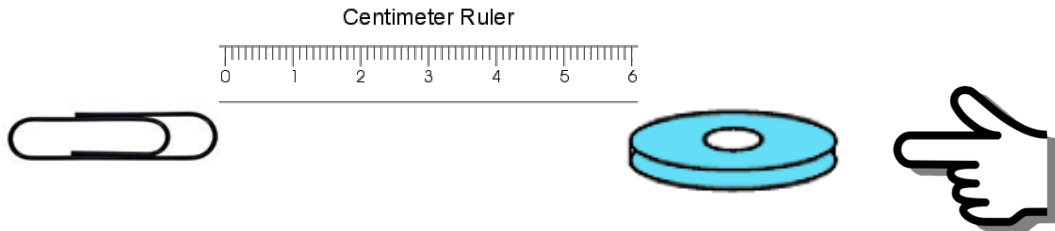## 3-PS2-3 - Magnetic Force - Assessment Task

**Task 1**

A group of students wanted to see how close a paper clip needs to be to a donut magnet in order to *attract* it. They set up an investigation as shown below.



They pushed the magnet closer and closer to the paper clip until the paper clip moved toward the magnet. They stopped moving the magnet as soon as the paper clip started to move. They used the ruler to measure the distance from where the paper clip started to the front of the magnet. The distance was 2 centimeters (cm). They called this the *attraction distance.*
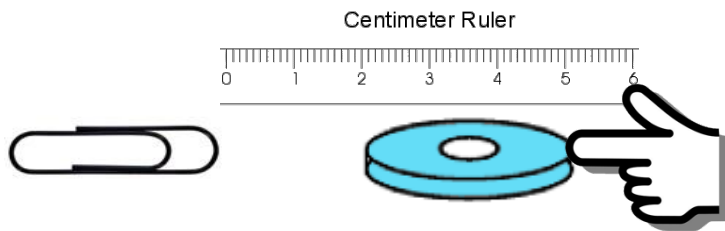


They wondered if adding extra magnets would change the attraction distance. They added 3 more magnets, one at a time, and recorded each distance in a data table. Their results are shown in the chart below.

| Number of Magnets | Attraction Distance |
|:---:|:---:|
| 1 | 2 cm |
| 2 | 4 cm |
| 3 | 6 cm |
| 4 | 8 cm |
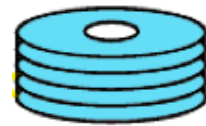
1. What pattern do you notice in this data?

_____

_____

The students made a line graph using their data.  Their graph is shown here:



**Number of Magnets and Attraction Distance**
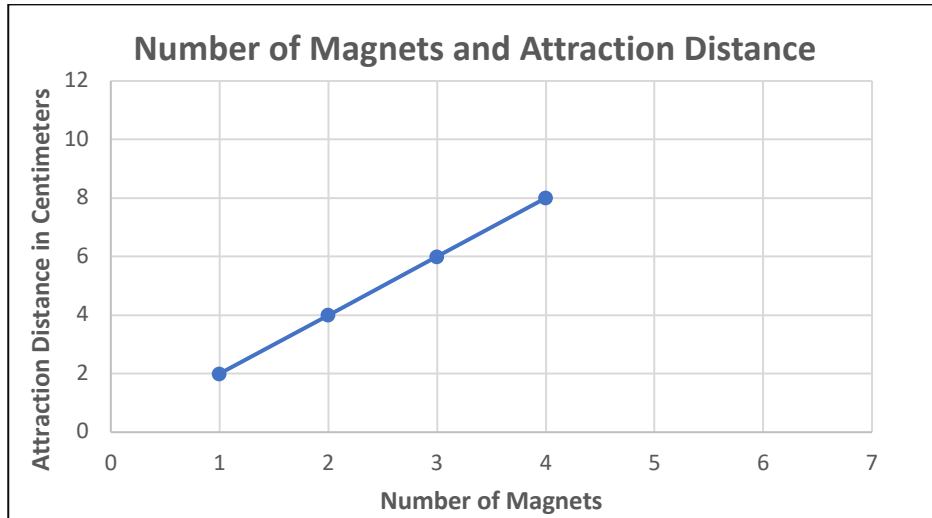
2. Predict what the attraction distance would be for 5 magnets.  _____

   Show your prediction on the graph above by **drawing a new point and connecting the line.**

3. Why did you predict this distance?

   _____

   _____

   _____

4. **Explain** why adding magnets causes the attraction distance between the magnets and the paper clip to **change.**
   (Be sure to use the data from the charts and graphs in your explanation.)

   _____

   _____

   _____

   _____

**Task 2**

The students wondered if different types of magnets would have different attraction distances. They decided to compare a bar magnet, a cylinder magnet, one donut magnet, and a stack of 4 donut magnets. They tested each type of magnet the same way as they did in Task 1. Their results are in this chart.

| Magnet | Attraction Distance |
|---|---|
| bar magnet | 12 centimeters |
| cylinder magnet | 5 centimeters |
| 1 donut magnet | 2 centimeters |
| Stack of 4 donut magnets | 8 centimeters |

1. According to the data in the chart above, which of the magnets is the <u>strongest</u> (pulls with the <u>greatest force</u>)?

   _____

2. According to the data in the chart above, which of the magnets is the <u>weakest</u> (pulls with the <u>least force</u>)?

   _____

3. Use data from the chart to explain your answers.

   _____

   _____

   _____

**Task 3**

The students did <u>another investigation</u> with the same four magnets. This time they wanted to find out how many paper clips each of the magnet types could attract at one time.
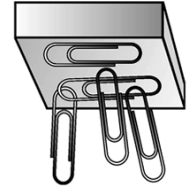
**Circle the table** below that you think shows the results they got based on what you learned from the data gathered in Task 1 and Task 2.

| TABLE A | |
|---|---|
| **Magnet Type** | **Number of Paper Clips Attracted** |
| bar magnet | 36 |
| cylinder magnet | 16 |
| 1 donut magnet | 4 |
| stack of 4 donut magnets | 10 |

| TABLE B | |
|---|---|
| **Magnet Type** | **Number of Paper Clips Attracted** |
| bar magnet | 4 |
| cylinder magnet | 10 |
| 1 donut magnet | 36 |
| stack of 4 donut magnets | 16 |

| TABLE C | |
|---|---|
| **Magnet Type** | **Number of Paper Clips Attracted** |
| bar magnet | 36 |
| cylinder magnet | 10 |
| 1 donut magnet | 4 |
| stack of 4 donut magnets | 16 |

Using data from all three investigations, **explain why** you chose this table.

_____

_____

_____

_____

_____