Science Skill Builders Assessments/Teacher Masters: Table of Contents

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Name: _____ **Date:** _____

Checklist: Using Field Guides

Teacher Assessment

Determine whether the following elements are evident in the child's approach to using field guides. You might want to assign one point for each criterion that the child demonstrates. You can add specific observations or comments in the space below each criterion.

Criteria:

_____ A. Knows what a field guide is and what it can be used for.

_____ B. Uses the pictures and descriptions in a field guide to try and identify or learn about specimens.

_____ C. Makes plausible identifications of specimens using a field guide.

_____ D. Independently chooses to use a field guide as a resource when appropriate.

Name: _____ **Date:** _____

Checklist: Measuring Small Things

Teacher Assessment

Determine whether the following skills are evident as the child measures different objects. You might assign one point for each criterion that a child demonstrates. You can add specific observations or comments in the space below each criterion.

Criteria:

_____ A. Uses a ruler or manipulatives (such as centimeter cubes) to measure an object.

_____ B. Recognizes that there is more than one dimension to measure (such as length or width).

_____ C. Understands that measurements are not always exact.

_____ D. Rounds to the nearest unit of measurement.

Assessment Chart: Measuring Small Things

Determine whether children demonstrate the following measuring skills.

	Assessment Criteria:				
Children's Names	A. Uses ruler or manipulatives (such as centimeter cubes) to measure an object.	B. Identifies which unit of measurement is being used.	C. Recognizes that there is more than one dimension to measure (such as length or width).	D. Understands that measurements are not always exact.	E. Rounds to the nearest unit of measurement.
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Name: _____ **Date:** _____

Checklist: Measuring Length and Circumference

Teacher Assessment

Determine whether the following skills are evident as the child measures different objects. You might assign one point for each criterion that the child demonstrates. You can add specific observations or comments in the space below each criterion.

Criteria:

_____ A. Uses the appropriate measurement tool for the task.

_____ B. Lines up the ruler or tape measure at "zero".

_____ C. Identifies the correct unit of measurement.

_____ D. Selects an appropriate dimension to measure.

_____ E. Rounds to the nearest unit of measurement.

Assessment Chart: Measuring Length and Circumference

Use this sheet to assess children's ability to measure length and circumference.

Date of Observation: _____ Lesson _____

	Assessment Criteria:				
Children's Names	A. Uses the appropriate measurement tool for the task.	B. Lines up ruler or tape measure at "zero."	C. Identifies the correct unit of measurement.	D. Selects an appropriate dimension to measure.	E. Rounds to the nearest unit of measurement.
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Name: _____ **Date:** _____

Checklist: Creating and Using Models

Teacher Assessment

Determine whether the following skills are evident as the child uses and creates models. You might assign one point for each criterion that the child demonstrates. You can add specific observations or comments in the space below each criterion.

Criteria:

_____ A. Understands that a model is a representation of something.

_____ B. Can create a model to represent his or her ideas.

_____ C. Can critique one's own model as well as scientific or peer's models.

_____ D. Can compare one's own model to scientific or peer's models.

Name: _____ **Date:** _____

Self-Assessment: Making Models

Think about the model or models you made in class. Answer the following questions.

1. How well does your model represent your ideas?

   Very well Okay Not very well

2. What do you like most about your model?

3. Did you learn anything from other models you could include on your model or a new model? Explain you answer.

4. If you had more time to work on your model, what would you change about it? Explain your answer.

Assessment Chart: Creating and Using Models

As you evaluate the children's discussions, their work in their science notebooks, and their models, consider whether they demonstrate understanding of the following concepts.

	Assessment Criteria:			
Children's Names	A. A model is a representation of something.	B. A model can be constructed to represent a scientific idea.	C. It is important to interpret other models such as a peer's model or a scientific model.	D. Another model can be critiqued and compared to one's own model.
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Name: _____ **Date:** _____

Checklist: Measuring Weight and Volume

Teacher Assessment

Determine whether the following skills are evident as the student works on measuring techniques. You might assign one point for each criterion that the student demonstrates. You can add specific observations or comments in the space below each criterion.

Criteria:

_____ A. Measures things as accurately as possible.

_____ B. Approximates to the nearest increment.

_____ C. Measures liquid volume in a graduated cylinder by reading the lowest point of the meniscus.

_____ D. Sets the scale to zero before weighing objects.

Assessment Chart: Measuring Weight and Volume

As you evaluate children's discussions and work, determine if they demonstrate understanding of the following skills:

	Assessment Criteria:			
Students' Names	**A.** Measures things as accurately as possible.	**B.** Approximates to the nearest increment.	**C.** Measures liquid volume in a graduated cylinder by reading the lowest point of the meniscus.	**D.** Sets the scale to zero before weighing objects.
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Name: _____ **Date:** _____

Checklist: Experimental Process

Teacher Assessment

Determine whether the following skills are evident in the student's approach to the experimental process. You might assign one point for each criterion that the student demonstrates. You can add specific observations or comments in the space below each criterion.

Criteria:

_____ A. Identifies one variable to be tested at a time.

_____ B. Keeps all variables (except the one being tested) the same.

_____ C. Writes procedures clearly so others can repeat the experiment or investigation.

_____ D. Records results in an organized manner (e.g., in a table) so that they are easy to read and interpret.

_____ E. Makes sense of the results by looking at similarities and differences in the data and speculating about why they occur.

_____ F. Bases conclusions on observations or other data.

_____ G. Communicates conclusions clearly and offers an explanation for the results.

Assessment Chart: Experimental Process

As you evaluate children's experiments and work, determine if they demonstrate understanding of the following important elements of the experimental process:

	Assessment Criteria:					
Students' Names	**A.** Identifies one variable to be tested at a time.	**B.** Keeps all variables (except the one being tested) the same.	**C.** Writes procedures clearly so that others can repeat the experiment or investigation.	**D.** Records results in an organized manner (e.g., in a table) so that they are easy to read and interpret.	**E.** Makes sense of the results. Is able to look at similarities and differences in the data and speculate about why they occur.	**F.** Conclusions are based on observations or other data. Conclusions are communicated clearly and offer an explanation for the results.
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Assessment Chart: Experimental Process

	Assessment Criteria:					
Students' Names	**A.** Identifies one variable to be tested at a time.	**B.** Keeps all variables (except the one being tested) the same.	**C.** Writes procedures clearly so that others can repeat the experiment or investigation.	**D.** Records results in an organized manner (e.g., in a table) so that they are easy to read and interpret.	**E.** Makes sense of the results. Is able to look at similarities and differences in the data and speculate about why they occur.	**F.** Conclusions are based on observations or other data. Conclusions are communicated clearly and offer an explanation for the results.
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Name: _____ **Date:** _____

Checklist: Scientific Drawing

Teacher Assessment

Determine whether the following skills are evident as the child makes scientific drawings. You might assign one point for each criterion that the child demonstrates. You can add specific observations or comments in the space below each criterion.

Criteria:

_____ A. Observes with the intention of noticing details.

_____ B. Is patient with and encouraged by emerging drawing skills.

_____ C. Drawings reflect an attention to accuracy and detail.

_____ D. Explains the features of the drawing to others.

Name: _____ **Date:** _____

Self-Assessment: Scientific Drawing

Think about your drawings. Answer the following questions.

1. How much detail do you include in your drawings?

   A lot of detail Some detail Very little detail

   Give some examples of when you included details in your drawing.

2. Can you explain your drawings to others?

   Always Sometimes Seldom

Assessment Chart: Scientific Drawing

Determine whether the following elements are emerging in the children's approach to scientific drawing.

Teacher Note: Observation and drawing are skills that take time and practice to develop. Children should be free to engage in this learning process without judgment or comparison.

	Assessment Criteria:			
Children's Names	A. Observes with the intention of noticing details.	B. Is patient with and encouraged by emerging drawing skills.	C. Drawings reflect an attention to accuracy and detail.	D. Explains the features of the drawing to others.
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Name: _____ **Date:** _____

Checklist: Observing and Describing

Teacher Assessment

Determine whether the following skills are evident as the student makes observations and descriptions. You might assign one point for each criterion that the student demonstrates. You can add specific observations or comments in the space below each criterion.

Criteria:

_____ A. Observations, descriptions and drawings are accurate; they reflect actual properties or events.

_____ B. Observations, descriptions, and drawings incorporate details.

_____ C. Uses multiple perspectives and senses when making observations.

Name: _____ **Date:** _____

Self-Assessment: Observing and Describing

Think about your observations, descriptions and scientific drawings. Answer the following questions.

1. Do you make careful observations?

   Always Sometimes Seldom

2. How much detail do you include in your observations, drawings or descriptions?

   A lot of detail Some detail Very little detail

   Give some examples of when you included details in your observations:

3. Do you use more than one sense when you make observations?

   Always Sometimes Seldom

   Give some examples of when you used different senses in your observations:

Assessment Chart: Observing and Describing

Consider the children's abilities to make and communicate observations, and determine whether the following elements are reflected.

Teacher Note: Some children are acute observers, but have difficulty communicating what they have observed. Offer multiple avenues for description, including drawings as well as verbal or written descriptions.

