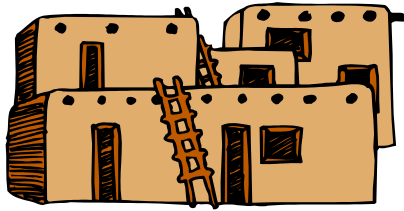


Homes for Different Climates



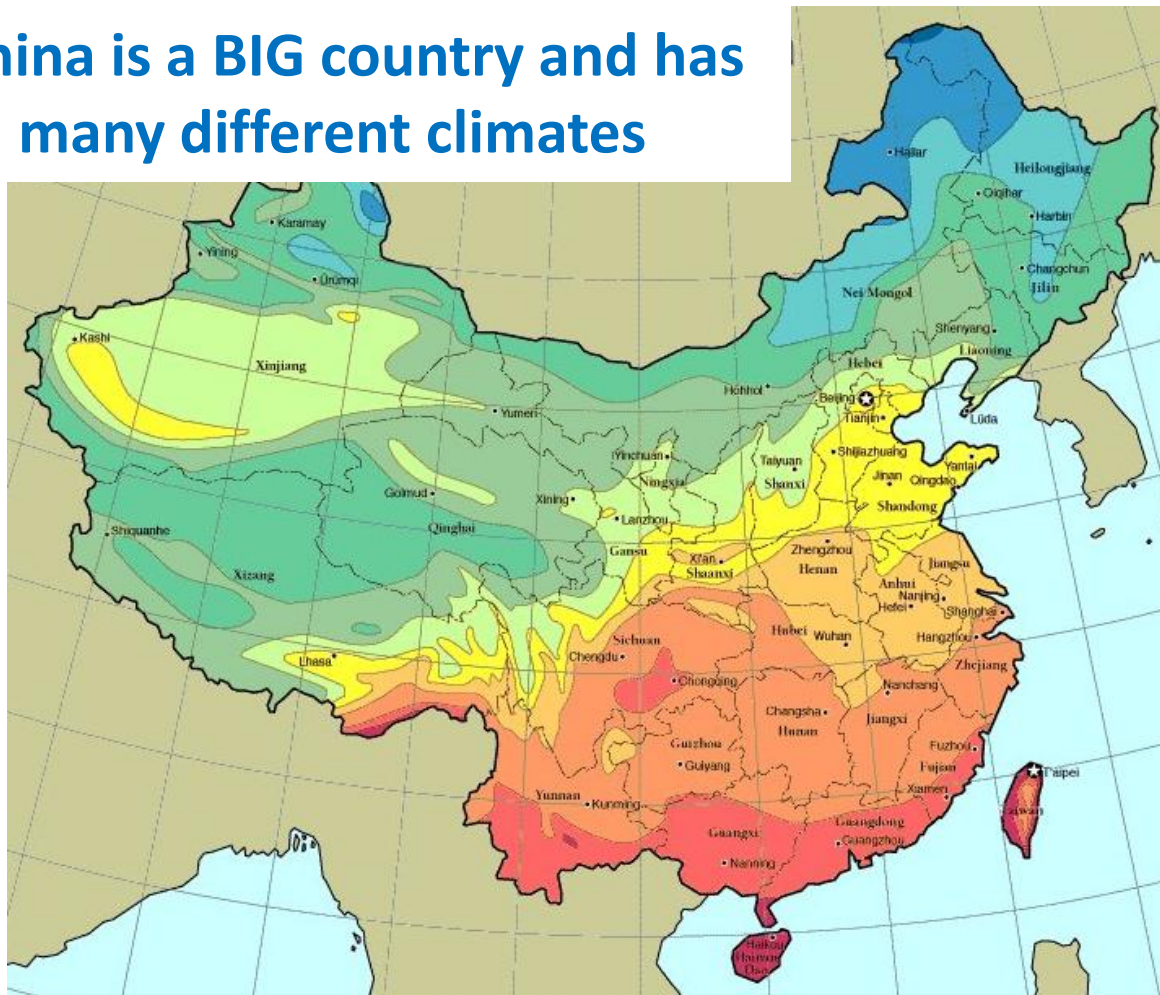
Our Plan for Today

- Review what we learned last week
- Learn about energy in the countryside in China
- Work in engineering teams to design houses for specific climates in China

