



Team 18: The Centennial Calendar

Virtual Design Review 2



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Team Introduction



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VDR1 RECAP



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Recap

➤ Project Summary

- Create a calendar that runs continuously for 100 years
 - Must utilize all-mechanical workings
 - No electrical input power
 - Zero maintenance required

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Recap (cont.)

➤ Project Scope

- Produce a mechanically powered, aesthetically pleasing calendar that accurately displays the date and requires no maintenance.
- Assume display will not be tampered with and design can fit through doorway.

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Recap (cont.)

➤ Customer needs

- Mechanism powered mechanically.
- Mechanism accounts for leap years and non-leap years.
- Internal workings visible from a distance.
- Usage of cost-effective materials while not sacrificing quality.
- Compact mechanism and is self-sufficient.

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Target Catalog

Table 1: Target Metrics

Metric	Measure	Target
Max allowable error in duration of use	Time	1 day
Life span of power supply	Time	100 years
Weather-proof rating	Durability	IP-55
Maintenance interval	Reproducibility	0
Max mechanism size	Dimensions	Door way
Furthest distance the date is legible	Visibility	3 meters
Organized design	Aesthetics	N/A
Amount of movements per day	Quantity	1
Tamper-proof rating	Durability	TL-40

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Target Summary

Table 2: Critical Target Metrics

Metric	Measure	Target
Life span of power supply	Time	100 years
Weather-proof rating	Durability	IP-55
Maintenance interval	Reproducibility	0

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Research—Environment

- Environment influences
 - Water collection
 - Barometric pressure
 - Temperature

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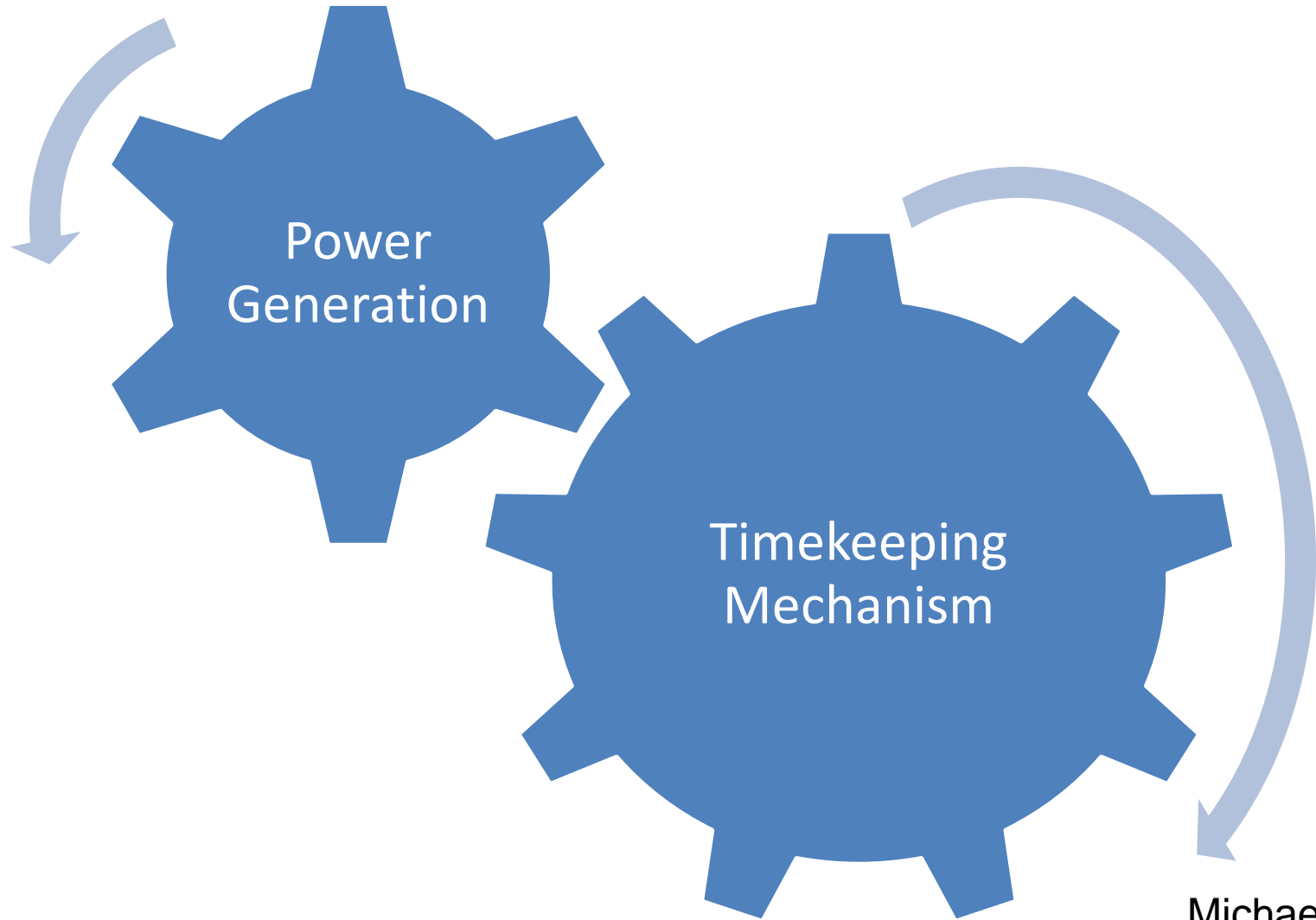
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CONCEPT GENERATION