	Assessment Criteria:		
Children's Names	A. Observations and descriptions are accurate; they reflect actual characteristics or events.	B. Observations and descriptions are detailed.	C. Uses multiple senses and perspectives when making observations.
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Name: _____ **Date:** _____

Checklist: Relative Scale

Teacher Assessment

Determine whether the following concepts are evident as the child works with relative scale. You might assign one point for each criterion that the child demonstrates. You can add specific observations or comments in the space below each criterion.

Criteria:

_____ A. Understands that scale models are used to represent things in the real world.

_____ B. Recognizes that scale is the size of the model compared to the real object.

_____ C. Understands that a change in scale of one variable (such as length or distance) requires a change in scale of another variable (such as size).

Assessment Chart: Relative Scale

Observe the children as they apply the concept of relative scale to their use of models to determine whether they understand the following criteria.

	Assessment Criteria:		
Children's Names	A. Scale models are used to represent things in the real world.	B. Scale is the size of a model compared to the size of the original.	C. A change in scale of one variable (such as length or distance) requires a change in scale of another (such as size).
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Name: _____ **Date:** _____

Checklist: Collecting Data and Making Conclusions

Teacher Assessment

Determine whether the following elements are evident as the student records and analyzes their data. You might assign one point for each criterion that a student demonstrates. You can add specific observations or comments in the space below each criterion.

Criteria:

_____ A. Data is detailed and demonstrates careful consideration (e.g., uses correct units).

_____ B. Data reflects only what was actually observed (objective) and does not include personal opinions or interpretations (subjective).

_____ C. Makes sense of the results by looking at similarities or differences in the data and speculating about why they occur.

_____ D. Makes conclusions based solely on experimental data.

_____ E. Conclusions are communicated clearly and offer an explanation for the results.

Name: _____ **Date:** _____

Self-Assessment: Collecting Data and Making Conclusions

1. How careful are you when you collect and record data?

   Very careful Okay Not very careful

2. How well does your data show what you actually observed?

   Very well Okay Not very well

3. How well do you use data you collect to make conclusions?

   Very well Okay Not very well

   Give an example of when you used your data to make conclusions.

Note Recording Tool

Instructions: Use this tool as a note recording device to record each child's initial understanding of concepts. We suggest you return to these original thoughts throughout the unit.

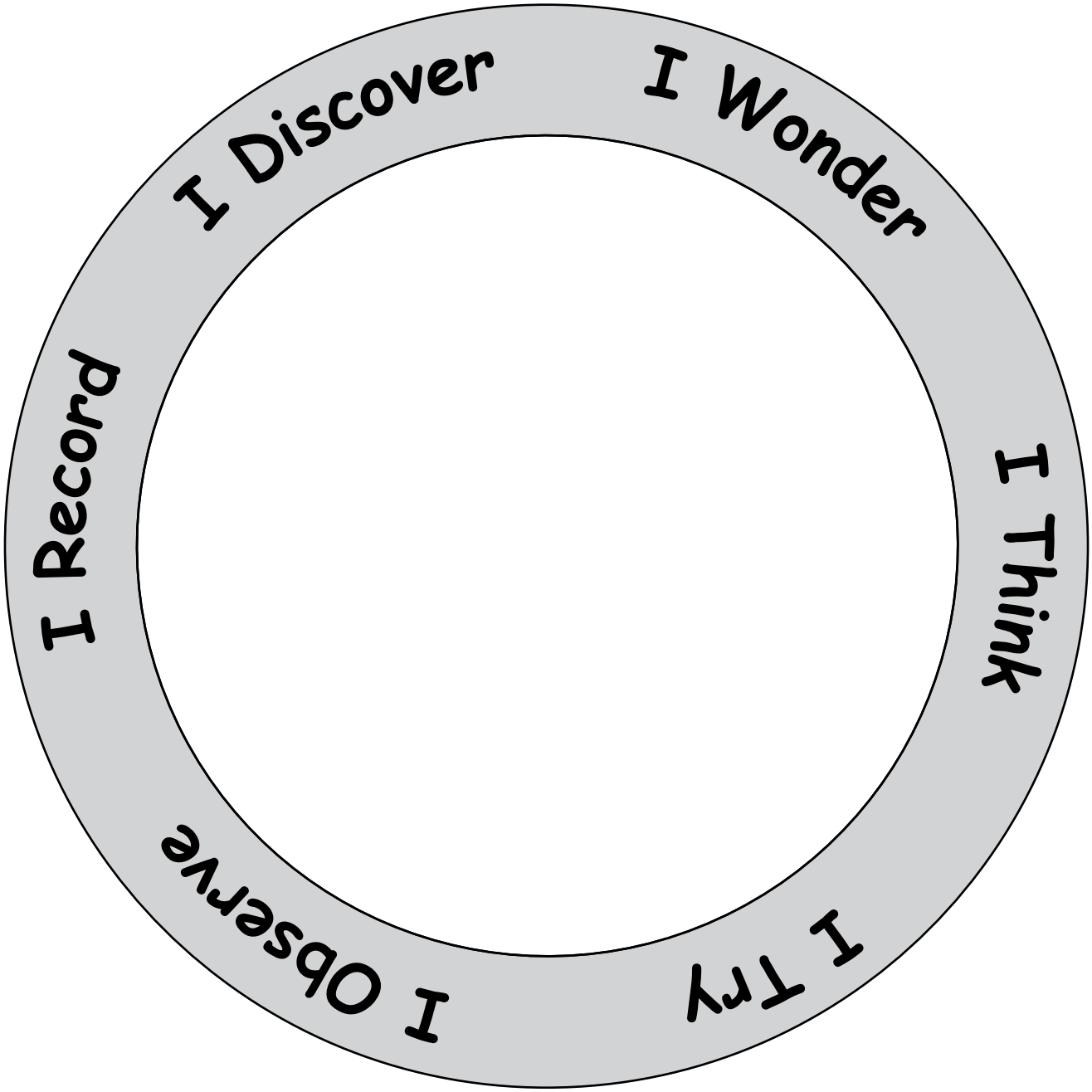
Unit: _____ Lesson # _____ Date(s) _____

Concept _____

Student Identification (name and/ or number)	**Comments**

Doing Science

"I Wonder" Circle®



Name: _____ **Date:** _____

Experimenting with Gravity

Question: Does gravity make everything fall at the same rate?

1. Use the materials provided to design an experiment to answer this question.
2. Record each step of your experiment on the table. You may follow the steps in any order. Write down the order you did steps in.

Order	Step	Notes
	Wonder	
	Think	
	Try	
	Observe	
	Record	
	Discover	

Here are some simple "rules of thumb" for designing an experiment:

- Keep it simple.
- Only test one thing at a time; it makes it easier to keep track of your results.
- Write out your procedures so other scientists can repeat your experiment themselves.
- Record your results as they happen.
- Keep an eye out for unexpected results.
- Always use evidence to support your conclusions.
- Use one experiment as a jumping off point for the next experiment.

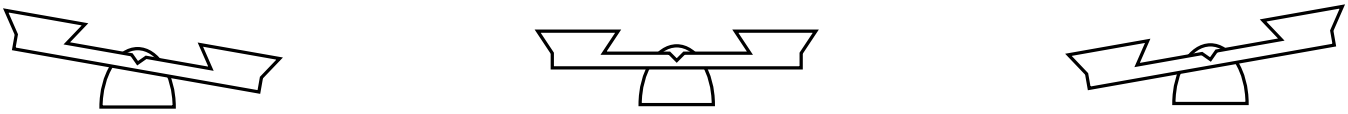
Name: _____ **Date:** _____

Using Balances and Scales

1. I have two vegetables. One is a(n) _____ and the other is a(n) _____.

2. Which vegetable **feels** heavier? _____.

3. My balance looks like this one: (circle one)



Draw a picture of your vegetables in the balance pans.

4. Which vegetable is heavier?_____

5. The balloon weighs more less than the marble.
(circle one)

6. Are larger objects always heavier than smaller ones? _____

7. My pencil weighs about _____ grams.

Name: _____ **Date:** _____

Facts from My Field Guide

Complete the following information about your field guide and your organism or object.

1. Title of the field guide:

   _____

2. Author of the field guide:

   _____

3. Name of the organism or object that is most like yours:

   _____

4. What page number did you find it on? _____

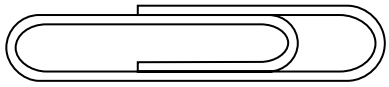
5. What else did you learn about your organism or object?

Name: _____ **Date:** _____

Measuring Small Things

I measured:

a paperclip



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length: _____ cm

width: _____ cm

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length: _____ cm

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length: _____ cm

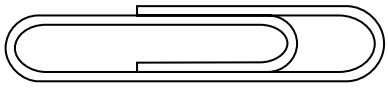
width: _____ cm

Name: _____ **Date:** _____

Measuring Length and Circumference

I measured:

a paperclip:



length: _____ cm

any object:

_____

length: _____ cm

a round object or cylinder:

_____

circumference: _____ cm

a round object or cylinder:

_____

circumference: _____ cm

Science Center

Elapsed Time Challenge Cards

Directions: Duplicate the challenges below and attach them to index cards. Write the answers on the back of the cards. Place the cards in the Science Center after Skill Building Activity "Elapsed Time." Place blank index cards in the Science Center for the children to write their own challenges on. Put a clock and calculator in the Science Center to help the children solve the problems.

