



Grade 9 Lab Notebook

Science in Action 9

Index of Investigations, Challenges and Activities

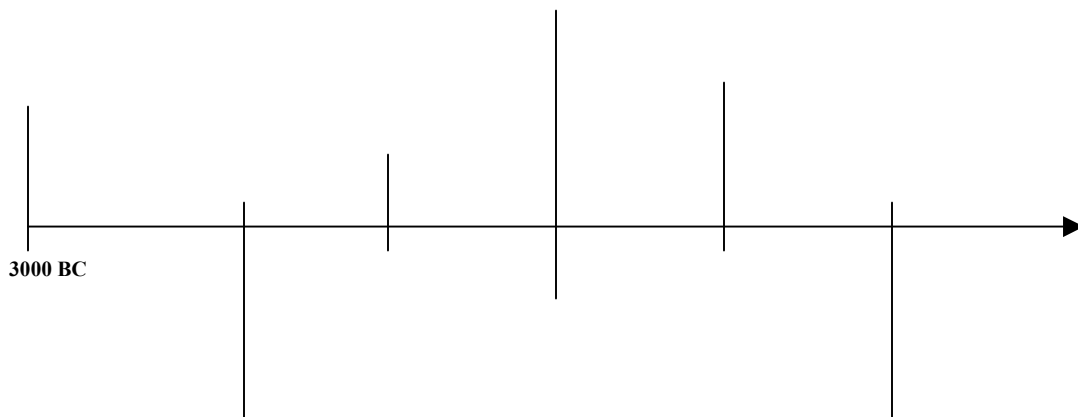
Space Exploration

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Give It A TRY
CRATER PATTERNS ON THE MOON (p. 269)

Observations (illustrate)

Give It A TRY
EVOLVING IDEAS ABOUT PLANETARY MOTION (p.371)



QuickLAB
Elliptical Loops (p. 375)



Questions:

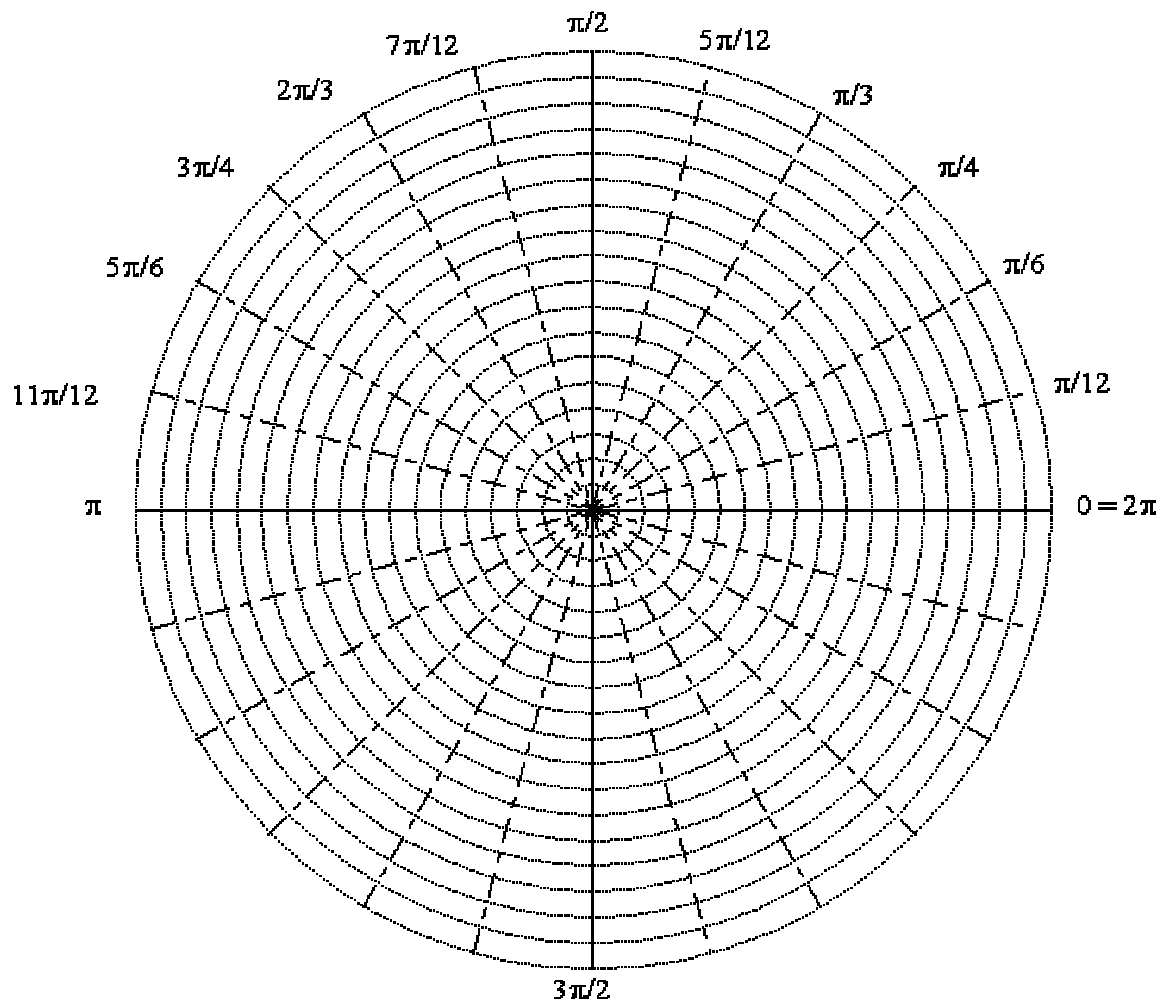
6. _____

7. _____

8. _____

QuickLAB

Telling SunDial Time (p. 377)



Questions:

4. _____

5. _____

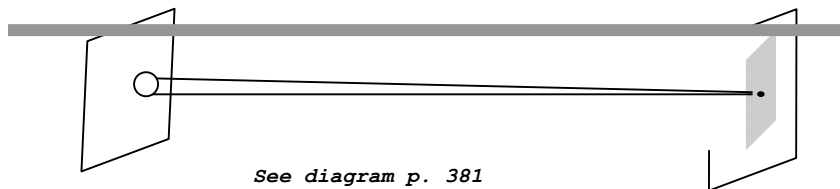
Inquiry E-1

How Big Is The Sun? (p. 380-381)

Question: Can we accurately measure the diameter of the Sun by using an indirect method?

Hypothesis: _____

Materials and Procedure: (p. 380-381)



Data Collection:

Trial 1 Diameter	Trial 2 Diameter	Trial 3 Diameter

Analyzing and Interpreting:

7. Average diameter = _____

8. $\frac{d}{100 \text{ cm}} = \frac{D}{150\,000\,000 \text{ km}}$

9. 'Percent error' calculation = $\frac{(\text{actual value} - \text{measured value})}{\text{actual value}} \times 100$

10. _____

Forming Conclusions:

11. _____

12. _____

Applying and Connecting (p. 381)

13. _____

14. _____

Give It A TRY

TAKE A WALK THROUGH THE SOLAR SYSTEM (p. 382)

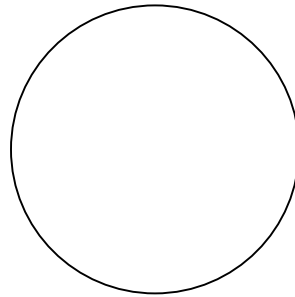
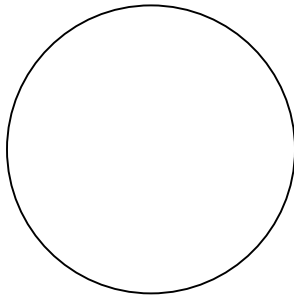
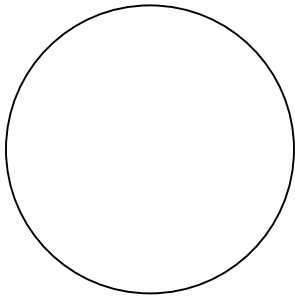
Class Participation (groups of 10) **Creating a Model**

3. _____

4. _____

QUICKLAB

WHAT COLOR & TEMPERATURE TELL US ABOUT ELEMENTS (p. 385)



6. _____

7. _____

8. _____

Give It A TRY
(CLASSIFYING STARS BY SIZE) (p. 200)

1. Classification of Sample Stars

Red Supergiants	Giants	Main Sequence Stars	White Dwarfs

2. a) _____

b) _____

c) _____

d)

_____ because _____

_____ because _____

SKILL PRACTICE

Building A Planetary Spreadsheet (p.393)

Sun	Characteristics:						
	-						
	-						
	-						
	-						
Planets	Composition	Atmosphere	Moons	Ring system	Axis of Rotation	Length of Day	Length of Year
Mercury							
Venus							
Earth							
Mars							
Jupiter							
Saturn							
Uranus							
Neptune							
Pluto							
Planet X							

Give It A TRY

HOW CAN COLLISIONS OCCUR IN ALL THAT SPACE? (p. 297)

4. _____

5. _____

Give It A TRY

ESTIMATING POSITIONS IN SPACE (p. 401)

