

Wheel & Axle Packet

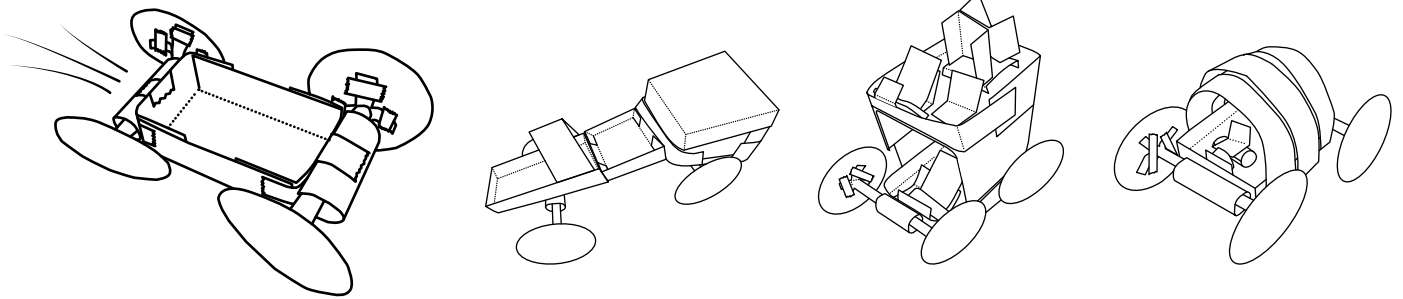
Use inner and outer tubes to create wheel and axles projects that roll, spin and rotate!



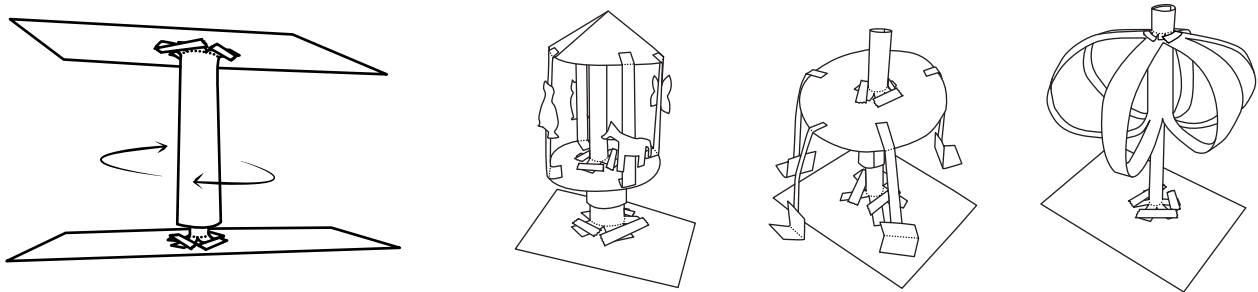
Technique Pages Included:



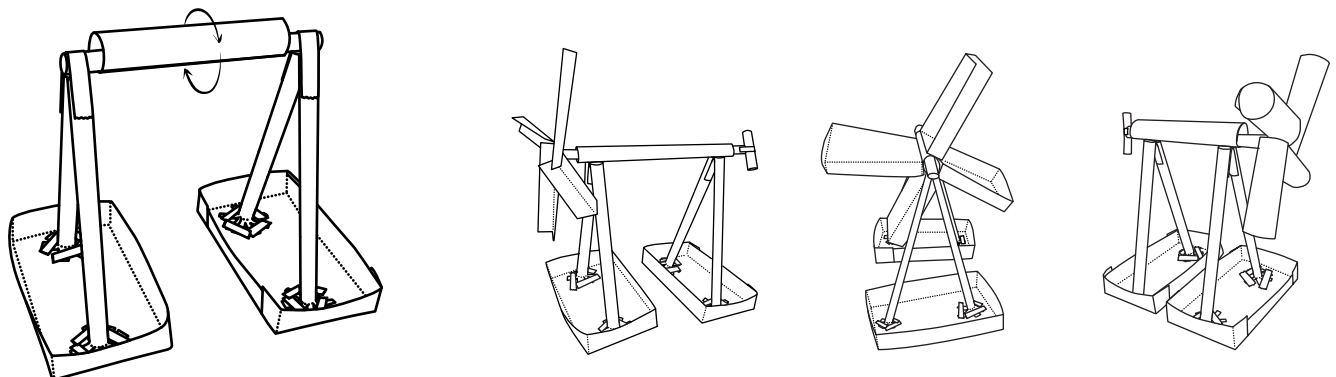
Rolling Vehicle



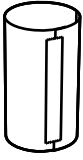
Vertical Axle Spinner



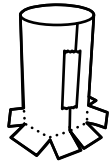
Horizontal Axle Spinner



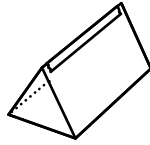
Cylinder



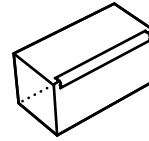
Cylinder with Flaps



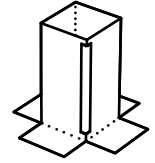
Triangular Prism



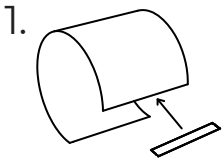
Rectangular Prism



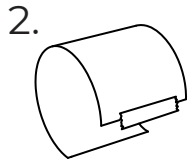
Rectangular Prism with Flaps



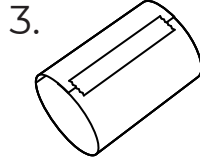
Cylinder



Put tape on one edge of paper

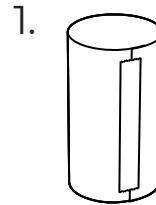


Bring taped edge over the other edge

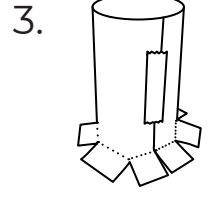
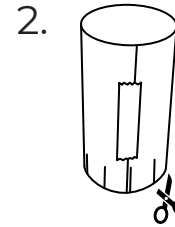


Secure with tape

Cylinder with Flaps

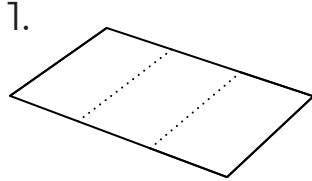


Cut slits along base of cylinder

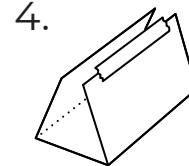
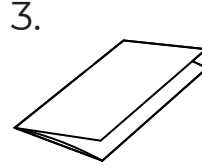
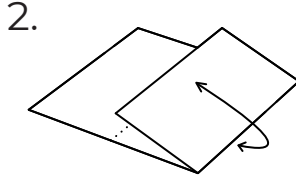


Fold flaps outward from cylinder

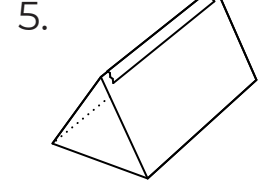
Triangular Prism



Fold paper into thirds

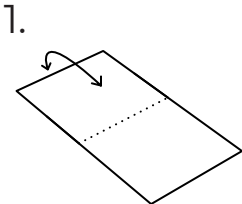


Place tape, line up ends of paper

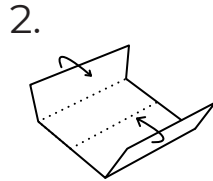


Tape the ends together

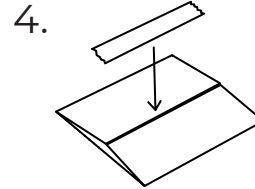
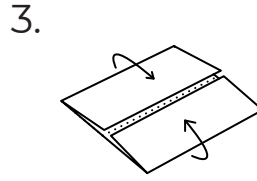
Rectangular Prism