Jimmy practiced football from 8:00 A.M. until 10:15 A.M. How many hours did he practice?	Kelly leaves her house at 10:05 A.M. and returns at 5:25 P.M. How long has she been gone?
Andy sailed his boat to an island off the coast. He began sailing at 9:15 A.M. and arrived at 4:50 P.M. How long did it take him to get to the island?	Jamie arrived at work at 8:10 A.M. She left at 5:25 P.M. How long was she at work?
Samantha got on a bus at 9:20 A.M. She got off the bus at 11:00 A.M. How long was she on the bus?	Make up some problems for a friend to solve. Write them down on index cards or on one of the blank pages in your science notebook so that others can try them out.

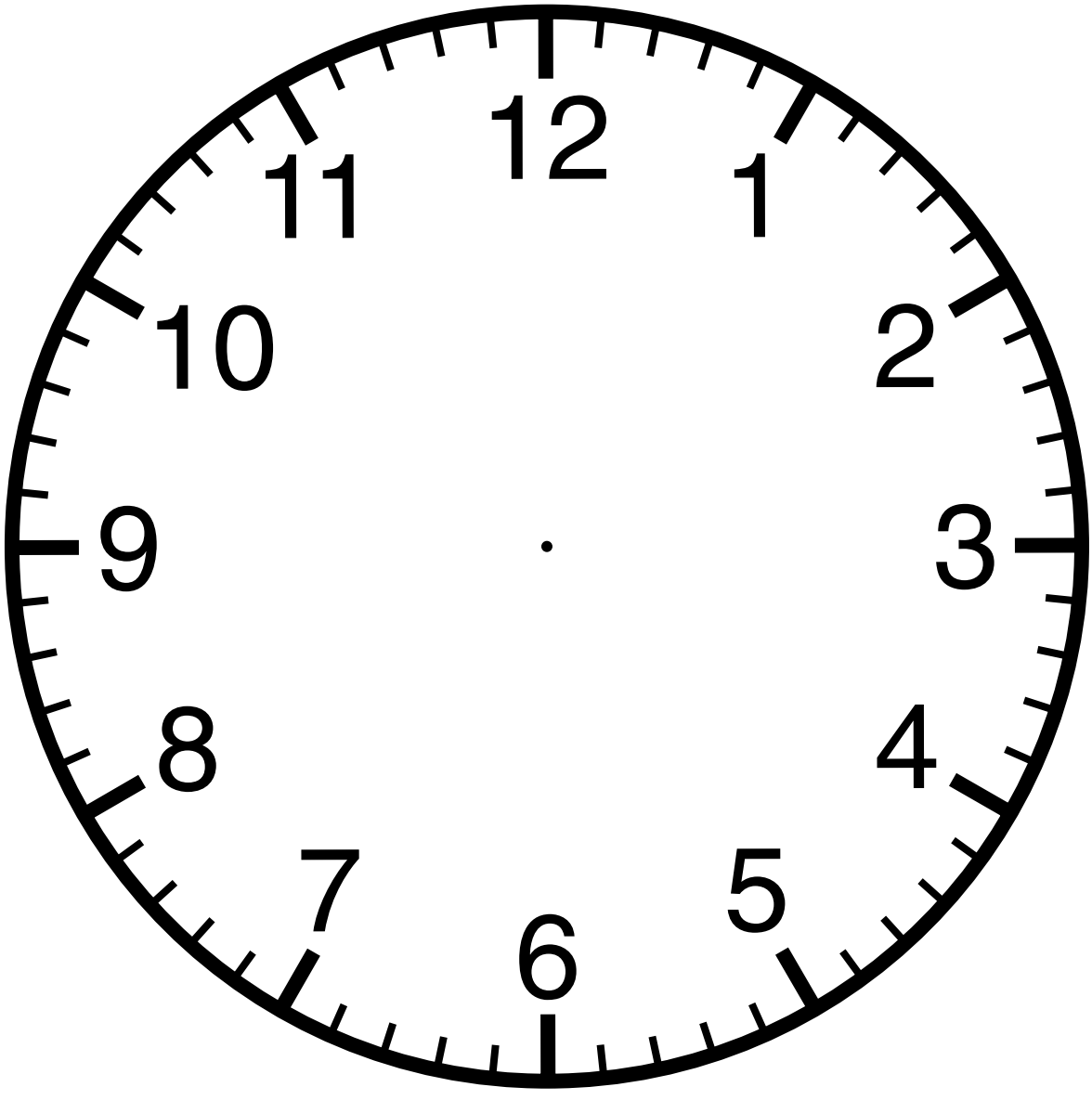
Answers:

2 hours, 15 minutes
7 hours, 35 minutes
1 hour, 40 minutes
7 hours, 20 minutes
9 hours, 15 minutes

Name: _____ **Date:** _____

Paper Clock

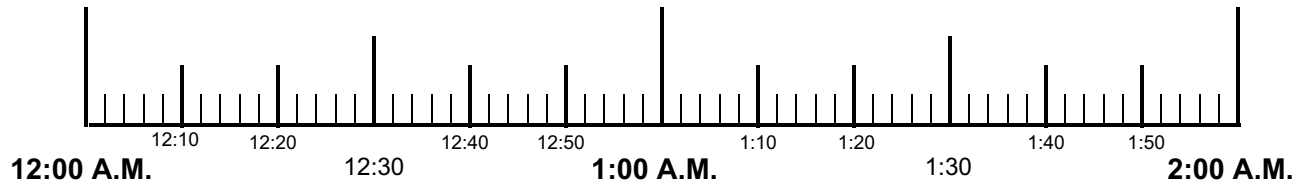
Directions: Cut out the clock face, the minute hand, and the hour hand. Punch a hole through the center of the clock face and through the circles on the hands. Fasten the hands to the clock face with a brad.

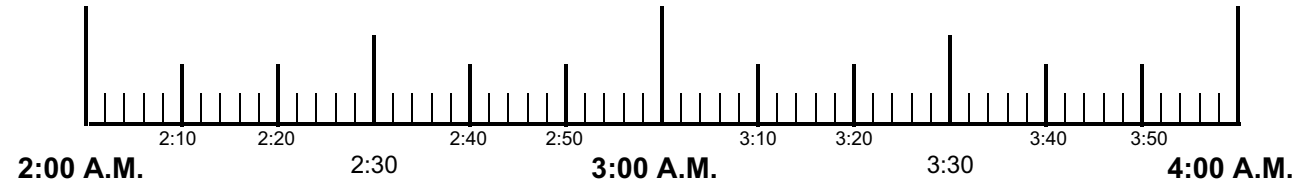


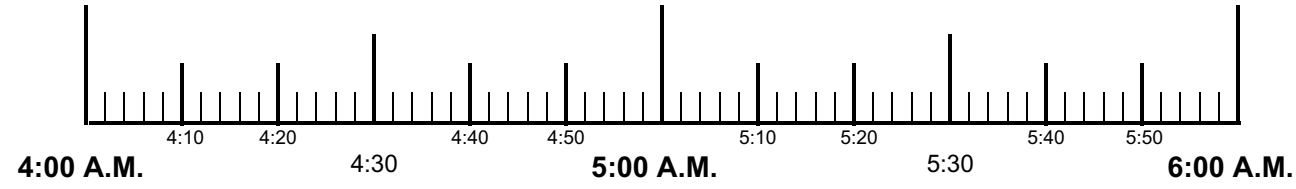
Time Line

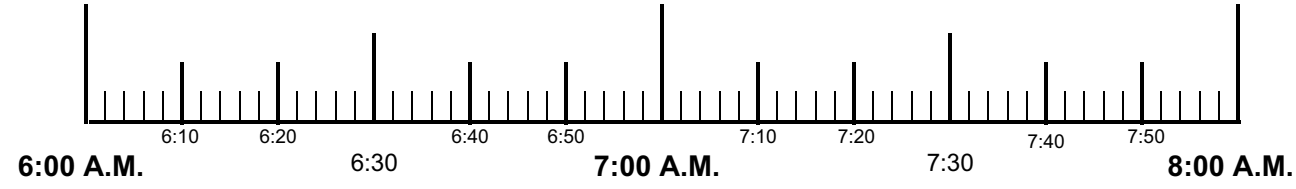
(Page 1 of 3)

Directions: Cut out each strip and tape them together to form a continuous, 24-hour time line.