Object	Fists (Elevation)	Direction

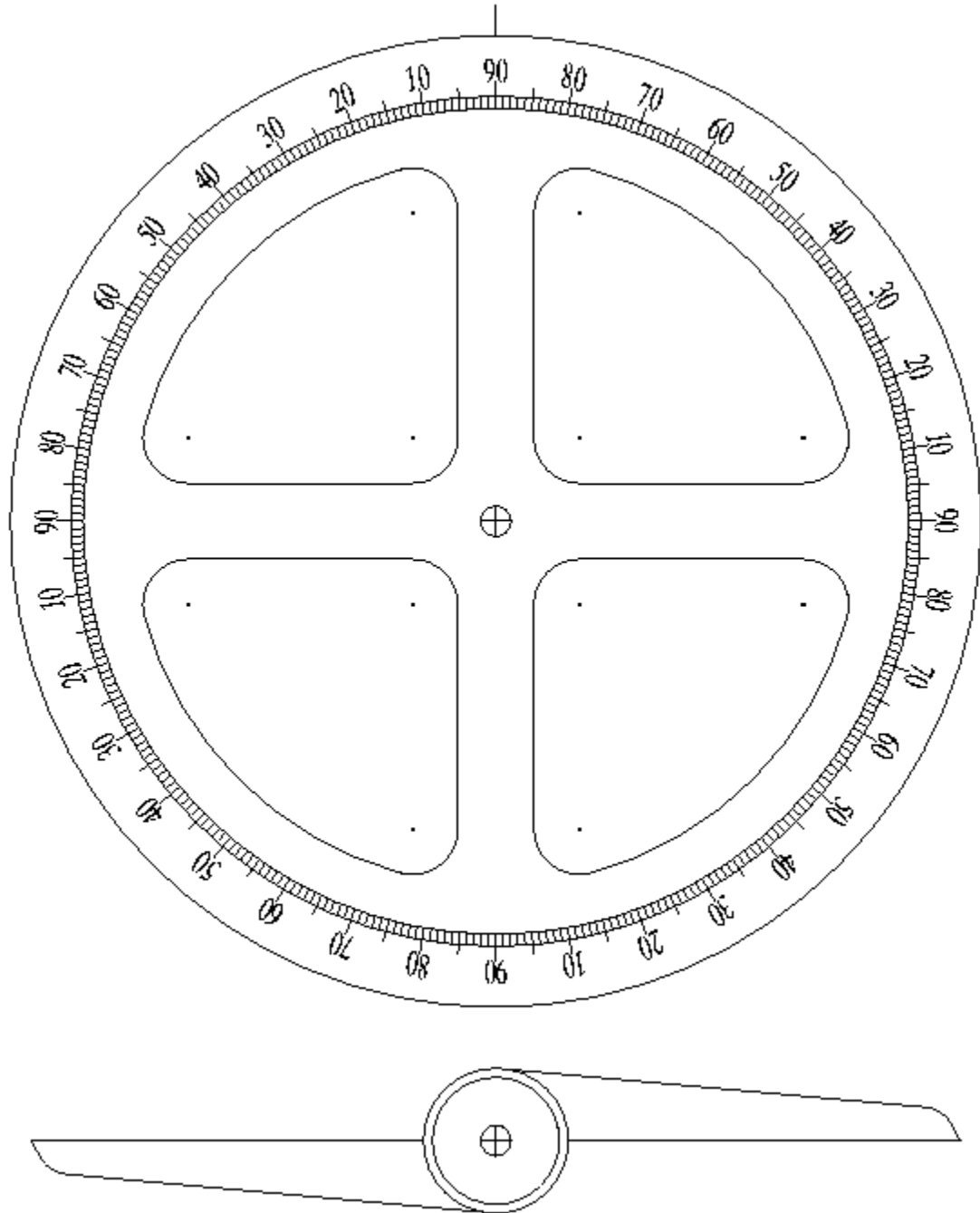
Problem Solving E-2

WHERE DO WE LOOK? (p. 402 - 403)

Question: Can you build your own 'astrolabe'?

Hypothesis: _____

Materials and Procedure: (p. 402 - 403) Use this to make yours!



Communicate:

8. _____

9. _____

10. _____

Extension:

(EXTREME CAUTION - DO NOT LOOK DIRECTLY AT THE SUN WITH THIS OR ANY OTHER 'Astrolabe' DEVICE)

Day 1	Day 2	Day 3	Day 4	Day 5

OBSERVATIONS

Questions

6. _____

7. _____

8. _____

9. _____

STABILIZING ROCKET FLIGHT (p. 411)

	Test Flight 1	Test Flight 2
Distance		
Flight Pattern		

Questions

6. _____

Conclusion _____

7. _____

Inquiry E-3

DESIGNING A SOLAR SAIL-POWERED SPACECRAFT (p. 414-415)

Follow the procedures outlined for this activity (on p. 414-415) as a Lab, or use this Alternative Project Activity

Description of Goal

To design and construct a prototype model of a **Solar Sail-powered Spacecraft**.
(**optional**: a **working** model should be solar powered and perform the task using only light as the power source)

Background:

The solar sail is likely the next great advance for interplanetary flight. Using the power of the sun (to generate electricity) to run a fan, your prototype model will carry a payload to a specified destination and will be scored on the success of the mission.

