

## Grading systems

Many would argue that putting labels on things or people is wrong but, in practice we do it all the time – and for good reason. Whatever your views are, about such descriptions, many uses are made of grading systems – generally as a short form of a more detailed description of things. These ‘things’ are often physical assets though frequently grades are assigned to other aspects such as performance or behaviour. They are generally used in two specific contexts:

- Simple systems which tend to be based on around five grades
- Complex systems which are more likely to use a scale closer to ten

The examples which follow illustrate some good examples, which tend to be based on five substantive grades and some very bad ones. Any system with an odd number of grades works much better than those with an even number with the exception of those using ten.

## Social Systems

### Moral Behaviour

The grades for moral behaviour are loosely based on those which can be found in a number of religious books though they tend not to use numerical values. They epitomize the grading systems which work well as opposed to those that don't.

- 1 Rewardable
- 2 Laudable
- 3 Acceptable
- 4 Reprehensible
- 5 Punishable

### Maturity

1	Innocent	Starting to learn
2	Aware	Starting to apply
3	Developing	Developing and embedding
4	Competent	Developed and embedded...
5	Effective	...and incorporated
6	Excellent	Fully integrated and continuously improved

It is arguable that these grades should be included in the Education section.

## Prosperity, availability and attainment

These are cited as examples of how a grading system may be developed to cover any eventuality.

<b>Grade</b>	<b>Prosperity</b>	<b>Availability</b>	<b>Attainment</b>
<b>1</b>	Fortune	Abundant	Miracle
<b>2</b>	Prosperity	Plenty	Victory
<b>3</b>	Comfort	Available	Draw
<b>4</b>	Poverty	Scarce	Disaster
<b>5</b>	Ruination	Absent	Catastrophe

There is, of course for pedants, the necessity to have all of the words in the same case – nouns, verbs, adverbs or adjectives.

## Booth's Social Classes

These were produced by Charles Alfred booth for his maps of London in Victorian times.

<b>Class</b>	<b>Map colour</b>	<b>Order</b>	<b>Description</b>
A	Black	Lowest	Viscious, semi-criminal
B	Dark Blue	Very poor, casual	Chronic want
C and D	Light blue	Poor	18s to 21s a week for a moderate family
E	Purple	Mixed	Some comfortable others poor
F	Pink	Fairly comfortable	Good ordinary earnings
G	Red	Middle class	Well-to-do
H	Yellow	Upper-middle and Upper classes	Wealthy

More detail can be found at: <http://booth.lse.ac.uk/static/a/4.html>

## Politics

Most grading systems have a vertical format and numerical association; this is decidedly horizontal with no numerical system of description:

Extreme left wing	Left wing	Left of center	Center	Right of center	Right wing	Extreme right wing
Communist	Socialist		Conservative		Fascist	
	Liberal, Social Democrat					
	Democrat			Republican		

## State of alert against terrorist threats in the UK

This is an indicator of the state of readiness of the security forces based on intelligence relating to terrorist threats.

1	Low	An attack is unlikely
2	Moderate	An attack is possible but not likely
3	Substantial	An attack is a strong possibility
4	Severe	An attack is highly likely
5	Critical	An attack is expected imminently

The level is set by the Joint Terrorism Analysis Centre and the Security Service (MI5). They use only the descriptive word, not numbers, codes or colours.

## DEFCON (Defence Condition)

These are used to indicate the state of readiness of the American armed forces.

Readiness	Code name	Description	Readiness	Color
1	Cocked pistol	War imminent	Maximum	White
2	Fast pace	Above normal	Ready to deploy	Red
3	Round house	Increase in force	Ready to mobilize	Yellow
4	Double take	Watch and strengthen	Above normal	Green
5	Fade out	Lowest state	Normal	Blue

The use of the numbers – in reverse of the logical sequence is unfortunate.

