# YOUTH BALLOON MAPPING WORKSHOP

## Presented by the CivicLab

Team Name:

Members:

# REMINDERS
## NEVER HESITATE TO ASK FOR HELP AND DON'T FORGET ABOUT THE TUTORIAL VIDEOS!

Knife Safety
1. pay undivided attention to your knife work
2. don't hold what you are cutting, place it on a solid surface
3. cut away from your body
4. make sure all body parts (yours and others) are out of the way of the blade's bath
5. DO NOT CUT WITHOUT SUPERVISION
6. there will be ZERO TOLERANCE for unsafe knife use
7. if you do not feel comfortable using a knife, just ask a supervisor
8. always cover the knife after you finish using it
9. don't leave a unused blade exposed
10. sketch the line of incision before cutting

Field Materials
1. pencil/pen
2. writing surface (binder, clipboard, etc.)
3. materials to take down observations (provided packets, notebook, etc.)
4. Sun protection gear (sunglasses, sunscreen, hat, etc.)
5. refreshments

Camera Materials
1. camera with continuous shot (make sure to test)
2. batteries (and even an extra set)
3. memory card (4GB gives you approx. 35 minutes of continuous shooting)
4. 20 #64 latex free rubber bands to make the rubber band harness
5. camera housing
6. scissors
7. x-acto knife (optional)
8. packing or duct tape (it is helpful if the tape is resealable)
9. permeant marker
10. hot glue (optional)
11. device to watch tutorial videos on (internet is necessary)
12. 2 liter soda bottle

Balloon Materials
1. weather balloon
2. line winder (8" or 9")
3. work gloves
4. carabiner (minimum of 2)
5. cable ties
6. swivel clips (minimum of 3)
7. attachement ring (1.25")
8. cable ties
9. helium
10. mooring weight (optional)
11. 1000+ feet of line

Filling the Balloon
1. start inflating slowly
2. close nozzle tightly
3. let the balloon rise as fest as you can

Don't Forget
4. CHECK ALL KNOTS
5. test camera (check batteries and memory card)
6. check your camera settings (continuous shot and infinity)
7. wear gloves (rope burns are not fun)
8. watch out for hazards (trees, buildings, power lines, etc.)
9. don't stand still when collecting footage
10. the more you walk around, the larger area you can map
11. a map of the area you're mapping
12. trash bags (2 or more)
13. cotton string (optional)

Finishing Up:
1. knit your images to form a map
2. share your map with the world

MOST OF ALL, HAVE FUN!!!

note: some of the materials and supplies may be included in the provided kit.

An Illustrated Guide to

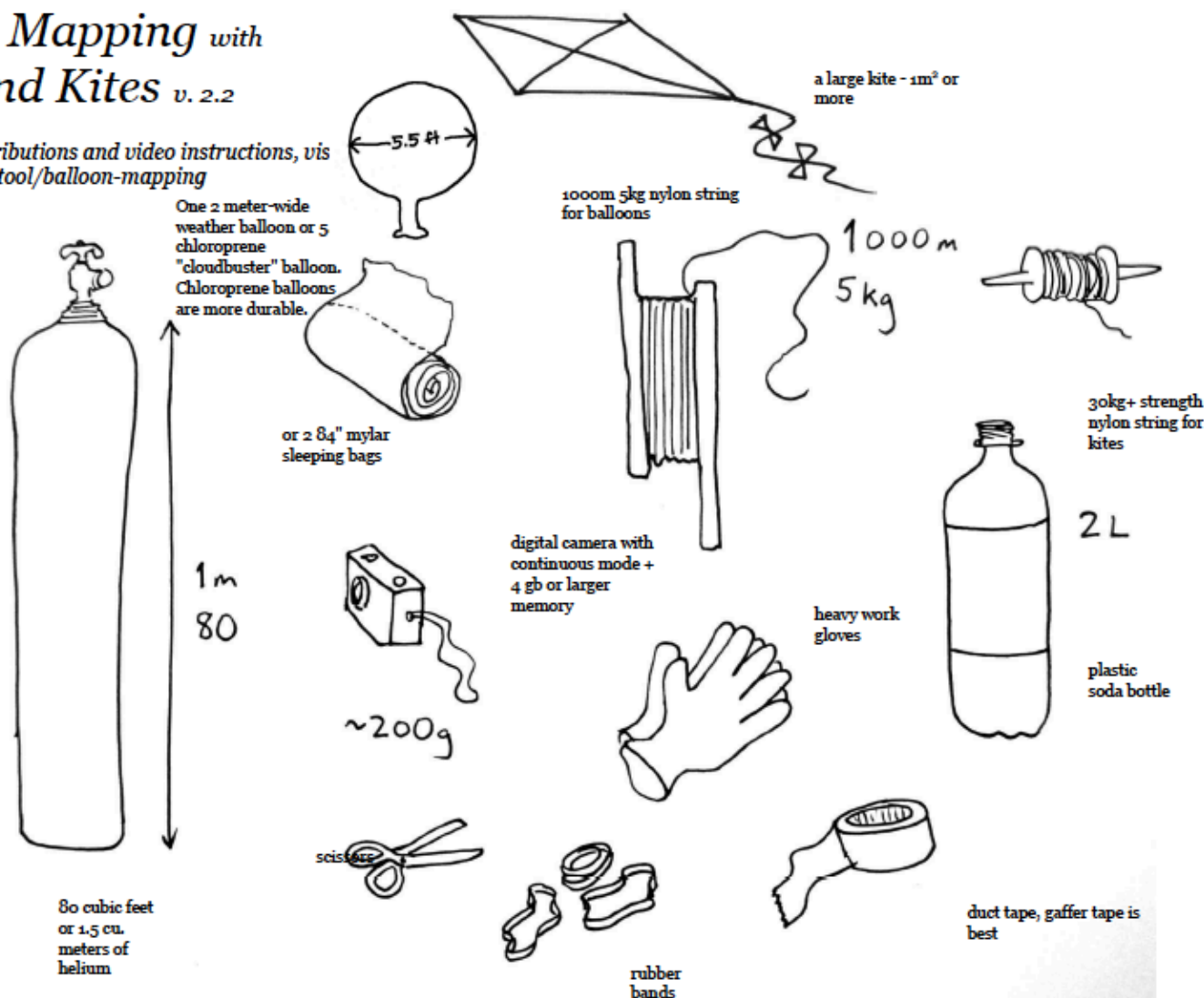# Grassroots Mapping with
# Balloons and Kites *v. 2.2*