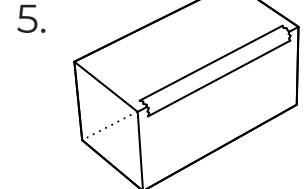
Fold paper in half, unfold



Fold outside edges to center fold line

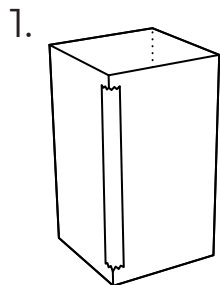


Line up edges of paper, tape them together

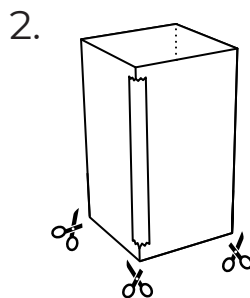


Pop open the rectangular prism

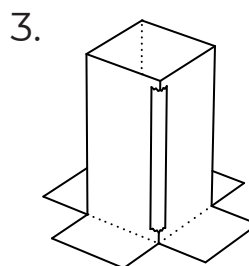
Rectangular Prism with Flaps



Start with rectangular prism

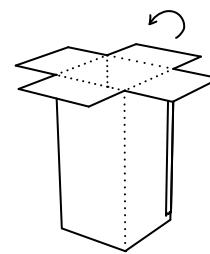


Cut slits at each corner as shown

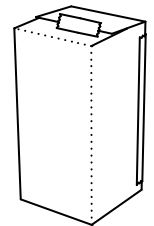


Fold flaps outward to widen base and make it more stable

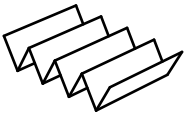
or



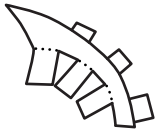
Create a closed end by folding flaps inward and taping them together



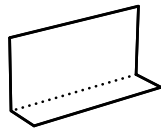
Accordion



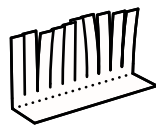
Curved Wall



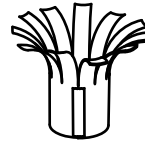
Stand Up



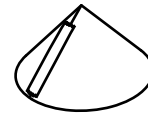
Stand Up Fringe



Cylinder with Fringe



Cone



Tent



Accordion

- Fold paper into quarters, unfold
- Fold short edges to center fold
- Fold edges in half outward
- Fold section backwards to meet at center fold
- Flip it over
- Fold along center fold
- Finished

Curved Wall

- Fold approximately 1/4 from edge
- Cut slits from edge to fold line
- Fold flaps to opposite sides

Stand Up

- Fold approximately 1/4 from edge
- Decorate
- Fold and stand upright

Stand Up Fringe

- Fold approximately 1/4 from edge
- Cut parallel lines as shown
- Fold flaps to opposite sides

Cylinder with Fringe

- Cut parallel lines as shown
- Place tape along long edge
- Curve edges around, tape them together
- Finished

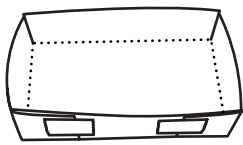
Cone

- Trace a circle on piece of paper and cut it out
- Mark the center. Cut a slit from edge to center
- Place tape along one edge. Bring taped edge over the other
- Tape edge in place

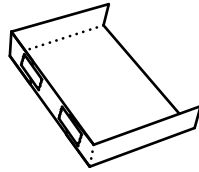
Tent

- Fold paper in half
- Flip over & stand upright

Tray

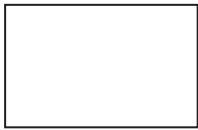


Half Tray

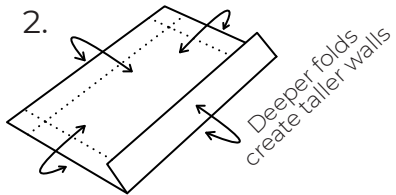


Tray

1.

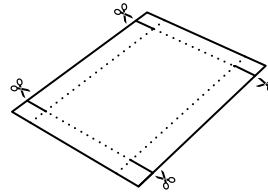


2.



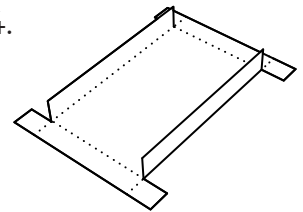
Fold and unfold each edge inward to make walls

3.



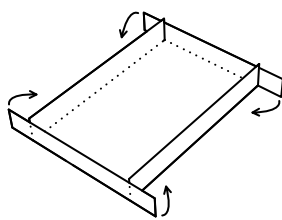
Cut slits from edge of paper to intersection of fold lines

4.



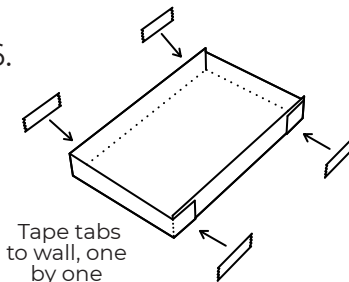
Fold edges up to make walls

5.



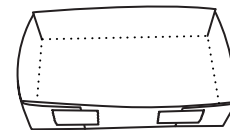
Fold tabs inward

6.

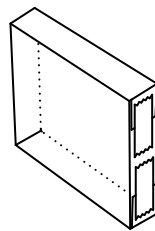
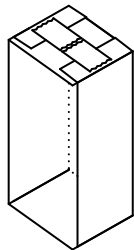
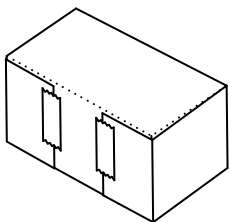


Tape tabs to wall, one by one

7.



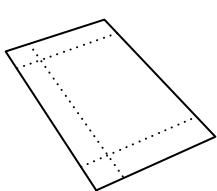
Finished tray



Vary the dimensions and orientation for more project possibilities

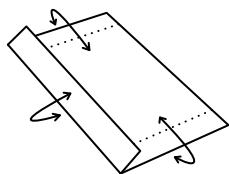
Half Tray

1.

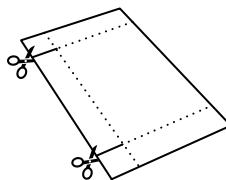


Fold 3 edges inward, unfold

2.

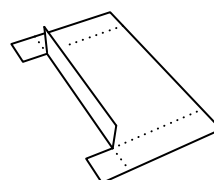


3.



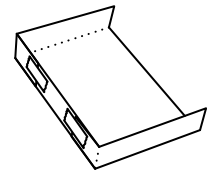
Cut slits from edge to intersection of fold lines

4.



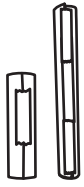
Fold center wall up, then side walls

5.