## Films

The British Board of Film Classifications is based on the age that is appropriate for film goers. In it's simplest form:

U	Universal	All ages
PG	Parental guidance	All ages but some scenes not suitable for younger children
12A	12s and over	Not suitable for under 12s but may be OK if accompanied by an adult
12	12 and over	Only suitable for age 12 and over
15	15 and over	Only suitable for age 15 and over
18	18 and over	Only suitable for age 18 and over
R18	18 and over	Only suitable for age 18 and over in adult cinemas

## Housing Health and Safety Rating System (HHSRS)

This is a scoring system based on four classes of harm:

<u>Class of harm</u>		<u>Weighting</u>
I	Extreme	10,000
II	Severe	1,000
III	Serious	300
IV	Moderate	10

Details of this complex system can be found at:

<https://www.gov.uk/government/publications/hhsrs-operating-guidance-housing-act-2004-guidance-about-inspections-and-assessment-of-hazards-given-under-section-9>

## **Physical Systems**

### **Asset management**

'Asset Management' is the methodology used to determine when physical assets need to be refurbished or replaced as they near the end of their working life in order that they may continue to provide outputs for the business which owns them. The five grades are based on those developed by the UK's Water Research Centre for the classification of pipelines which was first introduced in the 1970s.

1	Excellent
2	Good
3	Adequate
4	Poor
5	Awful

The grades are used for both condition and performance (based on levels of service).

Information on condition grades can be found at:

<https://felixschrodinger.wordpress.com/2011/08/11/condition-grading/>

Information on performance grades can be found at:

<https://felixschrodinger.wordpress.com/2011/08/13/performance-grading/>

There have been attempts to improve on this but sub-dividing and even increasing the five grades to ten. None have been any improvement on the basic five grade system.

As a general principle, grade 1 is associated with a good state/feeling and grade 5 with a bad one. Cases where this has been reversed do not work as well (see DEFCON).

### **Traffic lights**

Red	Stop
Red and amber	Prepare to go
Green	Go
Amber	Stop if safe to do so
Flashing amber*	Proceed only if safe to do so

\* Only used off peak in some countries

Whilst this is not strictly a grading system, it is included here as the colours associated with it are often used to grade things or contexts: red being associated with danger and green with safety.

## Coins

There is a formal system called the Sheldon System for coin grading which is somewhat over-complex and has been altered over time. Most coin grading systems are based on a simple structure:

Basal or poor

Fair

Good (G) and very good (VG)

Fine (F), very fine (VF) and extremely fine (EF)

Uncirculated (UNC) and brilliant uncirculated (BU)

Mint, proof and Fleur de coin (FDC)

There is also a Sheldon scale for rarity

## Brinell Hardness Numbers

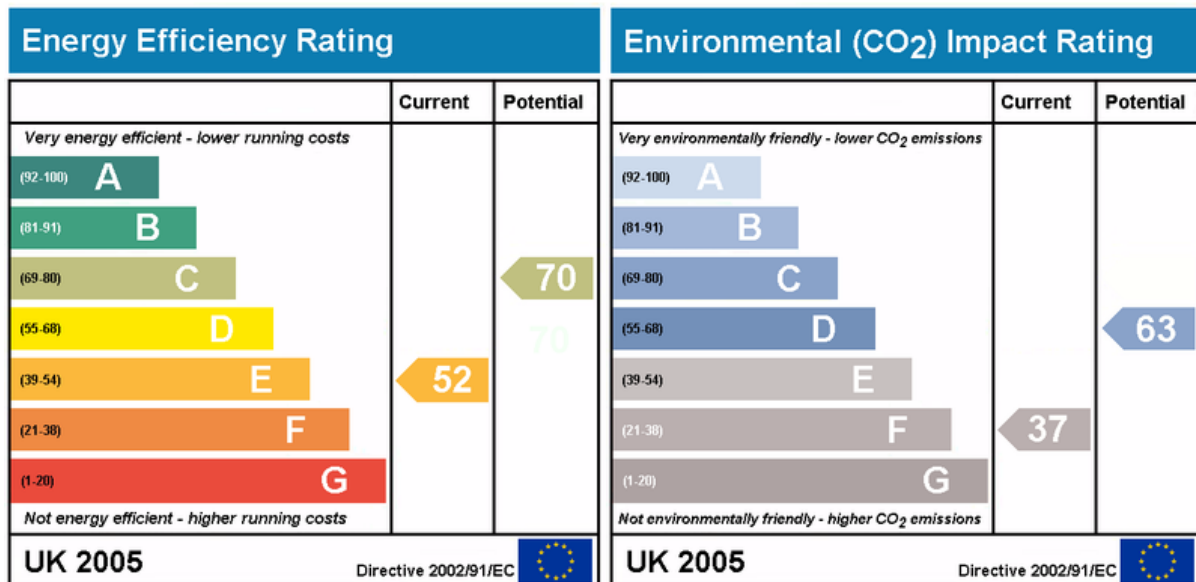
Material	Hardness
Softwood	1.6 HBS 10/100
Hardwood	2.6–7.0 HBS 1.6 10/100
Lead	5.0 HB (pure lead)
Pure Aluminium	15 HB
Copper	35 HB
Hardened AW-6060 Aluminium	75 HB
Mild steel	120 HB
18–8 (304) stainless steel annealed	200 HB
Glass	1550 HB
Hardened tool steel	600–900 HB
Rhenium diboride	4600 HB