*To see all the latest contributions and video instructions, vis //publiclaboratory.org/tool/balloon-mapping*

*Do you want to make maps? Do you need satellite images but can't afford them? Do you want to see your home from above?*

*Follow these instructions and you can, for as little as $100!*

a large kite - 1m² or more

5.5 ft

1000m 5kg nylon string for balloons

1000m
5kg

One 2 meter-wide weather balloon or 5 chloroprene "cloudbuster" balloon. Chloroprene balloons are more durable.

or 2 84" mylar sleeping bags

30kg+ strength nylon string for kites

2 L

1m
80

digital camera with continuous mode + 4 gb or larger memory

heavy work gloves

plastic soda bottle

~200g

scissors

80 cubic feet or 1.5 cu. meters of helium

rubber bands

duct tape, gaffer tape is best

## Choose and prepare your camera

*for all options, see: http://publiclaboratory.org/wiki/camera-trigger*

Any digital camera around 2-300 grams that has a 'continuous mode' can work. You can also use a Canon camera with the CHDK to trigger a photo every 5 seconds.

600 photos
=
~ 600 seconds

CONTINUOUS MODE

SD

4,8,16 GB
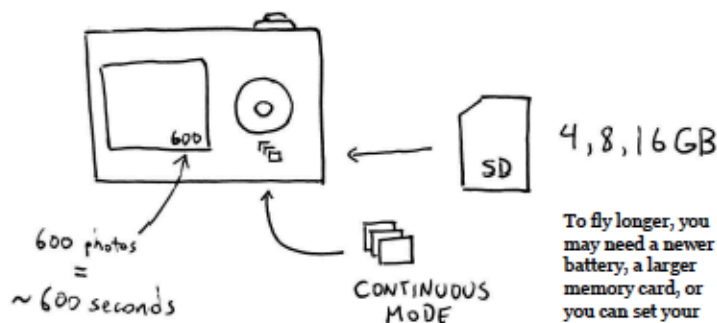
In 'Continuous Mode' a camera takes a picture every 1 second if the trigger is held down. Your display will show how many pictures you can take on your card.

To fly longer, you may need a newer battery, a larger memory card, or you can set your camera to a lower resolution. A 4 GB card fills up in about 35 minutes.

## Balloons or kites?

Decide whether to use a balloon or kite based on local wind conditions. While kites are cheaper, they're harder to fly, and you may have to prepare for both:
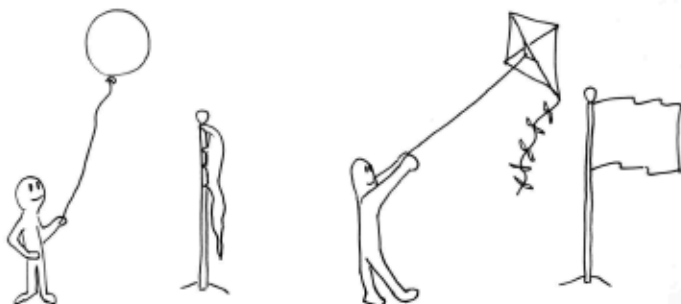
Balloons in <10kph wind; kites in more than that. Look at flags to decide.

## Build a camera capsule

*up to date: http://publiclaboratory.org/wiki/pet-bottle-rubber-band-rig*

This simple protective cover stops your lens from hitting the ground, and protects your camera from hitting walls and trees.
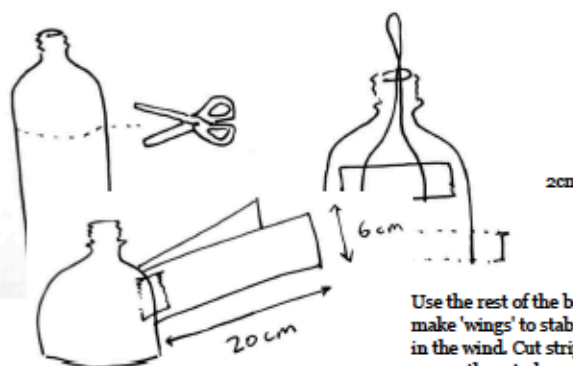
Cut a soda bottle in half and put the camera inside the top with the loop through the bottle neck.

Be sure the camera lens is protected even when it's extended!

2cm

6cm

20cm

Use the rest of the bottle to make 'wings' to stabilize it in the wind. Cut strips and crease them to keep them straight.

30°

WIND
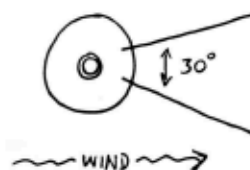
This will keep your camera from spinning, which blurs the photos.

