s, it reached America and they made their own version called the California roll. Since then, many more inventive creations have come about.

Project task:

Design and create a range of sushi rolls with at least two ingredients for the filling, that children will enjoy eating.





TECHNOLOGICAL ADVANCEMENTS

Homemade compass

1. INQUIRE

What is a compass? How does it work? How can a simple compass be made? What items and materials are used? How do you write instructions to plot a course?

2. IDEATE

What household items will you use to create your compass? Which location will you write navigation instructions for? How will you be able to transport your compass easily?

3. PLAN

Draw and label a diagram of your compass. Record the materials you will use and a step-by-step process for creating it.

4. CREATE

Collect the materials, tools and equipment you need. Safely create your compass and check that it works. Write your instructions to navigate to your chosen location; e.g. go north 10 paces, then east 5 paces.

5. EVALUATE

Evaluate the success of your compass. Did it point in a certain direction? Could you easily tell which direction to go? Could it be easily transported to plot or follow a course? How is your compass limited?

6. SHARE

Use your compass to demonstrate which direction your school classroom faces. Then swap course instructions with a classmate and use the compass to follow their directions.



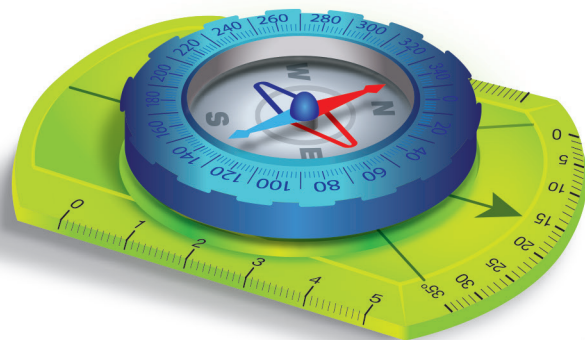
TECHNOLOGICAL ADVANCEMENTS

Homemade compass

Orienteering is a sport that requires you to navigate from one point to another, as quickly as possible. Participants use a compass and a map to work their way around a course. In 1928, a Swedish man loved the sport of orienteering so much that he invented a new style of compass which was far easier to use.

Project task:

Design and create a simple compass from common household items and use it to plot a short course from the classroom door to a location in the school.





BUILDING AND CONSTRUCTION

Aqueduct model

1. INQUIRE

What is an aqueduct? How do aqueducts work? What materials were they traditionally made from? What engineering design was used by the Romans?

2. IDEATE

What design will you create? How will you keep the water flowing? How will you prevent leaking, especially when changing direction? What materials will you use to create the aqueduct?

3. PLAN

Draw a sketch of your design. Label the main parts and the materials you will use, then record instructions for making your aqueduct.

4. CREATE

Collect the materials, tools and equipment you need. Use your sketch to safely create your aqueduct.

5. EVALUATE

Evaluate the success of your aqueduct. Did the design support the weight of the water and make it flow easily? Did the change of direction cause any leaking? Were the materials used suitable? Did the jar fill with water?

6. SHARE

Film a short video of your aqueduct in motion and explain how your design was able to make the water move to fill your jar.



BUILDING AND CONSTRUCTION

Aqueduct model

Aqueduct is a Latin word which means 'waterway'. The ancient Romans built these waterways throughout their cities to provide fresh water to the population—it was their version of plumbing! Some of them still remain today.

Project task:

Design and create a model of an aqueduct that is able to carry water, without leaking, a distance of at least 40 cm to fill a small jar. It should include one change of direction.





DESIGN & TECHNOLOGIES

PROJECT-BASED LEARNING

Use project-based learning to unlock students' knowledge and skills!

Key Features:

- ✓ Six-box series for Years 1 to 6
- ✓ 28 unique projects within each box
- ✓ Hands-on projects to cover the Design & Technologies curriculum area
- ✓ Utilises project-based learning, anchored by a six-step design process.

Design & Technologies: Project based learning encourages students to be curious, creative, and critical-thinkers.

With 28 unique projects in each box, students are taken through cross-curricular situations based on real-world tasks, issues, and challenges.

Design & Technologies Box 1
 Design & Technologies Box 2
 Design & Technologies Box 3
 Design & Technologies Box 4
 Design & Technologies Box 5
 Design & Technologies Box 6

Code: RIC-8470
 Code: RIC-8471
 Code: RIC-8472
 Code: RIC-8473
 Code: RIC-8474
 Code: RIC-8475



Design & Technologies Project-based learning in action

1 Inquire

Look at what the project is, why it is important and how it can be solved.

2 Ideate

Create a list of possible solutions and pick the best one.

3 Plan

Research and design a solution to the project.

4 Create

Gather the materials needed and create the design.

5 Evaluate

Assess what worked and make modifications to improve the design.



6 Share

Display the creation and record feedback for further projects.



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