

Fat Chemistry Worksheet ANSWER KEY

The properties of oils used in common foods can be examined through science!



Today we will be learning about the properties of different edible fats. You will design a robot that can measure the melting point of different fat samples. Use this worksheet to collect and organize your melting point data.

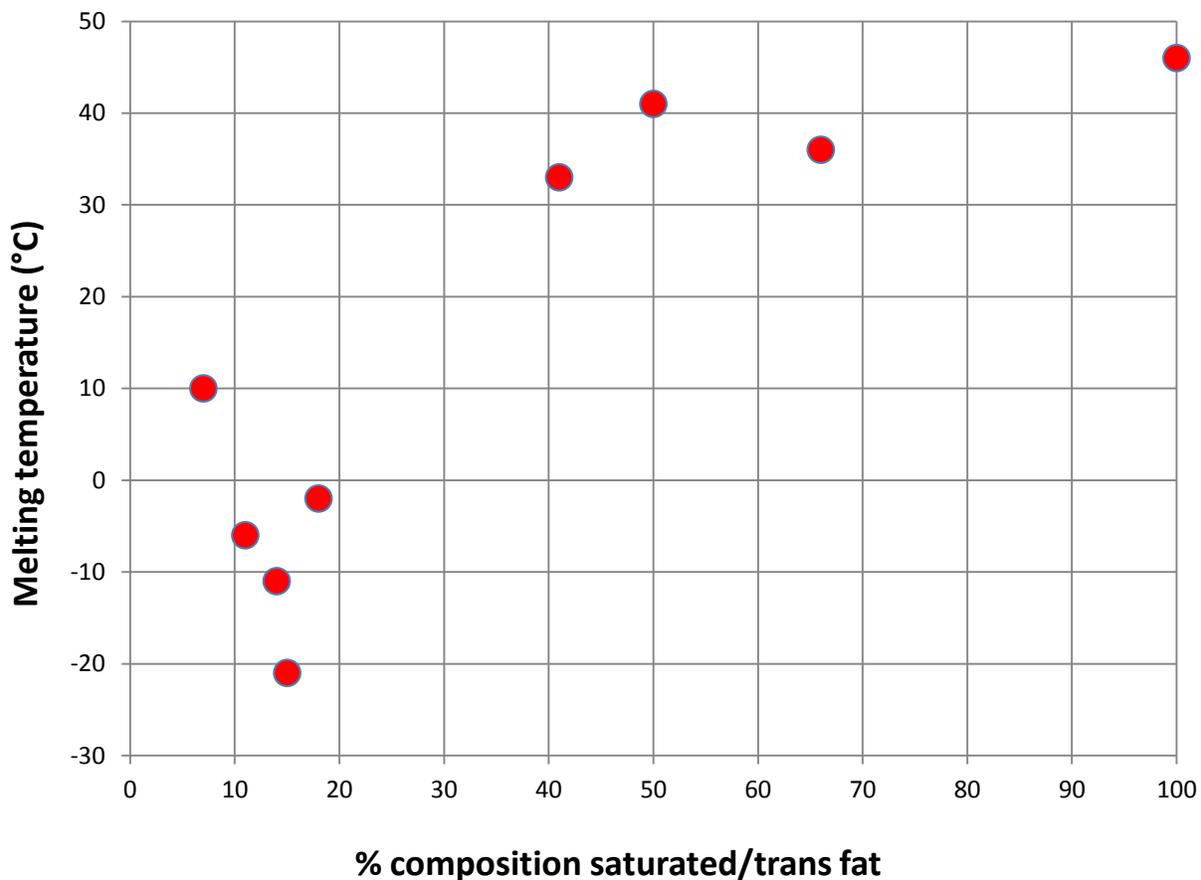
Follow the instructions below to complete the measurements:

1. Build and set up your robot, following the setup of the demonstration robot.
2. Collect melting points of samples 1-9.
3. With the aid of your instructor, light your Bunsen burner and place it under your sample.
4. With your group, insert the temperature sensor inside the sample and arrange it directly in front of the light sensor. Test one sample at a time by applying gentle heat to the bottom of the test tube.
5. Heat until the robot indicates that the sample has reached its melting point.
6. Record the melting point on this worksheet.
7. Repeated these step for each of the seven samples.

Table 1: Fill in this table with the melting point for each sample. Also record any comments or observations on the sample during the experiment.

	Sample	composition saturated/trans fat (%)	Melting point (°C)	Comments & observations
1	Olive oil	11	-6	(observations such as color, state, clarity, etc.)
2	Butter	66	36	
3	Animal lard	41	33	
4	Vegetable shortening	100	46	
5	Frying fat	50	41	
6	Corn oil	14	-11	
7	Canola oil	7	10	
8	Soybean oil	15	-21	
9	Peanut oil	18	-2	

Plot the melting point of these samples versus the saturated/trans fat content (in weight percent) below.



Use the space provided below to summarize the results of this exercise. Be sure to address the following questions:

- What did you learn about edible fats?
(Personal opinion question.)
- Are all fats the same chemically or physically? In what ways do they differ?
All fats are not the same chemically or physically. They can differ in their color, texture, viscosity, melting point, and smell.
- What kind of fat is most difficult for our bodies to process and digest? What physical property gives us insight into why it may be difficult for our bodies to process this fat?
Trans fat is the most difficult fat for our bodies to process and digest. The physical property that gives us insight as to why it may be difficult for our bodies to process this fat is the melting point.
- The human body has a temperature of 37 °C. Which of the fat samples you tested today would be solid at this temperature?

All fat samples that had a melting temperature above 37 °C would be solid at this temperature. (Depending on results of activity, this should frying fat and vegetable shortening.)

- What trend did you observe from the data plotted in the chart? How is melting temperature related to percent composition of trans fat?

The overall observed trend in the results is that as the percent composition of saturated or trans fat increases, so does the melting point.

- How might the information you learned today help you make wise choices on what foods you eat?

(Personal opinion question.) Answers might contain reference to looking at the fat composition on the Nutrition Facts labels on food packaging.