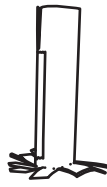


Tape tabs in place to secure walls

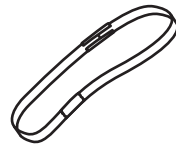
Tubes



Tube with Flaps



Paper String



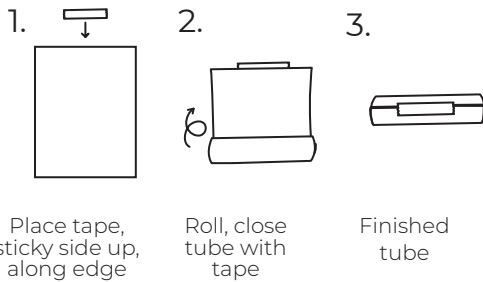
Paper Bracket



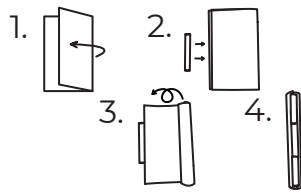
Pontoon Base



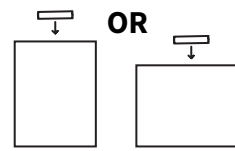
Tubes



Sturdier Tube

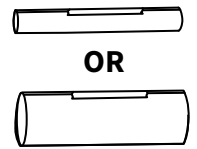


Longer vs. Shorter



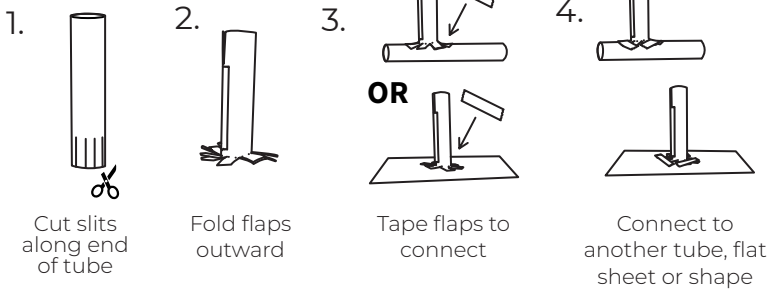
Roll from short or long edge of paper to achieve different lengths

Wider vs. Narrower

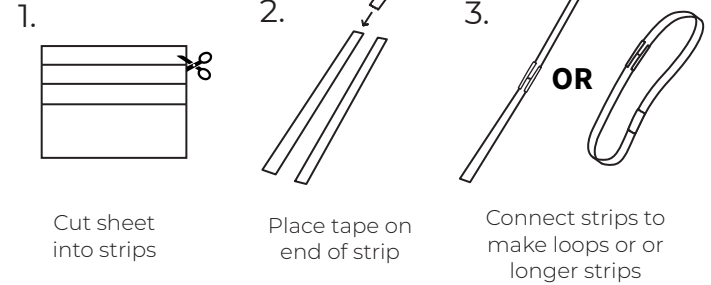


Roll tube loosely or tightly to achieve different widths

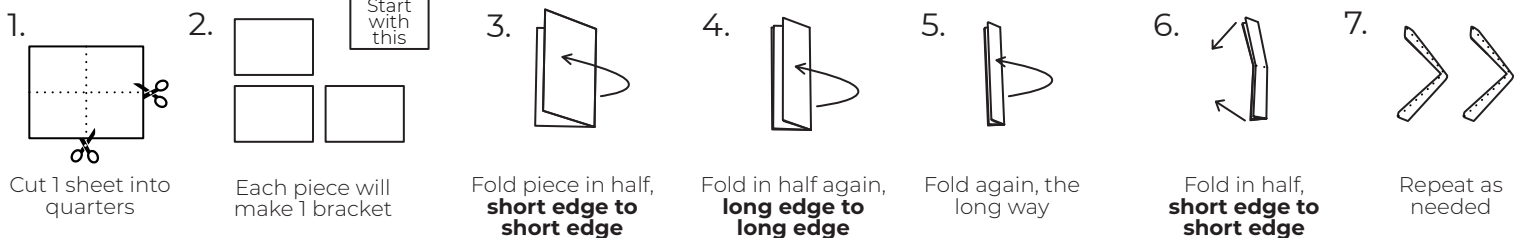
Tube with Flaps



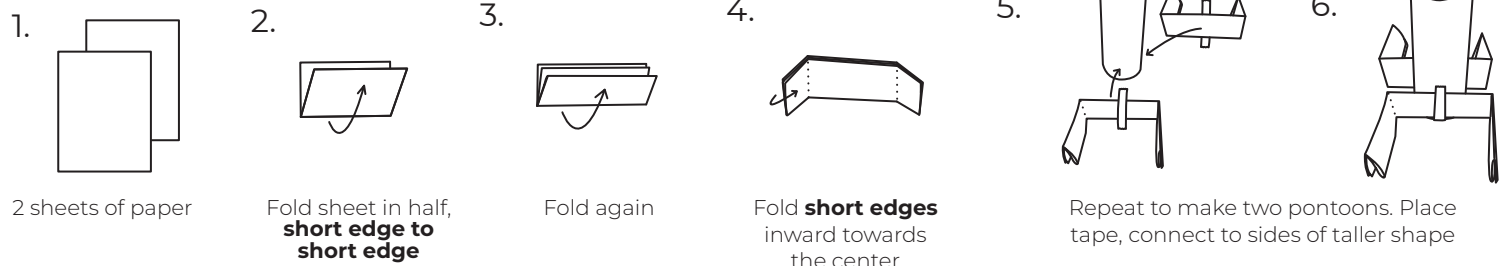
Paper String



Paper Bracket

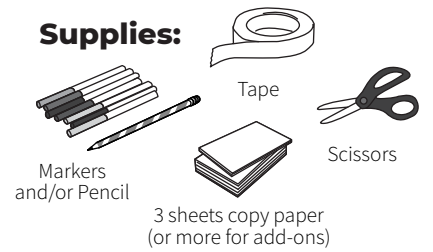


Pontoon Base



Rolling Vehicle

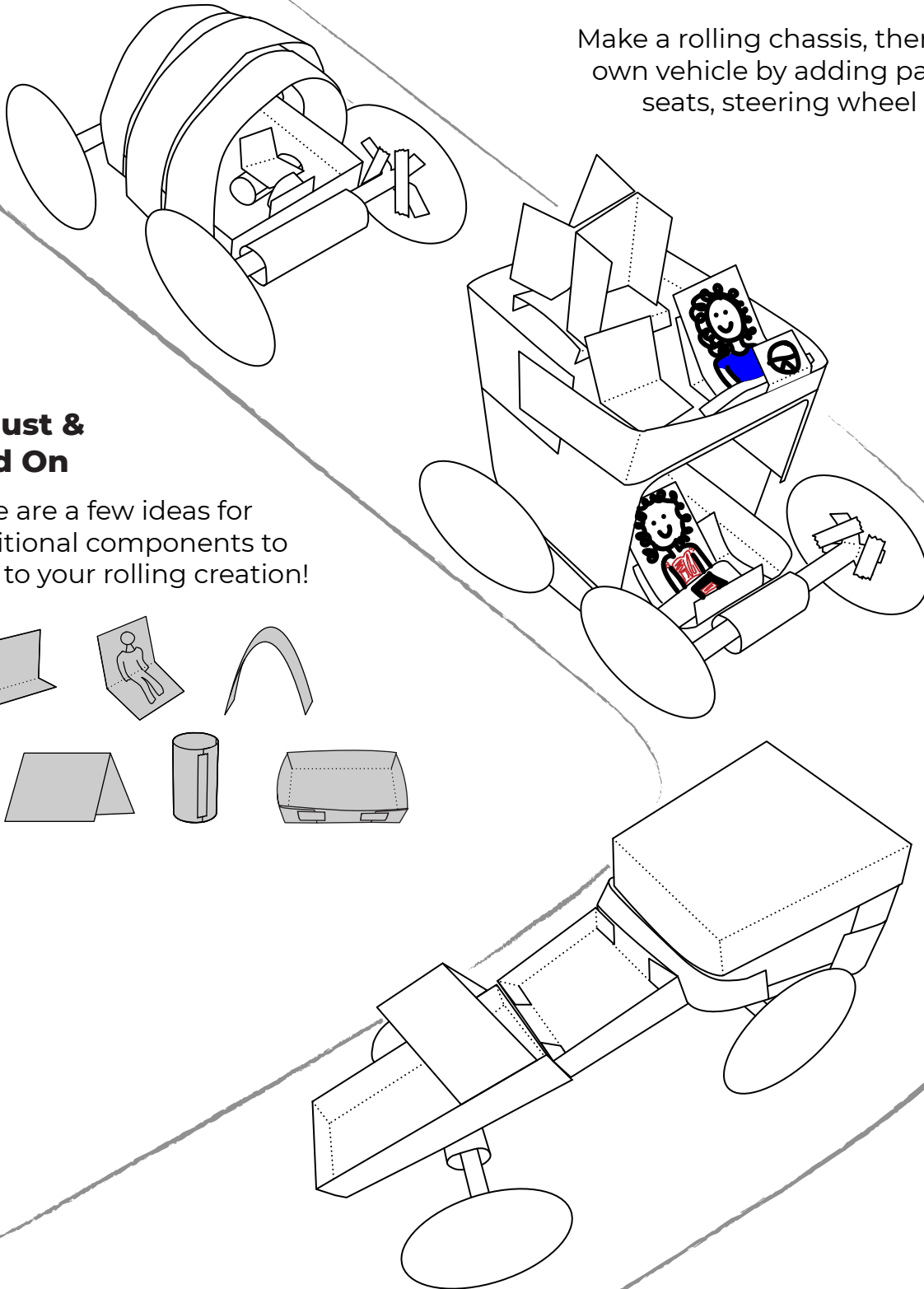
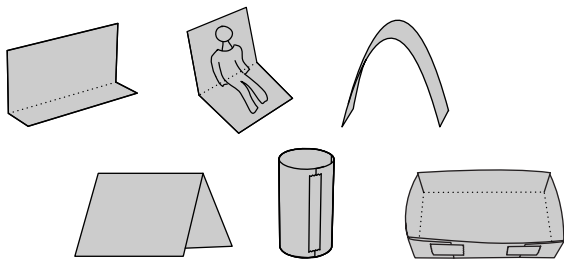
Supplies:



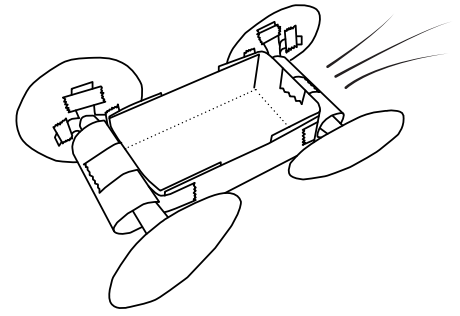
Make a rolling chassis, then create your own vehicle by adding paper people, seats, steering wheel & more!

Adjust & Add On

Here are a few ideas for additional components to add to your rolling creation!



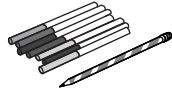
Create a Rolling Vehicle



Supplies:



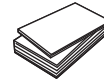
Tape



Markers
and/or Pencil



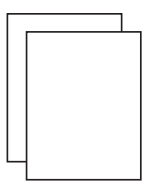
Scissors



3 sheets copy paper
(or more for add-ons)

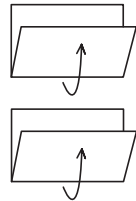
Prep the Paper

1.



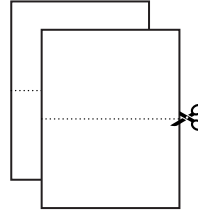
Begin with 2 sheets
of copy paper

2.



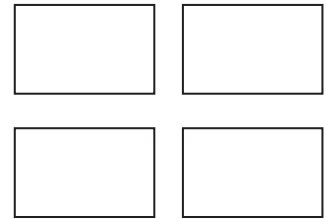
Fold each sheet in half
short edge to short edge

3.



Unfold, cut each sheet
in half, along crease line

4.



Use these four half
sheets for the project

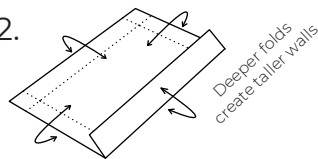
Build the Chassis

1.



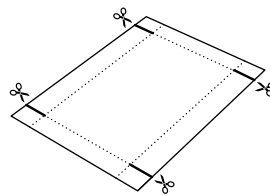
Use one half sheet

2.



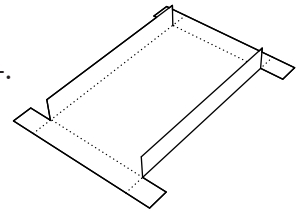
Crease all 4 edges
inward to make walls

3.



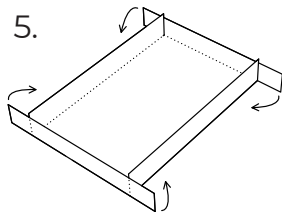
Cut slits from edge of paper to
intersection of fold lines

4.



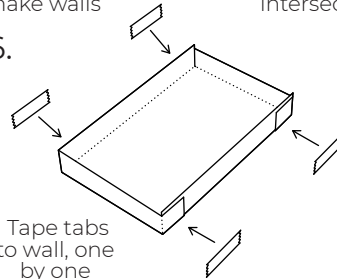
Fold edges up to
make walls

5.



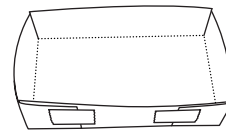
Fold tabs inward

6.



Tape tabs
to wall, one
by one

7.



Finished chassis

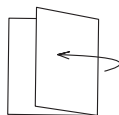
Cut the Wheels

1.



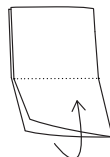
Use one half sheet
to make 4 wheels

2.



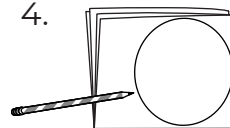
Fold in half, **short
edge to short edge**

3.



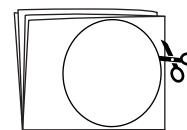
Fold in half
again, as shown

4.



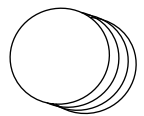
Trace a circle with
approx. diameter 2.5"

5.





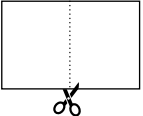

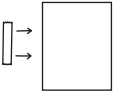
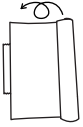

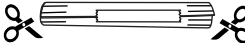
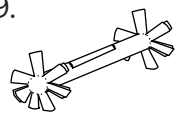
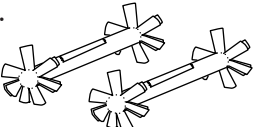
Cut circles

6.