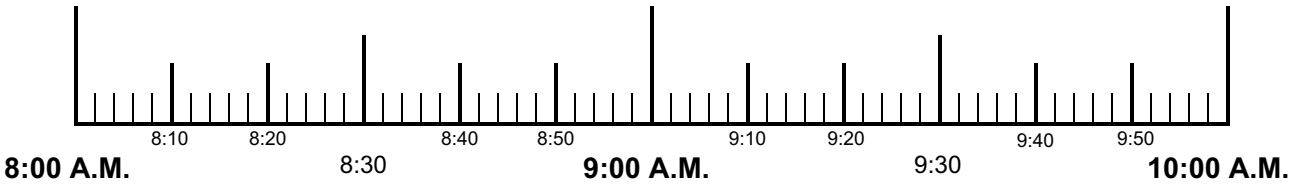


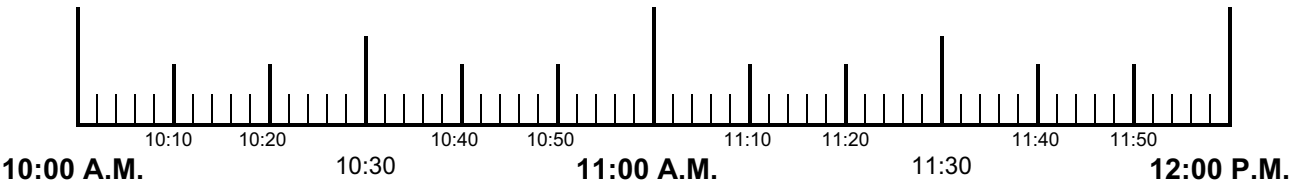


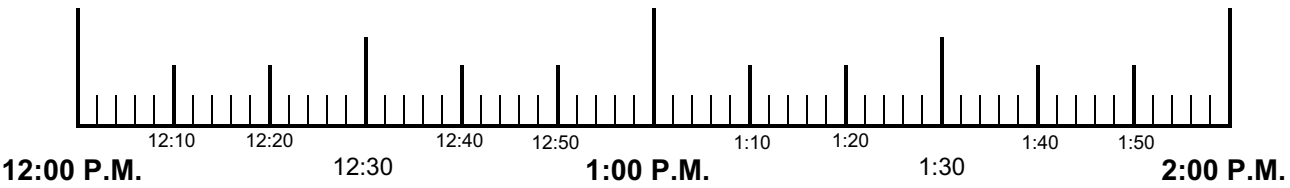
Time Line

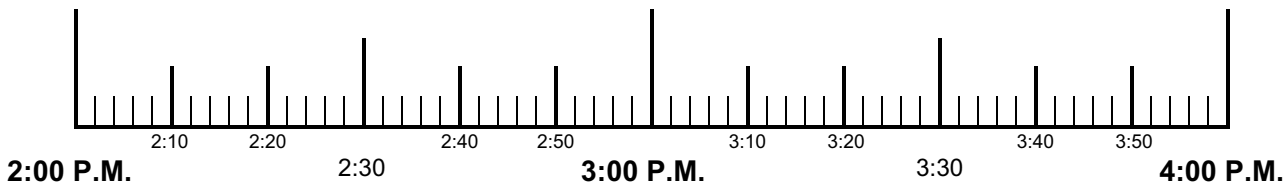
(Page 2 of 3)

Directions: Cut out each strip and tape them together to form a continuous, 24-hour time line.





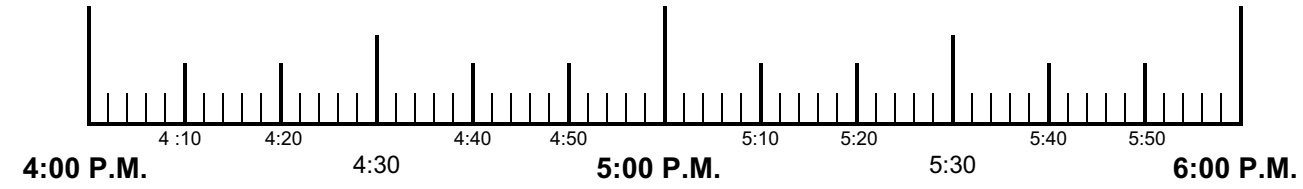


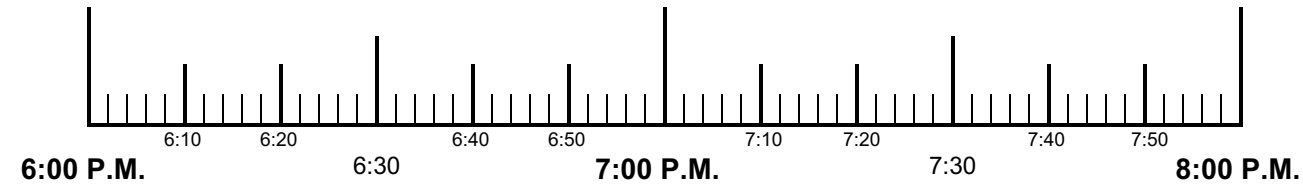


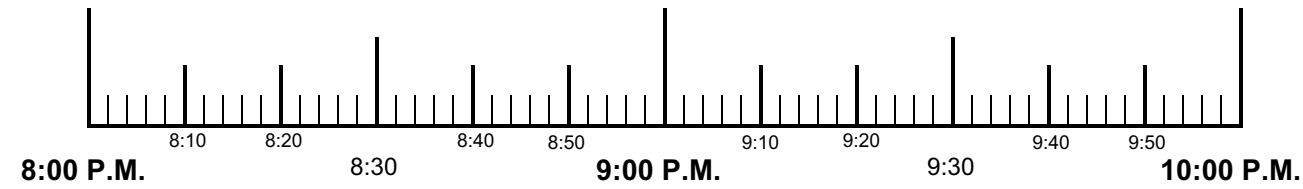
Time Line

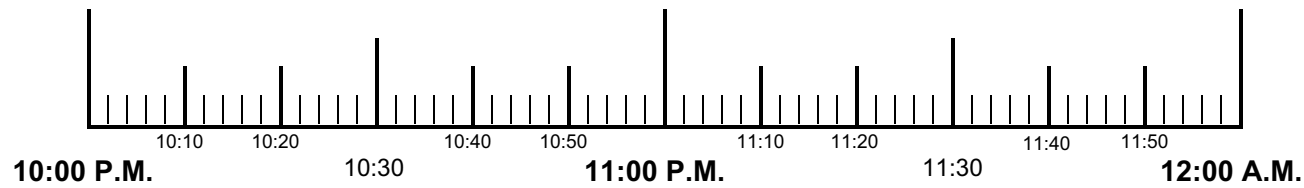
(Page 3 of 3)

Directions: Cut out each strip and tape them together to form a continuous, 24-hour time line.









Name: _____ **Date:** _____

Which Battery Lasts the Longest?

A scientist wanted to determine which brand of batteries lasted the longest. She tested 10 different brands of batteries by placing them in identical flashlights, turning on each flashlight and leaving it on until the flashlight stopped working. Listed below are the times the flashlights were turned on and when they stopped working. For each sample, calculate how much time elapsed before the batteries no longer worked.

Battery Sample Number	Time Flashlight Turned On	Time Flashlight Stopped	Elapsed Time:
Sample 1	7:00 A.M.	11:00 A.M.	
Sample 2	7:05 A.M.	11:35 A.M.	
Sample 3	7:10 A.M.	11:45 A.M.	
Sample 4	7:10 A.M.	12:50 P.M.	
Sample 5	7:10 A.M.	2:10 P.M.	
Sample 6	7:15 A.M.	2:05 P.M.	
Sample 7	7:15 A.M.	11:45 A.M.	
Sample 8	7:20 A.M.	4:30 P.M.	
Sample 9	7:20 A.M.	3:25 P.M.	
Sample 10	7:20 A.M.	6: 55 P.M.	

Name: _____ **Date:** _____

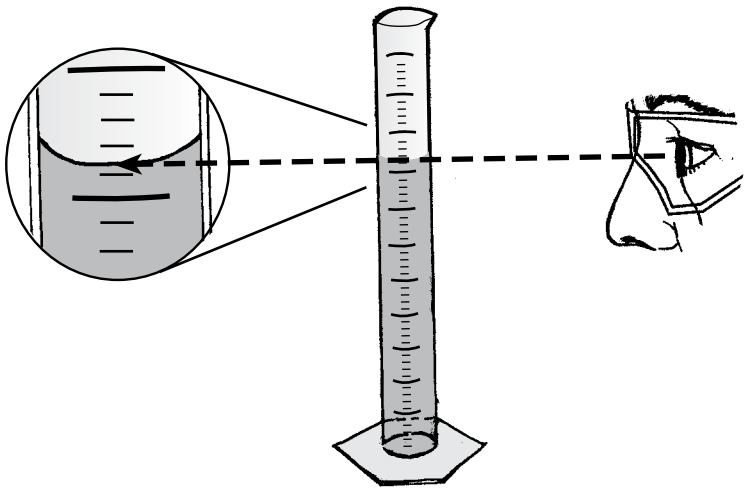
Accurately Measuring Volume

Materials:

- 100 ml graduated cylinder
- 100 ml beaker
- 230 cc calibrated cup
- Water

Procedure:

1. In the beaker, measure 60 ml of water.
2. Carefully pour the water from the beaker into the graduated cylinder. Remember to tap the bottom of the beaker to get the final drops of water into the graduated cylinder.
3. Measure and record the volume of water in the graduated cylinder. Remember, if the meniscus is obvious, look at the lowest part of the curve.
4. Carefully pour the water from the graduated cylinder into the calibrated cup.
5. Measure and record the volume of water in the cup. Remember, 1 cc = 1 ml.
6. Pour out the water from the calibrated cup, and repeat steps 1–3 with 70 and 80 ml of water.



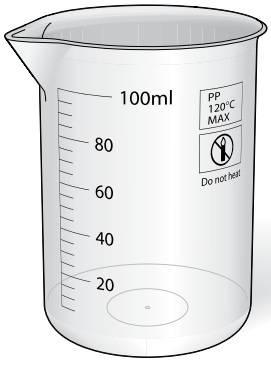
Look at the meniscus.

Name: _____ **Date:** _____

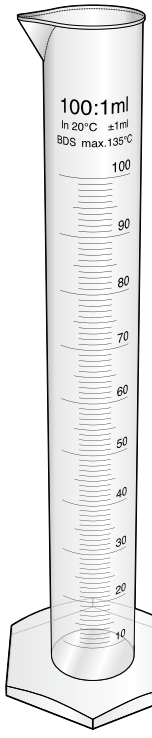
Accurately Measuring Volume

Data:

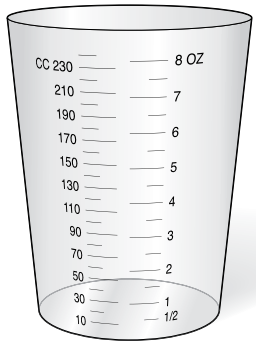
Volume of water in beaker	Volume of water in graduated cylinder	Volume of water in calibrated cup
60 ml	ml	cc
70 ml	ml	cc
80 ml	ml	cc



Beaker



Graduated cylinder



Calibrated cup

Name: _____ **Date:** _____

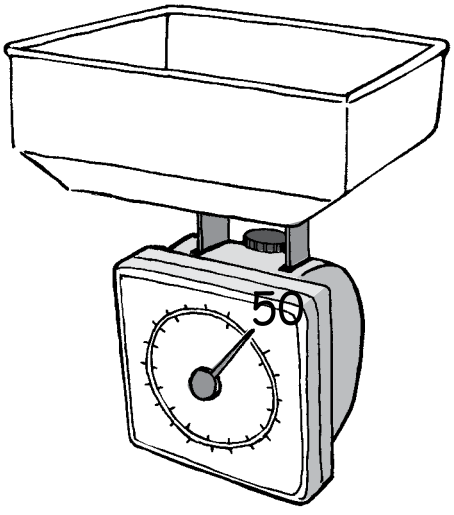
Accurately Measuring Weight

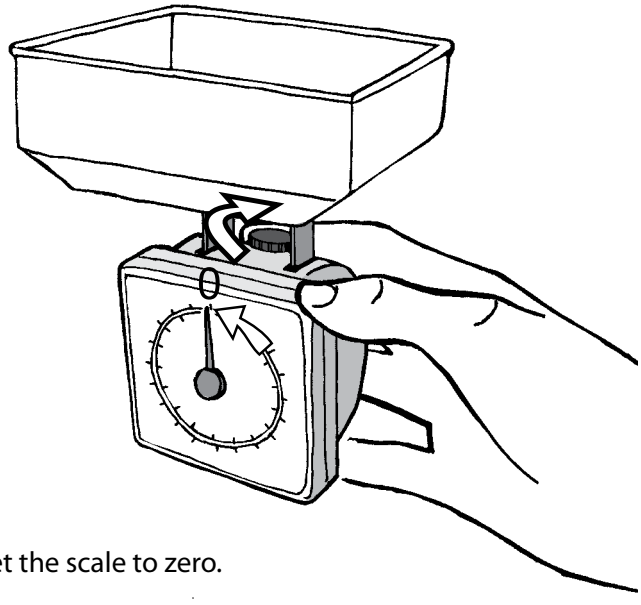
Materials:

- Scale
- 4 different objects to weigh

Procedure:

1. Write the number of the scale you are using and name of the objects being weighed in the first two columns of the table below.
2. Place the scale on a level surface, and set the needle to zero.
3. Weigh an object carefully and record the weight (in grams) in the third column of the table, "1st Weight." Make certain the needle on the scale has stopped moving before you record the weight.
4. Remove the object and make certain the needle on the scale is still pointing to zero. If it is not, you will need to set the scale to zero again.
5. Weigh the object two more times, and record the measurements as "2nd Weight" and "3rd Weight."
6. Repeat steps 3–5 for the remaining objects.





Set the scale to zero.

Name: _____ **Date:** _____

Accurately Measuring Weight

Data:

Scale #	Object	1st Weight	2nd Weight	3rd Weight
		g	g	g
		g	g	g
		g	g	g
		g	g	g

Name: _____ **Date:** _____

Setting Up a Fair Test

Investigative Question:

1. What are you trying to discover?

Variables:

2. What is the one **variable** you will test?

3. How will you change that variable?

Name: _____ **Date:** _____

Setting Up a Fair Test

Use the chart and questions on this page to help you organize the fair test.

What variable are you going to change? _____	
What variables will you keep the same?	How will you keep the variable the same?

4. What are you going to measure?

5. How will you measure this?

Name: _____ **Date:** _____

Setting Up a Fair Test

Materials:

6. What materials do you need?

Procedure:

7. List the steps you will follow to do your experiment.

Name: _____ **Date:** _____

Setting Up a Fair Test

Data:

8. Record observations and data in the space provided below.

Conclusion:

9. What did you learn from your test?

Name: _____ **Date:** _____

Measuring Accurately

Temperature

Materials:

- 2 thermometers
- Foam cups
- Warm water
- Cold water

Procedure:

1. Carefully fill a foam cup halfway with warm water.
2. Select one thermometer and measure the temperature of the water by submerging the bulb of the thermometer completely in the water.
3. Once the red line has stopped moving, record the temperature of the water in the data section below. Be sure to read the Celsius scale.
4. Repeat steps 1–3 with a different thermometer.
5. Repeat steps 1–4 with a cup of cold water.

Data:

Name: _____ **Date:** _____

Calibrating Thermometers

It is important to check the accuracy of the scientific tools you work with. To check how accurately a thermometer measures the amount of heat energy in something, you can **calibrate** it by bringing its temperature down to about freezing 0°C (32°F) in a cup of ice water.

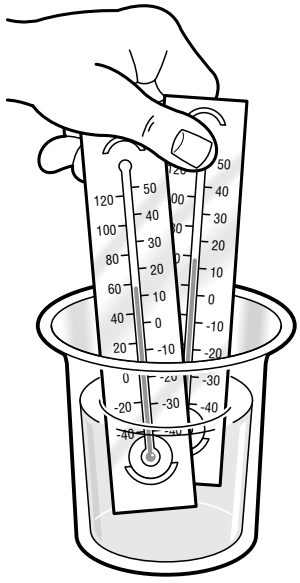
If the thermometer does not measure a temperature of about 0°C (32°F), then you know that your thermometer is inaccurate and needs to be calibrated to the correct temperature. (This means that you make a record of how different the thermometer is from the actual temperature—or from the temperature the other thermometer you're using registers.) Once you know how far off the thermometer is, you can adjust that data from your experiment to make up for the difference.

Materials:

- Cup of ice water
- 2 thermometers
- Permanent marker
- Masking tape

Procedure:

1. Suspend both thermometers in the middle of the ice water for two minutes.



Name: _____ **Date:** _____

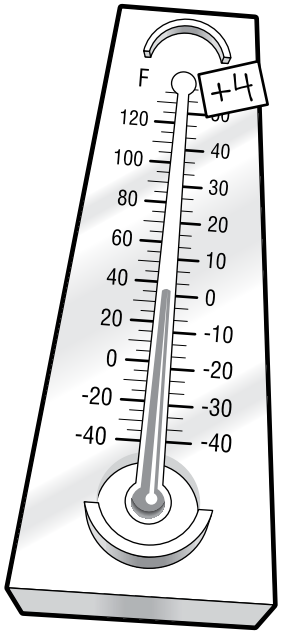
Calibrating Thermometers

2. After two minutes, check their temperatures. If their temperatures do not read about 0°C (32°F), note the difference (+2, -1, etc.) for each thermometer below.

Temperature of Thermometer 1 = _____**°C** Adjustment needed = _____**°C**

Temperature of Thermometer 2 = _____**°C** Adjustment needed = _____**°C**

3. Place a piece of masking tape on the top right corner of each thermometer and use a permanent marker to mark the adjustment needed for the thermometer (+1, +2, -1, etc.).