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Concept Generation



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Power Generation—Concept 1

➤ Atmos Clock

- Mechanical torsion clock with no external power source
- Powered by changes in atmospheric pressure or temperature

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Power Generation—Concept 1 (cont.)

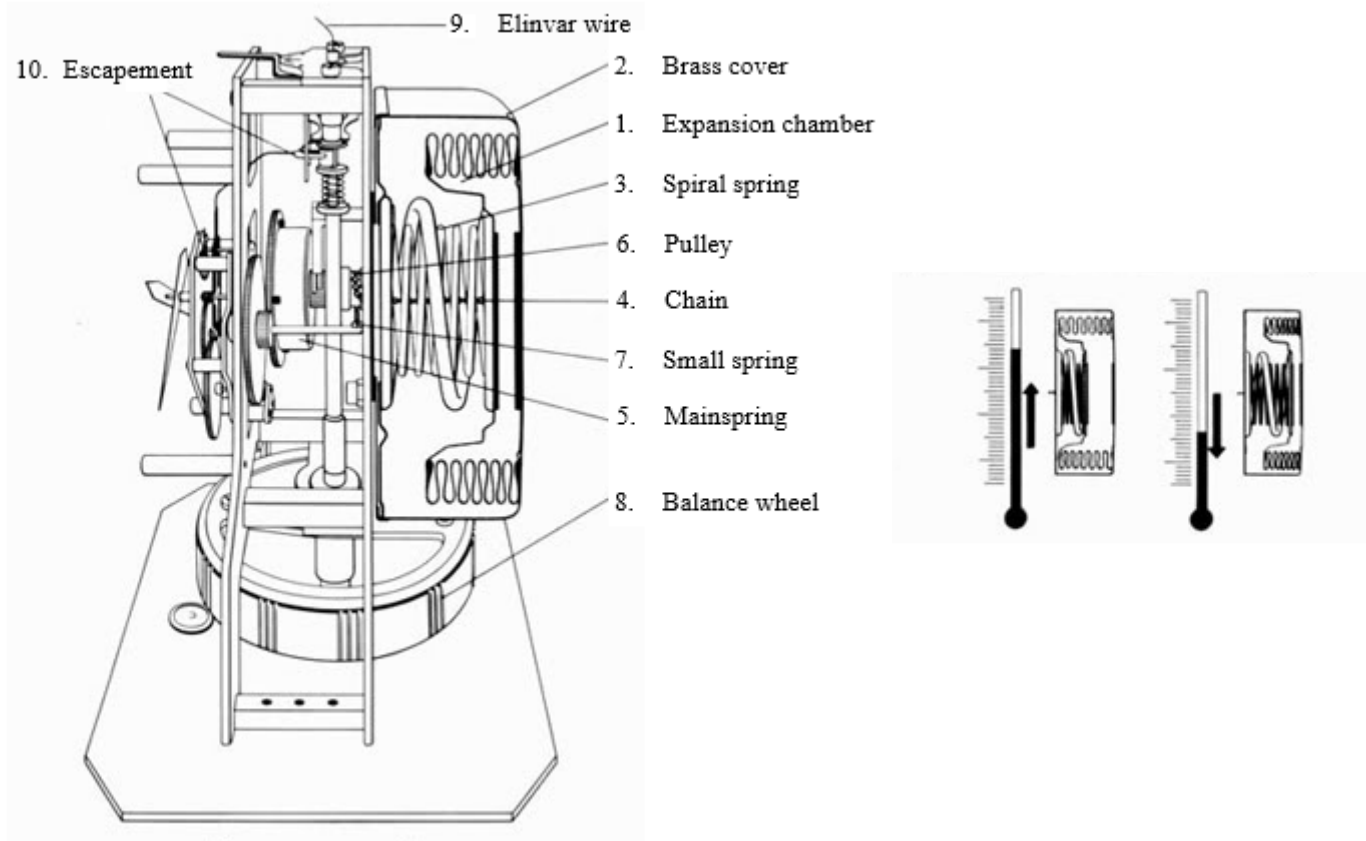


Figure 1: Atmos clock with expansion chamber

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Power Generation—Concept 2

➤ Bimetallic strip

- Converts temperature change into mechanical movement
- Two different metals with different coefficients of thermal expansion

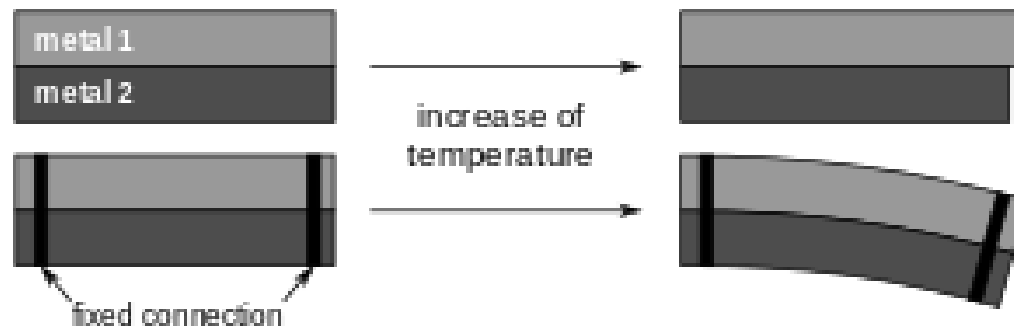


Figure 2: Bimetallic strip under temperature conditions

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Power Generation—Concept 3

➤ Rainwater collection device

- Natural and recurring energy source
- Similar to wind anemometer, but utilizing rain water
- Continuously winds a mainspring
- Could cause rust within the system
- Water reservoir must survive a storm