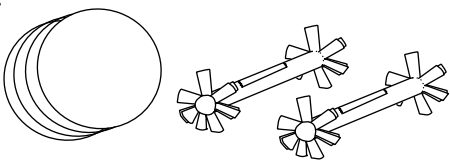
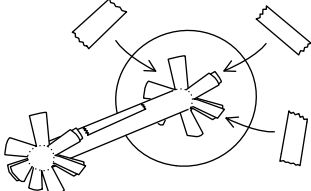
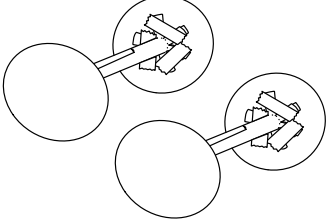


Finished wheels.
See Wheel Template
Page for tips


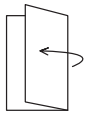
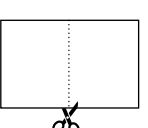

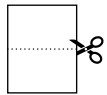

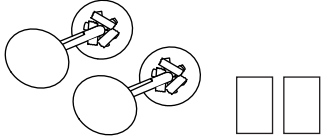
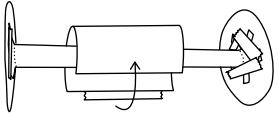
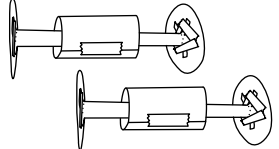
Create the Axles

- 
Use one half sheet
- 
Fold in half, **short edge to short edge**
- 
Unfold & cut along crease line
- 
Start with This
- 
Place tape, sticky side up, **along long edge** of each rectangle
- 
Roll tightly
- 
Close tube with tape
- 
Cut slits at both ends of tube
- 
Fold flaps outward
- 
Repeat with remaining paper piece to make 2 axles

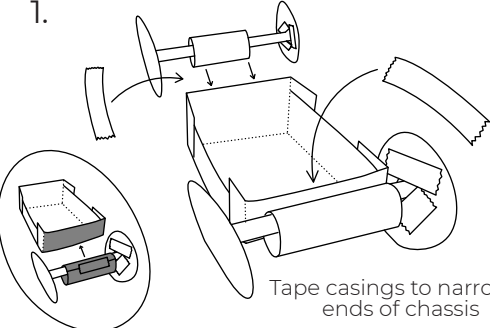
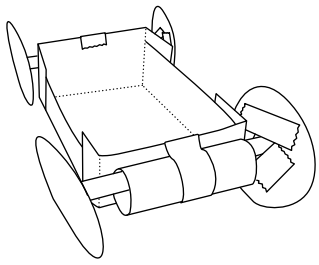
Connect Wheels & Axles

- 
Gather wheels and axles
- 
Tape flaps to center of wheels. See *Wheel Template Page* for tip to find wheels' center
- 
Repeat with remaining wheels & axle

Make Casings for Wheels & Axles

- 
Use one half sheet
- 
Fold in half, **short edge to short edge**
- 
Unfold, cut along crease line
- 
Extra Use This
- 
Fold **short edge to short edge**, unfold, cut
- 
These two pieces will be the casings
- 
Gather wheels & axles and casings
- 
Place **tape on short edge** of casing, roll it around axle, secure closed with tape
- 
Wheels & axles should spin easily within casings

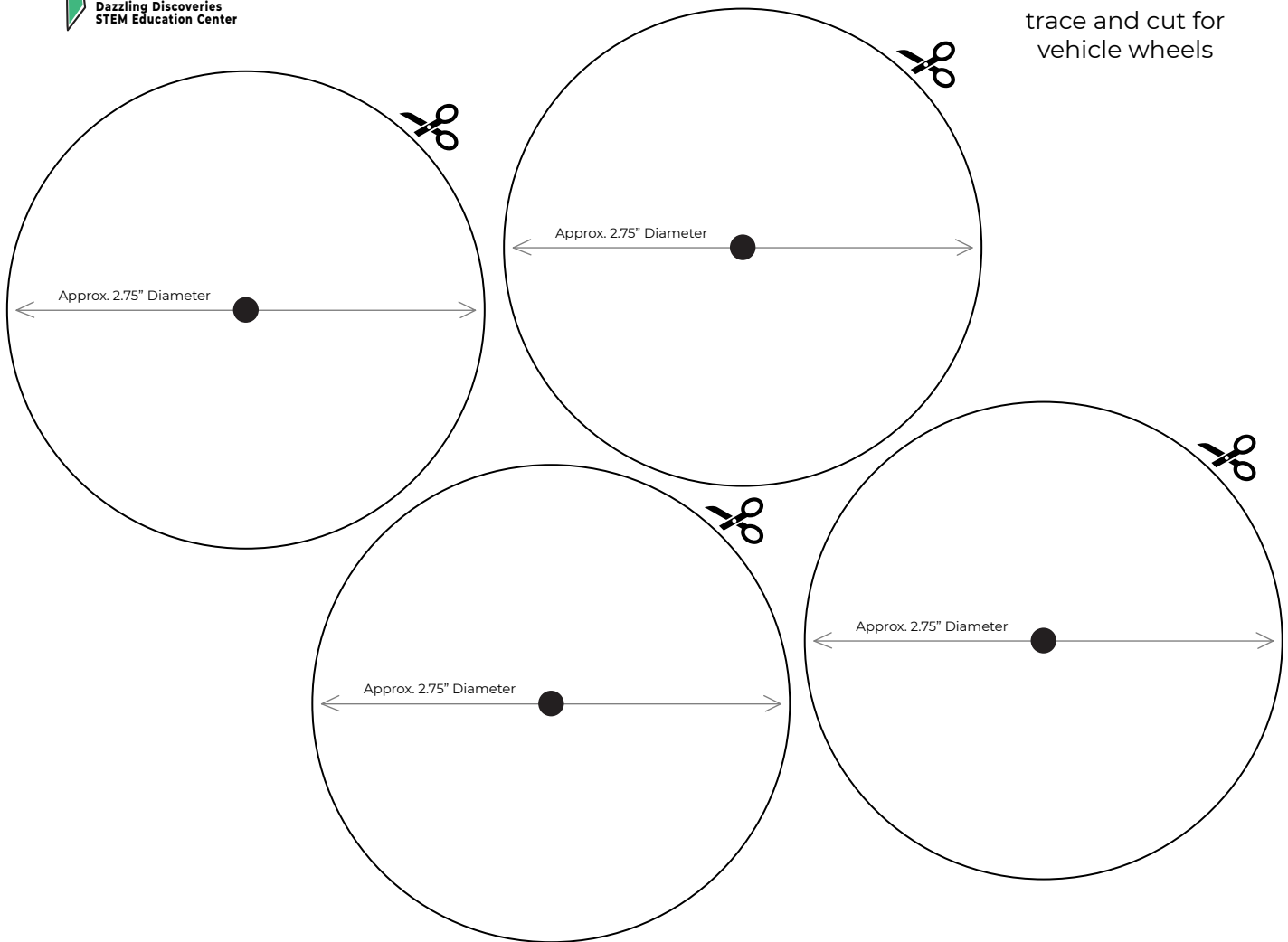
Assemble the Vehicle

- 
Tape casings to narrower ends of chassis
- 
Roll the vehicle, make adjustments as needed

Troubleshooting Tips:

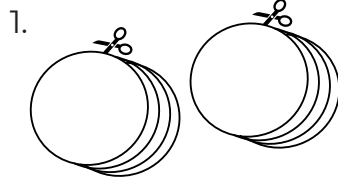
- **Round the edges of the wheels.** Trim the curve to make wheels rounder and roll more smoothly.
- **Double the wheels.** Make 8 wheels, stick them together in pairs to make each set sturdier. See *Wheel Template Page* for instructions.
- **Center the axles on wheels.** Mark the center point on each wheel before attaching axle. See *Wheel Template Page* for instructions.
- **Keep sticky tape out of the way.** Press down sticky sections of tape.