Specifications:

- Prototype must be your own design.
- Size is limited to spacecraft body which should not exceed 15cm long and 6cm wide
- Choice of materials is open
(*no commercially-developed robotic kits will be allowed – ie. Lego, Knex, Mechano, etc.*)
- You will be required to sail your spacecraft to the **target planet**, during the test phase.
- Spacecraft must travel in a straight line to its destination.
- It will be timed (speed is important).
- Impact or loss of payload will be penalized.
- Project **Report** should include:
 - Design Blueprint
 - Procedural Outline
 - *Construction Details*
 - Troubleshooting
 - Questions that you developed as a self analysis (reflection) of this project and the reality or science fiction it holds for you
 - Feedback sheet and recommendations from peers

Give It A **TRY**

Problems encountered:	Solutions:
1.	
2.	
3.	
4.	
5.	

Experiment On Your Own E-4

Designing And Building A Water Filter (p. 423)

Question: How effective are various materials for filtering water and improving its clarity?

Hypothesis: _____

Materials and Procedure: (p. 423)

2. a) _____

b) _____

c) _____

3. a) _____

b) _____

c) _____

d) _____

e) _____

4. Experimental Design (Scientific Illustration)

Data Collection:

6. _____

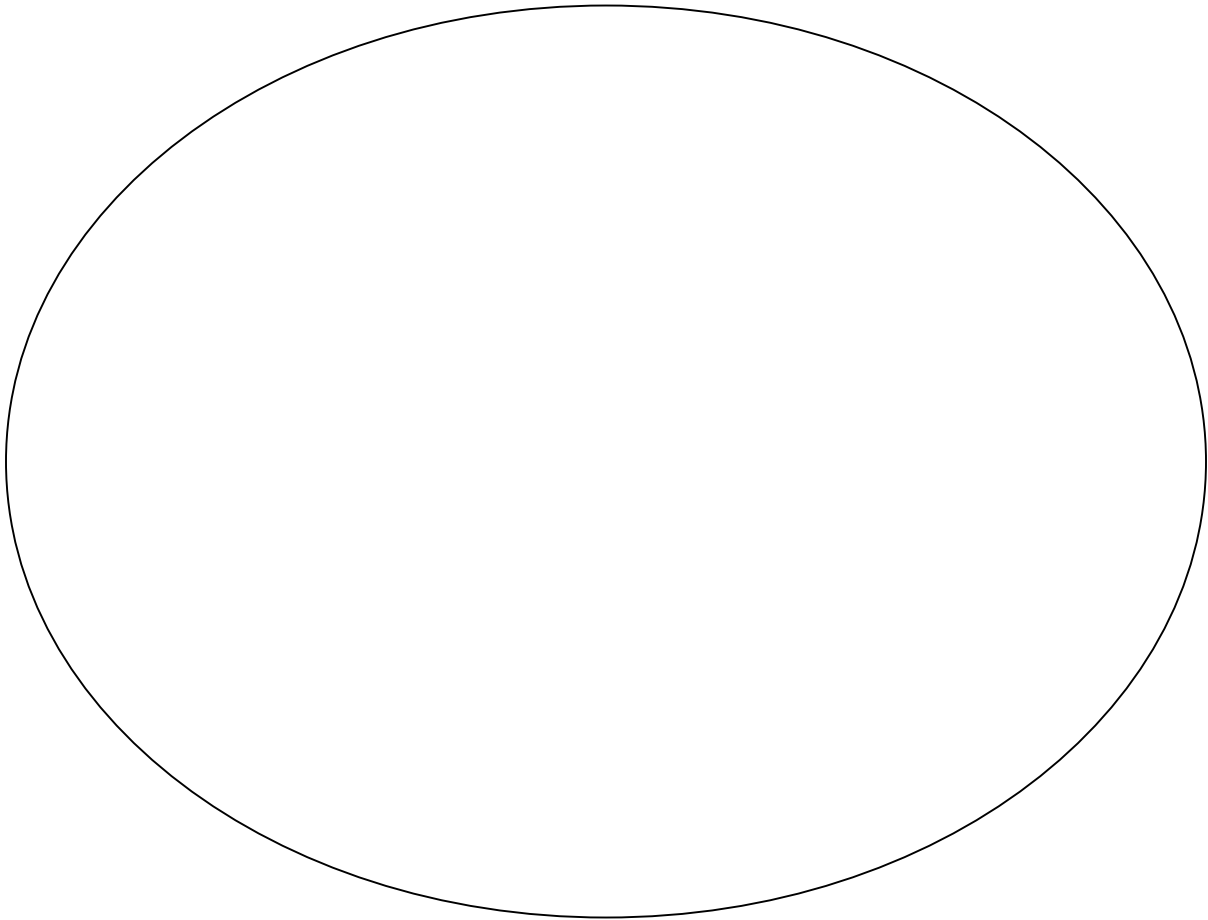
7.