Fold a 1 meter loop of string and tape it firmly onto your camera. Be sure the tape doesn't stop the lens from extending.

Press the tape down hard - its the only thing keeping your camera from slipping out of the string at 500 meters high!

50cm
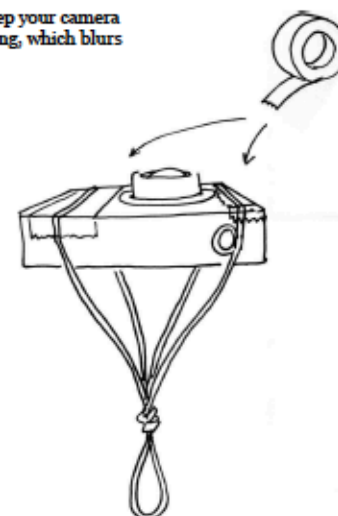
# Set up your camera to auto-trigger

Set your camera on continuous mode. Wad up a bit of card paper or use a pencil eraser to hold down the camera trigger. A small knot works very well. Use a rubber band to hold it in place and apply pressure. Be sure the button is being pressed - you may have to double or triple the band up.

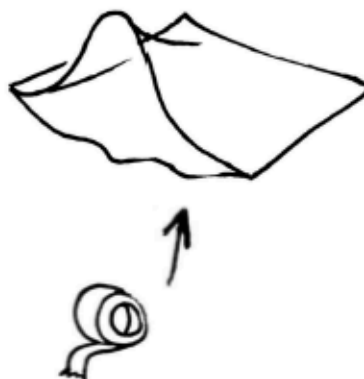Move the rubber band to one side until you're ready to start.
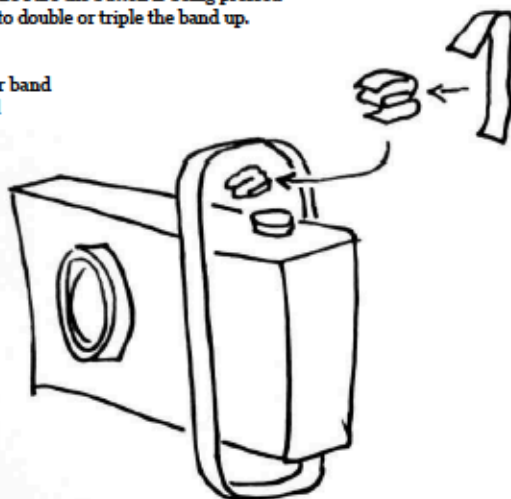
You can add a second loop or a rubber band and hook it on the bottom of the bottle to hold the camera firmly against the top.

Even better, put the cap on over the string when the camera is snugly in place, trapping the string.
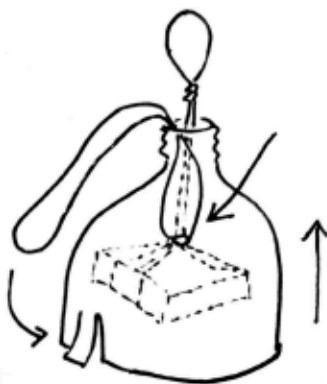
# Prepare and fill your balloon

1.5 meter wide weather balloons work best, but if you can't get one, you can make one from plastic. You can use several giant trash bags, but they won't stay inflated for more than an hour -- mylar - or PET plastic is far more airtight.

Where available, *mylar sleeping bags* can be taped shut and will stay filled for several days, unlike weather balloons. Two of these are enough to lift a typical camera.

Test your valve first by letting some helium out with nothing attached. Then put your balloon on and slowly inflate it.

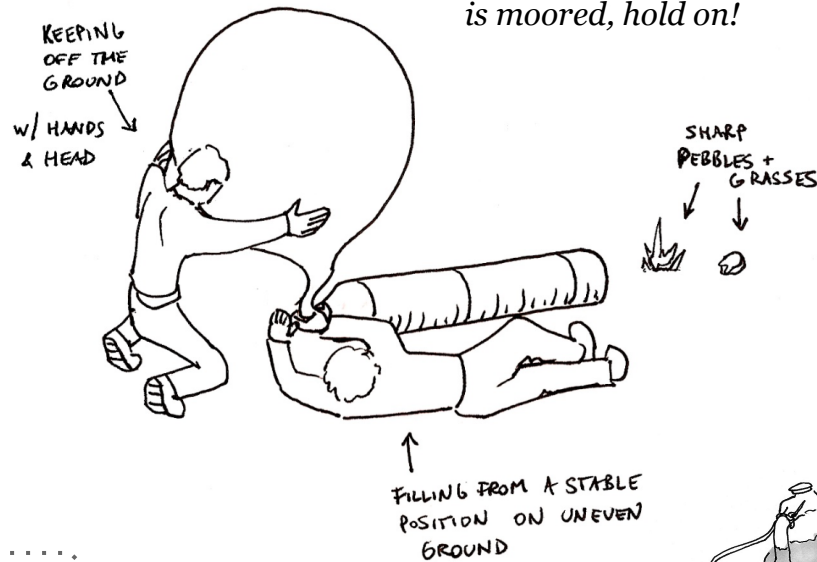Someone should be in charge of not letting the balloon touch trees, bushes, or the ground.

