

Lesson Plan

THE HOLY WINDING SHEET (THE SHROUD OF TURIN)

CONNECTING FAITH AND SCIENCE

*Activities with an * may be found in the ACTIVITIES / ASSESSMENT file*

DAY ONE	ACTIVITIES	OBJECTIVES	ASSESSMENT
FOCUS: History of the Shroud of Turin	-Begin an investigative project to examine and discuss reliability of forensic data to confirm the Shroud's authenticity	-Document the journey of the Shroud -Label the areas traveled before its final location	-Create a map of the areas traveled. Describe location (weather, landscapes, peoples)
DAY TWO	ACTIVITIES	OBJECTIVES	ASSESSMENT
FOCUS: Shroud of Turin -The Facts	<i>View: Part One The Holy Winding Sheet DVD</i> -Discuss the methods / tools used in the last examination of the Shroud of Turin -Study Jewish burial practices	--Identify the scientists who participated in the last examination of the Shroud of Turin	-Describe how the holy winding sheet was once used in Jewish burials -List at least 10 facts related to the Shroud
DAY THREE	ACTIVITIES	OBJECTIVES	ASSESSMENT
FOCUS: Artifacts & Relics	<i>View: Part Two The Holy Winding Sheet DVD</i> -Discuss and answer: What is an artifact / relic / icon? -Compare 2 relics important to the Catholic Church 1. Shroud of Turin 2. The Tilma of the Virgin of Guadalupe	-Identify characteristics of genuine artifacts and relics -State why the 2 artifacts are important to the Christian Faith	-List 4 specific characteristics of both the Tilma and the Shroud
DAY FOUR	ACTIVITIES	OBJECTIVES	ASSESSMENT
FOCUS: Tests and Tools Used	<i>View: Shroud Encounter -Russ Breault The Holy Winding Sheet DVD</i> -Study and examine the scientific tests / tools used in the examination OF 1978 -Study and examine the tests performed in the last examination	-Identify scientific tools used in the examination of the Shroud of Turin -Identify scientific tests used in the examination of the Shroud of Turin, in 1978	-Research current state-of-the-art tools and tests that could be used in the next examination -How will the new tools affect data?

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DAY FIVE	ACTIVITIES	OBJECTIVES	ASSESSMENT
FOCUS: Flowers and Pollen	<ul style="list-style-type: none">-Study ancient textile manufacturing techniques-Study of pollens associated with the areas traveled	<ul style="list-style-type: none">-Identify 2-3 pollens connecting the Shroud to specific areas it traveled-Identify 2-3 pollens found in your area	<ul style="list-style-type: none">-Fiber Analysis experiment: Identify pollens found on personal clothing item using scientific methods *
DAY SIX	ACTIVITIES	OBJECTIVES	ASSESSMENT
FOCUS: Anatomical Forensics	<ul style="list-style-type: none">-Study a medical forensic evaluation as it relates to death by crucifixion	<ul style="list-style-type: none">-Explain characteristics of the Shroud today-Describe the image using scientific terminology based on evidence found (skeletal images, blood markings)	<ul style="list-style-type: none">-Using feet to determine height *-Create a pattern of partner's face using a long cloth-Determine the height of a skeleton *
DAY SEVEN	ACTIVITIES	OBJECTIVES	ASSESSMENT
FOCUS: Biological Forensics	<ul style="list-style-type: none">-Study characteristics of DNA-Blood Typing Lab Activity *	<ul style="list-style-type: none">Explain how DNA is used in crime scenes to determine how subject died	<ul style="list-style-type: none">-Blood Splatter forensics activity *-Creating blood patterns *
DAY EIGHT	ACTIVITIES	OBJECTIVES	ASSESSMENT
FOCUS: Where Faith and Science Meet	<ul style="list-style-type: none">-Conclude investigative project by presenting and discussing findings	<ul style="list-style-type: none">-Students will effectively express how Faith and Science can work together in the exploration of God as creator	<ul style="list-style-type: none">-Groups present their findings and conclusions based on personal findings-Debate / discuss how Faith and Science are connected
DAY NINE	ACTIVITIES	OBJECTIVES	ASSESSMENT
FOCUS: The Debate: Two Questions Remain	<ul style="list-style-type: none">-Small group discussions-Class debates	<ul style="list-style-type: none">-Encourage debate and discussion on the image found on the Shroud of Turin	<ul style="list-style-type: none">-Students write an essay addressing the following questions: --If it is not authentic, then WHAT is it? --If it is not Jesus, then WHO is it?

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Blood Spatter Patterns

(LEVEL: Grade 7-12)

Forensic investigators can determine a lot about the nature of a violent crime by analyzing the patterns in blood spatters. You can learn about what they can know by performing some simple experiments.

For this project, you should create a 50/50 mixture of corn syrup and water colored with red food coloring for use as "blood" in your investigation.

You will also need an eyedropper, a large white poster board, a meter stick and a protractor. You will determine the lengths of streaks of blood created by drops of "blood" falling from different heights and at different angles to the poster board.