Engineers design different types of houses for different climates

China is a BIG country and has many different climates

TeachEngineering.org – Free STEM Curriculum for K-12



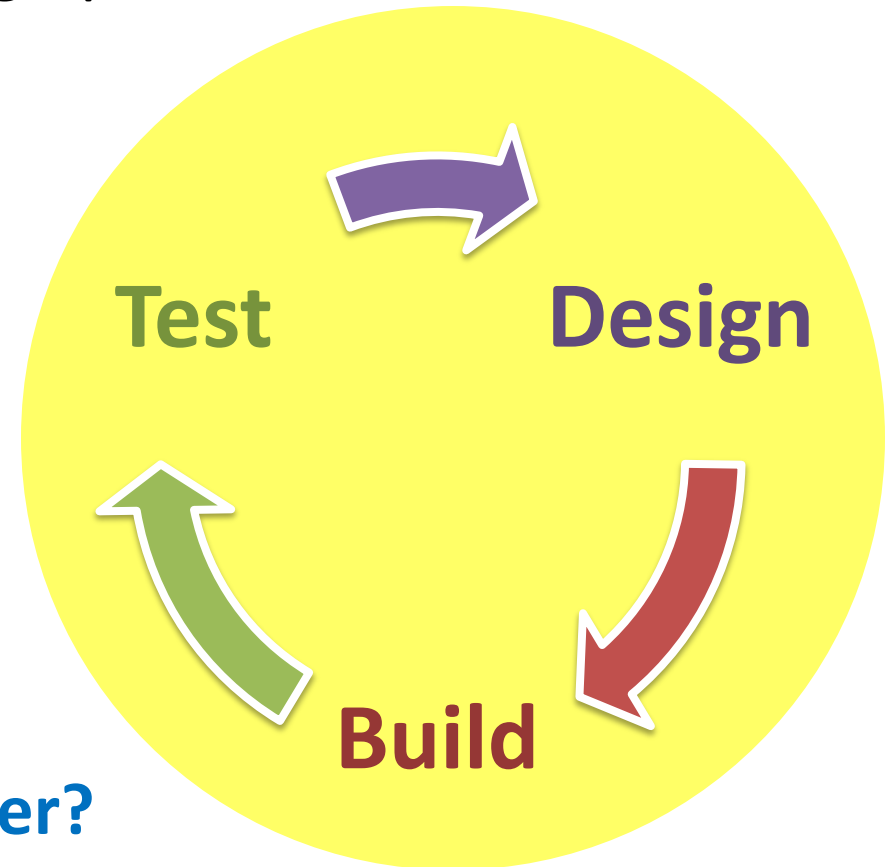
Hardiness zone		
below -45.5	1	below -50
-45.5 to -40.0	2	-50 to -40
-40.0 to -34.5	3	-40 to -30
-34.4 to -28.9	4	-30 to -20
-28.8 to -23.4	5	-20 to -10
-23.3 to -17.8	6	-10 to 0
-17.7 to -12.3	7	0 to 10
-12.2 to -6.7	8	10 to 20
-6.6 to -1.2	9	20 to 30
-1.1 to 4.4	10	30 to 40
4.5 and above	11	40 and above
Mean annual minimum temperature (°C)		Mean annual minimum temperature (°F)

Engineering *Design-Build-Test* Cycle

Engineers design different types of houses for different climates

Steps of the engineering design process:

- Design
 - Understand the need
 - Brainstorm different designs
 - Select a design
 - Plan (drawings, materials)
- Build
- Test & improve



➔ Why does it go in this order?



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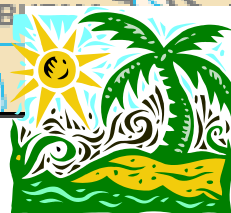


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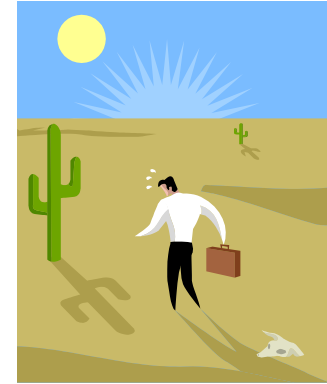
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China



Engineering Design → Build → Test

- Today we are going to **design** a house for one of three climates:
 - Very cold
 - Desert
 - Tropical



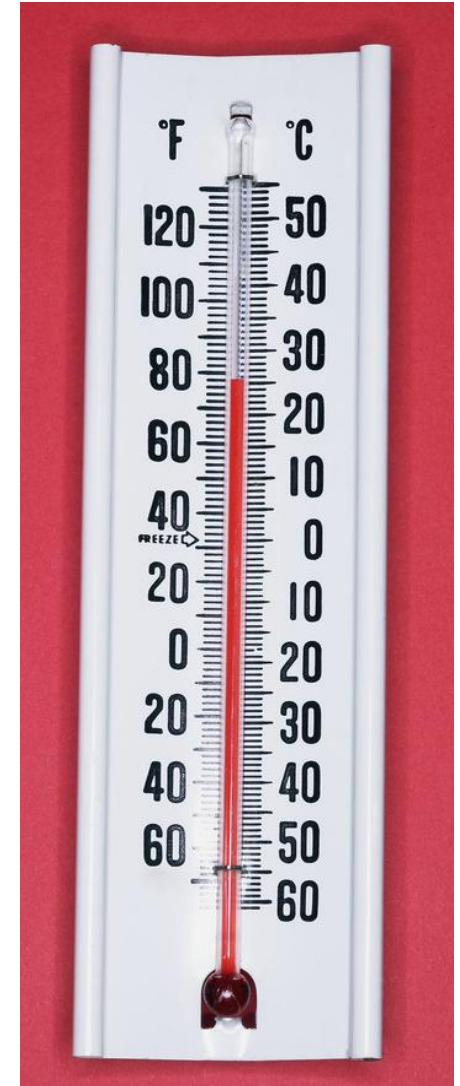
How do you think these houses should be different from each other?

- Then, we will **build** and **test** our houses.



Things to know before you design

- Latitude
- Altitude
- Number of rainy/snowy days
- Average summer temperature
- Average winter temperature



Harbin: very cold climate



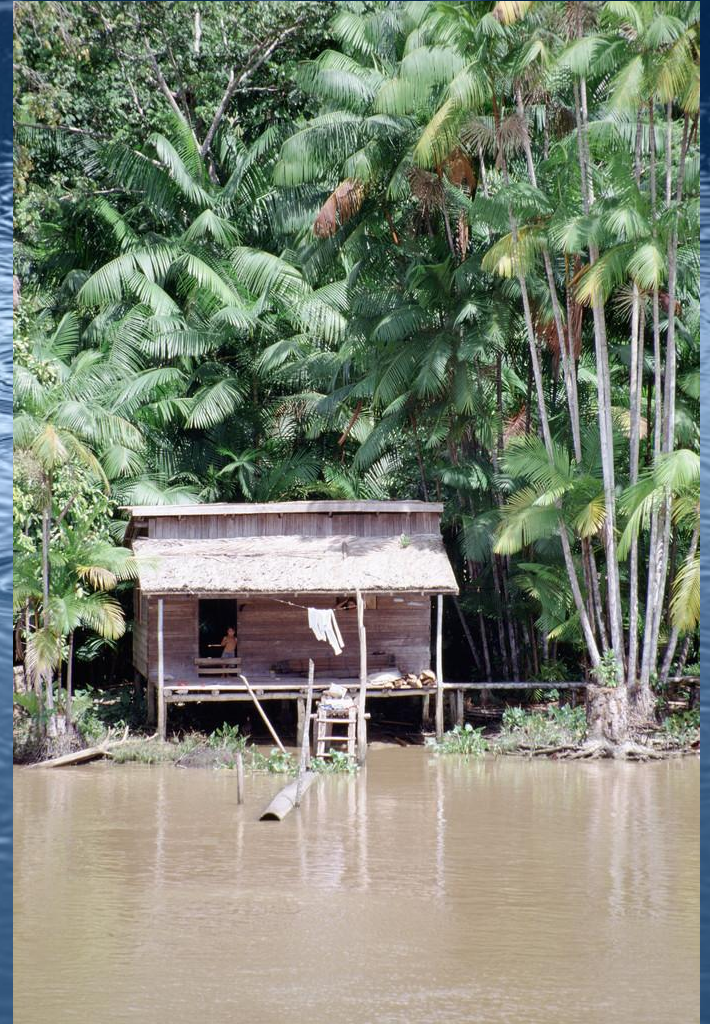
Test: Your house must be able to keep the roof from caving in when we put a lot of snow (weight) on top



