



Helping With Math

GRADES

Measuring Skill:
Nautical Measurement

Suitable for students
aged 8-10



This pack is suitable for learners aged 8-10 years old or 4th to 5th grades. The content covers fact files and relevant basic and advanced activities of nautical measurement topics that aim to develop and strengthen the learners' measurement skills.

Benjamin Franklin Day!



Benjamin Franklin Day is celebrated every January 17, which is his birthday. He was a renowned polymath and one of the United States' Founding Fathers. He was also an author, inventor, scientist, politician, civil activist, statesman, and diplomat.

Measurement Skill



Learning measurement skills gives us the knowledge to measure the physical attributes of an object. It also teaches us to use the different measurement tools and techniques.

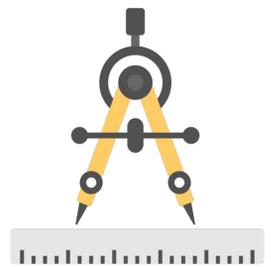
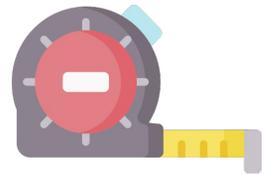


CONCEPTS

MEASUREMENT SKILL



- Measurement means finding a number which shows the amount or size of an object.
- Being able to learn how to measure helps us to describe and quantify the world using numbers.
- There are different types of measurement like *Length, Area, Volume, Mass, and Time*.
- For Kinder to Grade 2, students use activities and illustrations to easily understand how to measure specific objects.
- 3rd and 4th graders encounters measurement more in their daily activities. In this stage, learning measurement also help them to have a connection with mathematics.
- Students in the 5th and 6th grade, learn more about measurement to be able to solve real life problems. Being able to use measurement formulas is very important during this stage.
- Those in the higher levels should be able to understand estimation and actual measurement. Students also learn the connection of measurement in other disciplines, like in Science, Social Studies, and Technology classes.



CONCEPTS

NAUTICAL MEASUREMENTS

- These measurement involves measures for the air, sea or space navigation.



NAUTICAL MILE (M or NM)	Unit of length used in sea or air Derived as 1,852 meters
FATHOM (FATH)	Unit of length used to measure the depth of the sea Derived as 0.00009868 nm or 6 feet
CABLE LENGTH (CBL)	Unit of length used to measure 1/10 of a nautical mile or approx 100 fathom
KNOT (KN)	Unit of speed equivalent to one nautical mile per hour or 1,852 m/hr

CONVERSION OF NAUTICAL MILE

(1 NM is approximately equal to one minute of arc of latitude along any meridian)
(1 NM is approximately equal to one minute of arc of longitude at the equator)

1.853 km

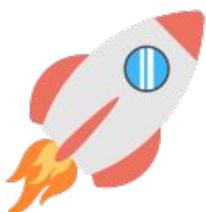
185,325 cm

1.152 mi

2,027 yd

6,080 ft

72,983 in



10.01 cbl

1,013 fath



PRACTICE TIME!

Convert the given measurements in Nautical Mile into the respective units being asked below. The first two items will serve as your guide.

5 nm (NM TO CM)	<p><i>Example:</i> 1 nm is equivalent to 185,325 cm. Since the given is 5 nm, we have to multiply it to 185,325 which gives us 926,625 cm</p> <p>5 nm x 185,325 cm = 926,626 cm</p>
7 nm (NM TO YD)	<p><i>Example:</i> 1 nm is equivalent to 2,027 yd. To convert 7 nm into yards, we need to multiply it to 2,027. This will give us an answer of 14,189 yd.</p> <p>7 nm x 2,027 yd = 14,189 yd</p>
10 nm (NM TO FT)	
8 nm (NM TO CBL)	

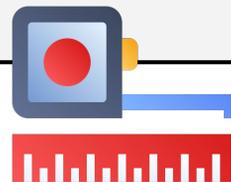


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FLIGHT DETAILS

G4
Basic

USS Franklin was named after Benjamin Franklin. This was given the nickname, "Big Ben" and one of the aircraft carriers during WW2. As someone working in the airport, the pilot gave you his flight details. He needs to know the speed in nautical miles. Can you provide him with this information?

FLIGHT NUMBER	TRAVEL SPEED (KN)	TRAVEL SPEED (NM)
HWM 5674	156 kn	
HWM 7634	178 kn	
HWM 9763	278 kn	
HWM 1467	146 kn	
HWM 7921	299 kn	



KITE EXPERIMENT

G4
Basic

Franklin performed a kite experiment that determined that electricity can come from storm clouds and lightning. Help the kite go higher by identifying if the given below are True or False. If false, provide the correct answer.

1. $12 \text{ nm} = 12,156 \text{ fath}$

2. $16 \text{ nm} = 16,500 \text{ fath}$

3. $21 \text{ nm} = 201.1 \text{ cbl}$

4. $33 \text{ nm} = 330.3 \text{ cbl}$

5. $19 \text{ nm} = 191 \text{ cbl}$



TRAVEL BY SEA

G4
Basic

In his days, Benjamin Franklin has been traveling by sea. Write down the equivalent nautical mile of the given measures of speed below.

1. A ship that has a speed of 13 kn/hr.

2. A ship that is sailing at a speed of 10 kn/hr.

3. A ship that has a speed of 5 kn/hr.

4. A ship that has a speed of 8 kn/hr.



DEEP SEA DIVING

G4
Basic

Benjamin Franklin is an avid fan of swimming and invented the swim fins when he was only 11 years old. Help Jake, the swimmer, identify how deep the sea is (in fathom) using the distance he traveled.

1) 1.45 nautical mile

2) 1.20 nautical mile

3) 1.50 nautical mile

4) 1.65 nautical mile

Is it too deep
for me?



PARADE FOR FRANKLIN

G4
Basic

A parade is being done to celebrate Benjamin Franklin Day. Join the parade and convert the given measures below to a nautical mile before reaching the White House.

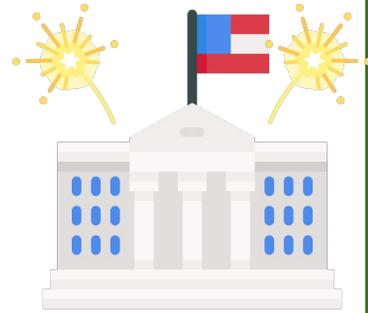


4. $144 \text{ kn} =$

3. $142 \text{ kn} =$

2. $1,340 \text{ fath} =$

1. $1,120 \text{ fath} =$



INSPIRED BY FRANKLIN

G5
Advanced

Penny was inspired by how great Benjamin Franklin was in terms of swimming. He went swimming at the nearest beach, but he wanted to find out the depth of the sea. Using the given below, convert it to feet to determine its depth.

The diagram shows a swimmer in the ocean. A vertical line with tick marks indicates three depth measurements. To the right of the line are three empty boxes for conversion. Above the water, there is a sun and three birds. A large empty box is labeled 'TOTAL (FT):'.

Depth (Fathoms)	Conversion (Feet)
248 fath	<input type="text"/>
115 fath	<input type="text"/>
476 fath	<input type="text"/>

TOTAL (FT):



TO PHILADELPHIA

G5
Advanced

People are traveling to Philadelphia to celebrate Benjamin Franklin Day. Some of them will be transferred by sea. Below are the details of their travel. Identify the speed of their trip in nm/hr and m/hr.

TRAVEL SPEED (KN)	TRAVEL SPEED (NM)	TRAVEL DISTANCE (METERS)
214 kn	1.	2.
178 kn	3.	4.
194.5 kn	5.	6.
290.10 kn	7.	8.
188 kn	9.	10.



VACATION MODE

G5
Advanced

Steve and his friends talked about their vacations during Benjamin Franklin Day. They have shared the distance of their travel. Identify which mode of transportation each of them took by matching the equivalent measurement of the distance in miles.



I travelled at about
254 nm.



A. 293.40 mi



I travelled at about
176 nm.



B. 292.50 mi



I travelled at about
194 nm.



C. 274.10 mi



I travelled at about
238 nm.



D. 202.70 mi



WHO IS FRANKLIN?

G5
Advanced

Benjamin Franklin was one of the Founding Fathers of the United States. Study more about him and answer the following questions below.



Steve is on a cruise ship for his holiday. This is his first time on a ship, and he wants to know how fast it is going. According to the crew, it is going at a speed of 12 kn/hr. Can you convert it to m/hr, so Steve can understand?

Jane and John are on their way to Italy for their honeymoon. The total distance that they will be traveling is 107 nm. Can you convert the distance into miles?

Ron loves scuba diving, but he can only dive up to 240 ft. He entered a competition wherein the minimum diving depth is at 60 fath. Is he qualified?

Aria will be taking her pilot exams soon. To pass the exam, she needs to fly the plane at a speed of 1,570 m/hr. She can fly the plane at a speed of 0.85 kn/hr. Can she pass the exam?



DISCOVERIES OF FRANKLIN

G5
Advanced

Benjamin Franklin is not only one of the Founding Fathers of the United States but also invented things that we still use today. Some of which are the bifocals, swim fins, lightning rods, etc. Learn more of these discoveries but answer the questions below first.

1. If 1 nm is equivalent to 1,852 m, 37 nm is equivalent to how many meters?

2. If 1 fath is equivalent to 6 ft, 70 fath is equivalent to how many feet?

3. If 1 kn is equivalent to 1 nm/hr, 15 kn is equivalent to how many m/hr?

4. If 1 nm is equivalent to 1.152 mi, 315 kn is equivalent to how many miles?

5. If 1 nm is equivalent to 72,983 in, 100 nm is equivalent to how many inches?

6. If 1 kn is equivalent to 1 nm/hr, 297 kn is equivalent to how many nautical miles?



ANSWER GUIDE

Activity 1

1. 156 nm/hr 2. 178 nm/hr 3. 278 nm/hr 4. 146 nm/hr 5. 299 nm/hr

Activity 2

1. True 2. False - 16,208 3. False - 210.21
4. True 5. False - 190.191

Activity 3

1. 13 nm/hr 2. 10 nm/hr 3. 5 nm/hr 4. 8 nm/hr

Activity 4

1. 1,469 fath 2. 1,216 fath 3. 1,520 fath 4. 1,672 fath

Activity 5

1. 1.105 nm 2. 1.322 nm 3. 142 nm/hr 4. 144 nm/hr

Activity 6

1. 1,488 ft 2. 690 ft 3. 2,856 ft Total: 5,034 ft



ANSWER GUIDE

Activity 7

1. 214 nm/hr
2. 396,328 m/hr
3. 178 nm/hr
4. 329,656 m/hr
5. 194.5 nm/hr
6. 360,214 m/hr
7. 290.10 nm/hr
8. 537,265.2 m/hr
9. 188 nm/hr
10. 348,176 m/hr

Activity 8

1. B
2. D
3. A
4. C

Activity 9

1. 22,224 m/hr
2. 123.264 mi
3. No
4. Yes

Activity 10

1. 68,524 m
2. 420 ft
3. 27,780 m/hr
4. 362.88 mi
5. 7,298,300 in
6. 296 nm/hr



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