To collect data, prop the poster board against a wall and use the eyedropper to drop one drop of blood on it.

Use your meter stick to measure the height from which the blood was dropped and your protractor to measure angle at which the blood struck the poster board. Then use the meter stick to measure the length of the blood streak that occurred when the blood struck the poster board.

Write down your data.

Conduct many more trials by varying the height from which the blood was dropped and record all your data in a table labeled "Height versus Spatter Length." Then select a constant height and conduct more trials while varying the angle each time.

Record these data in a table labeled "Angle of Incidence versus Spatter Length."

When you have recorded sufficient data, see whether you can determine algebraic or trigonometric relationships between height or angle and spatter length.

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Which Substance Makes the Best Blood?

(LEVEL: Grades 9-12)

In order to re-create crime scenes - and criminal events that have occurred, such as murders - with scientific accuracy, a forensic scientist needs to use materials that are identical to those used in a crime.

As a project, you can determine which material is best at replicating the effects and appearances of blood.

The best option is to buy blood that is preserved in chemicals from a science supply retailer; however, sterilized animal blood from a butcher's shop is another possible option.

Once you have your blood, compare it to several potential artificial blood candidates, like red paint, a saline solution, water and syrup. Observe how different solutions drip in comparison to the real blood, and what types of splatters marks they leave behind. Then determine which is the most similar to the actual blood.

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THE FEET CAN MEASURE THE HEIGHT
(LEVEL: Grades 7-12)

The bones of the feet can tell a lot about a person. What do feet reveal about a person's height? Forensic anthropologists team up with law enforcers to help solve crimes. Bones of the feet can reveal an interesting fact about an individual. Let's combine math with forensics to see how.

✓ Create an excel sheet to record results

List the individuals name, height, and foot length.

1. Have some adults remove their shoes and measure their height.
2. Measure the length of the adult's left foot from the wall to the tip of the big toe.
3. Examine the numbers. Do you see a pattern?
4. Divide the length of each person's left foot by his/her height. Multiply the quotient by 100. What do you get? You may also want to use the calculator on a computer for this activity

The results of your calculations should be about 15, illustrating that the length of a person's foot is approximately 15 percent of his or her height.

Find out the approximate height of each of your classmates by measuring their foot and charting it on a spreadsheet. Use this proportion for your calculations: $15/100 = \text{Length of Foot}/x$ (person's height)

When a forensic scientist has the length of a foot, the forensic scientist will be able to approximate the height of the individual.

This works best on a full-grown individual for the ratio of body parts is slightly different in growing children.

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Determining the height of a skeleton

(LEVEL: Grades 9-12)

Background

In this activity you will get to measure bones to figure out the height of the skeleton. It only takes one bone's measurement to approximate a person's height! Read [Paleontology and Forensic Anthropology](#) to learn more!



Objective

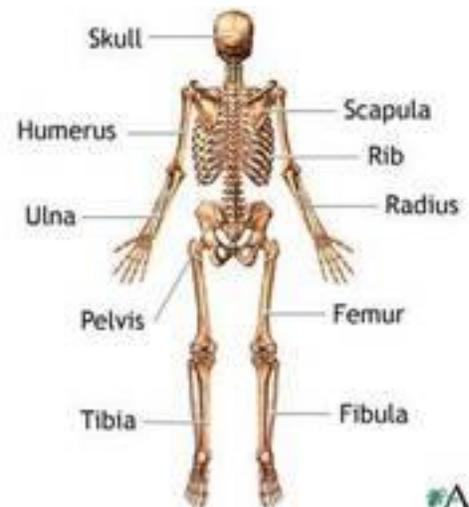
Gain experience with paleontology.

Equipment

4 Tape Measures (or use string and rulers)
Rulers
Pencils
Worksheets
Graphs

Activity

Working with a partner, you will measure each other's height, femur, humerus, and radius (approximately). Feel for the bony ends. For the femur, sit in a chair with knees bent and measure from the top of the knee to mid-hip on the side. Estimate the height from bone lengths. Compare your estimation with actual height. What are some possible causes of differences? (measurement error, using model for grown adult...).