## Moh's Hardness Scale

1	Talc	$Mg_3Si_4O_{10}(OH)_2$	1
2	Gypsum	$CaSO_4 \cdot 2H_2O$	3
3	Calcite	$CaCO_3$	9
4	Fluorite	$CaF_2$	21
5	Apatite	$Ca_5(PO_4)_3(OH^-, Cl^-, F^-)$	48
6	Orthoclase	$KAlSi_3O_8$	72
7	Quartz	$SiO_2$	100
8	Topaz	$Al_2SiO_4(OH^-, F^-)_2$	200
9	Corundum	$Al_2O_3$	400
10	Diamond	C	1600

## EPC Energy Ratings for Homes

Every home which is sold in the UK has to have an Energy Performance Certificate (EPC).



## European Union Energy labels

A similar scheme to that above exists for the energy rating of domestic appliances and vehicles. Inter alia, it applies to: cars, fridges, washers, dryers, light bulbs, air conditioners, water heaters, ovens and dishwashers. The rating for fridges, with the annual power consumption is shown below:

A+++	<22kWh/a	A++	<30kWh/a
A+	<42kWh/a	A	<55kWh/a
B	<75kWh/a	C	<95kWh/a
D	<110kWh/a	E	<125kWh/a
F	<150kWh/a	G	>150kWh/a

This would appear to be a system which has 'grown like Topsy' – why else would the A grade have to be so grossly amended? The grades all have pretty coloured labels like the system for homes above.

## MAFF Microwave Categories

Grade	Watts
A	600
B	700
C	800
D	900
E	1000



## **Education**

### **Intelligence**

There are about a dozen ranking systems based on IQ which can be found on Wikipedia:

[https://en.wikipedia.org/wiki/IQ\\_classification](https://en.wikipedia.org/wiki/IQ_classification)

The simplified example below is based on Terman's Stanford-Binet 1916 classification.

<b>IQ range</b>	<b>Classification</b>
Above 140	Genius or near genius
120 - 140	Very superior
110 - 120	Superior
90 – 110	Normal or average
80 – 90	Dull, rarely classifiable as feeble minded
70 – 80	Sometimes dull often feeble minded
Below 70	Feeble minded

### **Qualification**

<b>Level</b>	<b>Typical designation</b>	<b>Education</b>	<b>Remarks</b>
7	Consultant/technical specialist	PhD plus specialization	Equivalent to professor
6	Executive director	Higher degree/MBA	Equivalent to doctorate
5	Senior manager	Degree	Graduate
4	Middle manager	Diploma/BTEC	Technical diploma
3	Supervisor	NVQ3	
2/3	Craftsman	City and Guilds	Plumbers, electricians, carpenters etc.
2	Senior operative	NVQ2	
1	Operative/manual worker	NVQ1	

These are typical for the UK and there is, obviously, a high degree of overlap between the levels. A slightly different version incorporating eight grades may be found on Wikipedia.

## British University degrees

It can be argued that this has stood the test of time; alternatively that it has passed its 'sell by' date.

First class honours (with distinction)

Upper second class honours

Lower second class honours

Third class honours

Ordinary (Pass degree)

## American University Degrees

Grade	Scale (%)	UK equivalent
A+	90-100	Distinction
A	80+	Distinction
A-	70+	
B+	60+	First class
B	50+	Second class
B-	45+	
C+	40+	Third class
C	32+	Third class
C-		
D+		
D		
F	<32	Fail

The World Education System grade conversions can be found at:

<http://www.wes.org/gradeconversionguide/>

## GCSE

Arguably a 'dog's breakfast' both old and new.