Guangzhou: hot and wet



Test: Your house must keep dry a piece of tissue paper inside when we pour water (rain) on top



Urumqi: very dry

Test: your house must be able to keep an ice cube from melting as we heat the house with a hairdryer



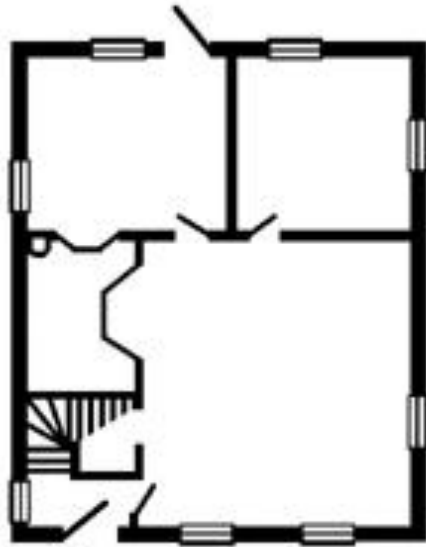
detailed plans

sketches

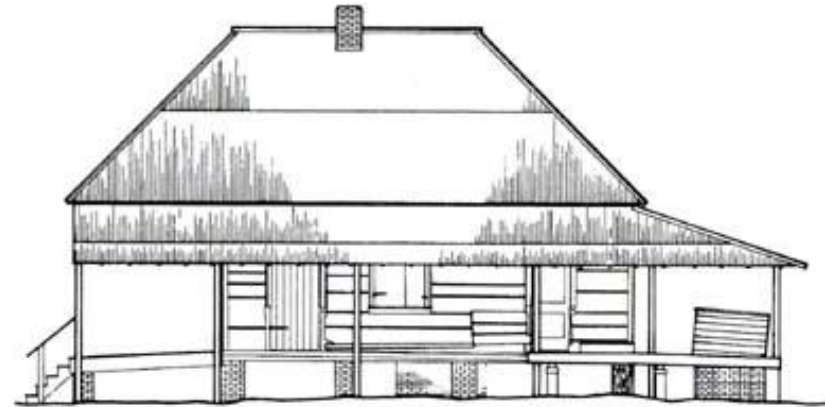
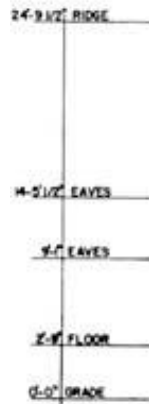
Your Drawing

materials

dimensions



Top View
(floor plan)



Side View

↑ **Floorplan:** rooms, doorways, windows...

↑ **Elevation:** foundation, porch, roof shape and overhangs...

Your engineering instructions

1. Choose a partner
2. Choose the climate you want to design for
3. Fill out the information on the top of your worksheet about the location you chose
4. Write your goal for your *model house*
5. Make a rough sketch of your house
6. Build, test and improve your house
7. Create a final drawing of your house
8. Turn in your worksheet to the teacher

the end

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