

# SCIENCE FAIR ENGINEERING PROJECT PLANNING PACKET

Student Name Example

Due Date	Things to Do:
	Identify the problem and write a goal statement.
	Get approval from your teacher.
	Do your research!
	Brainstorm ideas and solutions.
	Draw your new design.
	Build a prototype.
	Test the prototype. Create a table, chart or graph to record your data.
	Evaluate the prototype and redesign. Continue to record data.
	Draw conclusions about your design.
	Make the project display with the appropriate labels.
	Present your project at the science fair.

## Identify the Problem:

Example: Bridges are designed to hold a specific amount of weight. However, some designs hold more weight than others.

My cat eats twice a day, but no one is home in the afternoon to feed my cat. I need a feeder that will allow my cat to access food whenever he needs to do so.

Goal statement:

Example: The goal of this project is to design a model of a bridge that will hold 100 lbs.

The goal of this project is to design a cat feeder that will allow my cat to access food when he is hungry by pushing a lever.

## Research:

Keyword	Definition	How it impacts my design?
lever	rigid object used to lift a load, balanced on a fulcrum (steady object in the middle) push on one side, other side lifts.	The lever will open a flap to release the food when the cat pushes on it.
gravity	The force that makes things fall to the ground on Earth, attraction between objects relating to their mass	Gravity will make the cat food fall.
screw	inclined plane wrapped around a core, pulls things together or can push one thing into another	The screw will connect the lever to the design and allow it to pivot when pressed.
force	pushes or pulls. measured in Newtons	The cat must use enough force when pushing the lever to make it move.

What did you learn during your research that will impact your design?

I learned that in order to hold the lever in place while it pivots, I will need a screw. I also learned about how the placement of the fulcrum affects the amount of force needed to use the lever.

Sources:

Book Title

The Kids' Book of Simple Machines

Author

Kelly Doudna

Book Title

Author

Book Title

Author

Website

www.bbc.co.uk

Website

Hint: Don't forget to list your sources on your display board!

Ideas	Draw your Design
<ul style="list-style-type: none"><li>- screw in lever</li><li>- lever low enough for cat to use</li><li>- doesn't require much force to push lever</li></ul>	<p>cat food</p> <p>plastic container to hold cat food</p> <p>screw to allow lever to pivot</p> <p>string to connect lever to the flap</p> <p>flap that opens when lever is pushed</p> <p>wire lever</p> <p>pedal to push the lever down</p> <p>cat bowl</p> <p>cardboard slide for food to go down</p>

Now it is time to build a prototype (first working model). Don't forget to take pictures of your prototype!!

What materials did you use? Why did you choose those materials?

plastic container, screw, wire hanger, paper towel roll (slide), cardboard for flap and pedal, cat bowl, cat food, string, stand, hot glue

List the steps for creating your prototype.

1. Gather materials.
2. Connect plastic container to the stand.
3. Attach the wire lever to the peddall on one end and the container on the other with the screw.
4. Cut an opening in the container and attach the flap.
5. Use string to attach far end of flap to lever.
6. Attach the slide under opening.
7. Test design.

## Test Your Design

You must test your design at least three times. After each test, evaluate the design and make any changes necessary. Be very specific when describing the test results. Always refer back to the science!!

Test #	Description of Results	Adjustments Made
1	It took a lot of force to move the lever. A cat cannot move it.	I loosened the screw to allow the lever to move more freely.
2	The flap would not stay together with hot glue.	I attached it with a screw.
3	The slide would not carry the food all the way to the bowl.	I changed the angle of the slide.
4		

Hint: Take pictures of each adjustment that you made for your display board.

## Conclusion

Write a statement in paragraph form about your design. Include why you chose the design and the scientific principles that it was based on. What did you learn by testing your prototype and did the adjustments enhance your design?

My design is a cat feeder that allows the cat to feed itself whenever it chooses. I chose this design because my cat eats in the afternoon and no one is home to feed him. This design is based off simple machines working together, while using gravity, to accomplish a bigger goal. I learned, by testing my design, that all the parts of compound machines must work together. If one machine does not work properly, the whole design is compromised.

### Display Board

Problem	Goal Statement	Design Photo or Drawing
<input type="text"/>	<input type="text"/>	<input type="text"/>
Key Words and Research	Data	
<input type="text"/>	<input type="text"/>	
Procedures and Materials	Photo or Drawings	Conclusion Statement
<input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/>