Print this page or find a circle of similar size to trace and cut for vehicle wheels

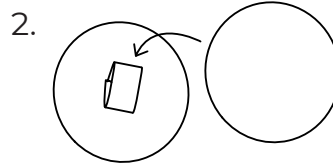


These tips can help you build sturdier wheels that roll more smoothly

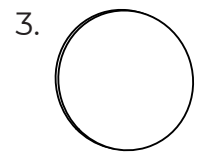
Double Layer the Wheels to make them sturdier



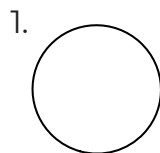
Cut 8 wheels



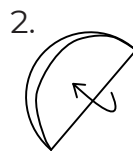
Make a loop of tape, sticky side out. Place tape loop at center of wheel. Put 2nd wheel on top. Repeat to make 4 sets of wheels



Find the Wheel's Center to place axle



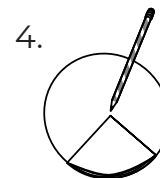
Make one extra wheel



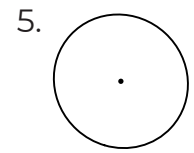
Fold wheel in half



Fold in half again



Place on top of wheel, line up curved edges



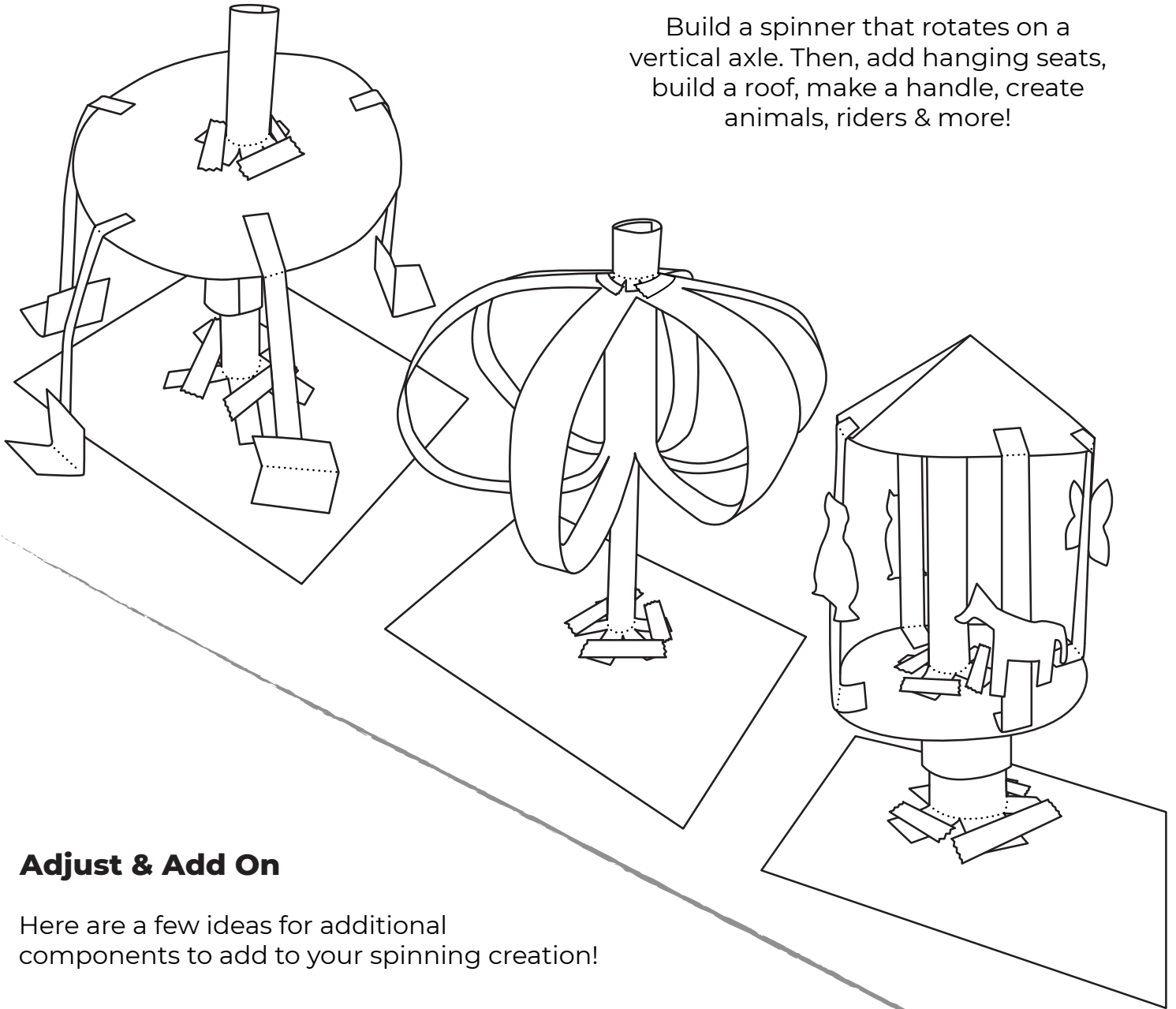
Use vertex of folded wheel, mark the center of all wheels

Vertical Axle Spinner

A carousel style spinner

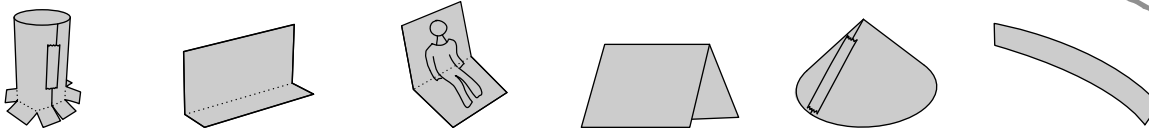


Build a spinner that rotates on a vertical axle. Then, add hanging seats, build a roof, make a handle, create animals, riders & more!



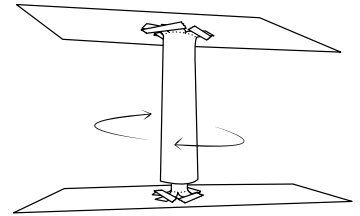
Adjust & Add On

Here are a few ideas for additional components to add to your spinning creation!



Vertical Axle Spinner

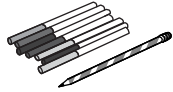
A carousel style spinner



Supplies:



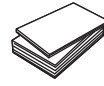
Tape



Markers and/or Pencil



Scissors



4 sheets copy paper (or more for add-ons)

Roll Narrow Inner Tube

1. 1 full sheet copy paper
2. Fold sheet in half, **short edge to short edge**
3. Place tape **sticky side up** on long edge of folded sheet
4. **Tightly roll** folded sheet
5. Close loose edges with tape
6. Finished narrow tube

Roll Wide Outer Tube

1. 1 full sheet copy paper
2. Fold sheet in half, **short edge to short edge**
3. Place tape **sticky side up** on long edge of folded sheet
4. **Loosely roll** sheet to easily fit around inner tube
Wider than inner tube
5. Close loose edges with tape
6. Finished wide tube

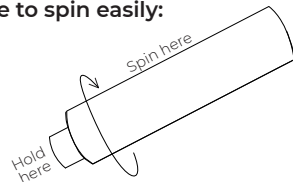
Test the Spinner

Place inner tube into outer tube

Adjust as needed for the outer tube to spin easily:

• **Keep sticky tape out of the way.**
Press down sticky sections of tape

• **Adjust tube sizes.** Roll them again if needed for smooth spinning



Cut Flaps

1. Inner and outer tube
2. Cut even slits along one end of each tube
3. Fold flaps outward

Assemble Spinner

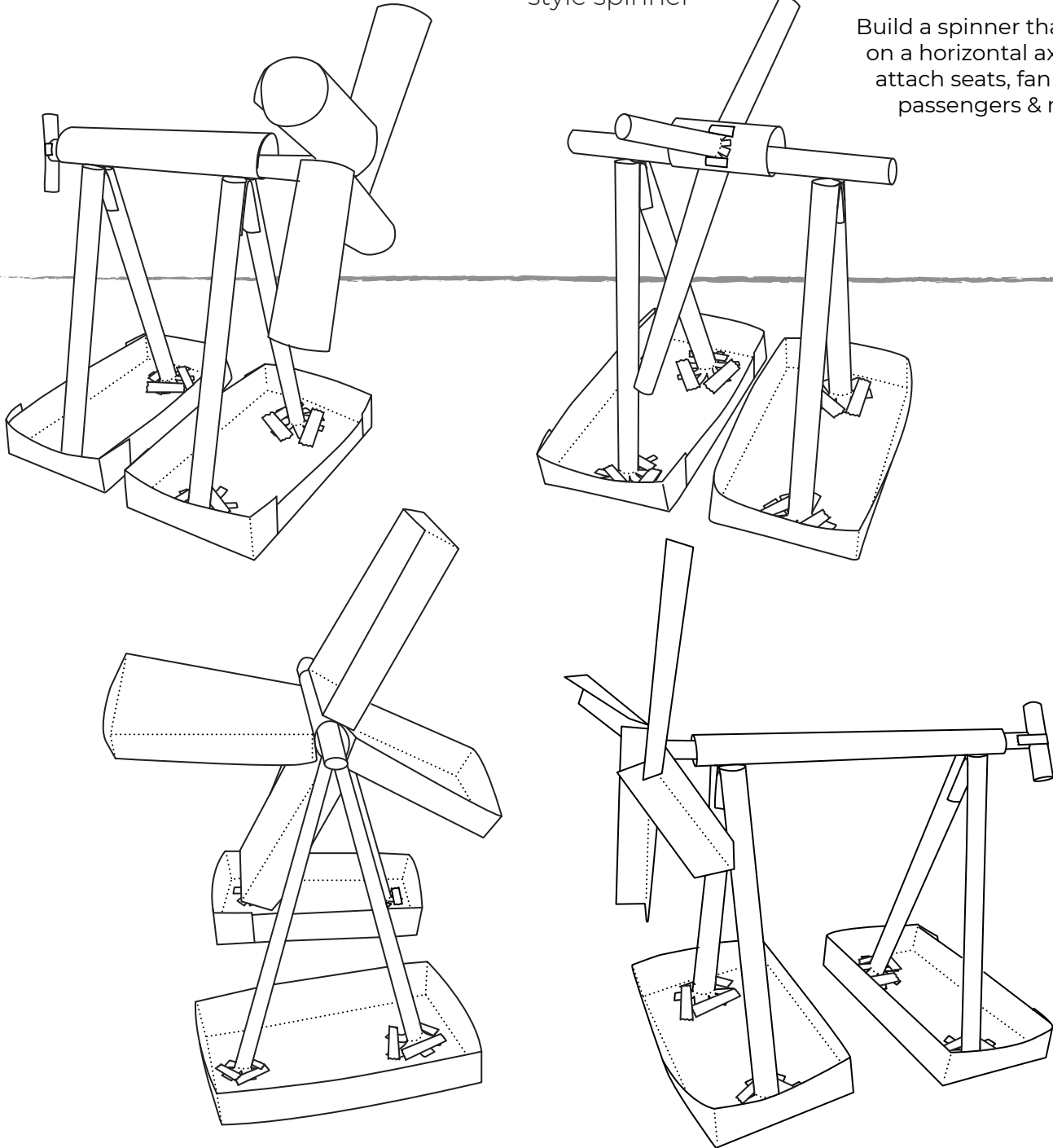
1. Fold sheet in half, **short edge to short edge**
2. Unfold and cut along crease
3. Tape flaps of each tube to half sheet of paper
4. Place outer tube on top of inner tube
5. Hold the base with one hand and spin the outer tube with other hand
6. Tape base to full sheet of paper to help stabilize spinner

Horizontal Axle Spinner

- Supplies:**
- Markers and/or Pencil
 - Tape
 - Scissors
 - 8 sheets copy paper (or more for add-ons)

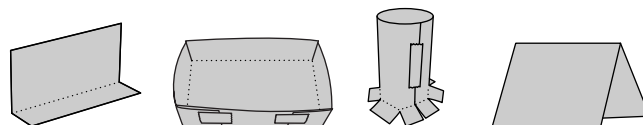
A ferris wheel/windmill style spinner

Build a spinner that rotates on a horizontal axle. Then attach seats, fan blades, passengers & more!



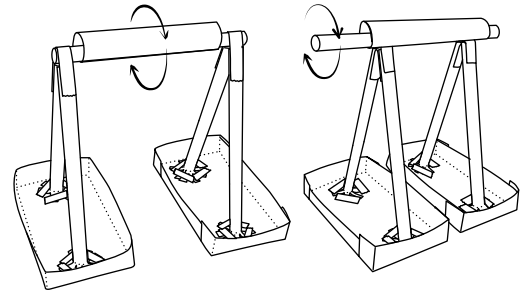
Adjust & Add On

Here are a few ideas for additional components to add to your spinning creation:



Horizontal Axle Spinner

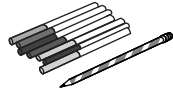
A ferris wheel/windmill style spinner



Supplies:



Tape



Markers and/or Pencil



Scissors



8 sheets copy paper (or more for add-ons)

Make Base Trays

- 1 sheet copy paper
- Fold sheet in half, **short edge to short edge**
- Unfold and cut along crease line
- These two pieces will be the base trays
- Deeper folds create taller walls
- Cut slits from edge of paper to intersection of fold lines
- Fold edges up
- Fold tabs inward
- Tape tabs to wall, one by one
- Repeat with other half sheet to make 2 trays

Create the Leg Tubes

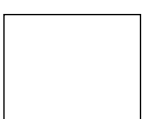
- 4 sheets copy paper
- Fold each sheet in half, **short edge to short edge**
- Place tape **sticky side up** on long edge of folded sheet
- Tightly roll** folded sheet
- Make 4 tubes
- Cut even slits along one end of each tube
- Fold flaps outward

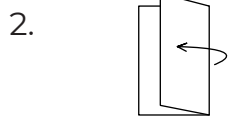
Connect Leg Tubes To Base Trays

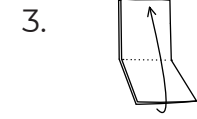
- Gather the 2 trays and 4 tubes
- Center tube along shorter wall, tape to tray
- Repeat with remaining tray and tubes as shown

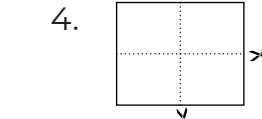
Fold Paper Brackets

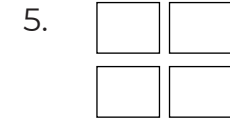
I. Prep the Paper

- 

1 sheet copy paper
- 

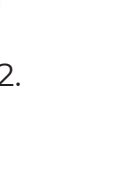
2. Fold in half, **short edge to short edge**
- 

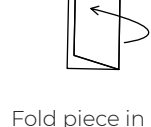
3. Fold in half, as shown
- 

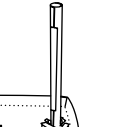
4. Unfold, cut into quarters along crease lines
- 

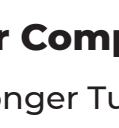
5. These pieces will be the brackets

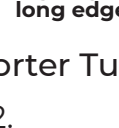
II. Make Brackets


- 

1. Each piece will make 1 bracket
- 

2. Fold piece in half, **short edge to short edge**
- 

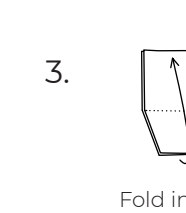
3. Fold in half again, **long edge to long edge**
- 