1.2 m
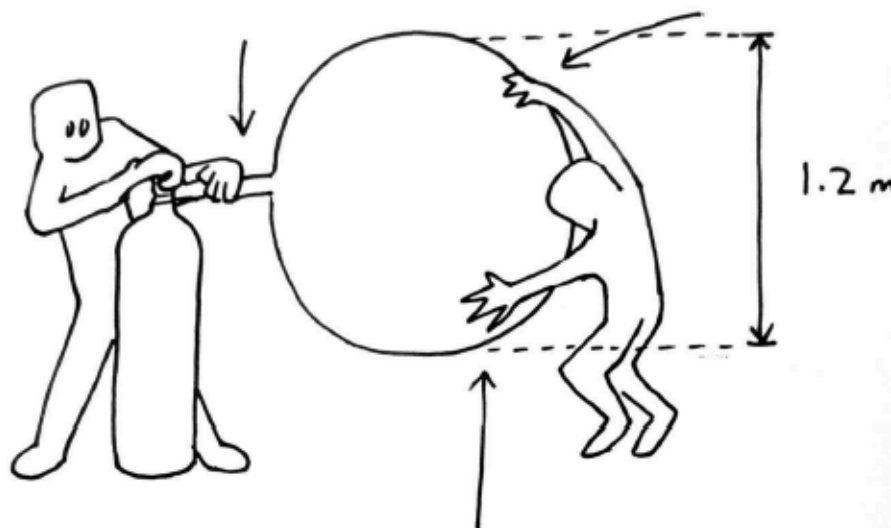
# Balloon Mapping Quick Start Guide

## Filling, closing, and mooring your balloon

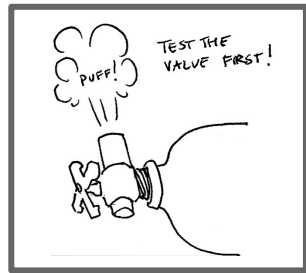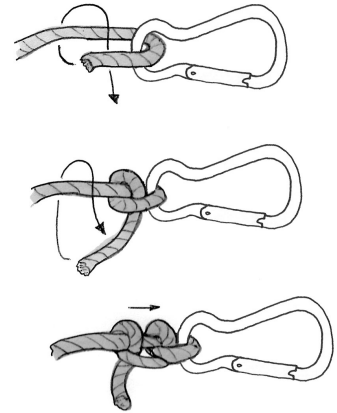1) Tie string to a carabiner with double overhand knot (see upper right box).

2) Tie the other end (5ft or so) to something heavy like a 1 gallon jug full of water -- so your balloon won't fly away as you're working.

3) Tie the clip swivel to the reel of kite string with the same knot.

KEEPING OFF THE GROUND
w/ HANDS & HEAD

*Unless your balloon is moored, hold on!*

SHARP PEBBLES + GRASSES

FILLING FROM A STABLE POSITION ON UNEVEN GROUND

*Double overhand knot:*

mooring point

*Fill slowly, gushing helium can rip your balloon and make the tank dangerously cold.*
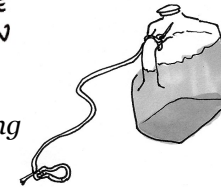
PUFF!  TEST THE VALVE FIRST!

Test the valve, and lay the tank on the ground. Attach the regulator if one came with your tank (not pictured).

1) Pull the balloon neck through the ring.

2) Cable tie the balloon to the helium tank. The balloon neck may need to be folded and squeezed tight. Continue holding on to your balloon.
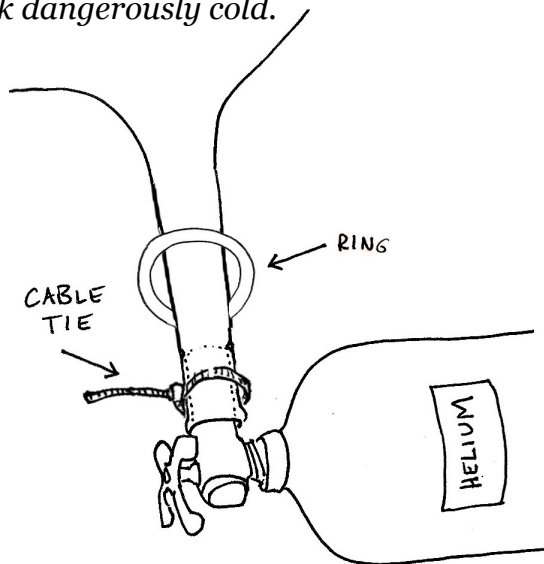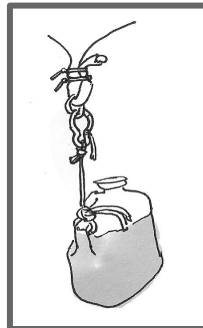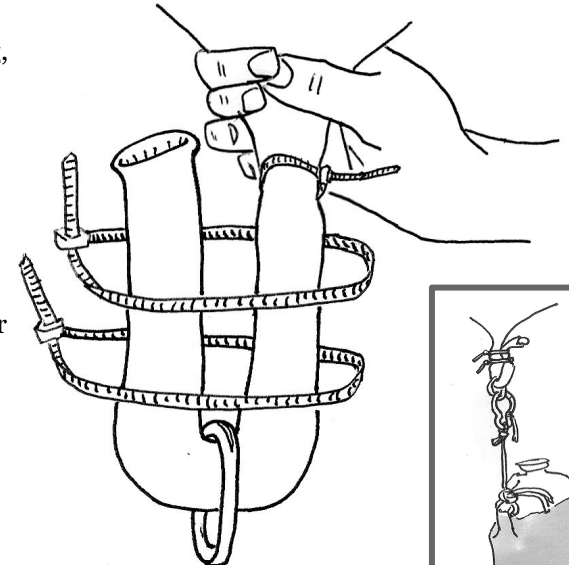
CABLE TIE

