MYTH
Does chewing gum take seven years to digest?

OBJECTIVES
1. Investigate the digestive process of humans.
2. Determine whether chewing gum is digestible.

BACKGROUND INFORMATION
Humans have been chewing gum for thousands of years with archeologists finding gum dating back 9000 years. This early gum was made of black tar and had bite impressions from a child aged between 6 and 15 years old.

These days, chewing gum has five basic ingredients including the gum base; softeners (usually vegetable oils); flavours; sweeteners; and corn syrup. Your mouth’s saliva dissolves all of these ingredients except the gum base. The gum base is a mixture of elastomers, resins, fats, emulsifiers and waxes and is pretty much indigestible. Your stomach is unable to break down the gum in the way it would other foods however your digestive system can still cope with it. Surprisingly we eat a few things that can’t be fully digested. The gut just keeps them moving along through the intestines until they come out the other end.

There is however a handful of cases whereby gum has caused an obstruction of the gastrointestinal tract in children. In the Journal of Paediatrics Dr David Milov published a paper entitled “Chewing Gum Bezoars of the Gastrointestinal Tract”. This paper identifies 3 of Dr Milov’s patients (aged 1 ½ to 4 ½) who developed obstruction of the gut from swallowing gum. The 1 ½ year old was a regular user and swallower of gum and had also swallowed four coins. The other two children had a long history of swallowing gum of up to seven pieces a day. The gum in these children formed “rectal masses” that had to be manually removed and were described as a long multi-coloured skinny trail of gum. Obstruction in children is more likely because they have a smaller diameter digestive tract.

WHAT YOU NEED
- One piece of chewing gum
- 0.05M Hydrochloric Acid (Also known as Muriatic Acid, for a concentration of 10% HCl dilute to a 1:60 solution)
- 2 x specimen jars
- Mass balance

WHAT TO DO
1. Place a piece of gum in your mouth and chew for 2 minutes to allow 1st stage of digestion to occur.
2. Measure the mass of the piece of chewing gum on the mass balance and record.
3. Repeat with a second piece of gum.
4. Place the first piece of gum into a specimen jar and cover with hydrochloric acid.
5. Place the second piece into a specimen jar and cover with water.
6. Shake the specimen jars for between 20 minutes and 2 hours. Make sure that both pieces are shaken for the same amount of time.
7. Leave the jars for a week, refreshing the hydrochloric acid and shaking each day.
8. Record the mass of each piece of gum using the mass balance.

QUESTIONS
1. When does digestion first start occurring? *Even before you put the gum in your mouth your salivary glands will start producing saliva. Saliva is usually produced when we first start thinking about food.*
2. What digestive enzymes are contained in our saliva? *Amylase.*
3. In what parts of the method are errors likely to occur? Discuss how these might affect your results. *The amount and type of shaking may not be consistent between the two samples this may affect the amount of digestion. The degree to which the pieces are chewed before the experiment may affect the result.*
4. What other variables might you test to further investigate this myth? *Investigate if sugar-free gum behaves differently to sugared gum. Compare the digestion of gum in this manner with digestion of a piece of bread, meat or vegetable.*

RESOURCES USED TO DEVELOP THIS ACTIVITY