Old system	new
A*	9
A	8 and 7
B	6 and 5
C	5 and 4
D	3
E	3
F	2
G	1
U	1

## OFSTED Ratings for schools

Arguably this system does not work well as it has no grade for a school which is performing 'adequately' (which would presumably make up the majority).

1 = outstanding

2 = good

3 = requires improvement

4 = inadequate (in special measures)

Recently, the SoS for Education stated that all schools should perform "above average" - hardly a great advertisement for maths teaching?

## Health

### **Burns**

The British system measures burns according the severity (depth) of the injury:

First degree	Superficial	Epidermal
Second degree		Deep dermal
Third degree		Subcutaneous
Fourth degree	Underlying	Affecting fat muscle and bone

The American system of burn severity is based on the area of coverage:

	<b>Adult</b>	<b>Young and old</b>
Minor	<10% TBSA	<5% TBSA*
	<2% full thickness burn	
Moderate	10-20% TBSA	
	2-5% full thickness burn	
Major	>20% TBSA	
	>5% full thickness burn	

\*Total Body Surface Area

### **The Bristol Scale for Faeces**

There are pictures to illustrate these but I won't confront you with them. The seven types of stool are:

Type 1: Separate hard lumps, like nuts (hard to pass)

Type 2: Sausage-shaped, but lumpy

Type 3: Like a sausage but with cracks on its surface

Type 4: Like a sausage or snake, smooth and soft

Type 5: Soft blobs with clear cut edges (passed easily)

Type 6: Fluffy pieces with ragged edges, a mushy stool

Type 7: Watery, no solid pieces, entirely liquid

## Ambulance response times

Another 'dog's breakfast'. Why this system did not make use of the amber colour for green 1 and 2 escapes me?

Code	Response time (minutes)	Notes
<b>Red 1</b> (Respiratory or cardiac arrest)	8	Despatch two units; blue lights and siren
<b>Red 2</b>	8	All other life threatening emergencies; blue lights and siren
<b>Green 1</b>	20	Blue lights and siren
<b>Green 2</b>	30	Blue lights and siren
<b>Green 3</b>	60	Telephone assessment within 20 minutes
<b>Green 4</b>	60	Telephone assessment within 20 minutes

## NHS GP surgeries

These appear to be based on a subjective assessment of patients' feedback on a website. There does not appear to be any widespread understanding of the system or, indeed, its use.

5 star

4 star

3 star

2 star

1 star

## Hospital safety score (US)

Note – no grade 'E' presumably because of the need for 'F' to indicate 'fail'.

A = best

B =

C =

D =

F = worst

### **NHS Trust - Financial risk rating**

- 1 high probability of significant breach of authorisation in short-term, unless remedial action is taken
- 2 risk of significant breach in medium-term, in absence of remedial action
- 3 regulatory concerns in one or more components; significant breach unlikely
- 4 no regulatory concerns
- 5 no regulatory concerns

### **NHS Trust - Governance risk rating**

[This one beggars belief.]

Red - Likely or actual significant breach of terms of authorisation

Amber-red - Material concerns surrounding terms of authorisation

Amber-green - Limited concerns surrounding terms of authorisation

Green - No material concerns

### **COGIATI (Combined gender identity and Trans Sexuality Inventory)**

No, this is not a joke; it's a serious attempt to measure the degree of confusion experienced by males who might wish to change gender and it is based on a scoring system using answers to a very detailed questionnaire. It would be quite easy to adapt it to the other gender.

#### Classification

- |   |                      |
|---|----------------------|
| 1 | Standard male        |
| 2 | Feminine male        |
| 3 | Androgyne            |
| 4 | Probable transsexual |
| 5 | Transsexual          |

## **Leisure**

### **Walking and climbing**

A simple grading system for walks is based on just three grades:

**1 – Easy** – easy stroll on roads and paths, level walk, no hills

**2 – Moderate** – fairly easy walk on roads and paths, some inclines

**3 – Hard** – fairly strenuous, several inclines/hills on roads and paths

This might be OK for some basic walks but would hardly suffice in any National Park.