RING

HELIUM

3) When done filling, push helium out of the neck and close with a cable tie just below the balloon.
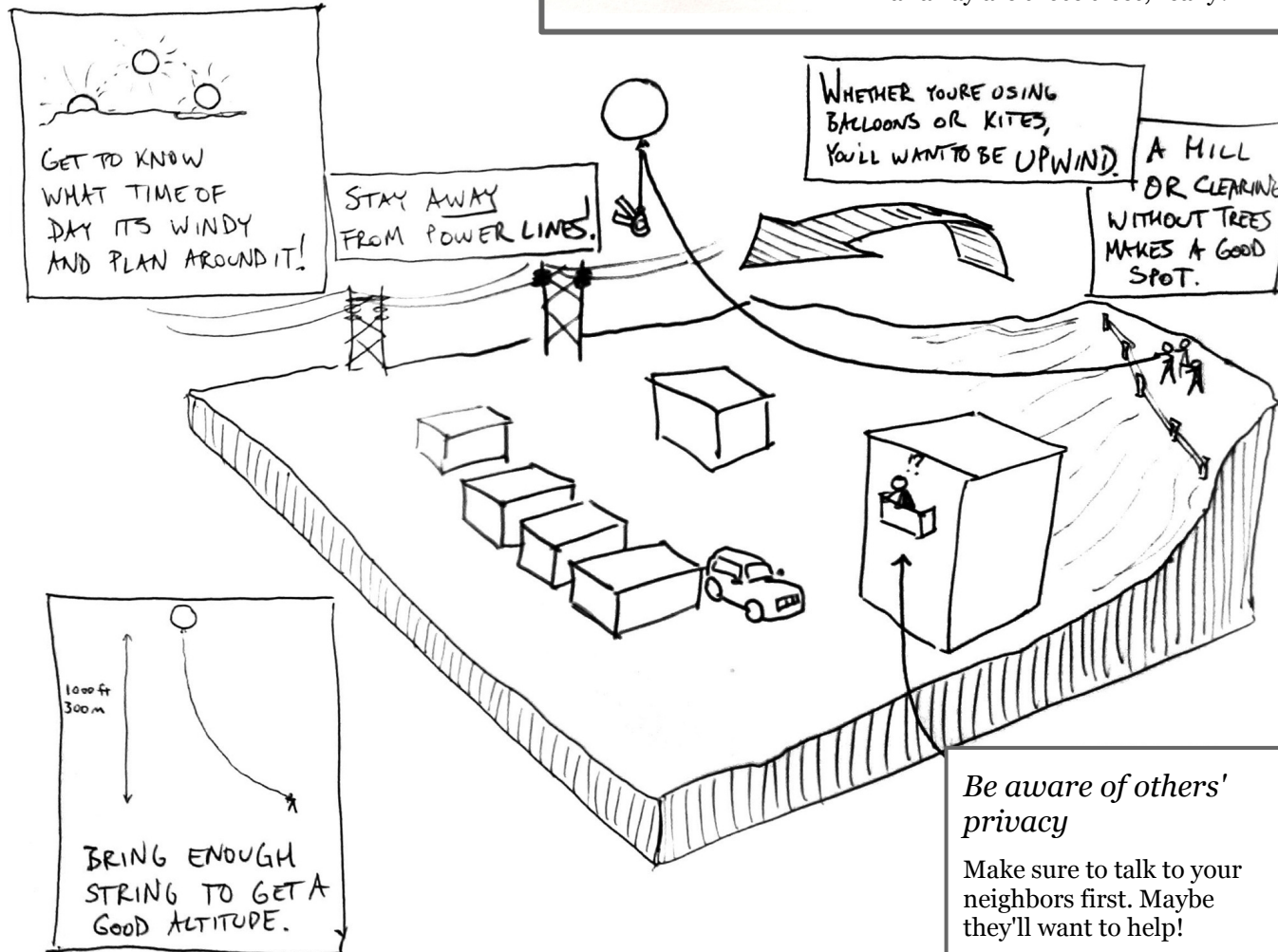
4) Release nozzle cable tie.

5) Fold the neck over onto itself and around the ring. Attach two more cable ties and pull tight.

6) Attach ring to the mooring point.

# Balloon Mapping Quick Start Guide

## Safely launching your balloon and camera

### Look around you!

Check tree tops, flag poles, clouds. Which way is the wind going on the ground? At tree level? Above in the sky? What obstacles will come up as you launch? Will the balloon change direction while rising? Check again on your satellite map - how far away are those trees, really?`

DROP SOME GRASS TO SEE THE WIND DIRECTION

WIND

### Be safe and responsible

Check that you are five miles or more away from the nearest airport. Otherwise, speak with the airport about sending a "Notice to Airmen". Print out satellite imagery of where you'll be mapping (Google, USGS, etc) to help in planning.

Do a test flight first, without a camera: reel out, then reel in, with about a hundred feet of string.

GET TO KNOW WHAT TIME OF DAY ITS WINDY AND PLAN AROUND IT!

STAY AWAY FROM POWER LINES!

WHETHER YOU'RE USING BALLOONS OR KITES, YOU'LL WANT TO BE UPWIND.

A HILL OR CLEARING WITHOUT TREES MAKES A GOOD SPOT.

1000 ft 300 m

BRING ENOUGH STRING TO GET A GOOD ALTITUDE.