#ADAM

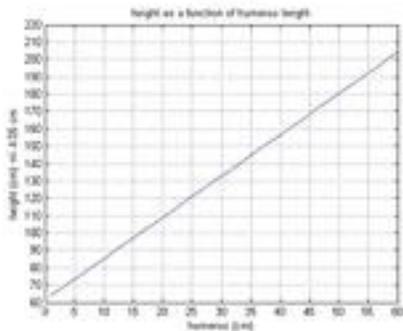
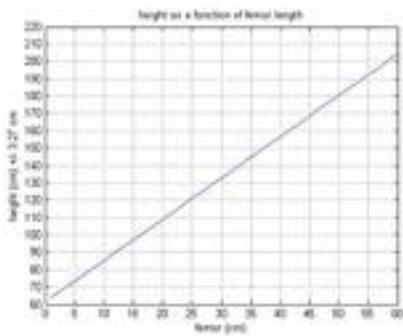
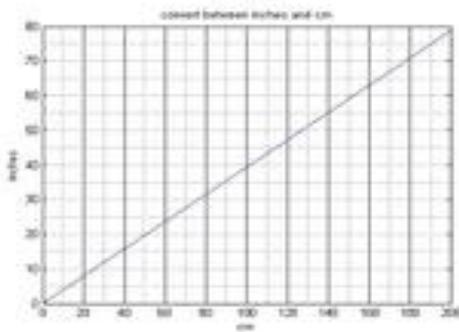
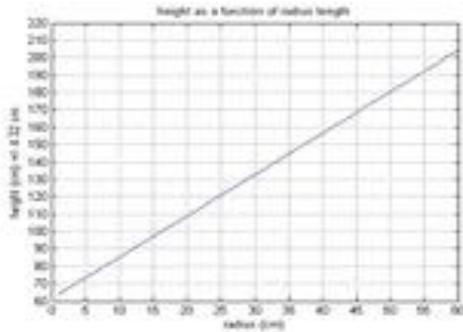
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Example:

	Inches	cm (1cm=2.54in)	Predicted Height (cm)	Predicted-Actual (cm)
Femur	17	43	164.18	4.18
Humerus	12	30	162.85	2.85
Radius	9	23	165.95	5.95
Height	63	160	-	-



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Worksheet

- Working with a partner, measure your height, and the length of your femur, humerus, and radius.
- Measure height against the wall.
- Use rulers to measure the other bones (approximately). You may need to put 2 rulers together. Feel for the bony ends. For the femur, sit in a chair with knees bent and measure from the top of the knee to mid hip on the side.
- Use the chart and the following equations to estimate height from bone lengths.
Femur: $2.38 \times l_{\text{femur}} + 61.41 \text{ cm} = \text{height in cm} \pm 3.27$
Humerus: $3.08 \times l_{\text{humerus}} + 70.45 = \text{height in cm} \pm 4.05$
Radius: $3.78 \times l_{\text{radius}} + 79.01 = \text{height in cm} \pm 4.32$
- Compare with actual height.

What are some possible causes of differences? _____

Group activity: Plot actual height vs. femur length (scatter plot).

Do the points seem to follow a line?

Draw a line through the scatter plot to give a prediction of the data.

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ADDITIONAL ACTIVITY / ASSESSMENT RESOURCES

ScienceLearn.org.nz: **DNA Detective Activity**
<https://www.sciencelearn.org.nz/resources/211-dna-detective>

CSI Project: **Fiber Analysis experiment**
<http://www.chymist.com/FIBER%20ANALYSIS.pdf>

CSI Project: **Blood Typing Lab Activity**
<https://sciencespot.net/Media/FrnsScience/bloodtypinglab2wkst.pdf>

CSI Project: **Forensics and DNA**
<https://www.sciencelearn.org.nz/resources/1978-forensics-and-dna>

CSI Project: **STEM Works**
<http://stem-works.com/subjects/10-crime-scene-investigation/activities>

TEACHER FACTS SHEET AND DISCUSSION QUESTIONS FOR THE HOLY WINDING SHEET (THE SHROUD OF TURIN)

- The image on the Shroud bears the image of a 5'10" crucified man
- Wounds include those from a crown of thorns with numerous punctures of the scalp
- The image of the body shows over 120 scourges or whip marks
- The side wound shows the clear separation of the blood and serum which only occurs after death
- The blood is AB blood type with human male DNA
- The chemistry shows evidence of bile, bilirubin, hemoglobin, serum albumin and other blood components
- While the blood penetrates the cloth and can be seen on the reverse side, the image is purely superficial and resides on only the top 1-2 microfibers – about 1% of a single thread (a razor blade could scrape off the image from the cloth)
- There is no visible trace of paint, ink, dye, pigmentation or stain
- The image on the cloth is a negative that appears as a positive image in a photo-negative
- Experiments with an ultraviolet excimer laser demonstrate that a 40-nanosecond burst against a control sample of linen creates the same depth and coloration as seen on the Shroud
- Most recent chemical analyses conducted in 2013 estimates the date of the cloth date range of 280 BC to 220 AD

TEACHER FACTS SHEET AND DISCUSSION QUESTIONS FOR THE HOLY WINDING SHEET (THE SHROUD OF TURIN)

➤ DISCUSSION QUESTIONS –

- Before watching this program, what did you know about the Shroud of Turin?
- What information about the Shroud made the biggest impression on you?
- Did you find anything hard to believe?
- How does what you learned about the Shroud challenge you in what you believe about Jesus Christ?
- If the cloth is not authentic, then what is it?
- If the man in the Shroud is not Jesus, then who is it?

The Holy Winding Sheet – How to Use the DVD

The DVD is chaptered into four (4) segments. So you can ‘play all’ and watch the entire documentary at one time. (It is 48 minutes long.) Or if you need to view it in shorter segments, the program has been divided into two chapters, each 22 to 25 minutes in length. There is also a bonus feature with Shroud expert Russ Breault. That is about 22 minutes long and can be viewed whenever and in whatever way you see fit.