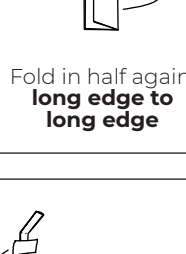
4. Fold in half again, as shown
- 

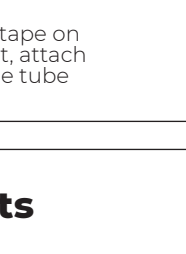
5. Crease in half, **short edge to short edge**
- 

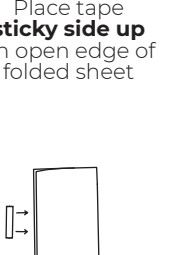
6. Repeat to make 2 brackets

Attach Brackets

- 

1. Gather bases and 2 brackets
- 

2. Place tape on bracket, attach to one tube
- 

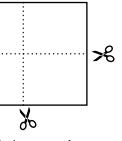
3. Tilt tubes toward each other
- 


4. Tape bracket to second tube
-

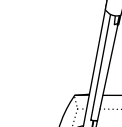
5. Repeat with remaining base


Make Spinner Components

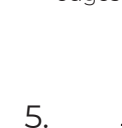
I. Roll Narrow Longer Tube


- 

1 sheet copy paper
- 

2. Fold in half, **long edge to long edge**
- 

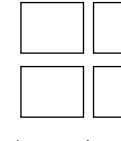
3. Place tape **sticky side up** on open edge of folded sheet
- 


4. **Tightly roll** folded sheet
- 

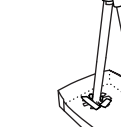
5. Cover loose edges with tape
- 


6. Finished narrow tube


II. Roll Wide Shorter Tube

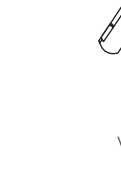
- 

1 sheet copy paper
- 

2. Fold sheet in half, **short edge to short edge**
- 

3. Place tape **sticky side up** on open edge of folded sheet
- 

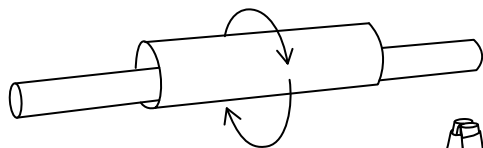
4. **Loosely roll** folded sheet to easily fit around inner tube
- 

5. Cover loose edges with tape
- 

6. Finished wide tube

A. Outer Tube Spins

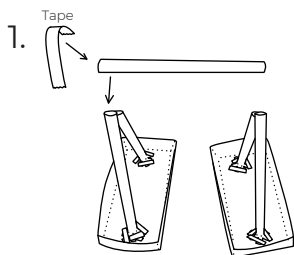
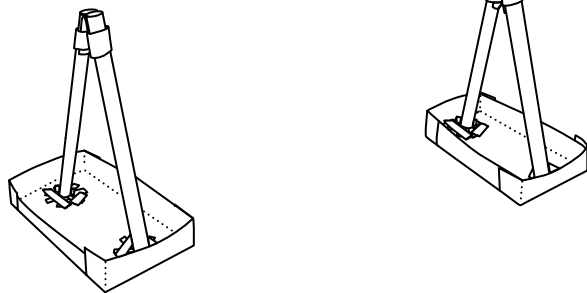
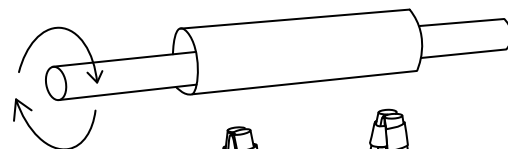
Secure long narrow tube to base so **short wide tube spins**



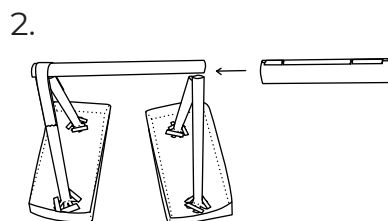
OR

B. Inner Tube Spins

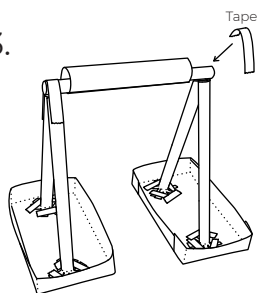
Secure short wide tube to base so **long narrow tube spins**



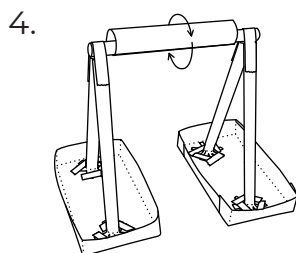
1. Tape narrow tube to one support, **leave other side open**



2. Slide wider tube onto open end of inner tube

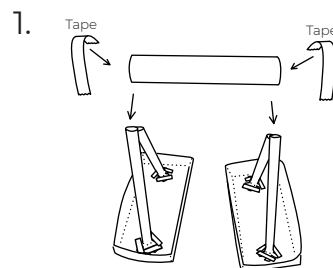
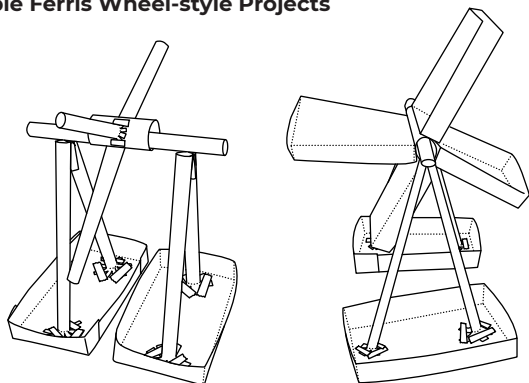


3. Tape open end of inner tube to support

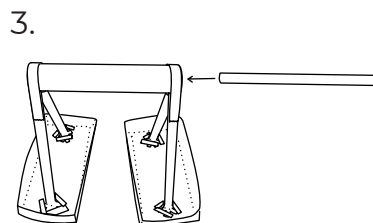
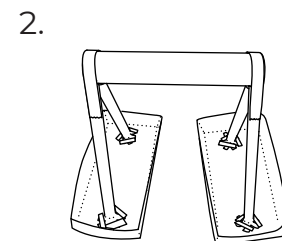


4. Test spinner, adjust & add components

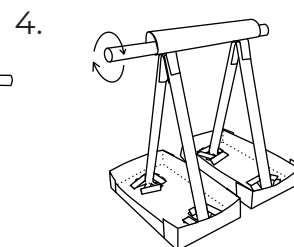
Sample Ferris Wheel-style Projects



1. Gently tape outer tube to both supports, be careful not to crush tube opening

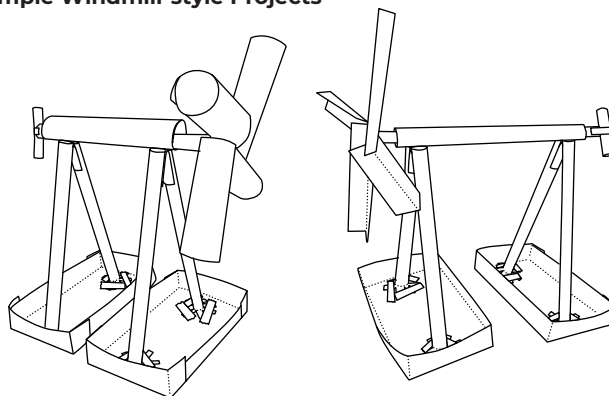


3. Slide inner tube through outer tube



4. Test spinner, adjust as needed. Attach a stopper to one end & add components to other end

Sample Windmill-style Projects



Adjust & Add On

Here are a few ideas for components to add to your spinning creation:

