Name: ____ Date: _________________ Class: ______________

Arctic Robot Worksheet

Research and Design

Sketch the arctic walking robot in the box below.

List three traits that you have as a person that help you get your basic needs.

1.

2.

3.

You will test a robot walking across a field of “snow”.

The first test will be done with the robot as-built.

The second test will be done with the robot fitted with shoes you will design.

Draw a sketch of the shoes you want to test with the walking robot in the box below. Think about the following when you design your shoes: Should they be a skinny rectangle, a square, or a circle? Or a different shape? Should they be BIG shoes or tiny shoes?

If your shoes are rectangles:

Cut out your shoes and measure the length of the shoes in centimeters. Write the number in the space below.

Length = ___________ cm

Measure the width of the shoes in centimeters. Write the number in the space below.

Width = ____________ cm

Compute the AREA of the shoes you designed.

Area = Length x Width

YOUR shoe area = ________ x ________ = ___________ cm^2
(Length) (Width) (Area)

<u>If your shoes are circles:</u>

Cut out your shoes and measure the diameter of the shoes in centimeters. Write the number in the space below. Then calculate the radius.

Diameter = __________ cm

Radius = Diameter/2 = ___________ ÷ 2 = __________ cm
(Diameter)

Compute the AREA of the shoes you designed.

Area = πR^2 = 3.1416 x $(\text{Radius})^2$

YOUR shoe area = 3.1416 x (_______)^2 = __________ cm^2
$(\text{Radius})^2$ (Area)

<u>If your shoes are neither rectangles nor circles:</u>

1. Trace the shoe onto graph paper and count the number of squares that fit inside the shoe.
2. If some square only partially fit in the shoe, count them as half of a square.
3. Add together all the whole squares and half squares that count inside the shoe and record the number in the space below.

YOUR shoe area = sum of all the squares = __________ cm^2

Write a hypothesis. Do you think the shoes will help increase how far the robot goes in the same number of steps? By how much? Write your **hypothesis** in the space below.

Testing Directions

1. Line up the robot at the start line. Mark the beginning with a pointer sticker.
2. Press the "run" button on the NXT brick.
3. When the robot stops, measure the distance it traveled.
4. Repeat one more time so you have two trials.
5. Repeat this with the shoes you designed. You should run the robot FOUR times, twice with the shoes and twice without the shoes.

Surface		Trial 1 Distance in centimeters	Trial 2 Distance in centimeters
1. Cotton	Robot without added shoes	1.	2.
	Robot with add-on shoes	3.	4.
2.________	Robot without added shoes		
	Robot with add-on shoes		
3. ________	Robot without added shoes		
	Robot with add-on shoes		

Analysis Questions

What did you observe in running the robot without the added shoes? Were there any problems?

What did you observe when running the robot with the added shoes? Were there any problems?

Was your hypothesis correct? If so, what evidence do you have to support one way or the other?