### Attach your camera

Make a temporary loop by tying an overhand knot on a loop on the string below the balloon:

A

B
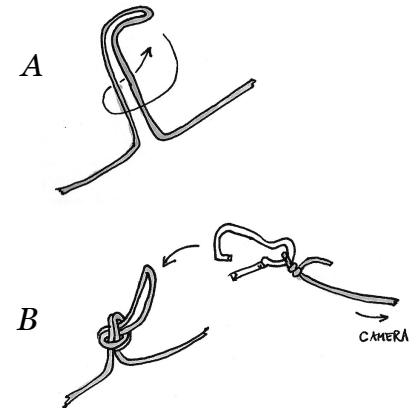
CAMERA

**A.** Slacken the line below the balloon & gather a loop in your hand

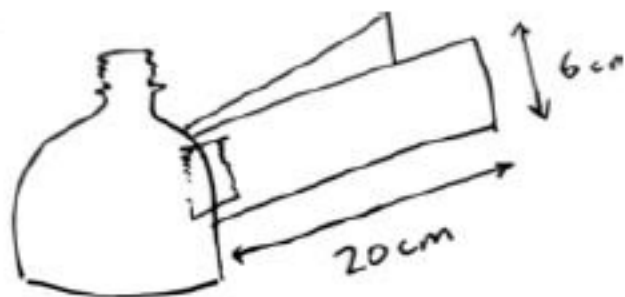**B.** Loop it around & through itself and pull taut; attach your camera!

### Be aware of others' privacy

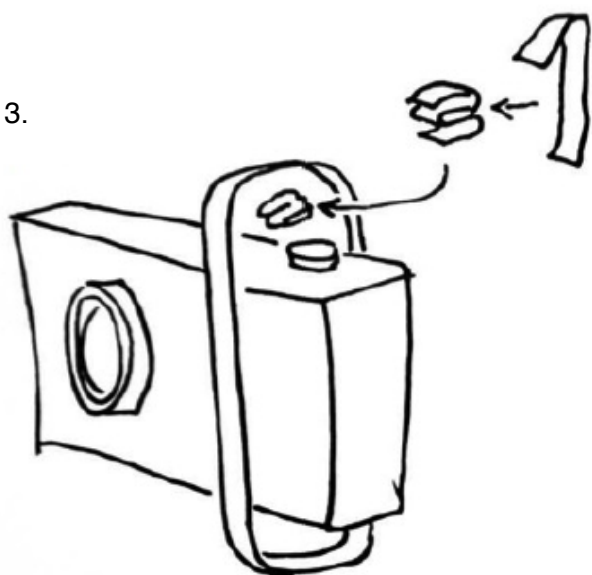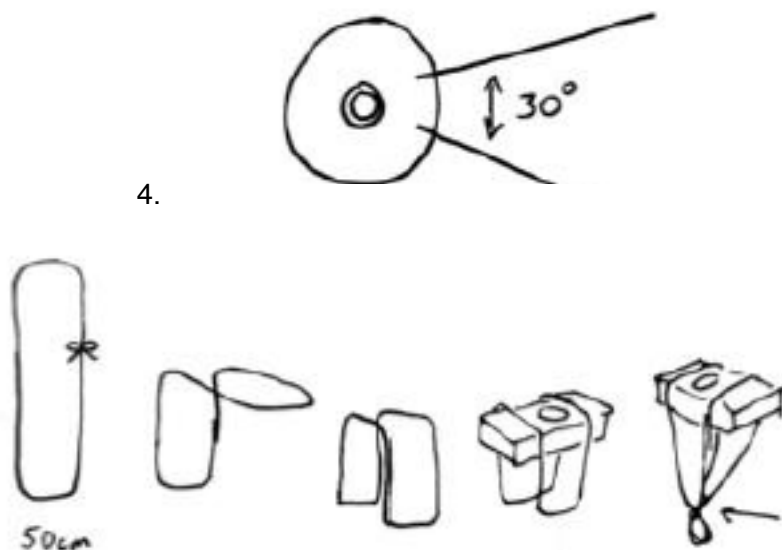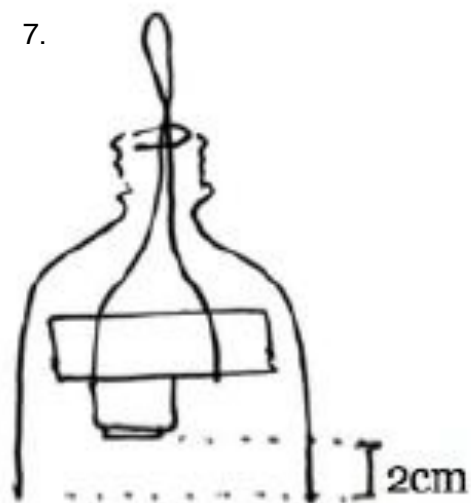Make sure to talk to your neighbors first. Maybe they'll want to help!

1.

2.

6cm

20cm

30°

3.

4.

50cm

5.

6.

7.



2cm

8.



9.



Weather balloon

clove hitch knot

looped string connecting housing to carabiner

carabiner

camera housing

10 feet

200M

500M

5-10 feet

Camera housing

YAY! this is so fun

**THIS DRAWING IS NOT TO SCALE!**

10.

11.

NO!

12.