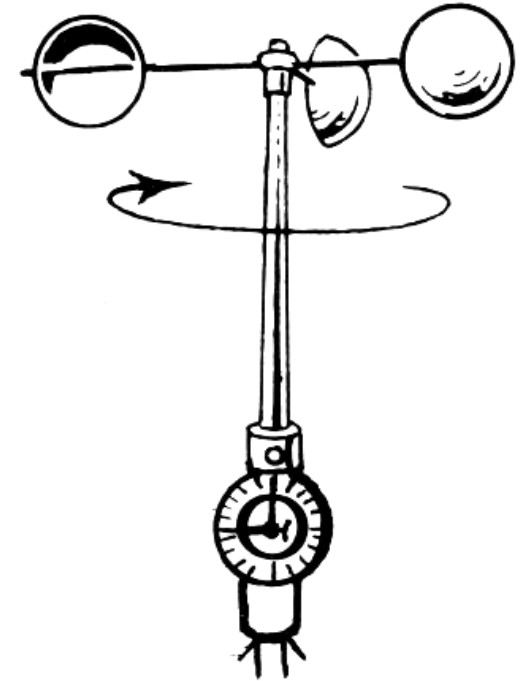


Figure 3: Wind anemometer

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Power Generation—Concept 4

➤ Magnet return system

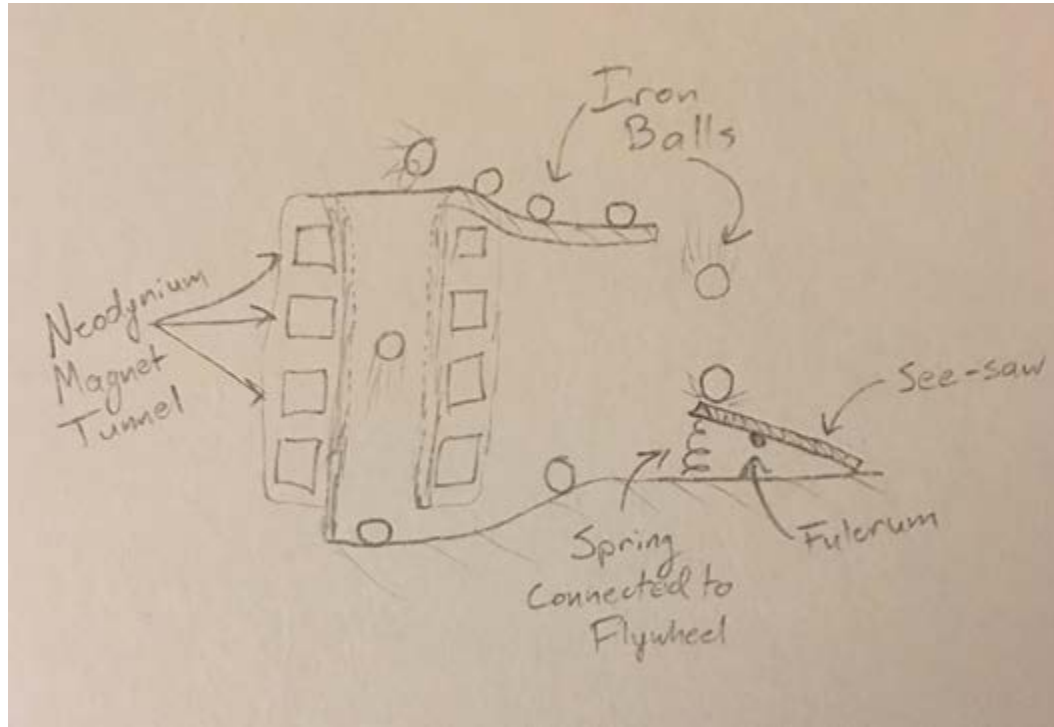


Figure 4: Sketch of magnet return concept

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Power Generation—Concept 5

➤ Perpetual motion

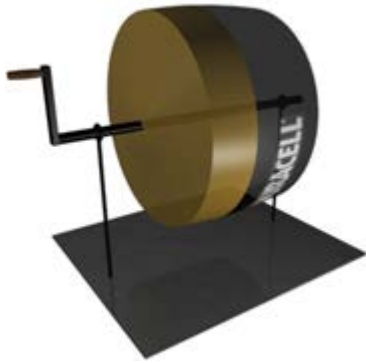


Figure 5: Flywheel

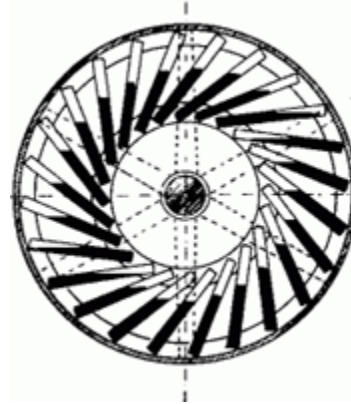


Figure 6: Bhaskara wheel

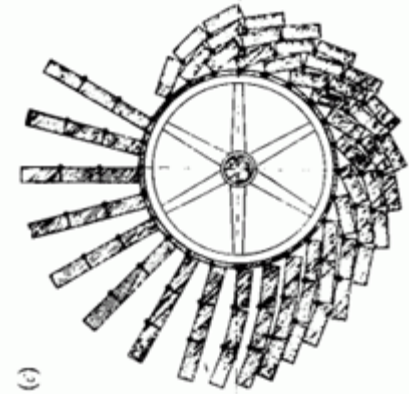


Figure 7: Bhaskara wheel variant



Figure 8: Free energy magnet device

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Timekeeping Mechanism—Concept 1

- Set of two gears on top of each other laid horizontally
- Magnetic bearings used
- Gears with 365 and 366 teeth
- Each tooth reads different day
- Switch between gears to account for leap year

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Timekeeping Mechanism—Concept 2

- Hourglass concept
- Contains fluid with a viscosity that remains constant with fluctuating temperatures
- Consistently accurate time keeping

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Thank you for your time.