Comparisons	Your Experiment	Peer Experiments
Procedure		
Set-Up		
Results		
8. Controls		

SPACE STATION DESIGN: THE VALUE OF TEAMWORK (P. 424)

Task: To design a module for an imaginary space station

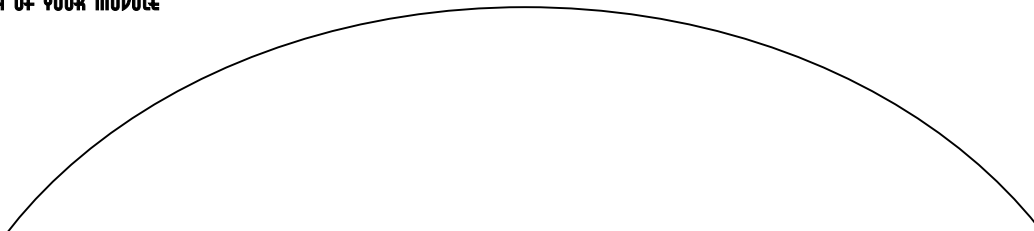
A SKETCH OF 'PANGEE' (_____ 'S ORBITING SPACE STATION)



MODULES INCLUDED BY YOUR CLASS

MODULE YOU ARE ASSIGNED TO DESIGN

SKETCH OF YOUR MODULE



HOW IT WAS CONSTRUCTED

EVALUATION:

C.

QUICKLAB

DATA RELAY FROM SPACE TO EARTH (p. 428)

Questions

8. _____

9. _____

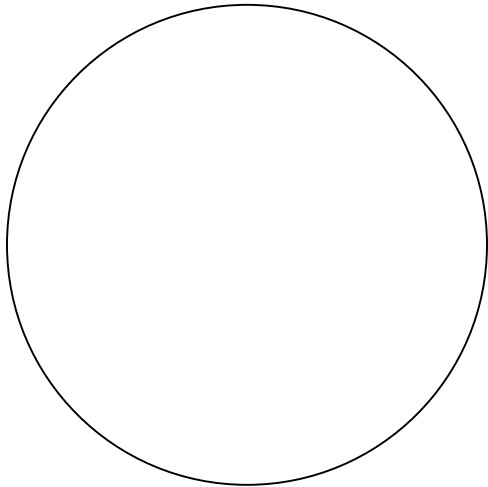
10. _____

SKILL PRACTICE
ON LOCATION WITH GPS (P. 430) (USING IMAGE ON P. 430)

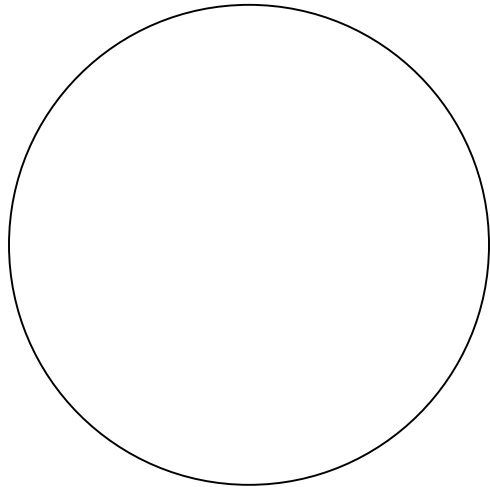


SKILL PRACTICE
SHARPEN YOUR STAR-GAZING SKILLS (P. 432)

(Do this activity at **HOME0**)



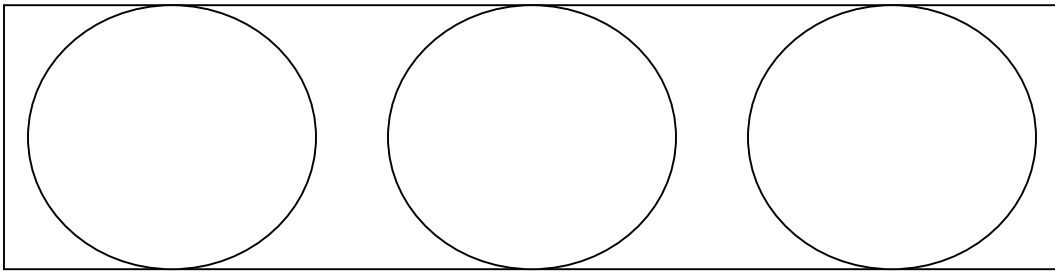
View Before



View After

Explanation:

QUICKLAB
COMPARING LIGHT SPECTRA (p. 441)



Light 1

Light 2

Light 3

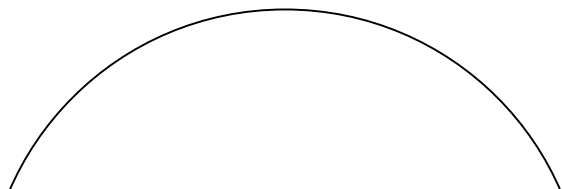
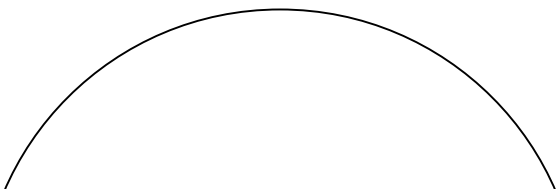
Questions:

3. _____

4. _____

5. _____

GIVE IT A TRY
LIGHT BULB STARS (p. 448)



Prediction: _____

Baseline Length (m)	Angle Position A (°)	Angle Position B (°)	Calculated length of field (m)	Actual length of field (m)	Percent Error (%)
10					
20					
30					

Analyzing and Interpreting:

7. Scale Drawings

10m



20m



30m

8. _____

9. See Table

10. See Table

Formula ... percent error = $\frac{\text{actual value} - \text{measured value}}{\text{actual value}} \times 100$

11. Average % error

$\frac{(\text{10m \% error}) + (\text{20m \% error}) + (\text{30m \% error})}{3} = \text{_____ \% error}$

Forming Conclusions:

12. _____

13. _____

14. _____

Applying and Connecting:

Sources of Error were likely _____

Inquiry E-7

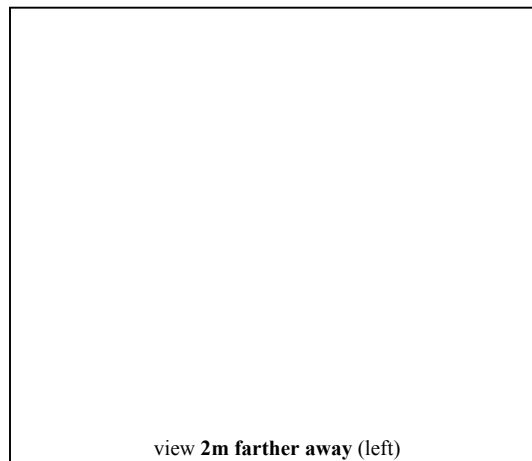
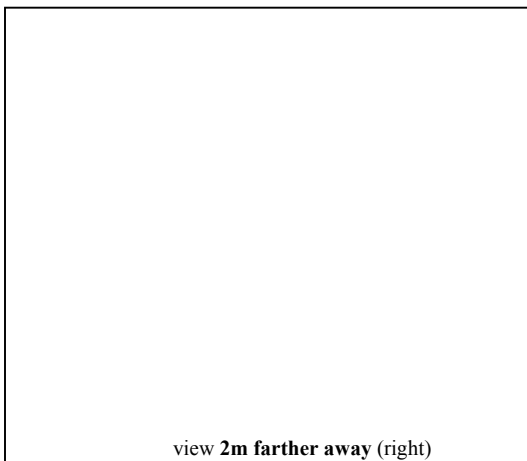
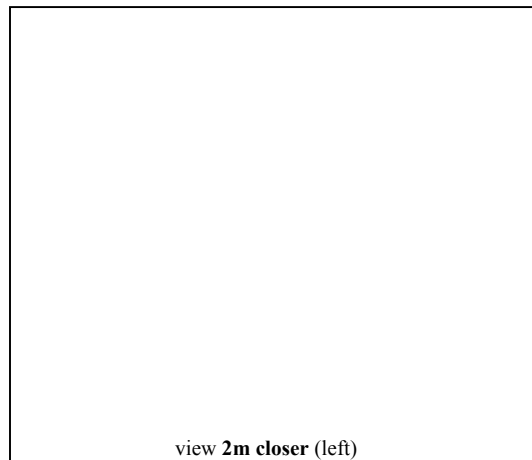
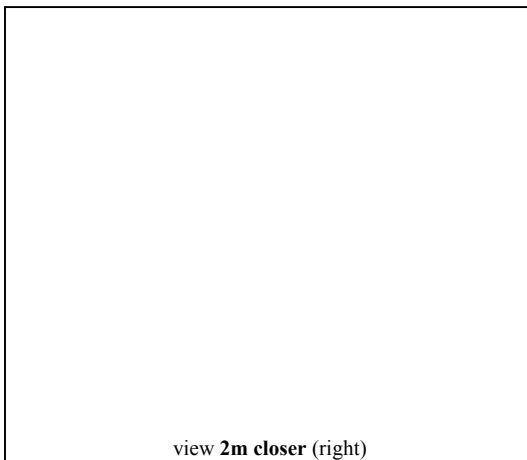
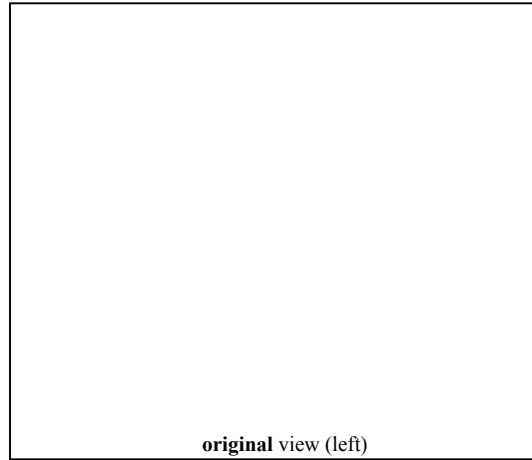
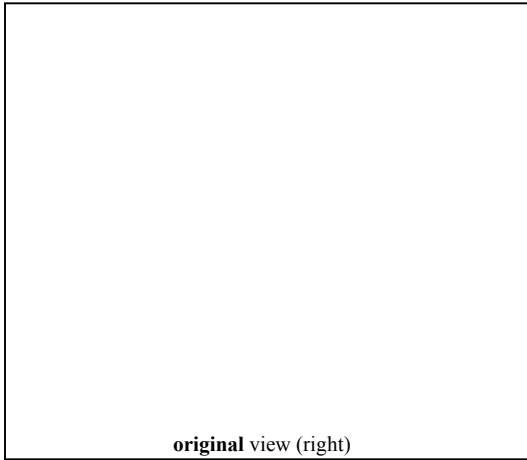
ANALYZING PARALLAX (p. 451)

Question: Which shows greater parallax: close objects or distant objects?

Hypothesis: _____

Materials and Procedure: (p. 451)

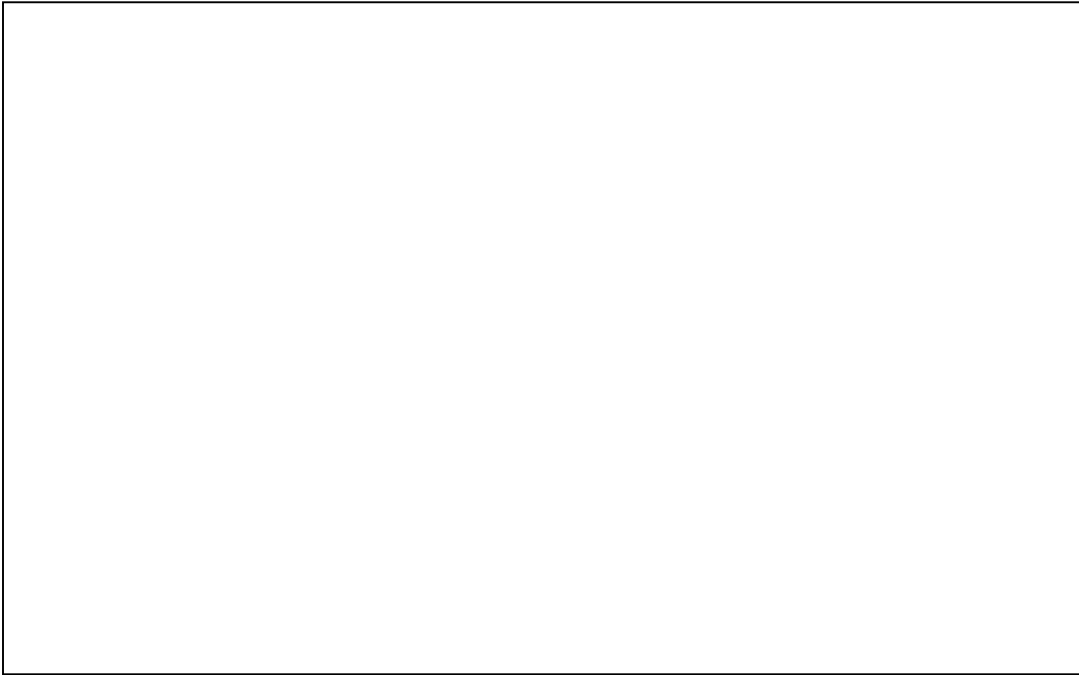
Data Collection:



Analyzing and Interpreting:

9. _____

10. Apparent shift ... map-view sketch



Forming Conclusions:

11. _____

12. _____

Applying and Connecting:

GIVE IT A TRY
EXPERIENCING THE DOPPLER EFFECT (p. 454)

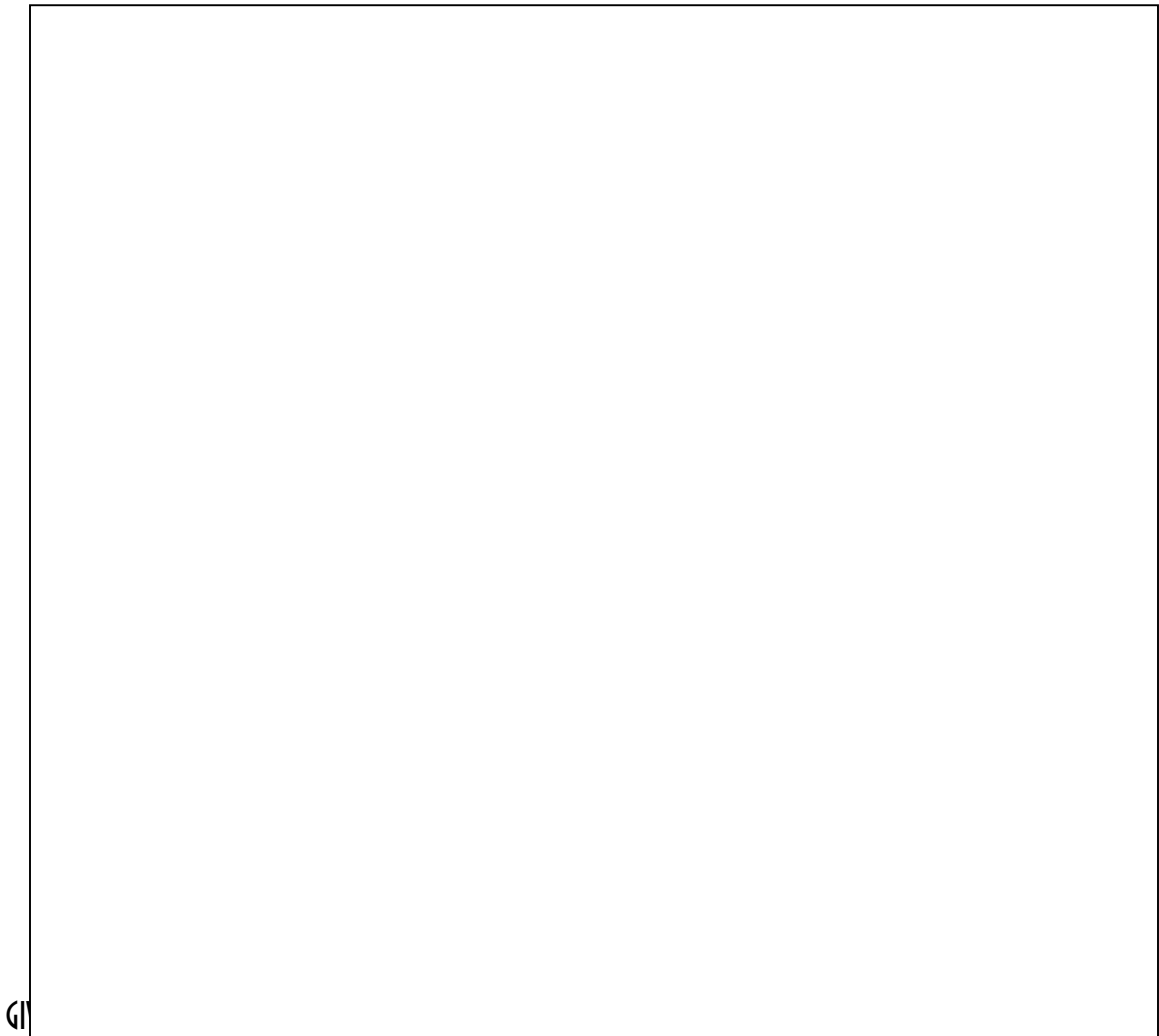
Questions:

1. _____

2. _____

3. _____

4. _____



GI
WHAT DOES IT TAKE TO BECOME AN ASTRONAUT? (p. 482)

1. Criteria of an *'ideal'* astronaut

2. Canadian Space Agency requirements to become an astronaut

3. Canadian Astronauts (Biographical Information)

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4. _____

5. (presentation to class)

6. (class discussion)

7. _____

WHO OWNS SPACE? (p. 467) (ETHICAL ISSUES)

1. _____

2. _____

3. _____

Class Discussion Summary and Analysis:

