

Name(s): Susie Q.

Project: Wind Lift - Heavy Lifting

ASK

What is the problem (what needs to be solved/made better)?

Lift as many pennies as possible in 20 sec.

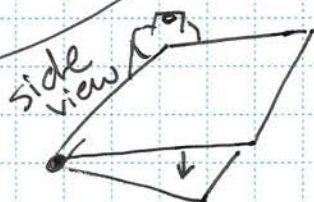
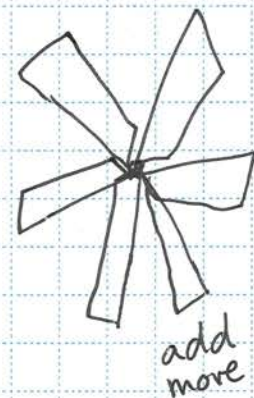
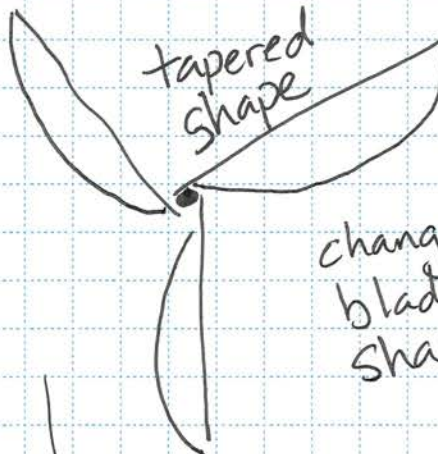
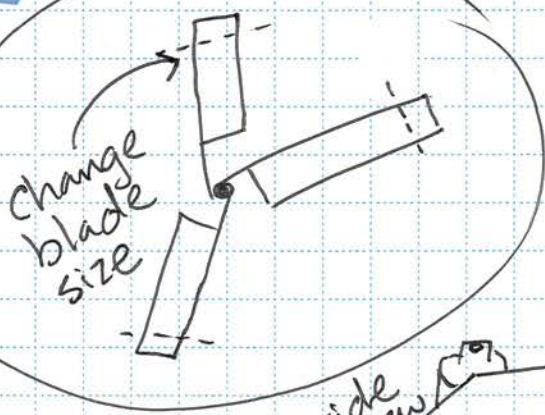
Research: How have others solved, or attempted to solve this problem? What are the constraints (things your design can not, or must, do or be)?

Constraints are: - must be powered only by the wind.
- can change blade shape, size, and angle
- Fan may be no closer than 60cm (2ft)

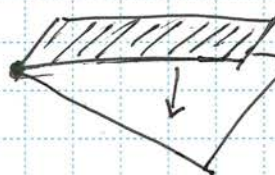
Some wind turbines are big, some are small, some have 3 blades, and some have more.

IMAGINE

Brainstorm, sketch and describe possible solutions (different ideas that might solve the problem). Use extra paper, if needed.

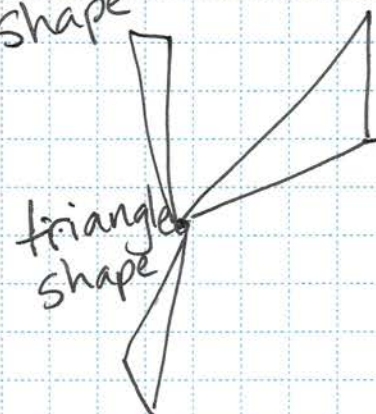


change blade angle



Front view

change blade shape

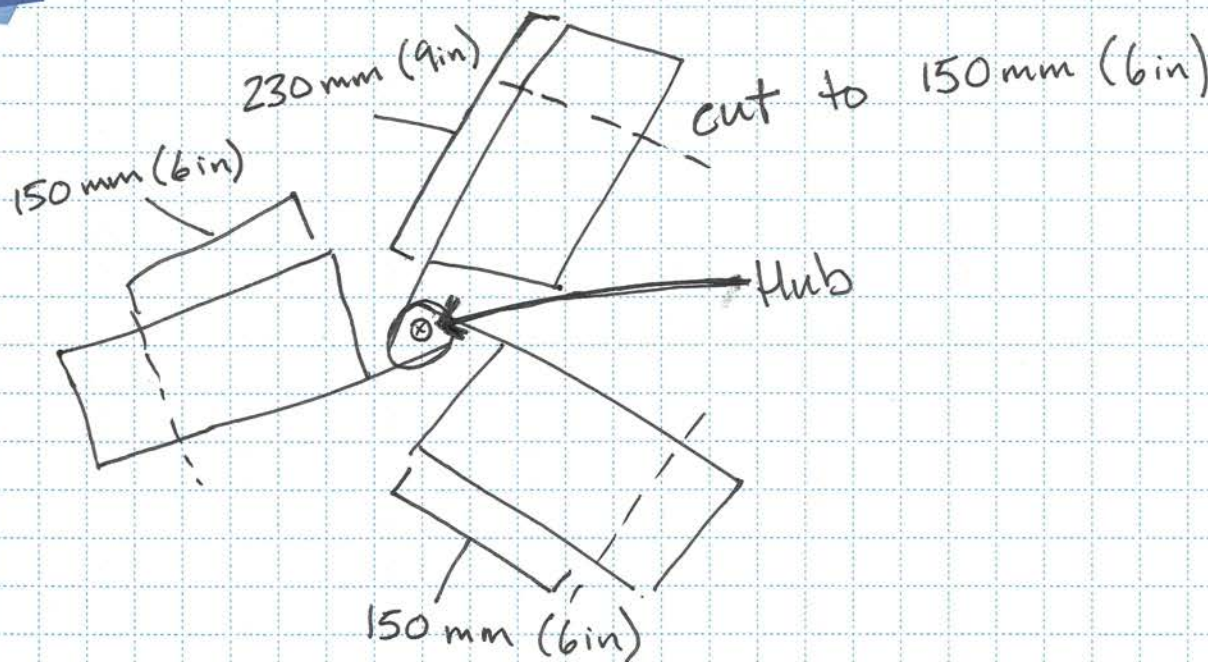


Choose the best solution. Circle it. Why do you think it is best?

Shorten blade size. If the blades are small I think it will spin faster and better to lift more pennies.

PLAN

Draw the solution you choose. Include the details you will need to create it. Use extra paper, if needed.



CREATE

- Build the solution you planned.
- Test it. Make observations. Record results below, or on another paper.

I cut the blades to 150mm (6in) each and turned on the fan. It didn't turn. I angled the blades back and it did start to turn and lift. Trying to lift 15 pennies, it stopped halfway.

Did you solve the problem?

Yes? Great! Identify a new problem (a way to make your design even better).

No? That's OK. What did you learn that can help solve it in a new/different way?

No, my wind lift stopped lifting about halfway up when trying to lift 15 pennies. I learned angles helped turn the blades. Maybe it will help if I had more blades.

IMPROVE

There is no perfect design (yep... your design can still be improved). Make it, faster, go faster, stronger, more accurate, easier to use, more efficient, better looking, etc.

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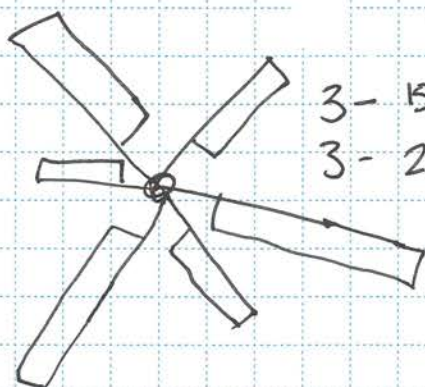
Research: How have others solved, or attempted to solve this problem? What are the constraints (things your design can not, or must, do or be)?

Same constraints as before.

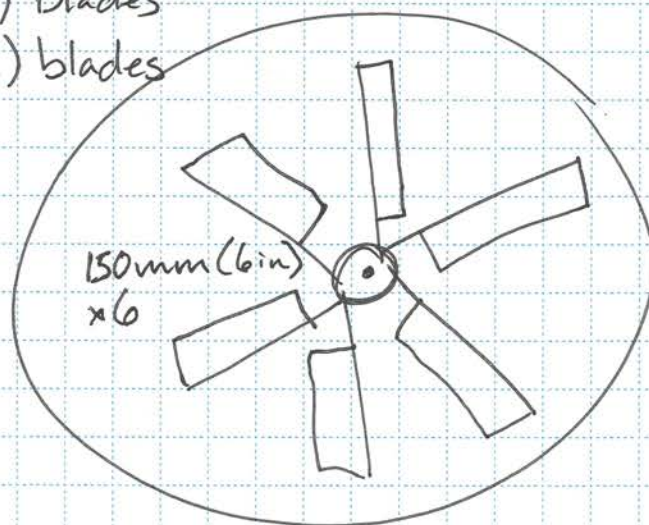
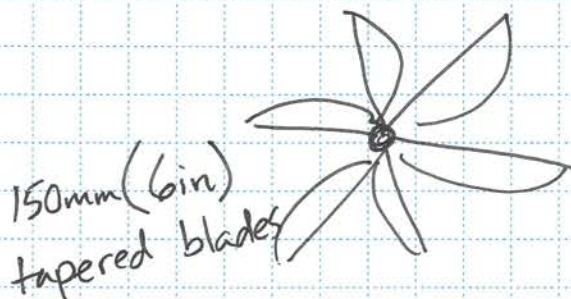
I last attempted to solve this problem by cutting my three blades to 150mm (6in) and angling the blade pitch back. After the 20 seconds were up, my wind lift was only half way up. I've research other wind machines that have 6 blades.

Brainstorm, sketch and describe possible solutions (different ideas that might solve the problem). Use extra paper, if needed.

IMAGINE



3 - 150mm (6in) blades
3 - 230mm (9in) blades



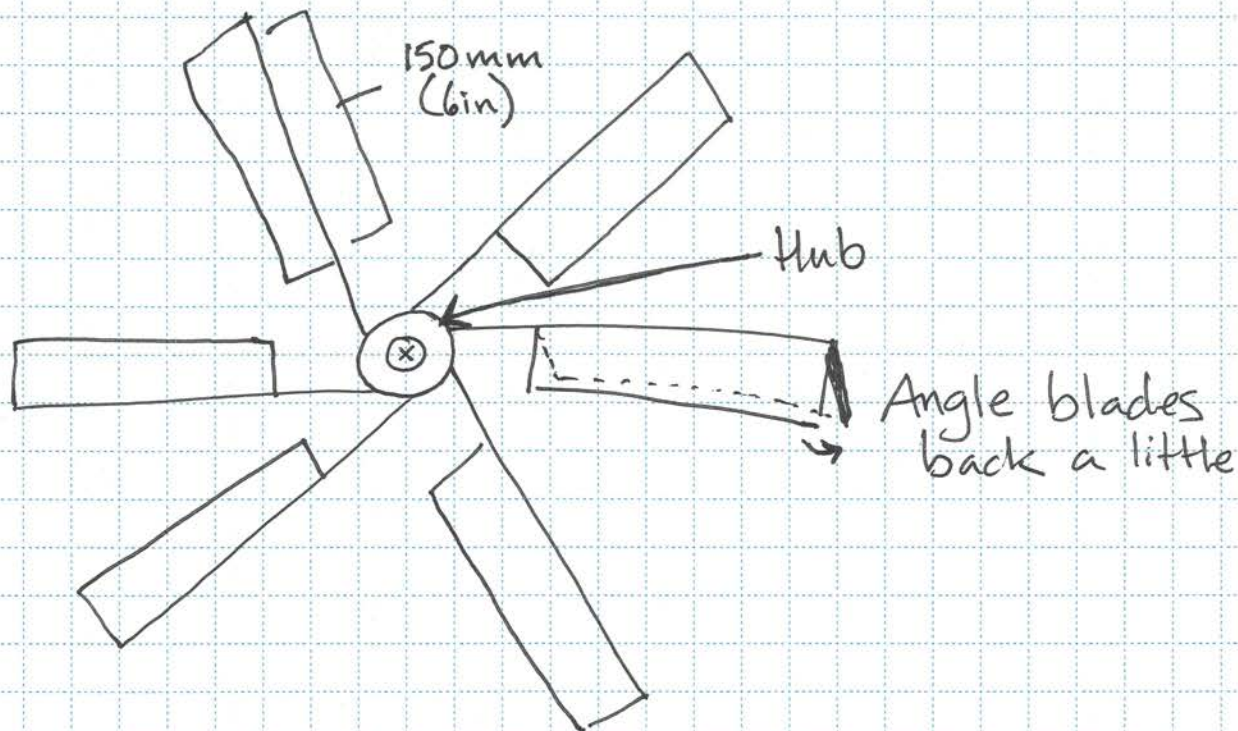
Choose the best solution. Circle it. Why do you think it is best?