~45°

500-1000m

500-1000m
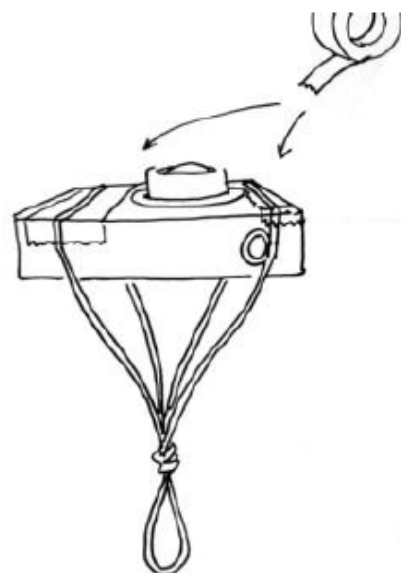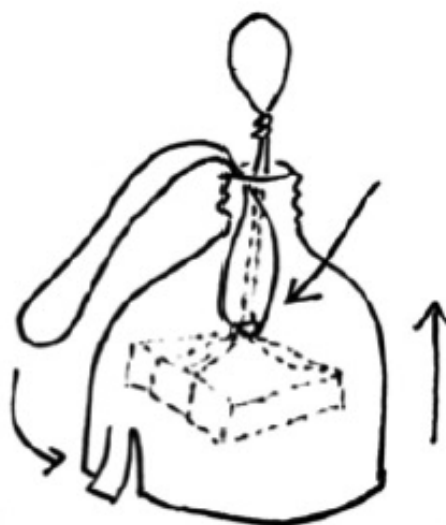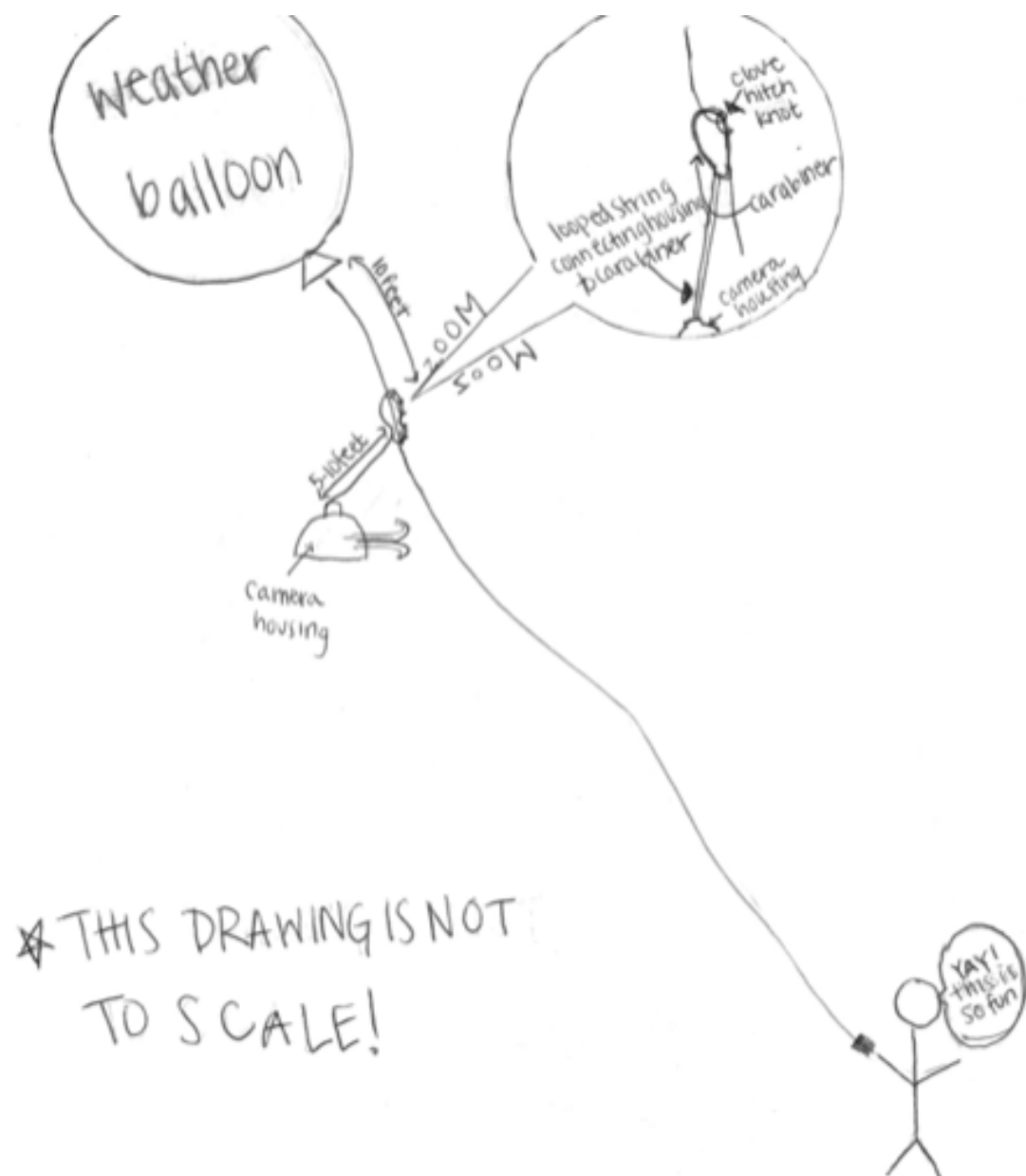
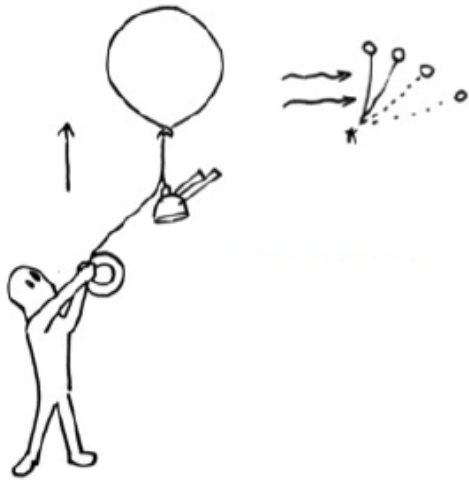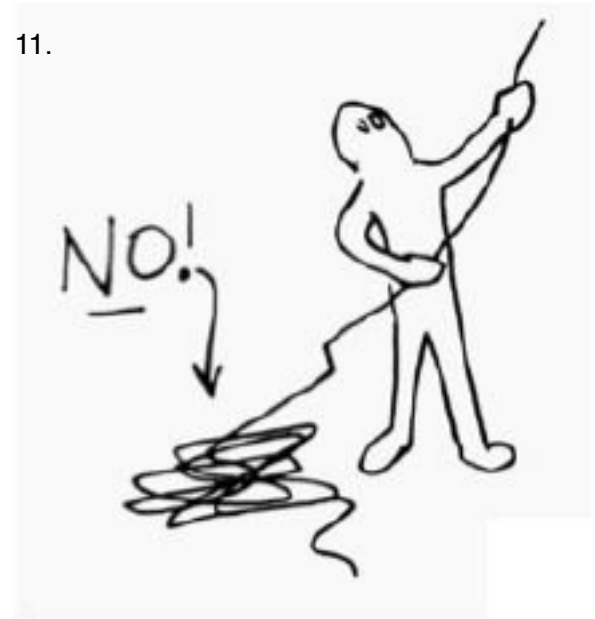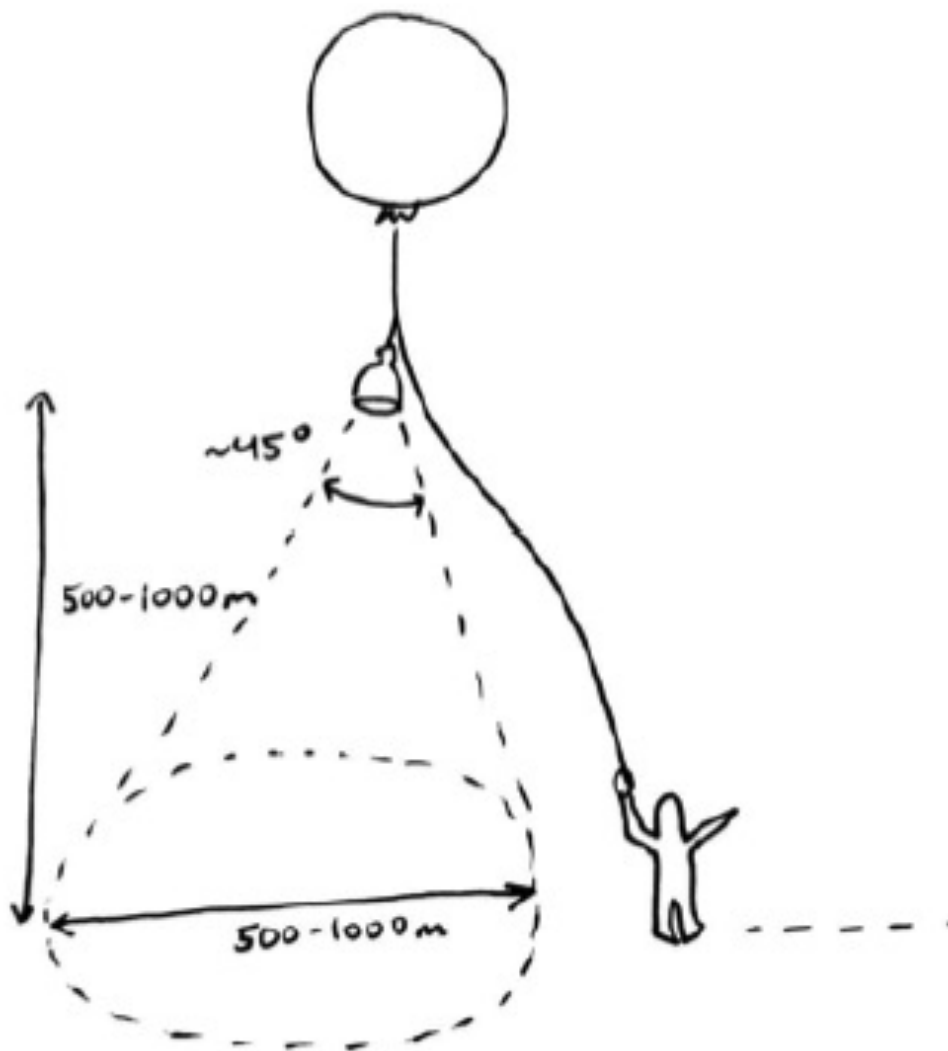Name:                                    Date:

# **Field Notes: Balloon Mapping**
## Part 1

| Observations on the camera cage? | Observations on the set up? |
|---|---|
|  |  |

Critique?

Name:                                    Date:

# Field Notes: Balloon Mapping
## Part 2

Where?

Weather? (temperature, clouds, visibility, etc.)

When?

Observations?

Name:                                        Date:

# **Field Notes: Balloon Mapping**
## Part 3

Observations?

Name:                                                    Date:

# Field Notes: Balloon Mapping
## Looking Back

Thank you for taking part in our workshop! We hope you enjoyed it. Please use the space below for feedback on our program! All thoughts will be graciously accepted! If you do not feel comfortable sharing your name, just scrub it out!

Comment? Compliments? Critique?