The more complex system now divides all hikes and climbs into five classes: The exact definition of the classes is somewhat controversial, and updated versions of these classifications have been proposed.

**Class 1:** Walking with a low chance of injury, hiking boots a good idea.

**Class 2:** Simple scrambling, with the possibility of occasional use of the hands. Little potential danger is encountered. Hiking Boots highly recommended.

**Class 3:** Scrambling with increased exposure. Handholds are necessary. A rope should be available for learning climbers, and if you just choose to use one that day, but is usually not required. Falls could easily be fatal.

**Class 4:** Simple climbing, with exposure. A rope is often used. Natural protection can be easily found. Falls may well be fatal.

**Class 5:** Is considered technical roped free (without hanging on the rope, pulling on, or stepping on anchors) climbing; belaying, and other protection hardware is used for safety. Un-roped falls can result in severe injury or death.

[Class 5.0 to 5.12 + is used to define progressively more difficult free moves.]

**Class 6:** Is considered Aid (often broken into A.0 to A.5) climbing. Equipment (Etriers, aiders, or stirrups are often used to stand in, and the equipment is used for hand holds) is used for more than just safety.

Climbs are generally graded in Class 5 and there are many systems in use internationally. A comparison can be found at:

<http://www.ukclimbing.com/logbook/comptable.html>

**Class 5** is generally split into the following descriptions:

Moderate

Difficult

Very difficult  
Hard very difficult  
Severe  
Hard severe  
Very severe  
Hard very severe

And there follows a series of grades listed as E1 to E10 which get ever more difficult.

### **European Hotelstars Union**

This has stood the test of time and works well.

- \* Tourist
- \*\* Standard
- \*\*\* Comfort
- \*\*\*\* First class
- \*\*\*\*\* Luxury

The stars are awarded on the facilities available rather than on the quality of that service. An 'S' after the stars indicates a 'superior' level within the basic grade.

### **Visit England Ratings for Accommodation**

This is an example of a totally subjective system though the structure itself is sound.

- \* Simple, practical, no frills
- \*\* Well presented and well run
- \*\*\* Good level of quality and comfort
- \*\*\*\* Excellent standard throughout
- \*\*\*\*\* Exceptional and with a degree of luxury



## **The AA System for Accommodation**

The Automobile Association run a grading system for other accommodation which can be found at:

[http://www.theaa.com/travel/accommodation\\_restaurants\\_grading.html](http://www.theaa.com/travel/accommodation_restaurants_grading.html)

## Environment

### Flood Warning Codes

This is an example of an informative but badly designed system; it has no code numbers or colours which would aid brevity. Further it has two standby levels – one at the beginning and one at the end.

<b>Level</b>	<b>Meaning</b>	<b>General Advice</b>
<b>On Line Flood Risk Forecast</b>	Be aware.  Monitor the weather situation.	<ul style="list-style-type: none"><li>• Check weather conditions.</li><li>• Check for updated flood forecasts on the Environment Agency website.</li></ul>
<b>Flood Alert</b>	Flooding is possible  Be prepared.	<ul style="list-style-type: none"><li>• Be prepared to act on your flood plan.</li><li>• Prepare a flood kit of essential items.</li><li>• Monitor local water levels and the flood forecast on our website.</li></ul>
<b>Flood Warning</b>	Flooding is expected.  Immediate action required.	<ul style="list-style-type: none"><li>• Move family, pets and valuables to a safe place.</li><li>• Turn off gas, electricity and water supplies if safe to do so.</li><li>• Put flood protection equipment in place.</li></ul>
<b>Severe Flooding</b>	Severe flooding.  Danger to life.	<ul style="list-style-type: none"><li>• Stay in a safe place with a means of escape.</li><li>• Be ready should you need to evacuate.</li><li>• Co-operate with the emergency services.</li><li>• Call 999 if you are in immediate danger.</li></ul>
<b>Warning no longer in force</b>	No further flooding is currently expected in your area.	<ul style="list-style-type: none"><li>• Be careful. Flood water may still be around for several days.</li><li>• If you've been flooded, ring your insurance company as soon as possible.</li></ul>