I am going to try adding more blades to my first design to see how that affects my design. Before changing other variables.

CONTINUE TO "PLAN"
on page 2

PLAN

Draw the solution you choose. Include the details you will need to create it. Use extra paper, if needed.



CREATE

- Build the solution you planned.
- Test it. Make observations. Record results below, or on another paper.

It looked like my blades spun faster! By adding more blades the wind lift was also stronger.

IMPROVE

Did you solve the problem?

Yes? Great! Identify a new problem (a way to make your design even better).

No? That's OK. What did you learn that can help solve it in a new/different way?

Yes! My 6 blade design had more turning strength or torque than the 3 blade design. I was able to lift more pennies.

I need the length to stay long, but I would like it to look better.

There is no perfect design (yep... your design can still be improved). Make it, faster, go faster, stronger, more accurate, easier to use, more efficient, better looking, etc.

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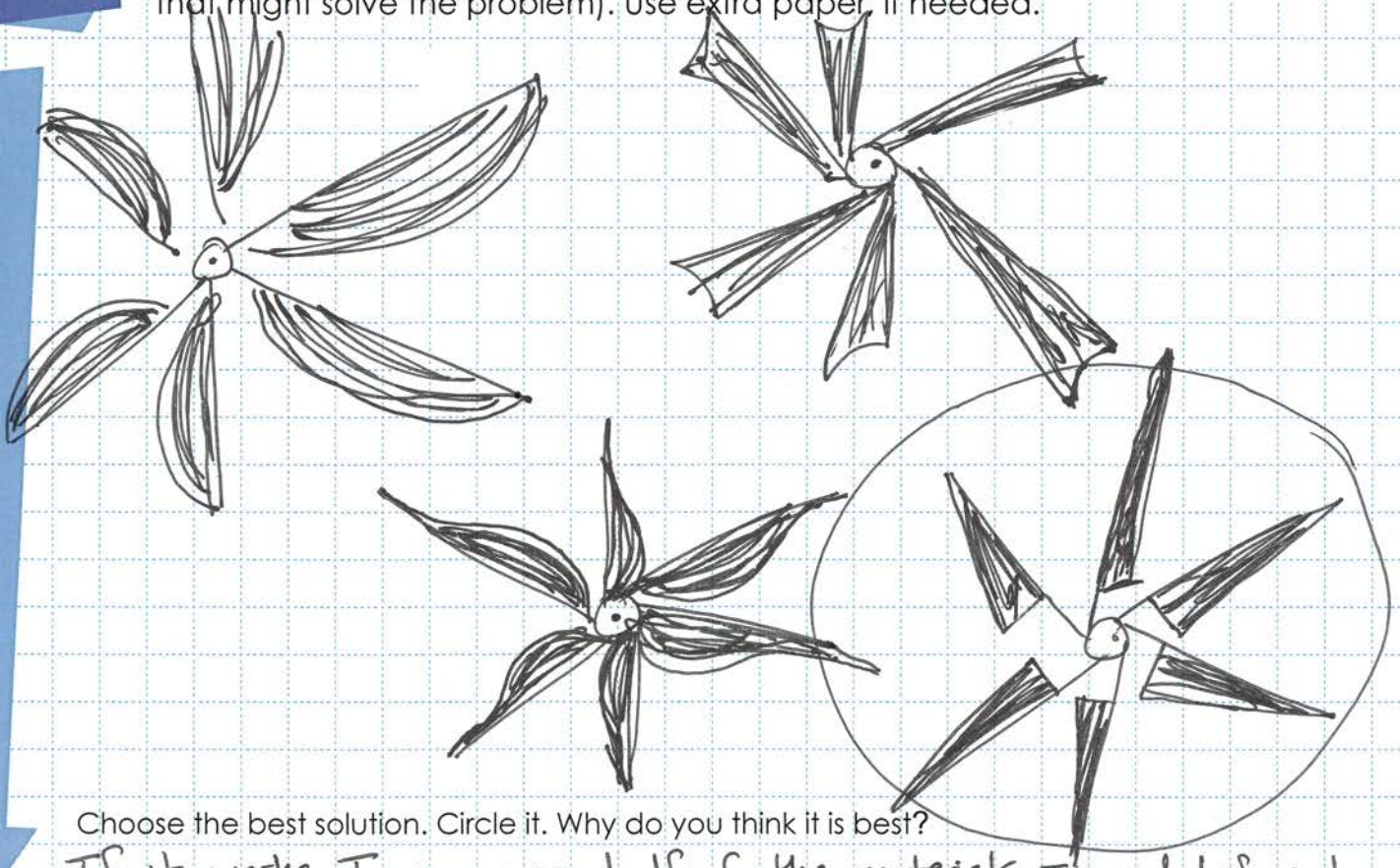
Research: How have others solved, or attempted to solve this problem? What are the constraints (things your design can not, or must, do or be)?

Same constraints as before.

I solved the strength problem (longer blades have more torque) and can lift a lot more pennies than my first design. I've researched what other wind blades look like and there are many different shapes.

IMAGINE

Brainstorm, sketch and describe possible solutions (different ideas that might solve the problem). Use extra paper, if needed.

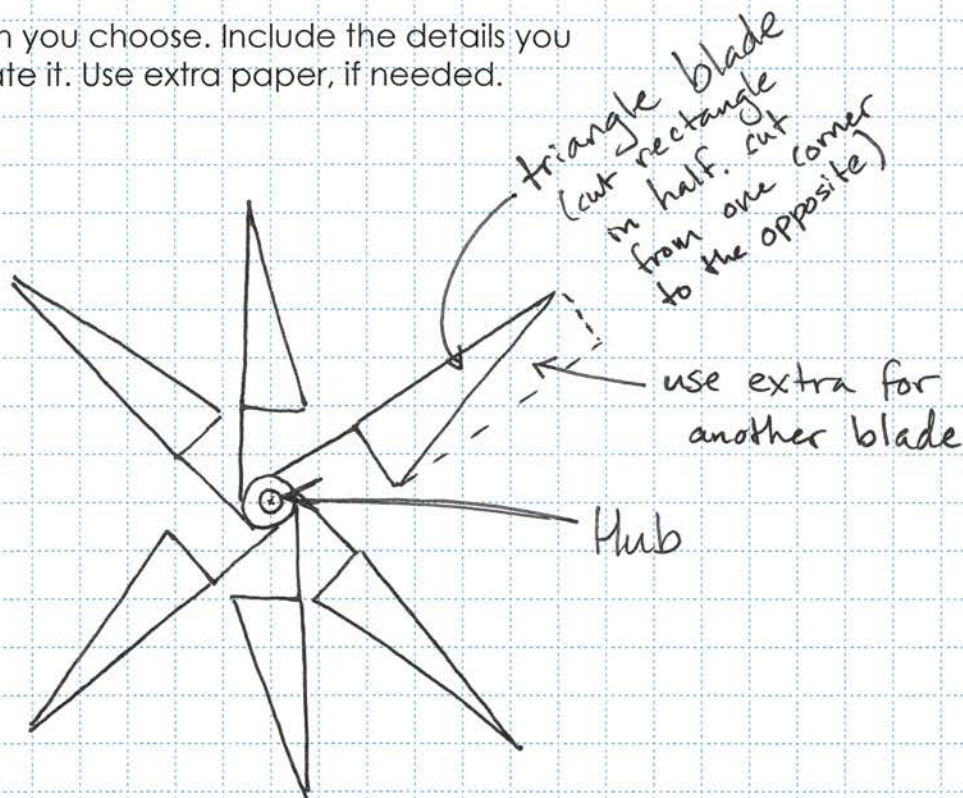


Choose the best solution. Circle it. Why do you think it is best?

If it works I can use half of the materials I used before to make the blades. Instead of full rectangles I can use half (a triangle)

PLAN

Draw the solution you choose. Include the details you will need to create it. Use extra paper, if needed.



CREATE

- Build the solution you planned.
- Test it. Make observations. Record results below, or on another paper.

Couldn't lift as many pennies as when I had the full rectangle blades.

IMPROVE

Did you solve the problem?

Yes? Great! Identify a new problem (a way to make your design even better).

No? That's OK. What did you learn that can help solve it in a new/different way?

No, it didn't work. I saved on materials, but I lost some lifting power. I kept the length the same. So maybe blade shape also affects torque.

I am going to try experimenting more with shape.

Maybe I'll flip the triangles so that the big end is on the outside

There is no perfect design (yep... your design can still be improved). Make it, faster, go faster, stronger, more accurate, easier to use, more efficient, better looking, etc.