ANY QUESTIONS?



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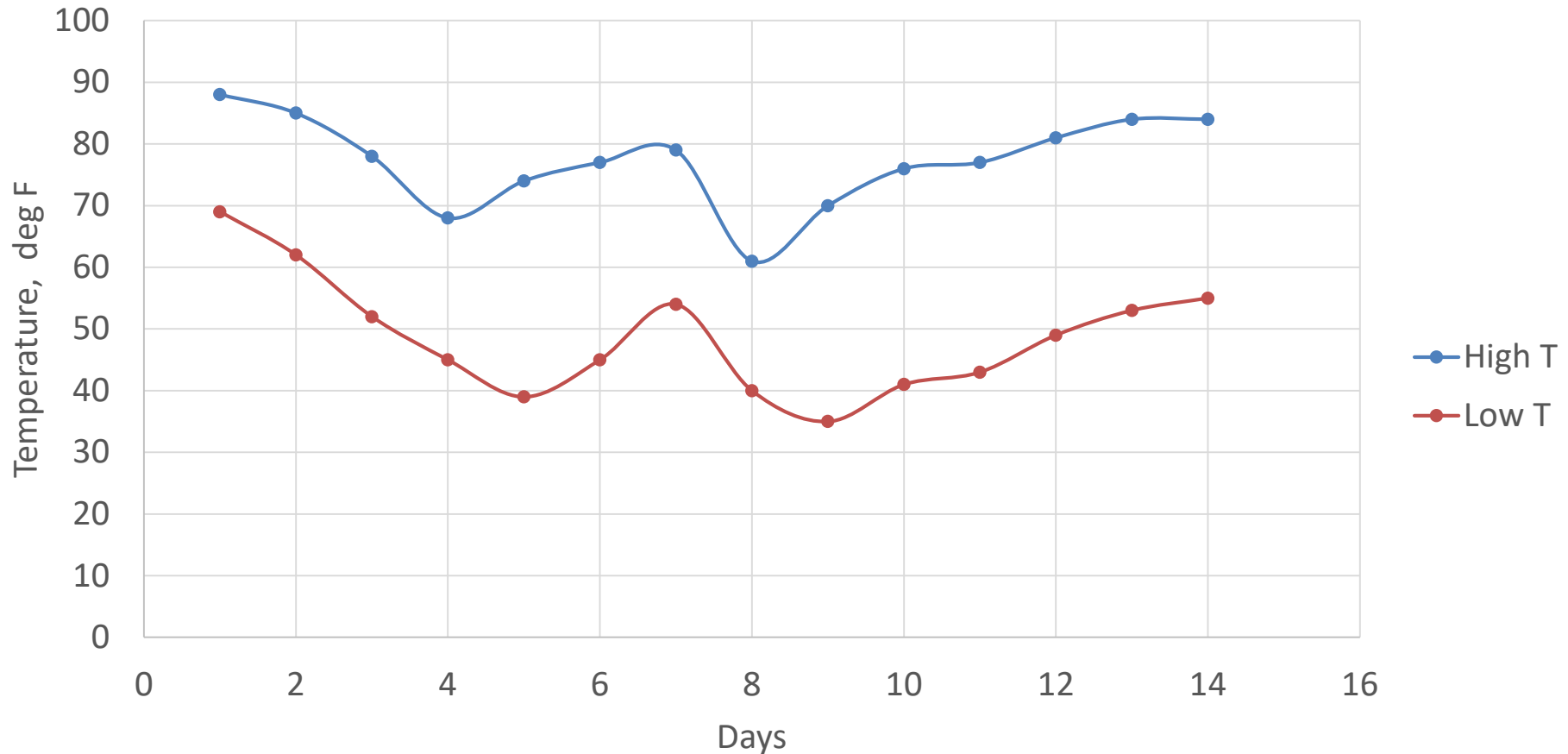
BACKUP SLIDES



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Tallahassee Temperature Gradient

Temperature Variances over 2 weeks



Tallahassee Pressure Gradient