Name: _____ **Date:** _____

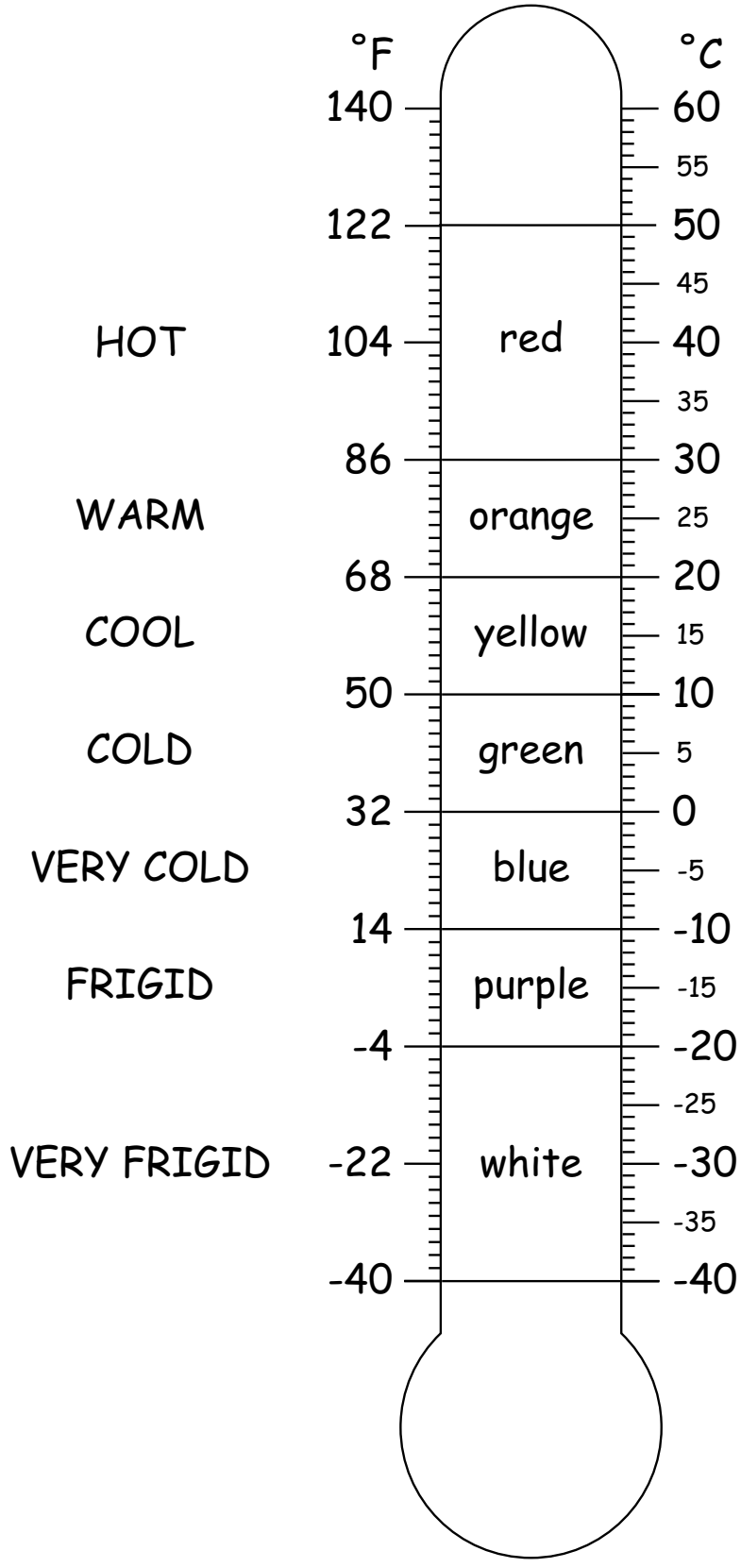
Observation Sheet

I looked at _____ .

Here is a picture of what I saw.

I noticed:

Thermometer



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Name: _____ **Date:** _____

Family Link with Science—Homework

Realistic Toys

Your child is going to study scale models at school. Please have your child bring in a toy that represents a real object. They can also bring any of the toy's accessories, if they want. But, please, don't let your child bring any toy that is valuable or irreplaceable.

Bring a realistic toy to school. For example:

- Dolls
- Dollhouse furniture
- Trains
- Train tracks and tunnels
- Cars
- Airplanes
- Plastic horses
- Other animals

Please bring the toy to school on _____.

(Day and date)

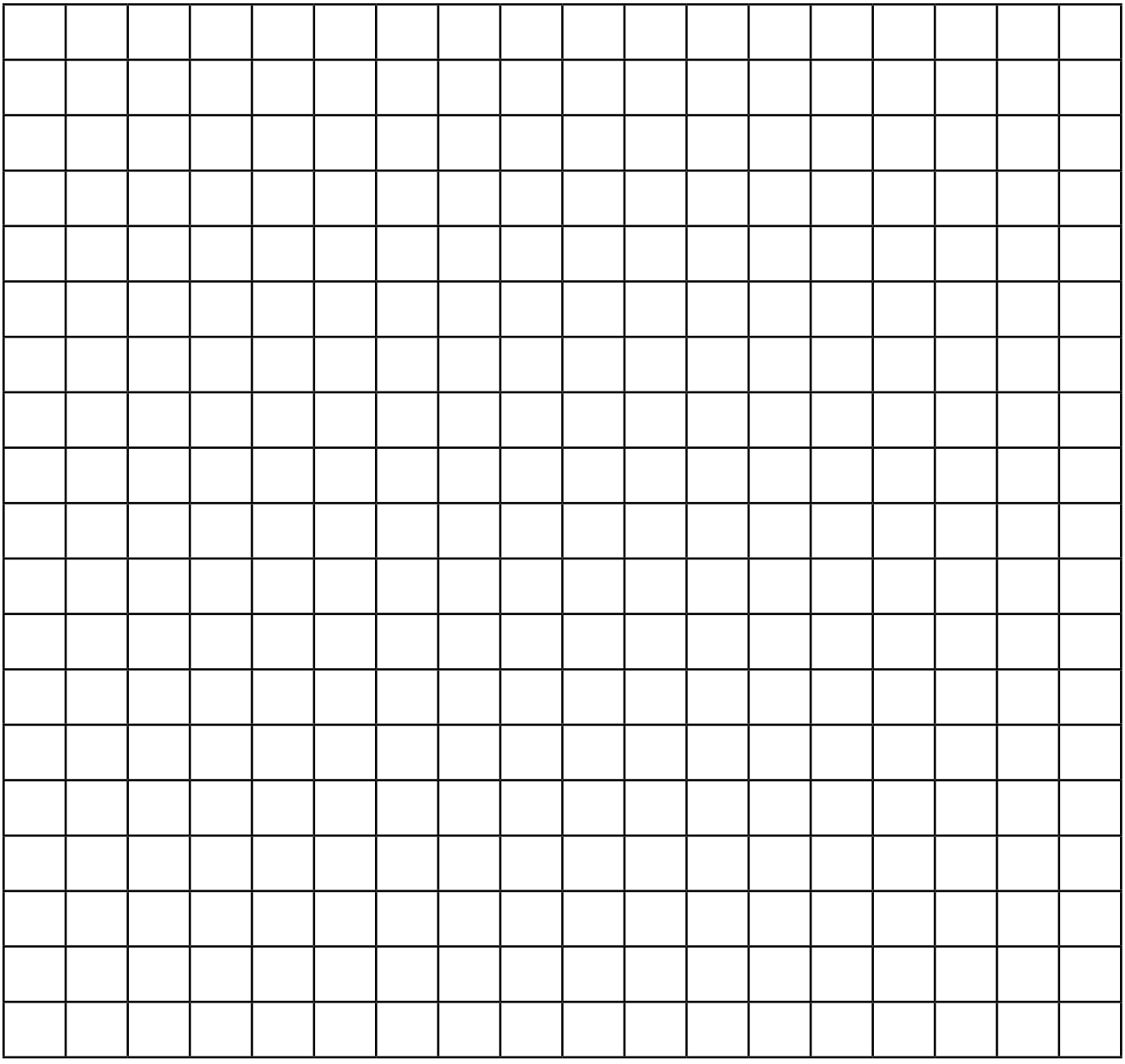
Please complete this assignment for science class.

Name: _____ **Date:** _____

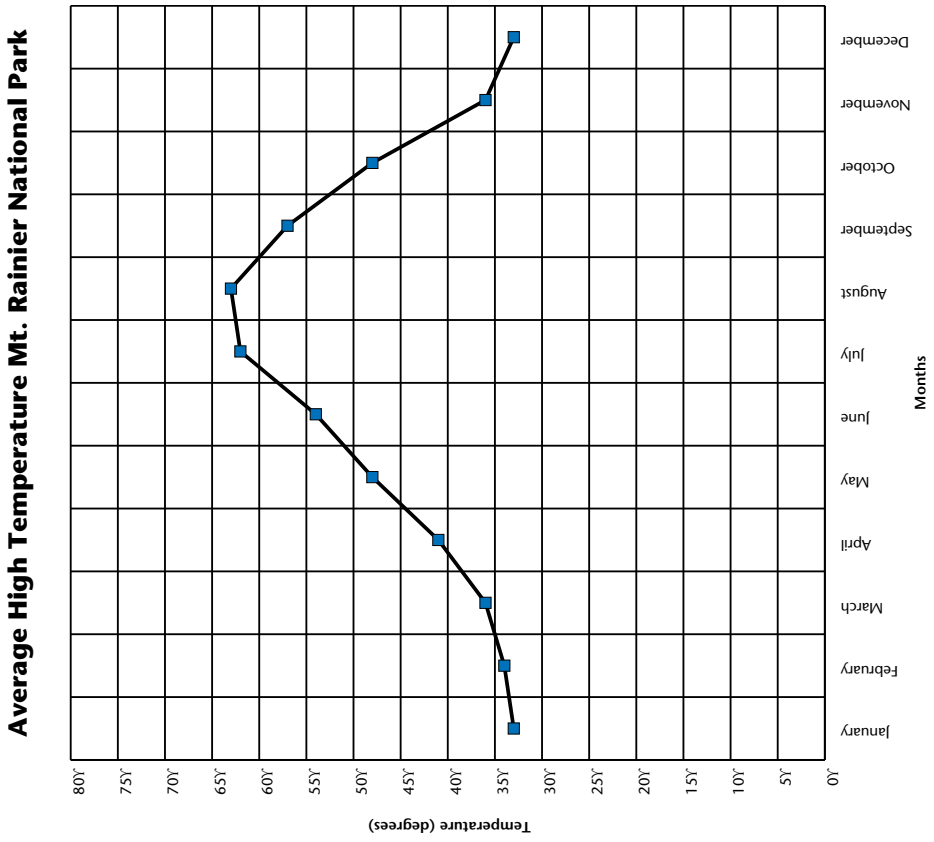
Graphing the Height of a Fern

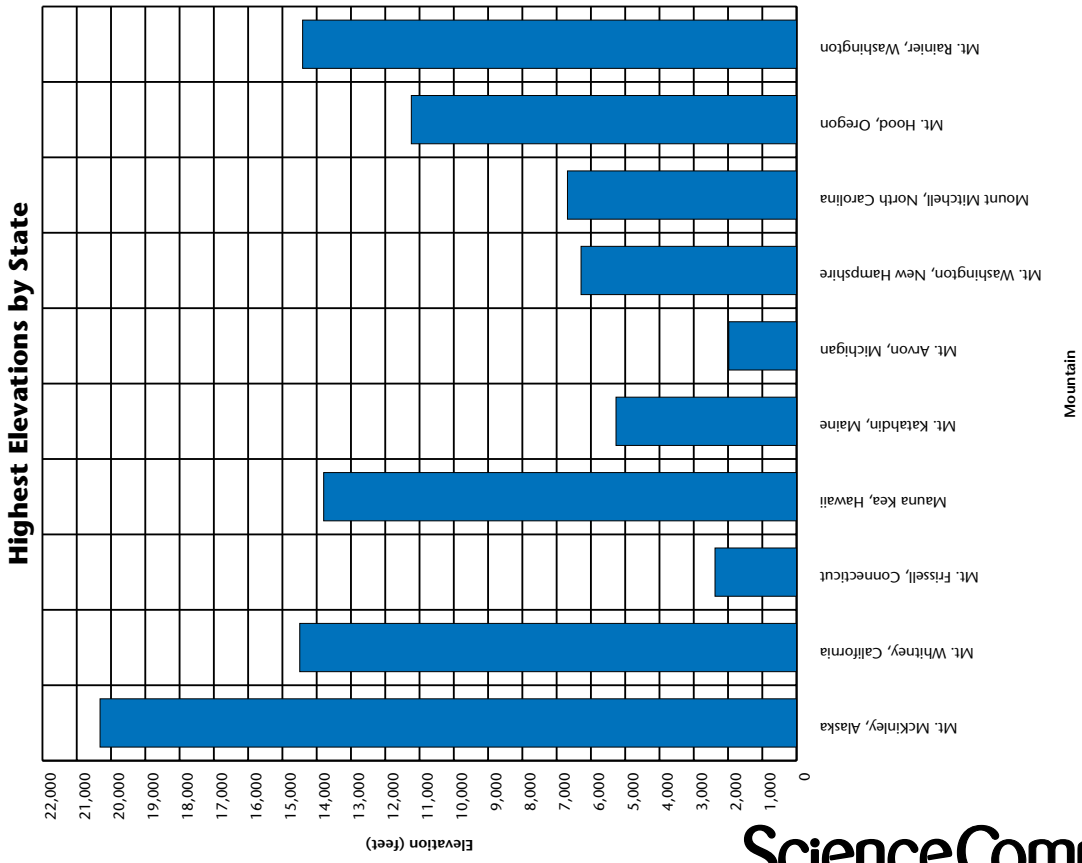
The chart below lists a fern's height, in centimeters, at the end of each month from January 2012 to June 2013.

Jan 2012	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan 2013	Feb	Mar	Apr	May	Jun
5	7	10	15	20	30	45	53	59	65	68	70	70	72	75	80	86	95



Comparing Graphs





Name: _____ **Date:** _____

Family Link with Science—Homework

Writing Procedures

In science class your child has been learning to follow written procedures. Today's assignment is to practice writing them.

Materials:

- Peanut butter in a jar
- Jelly in a jar
- Sliced bread in its packaging
- 2 plastic knives

Procedure:

Write numbered steps that tell a robot how to make a peanut butter and jelly sandwich.

Please complete this assignment for science class.

Name: _____ **Date:** _____

Guiding Questions for Forming Conclusions

A conclusion tells what you have discovered based on an observation or other data. It may be the answer to an investigative question. Use these two pages to make sure your conclusion is clear and supported by evidence. Then think about new questions that your conclusion may bring up.

Investigative question or study topic: _____

_____

1. Write your conclusion here. Check whether it is easy to understand. If not, revise it.

2. Is your conclusion supported by your data? Explain how the data supports your conclusion.

Name: _____ **Date:** _____

Guiding Questions for Forming Conclusions

3. Does the conclusion make sense, based on other things that you know (or think you know)? Write down some of these other things.

4. What new questions do you now have about this topic?

5. What kind of data or evidence would you need to explore these questions?

Data Set 1

Chicago in November 2012
Daily Sunrise and Sunset Data

Latitude: 41° 51′ North
Longitude: 87° 41′ West

Standard time zone: GMT -6 hours
Daylight saving time? No
(as of November 4)

Date	Time of Sunrise	Time of Sunset	Length of Daylight
11/1/12	7:24 AM	5:44 PM	10 hr, 20 min
11/2/12	7:25 AM	5:43 PM	10 hr, 18 min
11/3/12	7:26 AM	5:42 PM	10 hr, 16 min
11/4/12*	6:27 AM	4:41 PM	10 hr, 14 min
11/5/12	6:29 AM	4:40 PM	10 hr, 11 min
11/6/12	6:30 AM	4:38 PM	10 hr, 08 min
11/7/12	6:31 AM	4:37 PM	10 hr, 06 min
11/8/12	6:32 AM	4:36 PM	10 hr, 04 min
11/9/12	6:34 AM	4:35 PM	10 hr, 01 min
11/10/12	6:35 AM	4:34 PM	9 hr, 59 min
11/11/12	6:36 AM	4:33 PM	9 hr, 57 min
11/12/12	6:37 AM	4:32 PM	9 hr, 55 min
11/13/12	6:38 AM	4:31 PM	9 hr, 53 min
11/14/12	6:40 AM	4:30 PM	9 hr, 50 min
11/15/12	6:41 AM	4:30 PM	9 hr, 49 min
11/16/12	6:42 AM	4:29 PM	9 hr, 47 min
11/17/12	6:43 AM	4:28 PM	9 hr, 45 min
11/18/12	6:45 AM	4:27 PM	9 hr, 42 min
11/19/12	6:46 AM	4:26 PM	9 hr, 40 min
11/20/12	6:47 AM	4:26 PM	9 hr, 39 min
11/21/12	6:48 AM	4:25 PM	9 hr, 37 min
11/22/12	6:49 AM	4:24 PM	9 hr, 35 min
11/23/12	6:50 AM	4:24 PM	9 hr, 34 min
11/24/12	6:52 AM	4:23 PM	9 hr, 31 min
11/25/12	6:53 AM	4:23 PM	9 hr, 30 min
11/26/12	6:54 AM	4:22 PM	9 hr, 28 min
11/27/12	6:55 AM	4:22 PM	9 hr, 27 min
11/28/12	6:56 AM	4:21 PM	9 hr, 25 min
11/29/12	6:57 AM	4:21 PM	9 hr, 24 min
11/30/12	6:58 AM	4:21 PM	9 hr, 23 min

*Daylight saving time ends on Sunday, November 4, 2012. On that day, clocks change backward 1 hour.

Sunrise and sunset times are approximate, and assume a flat horizon. If there are hills or mountains or other obstructions, actual sunrise will be later and actual sunset will be earlier.