## Beaufort Wind Scale

Scale	Description	Seastate	Sea description
0	Calm	0	Calm (glassy)
1	Light air	1	Calm (rippled)
2	Light breeze	2	Smooth (wavelets)
3	Gentle breeze	3	Slight
4	Moderate breeze	3-4	Slight - Moderate
5	Fresh breeze	4	Moderate
6	Strong breeze	5	Rough
7	Near gale	5-6	Rough-Very rough
8	Gale	6-7	Very rough - High
9	Strong gale*	7	High
10	Storm	8	Very High
11	Violent storm	8	Very High
12	Hurricane	9	Phenomenal

## Cyclone classifications

If ever there was a need for common sense to prevail – this is it!

Saffir-Simpson Hurricane Scale (At and E Pacific)	5	4	3	2	1	Tropical storm	Tropical depression
RSMC Tokyo Tropical Cyclone Scale	Violent typhoon	Very strong typhoon	Typhoon	Severe tropical storm		Tropical storm	Tropical depression
India Metro'l Dept (N Indian Ocean)	Super cyclonic storm	Very severe cyclonic storm		Severe cyclonic storm		Deep depression	Depression
Metro-France (SW Indian Ocean)	V int tropical cyclone	Intense tropical cyclone	Tropical cyclone	Severe tropical cyclone	Moderate tropical cyclone	Tropical depression	Tropical disturbance
Australia and Fiji	5	4	3	2	1	Tropical Low	

Details including wind speeds can be found at: [http://en.wikipedia.org/wiki/Tropical\\_cyclone\\_scales](http://en.wikipedia.org/wiki/Tropical_cyclone_scales)

## Surface Water Quality

The grading of rivers, lakes and coastal waters is graded into five bands: high, good, moderate, poor and bad. These are defined by the boundaries between the grades. Overall the system is difficult to understand as it sometimes depends on chemical analysis and at other times on the life supported in the body of water. Standards for the Chemical GQA:

GQA Class	DO (%sat) 10%ile	BOD (mg/l) 90%ile	NH3 (mg N/l) 90%ile
A (very good)	80	2.5	0.25
B (good)	70	4	0.6
C (fairly good)	60	6	1.3
D (fair)	50	8	2.5
E (poor)	20	15	9.0
F (bad)	<20	-	-

## **Sport and Gaming**

### **Football Grounds**

The UK Football Association grades grounds according to: The ground itself; spectator facilities; dressing rooms and medical facilities. The complex grading system, which ranges from A (highest standards) to H (lowest), can be found at:

<http://www.thefa.com/my-football/club-leagues/ground-grading>

### **Karate**

Oriental martial arts have grading systems which reflect the colour of the belt worn by participants:

Yellow	8 <sup>th</sup> Kyu (beginner)
Orange	7 <sup>th</sup> Kyu
Green	6 <sup>th</sup> Kyu
Blue	5 <sup>th</sup> Kyu
Red	4 <sup>th</sup> Kyu
Brown	3 <sup>rd</sup> Kyu
Brown	2 <sup>nd</sup> Kyu
Brown	1 <sup>st</sup> Kyu
Black	Shodan Ho
Black	1 <sup>st</sup> Dan
Black	2 <sup>nd</sup> Dan
Black	3 <sup>rd</sup> Dan

This base on the handicap system used in Go (which follows).

### **GO**

Played mainly in Japan, China and Korea, Go is sometimes referred to as 'Chinese Chess'. The original rankings were for 9 Pin Zhi and described the characteristics of play:

1 pin	Being in the spirit
2 pin	Seated in enlightenment
3 pin	Concreteness
4 pin	Understanding changes
5 pin	Applying wisdom
6 pin	Ability
7 pin	Fighting strength
8 pin	Being quite inept
9 pin	Being truly stupid

It arguable that these grading could be applied to life in general, however, being somewhat subjective they were replaced with the 'kyu' and 'dan' system which now prevails and is very similar to the handicap system used in amateur golf:

30-20 kyu	'double digit'	Beginner
19-10 kyu	'double digit'	Casual player
9-1kyu	'single digit'	Intermediate amateur
1-7dan	Amateur Dan	Advanced amateur
1-9 p	Professional Dan	Professional player