Data Set 2

Chicago in Summer and Winter
Weekly Sunrise and Sunset Data

Latitude: 41° 51′ North
Longitude: 87° 41′ West

Standard time zone: GMT -6 hours
Daylight saving time: + 1 hour

May, 2012

Daylight saving time? Yes

Date	Time of Sunrise	Time of Sunset	Length of Daylight
Thurs, 5/3/12	5:44 AM	7:52 PM	14 hr, 8 min
Thurs, 5/10/12	5:35 AM	7:59 PM	14 hr, 24 min
Thurs, 5/17/12	5:28 AM	8:07 PM	14 hr, 39 min
Thurs, 5/24/12	5:23 AM	8:13 PM	14 hr, 50 min
Thurs, 5/31/12	5:18 AM	8:19 PM	14 hr, 1 min

June, 2012

Daylight saving time? Yes

Date	Time of Sunrise	Time of Sunset	Length of Daylight
Thurs, 6/7/12	5:16 AM	8:24 PM	15 hr, 8 min
Thurs, 6/14/12	5:15 AM	8:27 PM	15 hr, 12 min
Thurs, 6/21/12	5:16 AM	8:29 PM	15 hr, 13 min
Thurs, 6/28/12	5:18 AM	8:30 PM	15 hr, 12 min

July, 2012

Daylight saving time? Yes

Date	Time of Sunrise	Time of Sunset	Length of Daylight
Thurs, 7/5/12	5:22 AM	8:28 PM	15 hr, 6 min
Thurs, 7/12/12	5:27 AM	8:25 PM	14 hr, 58 min
Thurs, 7/19/12	5:33 AM	8:21 PM	14 hr, 48 min
Thurs, 7/26/12	5:39 AM	8:15 PM	14 hr, 36 min

Sunrise and sunset times are approximate, and assume a flat horizon. If there are hills or mountains or other obstructions, actual sunrise will be later and actual sunset will be earlier.

Data Set 2

Chicago in Summer and Winter
Weekly Sunrise and Sunset Data

Latitude: 41° 51′ North
Longitude: 87° 41′ West

Standard time zone: GMT -6 hours
Daylight saving time: + 1 hour

November, 2012

Daylight saving time? No (as of November 4)

Date	Time of Sunrise	Time of Sunset	Length of Daylight
Thurs, 11/1/12	7:24 AM	5:44 PM	10 hr, 20 min
Thurs, 11/8/12*	6:32 AM	4:36 PM	10 hr, 4 min
Thurs, 11/15/12	6:41 AM	4:30 PM	9 hr, 49 min
Thurs, 11/22/12	6:49 AM	4:24 PM	9 hr, 35 min
Thurs, 11/29/12	6:57 AM	4:21 PM	9 hr, 24 min

December, 2012

Daylight saving time? No

Date	Time of Sunrise	Time of Sunset	Length of Daylight
Thurs, 12/6/12	7:04 AM	4:20 PM	9 hr, 16 min
Thurs, 12/13/12	7:10 AM	4:20 PM	9 hr, 10 min
Thurs, 12/20/12	7:15 AM	4:23 PM	9 hr, 8 min
Thurs, 12/27/12	7:18 AM	4:27 PM	9 hr, 9 min

January, 2013

Daylight saving time? No

Date	Time of Sunrise	Time of Sunset	Length of Daylight
Thurs, 1/3/13	7:18 AM	4:33 PM	9 hr, 15 min
Thurs, 1/10/13	7:18 AM	4:40 PM	9 hr, 22 min
Thurs, 1/17/13	7:15 AM	4:48 PM	9 hr, 33 min
Thurs, 1/24/13	7:10 AM	4:56 PM	9 hr, 46 min
Thurs, 1/31/13	7:04 AM	5:05 PM	10 hr, 1 min

***Daylight saving time ends on Sunday, November 4, 2012. On that day, clocks change backward 1 hour.**

Sunrise and sunset times are approximate, and assume a flat horizon. If there are hills or mountains or other obstructions, actual sunrise will be later and actual sunset will be earlier.

Data Set 3

Chicago in November 2012, 2013, 2014
Weekly Sunrise and Sunset Data

Latitude: 41° 51′ North
Longitude: 87° 41′ West

Standard time zone: GMT -6 hours
Daylight saving time? No
(as of first Sunday)

November, 2012

Date	Time of Sunrise	Time of Sunset	Length of Daylight
11/1/12	7:24 AM	5:44 PM	10 hr, 20 min
11/8/12*	6:32 AM	4:36 PM	10 hr, 4 min
11/15/12	6:41 AM	4:30 PM	9 hr, 49 min
11/22/12	6:49 AM	4:24 PM	9 hr, 35 min
11/29/12	6:57 AM	4:21 PM	9 hr, 24 min

November, 2013

Date	Time of Sunrise	Time of Sunset	Length of Daylight
11/1/13	7:23 AM	5:45 PM	10 hr, 22 min
11/8/2013*	6:32 AM	4:37 PM	10 hr, 5 min
11/15/13	6:41 AM	4:30 PM	9 hr, 49 min
11/22/13	6:49 AM	4:25 PM	9 hr, 36 min
11/29/13	6:57 AM	4:21 PM	9 hr, 24 min

November, 2014

Date	Time of Sunrise	Time of Sunset	Length of Daylight
11/1/14	7:23 AM	5:45 PM	10 hr, 22 min
11/8/2014*	6:32 AM	4:37 PM	10 hr, 5 min
11/15/14	6:40 AM	4:30 PM	9 hr, 50 min
11/22/14	6:49 AM	4:25 PM	9 hr, 36 min
11/29/14	6:57 AM	4:21 PM	9 hr, 24 min

***Daylight saving time ends on the first Sunday in November. On that day, clocks change backward 1 hour.**

Sunrise and sunset times are approximate, and assume a flat horizon. If there are hills or mountains or other obstructions, actual sunrise will be later and actual sunset will be earlier.

Data Set 4

Five Cities in November 2012
Weekly Sunrise and Sunset Data

Reykjavik, Iceland in November 2012

Latitude: 64° 09′ North
Longitude: 21° 58′ West

Standard time zone: GMT +0 hours
Daylight saving time? No

Date	Time of Sunrise	Time of Sunset	Length of Daylight
11/1/12	9:12 AM	5:09 PM	7 hr, 57 min
11/8/12	9:35 AM	4:47 PM	7 hr, 12 min
11/15/12	9:58 AM	4:26 PM	6 hr, 28 min
11/22/12	10:20 AM	4:07 PM	5 hr, 47 min
11/29/12	10:41 AM	3:51 PM	5 hr, 10 min

Moscow, Russia in November 2012

Latitude: 55° 45′ North
Longitude: 37° 37′ East

Standard time zone: GMT +3 hours
Daylight saving time? No

Date	Time of Sunrise	Time of Sunset	Length of Daylight
11/1/12	8:36 AM	5:49 PM	9 hr, 13 min
11/8/12	8:51 AM	5:35 PM	8 hr, 44 min
11/15/12	9:05 AM	5:22 PM	8 hr, 17 min
11/22/12	9:19 AM	5:12 PM	7 hr, 53 min
11/29/12	9:32 AM	5:04 PM	7 hr, 32 min

Chicago, Illinois, U.S.A in November 2012

Latitude: 41° 51′ North
Longitude: 87° 41′ West

Standard time zone: GMT -6 hours
Daylight saving time? No
(as of Nov 4)

Date	Time of Sunrise	Time of Sunset	Length of Daylight
11/1/12	7:24 AM	5:44 PM	10 hr, 20 min
11/8/12*	6:32 AM	4:36 PM	10 hr, 4 min
11/15/12	6:41 AM	4:30 PM	9 hr, 49 min
11/22/12	6:49 AM	4:24 PM	9 hr, 35 min
11/29/12	6:57 AM	4:21 PM	9 hr, 24 min

***Daylight saving time ends in Chicago on Sunday, November 4, 2012. On that day, clocks change backward 1 hour.**

Sunrise and sunset times are approximate, and assume a flat horizon. If there are hills or mountains or other obstructions, actual sunrise will be later and actual sunset will be earlier.

Data Set 4

Five Cities in November 2012
Weekly Sunrise and Sunset Data

Jakarta, Indonesia in November 2012

Latitude: 6° 08′ South
Longitude: 106° 45′ East

Standard time zone: GMT +7 hours
Daylight saving time? No

Date	Time of Sunrise	Time of Sunset	Length of Daylight
11/1/12	5:27 AM	5:46 PM	12 hr, 19 min
11/8/12	5:26 AM	5:48 PM	12 hr, 22 min
11/15/12	5:26 AM	5:50 PM	12 hr, 24 min
11/22/12	5:26 AM	5:52 PM	12 hr, 26 min
11/29/12	5:28 AM	5:55 PM	12 hr, 27 min

Johannesburg, South Africa in November 2012

Latitude: 26° 08′ South
Longitude: 27° 54′ East

Standard time zone: GMT +2 hours
Daylight saving time? No

Date	Time of Sunrise	Time of Sunset	Length of Daylight
11/1/12	5:19 AM	6:25 PM	13 hr, 6 min
11/8/12	5:14 AM	6:30 PM	13 hr, 16 min
11/15/12	5:11 AM	6:35 PM	13 hr, 24 min
11/22/12	5:09 AM	6:41 PM	13 hr, 32 min
11/29/12	5:08 AM	6:46 PM	13 hr, 38 min

Sunrise and sunset times are approximate, and assume a flat horizon. If there are hills or mountains or other obstructions, actual sunrise will be later and actual sunset will be earlier.